A12 Chelmsford to A120 widening scheme

TR010060

Water Environment (Water Framework Directive) Regulations 2017 Without Prejudice Regulation 19 Submission

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0 Executive Summary

0.1.1 National Highways (the Applicant) has applied for a Development Consent Order (DCO) for the A12 Chelmsford to A120 widening scheme (the proposed scheme).

0.1.2 The Water Environment (Water Framework Directive) Regulations 2017 (WFD Regulations) transposed the provisions of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (the 'Water Framework Directive') and by virtue of the European Union (Withdrawal) Act 2018 continue to have effect following the exit of the United Kingdom from the European Union. The WFD Regulations place duties on the Secretary of State and the Environment Agency in respect of the preparation of river basin management plans (RBMPs) that set out environmental objectives for water bodies within river basin districts (RBDs). Additional duties are placed on the Secretary of State and the Environment Agency in respect of the exercise of functions that affect RBMPs.

0.1.3 The proposed scheme is located within the Anglian river basin district (RBD). The long-term framework for the management of issues affecting water quality in the Anglian RBD is provided by the Anglian RBMP. The proposed scheme includes eight main river crossings where the proposed works have the potential to affect water bodies within the Anglian RBD.

0.1.4 To demonstrate to the Examining Authority and the Secretary of State that the proposed scheme would comply with the requirements of the WFD Regulations, the Applicant submitted a compliance assessment, which can be found at Environmental Statement Appendix 14.2, Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159]) (WDFR Compliance Assessment). This concludes that, at a water body scale, the proposed scheme would be compliant with the WFD requirements for all designated water bodies assessed and that, with mitigation provided, it is unlikely that there would be deterioration in classification and/or prevention of water quality elements achieving good classification or Anglian RBMP objectives.

0.1.5 As a result of concerns raised by the Environment Agency relating to the extension of existing structures and the construction of new culverts at main river crossings the Applicant submitted document 9.68 Technical Note on Proposals for Main River Crossings [REP6-095] at Deadline 6. This described each of the proposed main river crossings and explained how their design had been informed by engineering feasibility, environmental impacts and the legal and policy position. It concluded that either the replacement of existing bridges is not required for environmental reasons or that the option of providing a bridge instead of a culvert would not lead to significantly better environmental outcomes. Replacing the proposed main river crossings with open span bridges would be disproportionate in

terms of whole life cost, embodied carbon and adverse construction impacts compared with any environmental gains manifest during the operational phase.

0.1.6 During Issue Specific Hearing 5 Session 2 (Transcript – 27 June 2023 [EV-055]) the Examining Authority noted that the Environment Agency did not agree with the Applicant's WDFR Compliance Assessment. In view of the limited amount of time to reach agreement before the end of the examination and to ensure the Secretary of State (who is the appropriate authority in respect of the DCO application) had sufficient information to inform any decision under Article 4(7) of the WFD, the Examining Authority requested that the Applicant set out the information required to consider the application of the Article 4(7) derogation, without prejudice to the Applicant's case that the proposed scheme is fully compliant with the requirements of the WFD Regulations.

0.1.7 The Final Position Statement from the Environment Agency in respect of the proposed scheme [REP8-024] confirmed to the Examining Authority that it was not prepared to consent to the disapplication of the environmental permitting regime under the DCO and will require the Applicant to submit applications for the required flood risk activities environmental permits (FRAPs). The Environmental Agency stated that it "must not issue a permit for any activity that may cause a deterioration of the status of a water body or will jeopardise the attainment of good status unless the defence under Regulation 19 of the Water Environment (Water Framework Directive) Regulations 2017 (transposed from Article 4(7) of the Water Framework Directive) applies".

0.1.8 As a result, the Applicant has withdrawn its request for the disapplication of regulation 12 of the Environmental Permitting (England and Wales) Regulations 2016 for flood risk activities. In document 9.40 Schedule of Changes to draft DCO [REP8-019] the Applicant confirmed the deletion from draft DCO Article 3 of paragraph (4)(a), which disapplied the environmental permitting regime in relation to flood risk activity and water discharge activity. In document 3.3 Consents, Licences and Agreements Position Statement [REP8-007] the Applicant records that multiple FRAPs will be required and that, following consultation with the Environment Agency, applications will be prepared and submitted.

0.1.9 The Applicant has set out the legislative framework relevant to the duties of the Secretary of State under the WFD Regulations, the determination of the DCO application and the determination of applications for environmental permits for flood risk activities under the Environmental Permitting (England and Wales) Regulations 2016.

0.1.10 As the Secretary of State will no longer determine the request for the disapplication of regulation 12 of the Environmental Permitting (England and Wales) Regulations 2016 for flood risk activities, the Secretary of State will not be exercising a relevant function within the meaning of the WFD Regulations and so the duty under regulation 3 of the WFD Regulations will not apply. The Environment Agency will, however, be subject to that duty

in the determination of the applications for FRAPs following the grant of a DCO.

0.1.11 In determining the DCO Application, the Secretary of State will be subject to the general duty under regulation 33 to have regard to (a) the River Basin Management Plan for that district as approved under regulation 31, and (b) any supplementary plan prepared under regulation 32. In discharging this duty, it will be relevant for the Secretary of State to consider whether the proposed scheme will comply with the Anglian RBMP. If the conclusion is that it will, then there is no need to consider the provisions of regulation 19 of the WFD Regulations. If the Secretary of State concludes that, as a result of the proposed scheme, there will be a failure to achieve good ecological potential (as all of the relevant water bodies are designated as heavily modified water bodies) or to prevent deterioration in the status of a body of surface water, then consideration will need to be given to the conditions set out in regulation 19(3) – (5).

0.1.12 In the event that the Secretary of State concludes that there will be a failure to achieve good groundwater status, good ecological potential or to prevent deterioration in the status of a body of surface water or groundwater then regulation 19(1) of the WFD Regulations will apply. This provides that there will not be a breach of the environmental objectives set out in the Anglian RBMP if:

(a) the failure is the result of new modifications to the physical characteristics of the body of surface water or alterations to the level of the body of groundwater as a result of the proposed scheme; and

(b) all the conditions in paragraphs (3) to (5) are or will be met.

0.1.13 None of the water bodies that would be affected by the proposed scheme have a high status so the provisions of regulation 19(2) of the WFD Regulations are not relevant.

0.1.14 The conditions set out in regulation 19(3) to (5) have been considered by the Applicant and the information provided to enable the Secretary of State to consider their application in the case of the proposed scheme. The conditions and the conclusions reached are summarised as follows:

0.1.15 The regulation 19(3) condition (which is described in PINS Advice Note Eighteen as test (a)) requires that all practicable steps are taken to mitigate the adverse impact on the status of the body of water. Section 3 of this report provides information to support appraisal of the regulation 19(3) condition. It records that the DCO Application was supported by a Water Framework Directive Regulations (WFDR) Compliance Assessment (Environmental Statement Appendix 14.2: Water Environment Regulations (WFD Regulations) [APP-159]) that was undertaken in the manner advised in PINS Advice Note Eighteen, with a preliminary assessment and a detailed assessment. These were consulted on with the Environment Agency and supported by consultation at various stages of the environmental assessment process including Scoping and preparation of the Environmental Statement.

0.1.16 Based on the outcomes of the WFDR Compliance Assessment [APP-159]) and the recommendations for mitigation, the compliance assessment concluded no adverse effects and therefore no deterioration to water body status. Further evaluation and description of the proposed crossings is provided in document 9.68 Technical Note on Proposals for Main River Crossings [REP6-095].

0.1.17 Subsequent to the closing of the Examination, the Applicant undertook further consultation with the Environment Agency on the proposed main river crossings and made a number of proposed changes. In respect of Rivenhall Brook and Domsey Brook and the Applicant identified some revisions that can provide additional benefits for riparian habitat, improved riverine heterogeneity, and are supportive to fish migration. These measures provide improved mitigation compared to the measures put forward during examination. For example, there is now a wider riparian corridor within the culvert on each side of the channel; the revised dimensions for the structure, including increased widths and height are designed to maintain higher light levels, and for improving conditions for fish. In respect of the regulation 19(3) condition the Applicant has taken all practicable steps to provide reasonable mitigation to support compliance with the WFD Regulations.

0.1.18 The Environment Agency provided its response to the proposed changes and identified considerations in respect of the main river crossings in its letter of 20 October 2023 (Appendix A: Environment Agency letter 20 Oct 2023 (ref: AE/2023/128756/02-L01)). In response to the Environment Agency's letter of 20 October the Applicant has proposed further changes to the design of some main river crossing structures and proposed additional measures. The measures proposed are proposed to be included in the Register of Environmental Actions and Commitments (REAC) (First Iteration EMP Appendix A REAC [REP7-016]) once the Environment Agency has provided any further feedback. The measures proposed are set out in Appendix B at Table 3 to this document and are discussed within this document as appropriate.

0.1.19 The regulation 19(4) condition provides that either one or both of two conditions, (a) and (b), must be met. The Applicant has addressed both conditions in this document and concludes that both can be met.

0.1.20 The regulation 19(4)(a) condition (which is described in PINS Advice Note Eighteen as test (c)(1)) is that the reasons for the modifications or alterations, or for the sustainable development activities, are of overriding public interest. Section 4 of this document provides information to demonstrate the overriding public interest in the proposed scheme proceeding. The proposed scheme will provide tangible wider benefits and enhancement to traffic and the economy as a result of better connections, less congestion and greater ease of travel. The public interest is defined by the need for the scheme, the growth generation, the economic case and public safety. Intangible benefits include better river corridor settings adjacent to culverts and increased catchment connectivity local to the river

crossings. It is concluded that there is overriding public interest in the proposed scheme proceeding.

0.1.21 The regulation 19(4)(b) condition (which is described in PINS Advice Note Eighteen as test (c)(2)) is that the benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development. Section 5 of this document records that whilst the Applicant's assessment identifies localised negative changes to water quality elements, with additional mitigation these will not cause deterioration in water body classification and/or prevent the water quality elements from either achieving good classification or achieving their RBMP objectives. The minor effects are outweighed by the positive benefits of the proposed scheme to human health, human safety and sustainable development.

0.1.22 The regulation 19(5) condition (which is described in PINS Advice Note Eighteen as test (d)) is that the beneficial objectives served by the modifications or alterations, or by the sustainable development activities, cannot, for reasons of technical feasibility or disproportionate cost, be achieved by other means which are a significantly better option. Section 6 demonstrates the careful and extensive appraisal of engineering designs that has been undertaken by the Applicant, encompassing alternative designs for the Main River crossings (9.68 Technical Note on Proposals for Main River Crossings [REP6-095]). The consideration of alternative options demonstrates there are no significantly better options than those put forward as part of the proposed scheme. Post-examination, measures agreed with the Environment Agency (Appendix A; letter 20 Oct 2023 (ref: AE/2023/128756/02-L01)) for all crossings will support the environmental objectives for the Anglian RBMP whilst not changing the Applicant's assessment of the likely outcomes to the water bodies, which is that there will be no impediment to achievement of the environmental objectives in the Anglian RBMP (REAC; REP7-015). Post-examination, with reference to the Environment Agency letter (Appendix A: Environment Agency letter dated 20 Oct 2023 (ref: AE/2023/128756/02-L01)), and the other measures, including enhancements, put forward in addition to those in the WFDR compliance assessment will also support the environmental objectives of the Anglian RBMP. More importantly, combined, the measures will not cause deterioration to the objectives of the WFD Regulations 2017 (REAC; REP7-015) or the environmental objectives of the Anglian RBMP.

0.1.23 By adding proposed mitigation, as outlined in the WFDR Compliance Assessment (Impact Assessment, Section 6 [APP-159]), the riverine conditions are likely to be the same or better than currently, in the Applicant’s view. Combined, these will improve the bed, the banks, the riparian corridor, potentially opening up the catchment and benefiting the wider riverine corridor where currently this is deficient in places.

0.1.24 By providing additional measures as a result of post-Examination discussions, the Applicant considers that these measures will ensure both that the proposed scheme will not lead to a failure to achieve good ecological potential or to prevent deterioration in the status of the relevant water bodies and that enhancement is provided relative to the current, baseline position.

0.1.25 In accordance with regulation 14 of the WFD Regulations the Applicant has demonstrated that the proposed scheme (a)does not permanently exclude or compromise the achievement of the environmental objectives set in relation to any other water body within the same river basin district; (b)is not inconsistent with any other retained EU law; and (c) guarantees at least the same level of protection for bodies of water as the EU instruments repealed by Article 22 of the WFD.

0.1.26 In summary, the Applicant considers that the proposed scheme is compliant with the WFD Regulations. If the Secretary of State disagrees, then this document sets out the case for the application of the conditions set out in regulation 19 of the WFD Regulations and demonstrates that all conditions are met. The proposed scheme will not lead to a breach of the environmental objectives set in the Anglian RBMP.

1 Introduction

1.1 Project Background

1.1.1 National Highways ('the Applicant') has applied for a Development Consent Order (DCO) for the A12 Chelmsford to A120 widening scheme (the proposed scheme). The proposed scheme is located within the Anglian River Basin District (RBD). The long-term framework for the management of issues affecting water quality in the Anglian RBD is provided by the Anglian River Basin Management Plan (RBMP), which was updated in December 2022. Changes since the last iteration in 2016 include additional biodiversity objectives, including the need to assess water-dependent sites, and protected species and habitats of conservation concern.

1.1.2 The proposed scheme involves widening the existing A12 to three lanes throughout in each direction, where it is not already three lanes. This would involve on-line widening of the carriageway, with off-line bypasses created between Junctions 22 and 23 (Rivenhall End Bypass) and between Junctions 24 and 25 (Kelvedon to Marks Tey). This would be accompanied by junction improvements (Junctions 19 and 25), construction of new junctions catering for traffic movements both north and southbound (Junctions 21, 22 and 24), and removal of existing junctions (Junctions 20a, 20b and 23).

1.1.3 The proposed scheme includes eight watercourse crossings over Main Rivers. Of these, two crossings on the on-line sections of the proposed scheme will remain unchanged, another four crossings along the on-line sections will be extended to accommodate the widened carriageway, and two new crossings will be required on the off-line sections of the proposed scheme. The EA is concerned with the aspects of the proposed design of five of the eight Main River crossings.

1.1.4 The two new culverts for the new, off-line sections of highway are proposed at:

- Domsey Brook, and
- Rivenhall Brook.

1.1.5 The culverts associated with the six existing A12 river crossings will remain in place. It is proposed to extend the existing crossings of the Domsey Brook and the Roman River and to extend the current bridge crossing of the River Brain. Owing to concerns raised by the Environment Agency during the examination, discussions between the Applicant and the Environment Agency have continued following closure of the examination. These have resulted in some changes. Table 1: Description of proposals and changes summarises all eight proposed river crossings and records the proposed changes that have been incorporated within the engineering sections submitted to the Secretary of State for approval.

Table 1: Description of proposals and changes

Water crossing	Existing Description	Proposed changes at end of Examination	Additional mitigation proposed post-Examination
1. Roman River	Existing culvert – online. Length: 40.05m. Inner width: 4.88m. Inner height: 2.13m. No mammal provision.	Existing culvert extended by 12m. Length: 52.05m. Inner width of extension: 4.88m. Inner height of extension structure: 2.10m. Mammal ledges proposed throughout.	Existing culvert extended by 6m. Length: 46.05m. Inner width of extension: 4.90m. Inner height of extension structure: 2.10m. Mammal ledges proposed throughout. Fish baffles to be installed through the existing culvert subject to approval from Environment Agency's fish pass panel.
2. Rivenhall - existing	Existing bridge structure – online of de-trunked section. Length: 28.7m.	No changes to the existing structure proposed.	No changes to the existing structure proposed.
3. Rivenhall Brook culvert (new)	New culvert – offline. .	Box culvert: Length: 46m. Width: 4.50m. Inner height: 3.10m. Soft bed comprising natural material. Mammal ledges proposed throughout.	Portal Culvert: Length of crossing reduced to 44m. Total width increased to 13m compromising of riparian zone of 3.5m either side of a 5m wide channel. Inner height increased to 3.95m to provide 1.350m clearance above the 1:100-year flood level. This is limited due to the vertical constraints imposed by the highway geometry. Inclusion of a light well in the central reserve. Soft two-stage channel bed comprising natural material. Scour protection to be considered during detailed design.
4. Brain Bridge	Existing bridge structure – online. Length: 28m. Span is 12.8m including a 5m wide low flow channel. Inner height: 3.5m.	Widened deck and abutments 7m to east, and 5m to west to accommodate three running lanes. Span unchanged at 12.8m. 3.5m headroom to average river level. Included the widening of the existing concrete invert slab within	The proposed wingwalls have been reoriented to remove the requirement to extend the existing concrete invert slab within the river channel. [Note: The installation of a rock ramp on the downstream side has been considered but

Water crossing	Existing Description	Proposed changes at end of Examination	Additional mitigation proposed post-Examination
		the channel by 7m to the east and 5m to the west. Flexible stone mattress to be provided on the widened invert slab to or scour protection.	confirmed to be not practicable.] The inclusion of other measures to improve fish passage (including coir rolls rocks etc. placed in the existing low flow channel) remain under consideration by the scheme and will be implemented subject to flood impact assessment and approval from EA's fish pass panel.
5. Domsey Brook Easthorpe	Existing culvert 100m north of proposed alignment- online on de-trunked section.	No change to existing 2 No. 1m diameter culverts proposed.	No change to existing 2 No. 1m diameter culverts proposed.
6. Domsey Brook east	New culvert – offline.	Box culvert: Length: 60m. Width: 2.9m. Inner height: 2.7m. Soft bed comprising natural material. Mammal ledges proposed throughout.	Portal culvert: Length reduced to 44.25m. Total width increased to 13m comprising, 5m wide riparian zones along both banks of the 3m wide channel. Inner height of the structure to be increased to 4.63m to provide 2.1m vertical clearance above the 1:100-year flood level. Soft two-stage channel comprising natural material. Scour protection to be considered during detailed design.
7. Domsey Brook west	Existing Single span cast in-situ concrete arch structure – online. Existing enclosed length: 35.5m. Existing inner width: 7m. Existing height: 6m.	Widen the existing arch structure by 34.6m to 70.1m in total. Proposal maintains 3.7m vertical clearance above the 1:100-year flood level. Flexible stone mattress along the bed of the extension. Mammal Ledges provided.	No change to dimensions of the proposal. Splayed wingwalls and Scour protection in form of riprap revetment at inlet, as required. One mammal ledge included in the revised design. Constrained by the need to maintain a maintenance walkway throughout the existing and proposed structures.
8. River Blackwater **(Ashman's Bridge)**	Existing bridge structure – online. Length: 29m. Span is 39.4. Height: 4.9m.	Asymmetrical widening of 10.1m to the south. New pile caps to be constructed. Span unchanged at 39.4m. Height unchanged at 4.9m.	Natural material along riparian zone under consideration by the scheme including stone mattress to act as scour protection and grasscrete. (or equivalent) for the hardened revetments.

1.2 Purpose of this Document and Context

1.2.1 The Applicant has prepared this document at the request of the Examining Authority (ExA) to set out the case for a WFD "Article 4(7) derogation", in the event that the information provided will assist the Secretary of State, as appropriate authority, in considering the requirements of the WFD Regulations. The provisions of Article 4(7) are transposed in England by regulation 19 of the WFD Regulations. There is some difference between the structure and wording of Article 4(7) of the WFD, which is advised on by Planning Inspectorate Advice Note Eighteen: Water Framework Directive, and regulation 19 of the WFD Regulations. This document follows the approach set out in the WFD Regulations.

1.2.2 This document is provided without prejudice to the Applicant's case that the proposed scheme is compliant with the requirements of the WFD Regulations.

1.2.3 The DCO Application was submitted on 15 August 2022 and accepted for examination by the Planning Inspectorate on 12 September 2022.

1.2.4 A Water Environment Regulations (WFD Regulations) Compliance Assessment (WFDR Compliance Assessment) was submitted with the DCO Application (Environmental Statement Appendix 14.2 Water Environment Regulations (WFD Regulations) Compliance Assessment (August 2022); [APP-159] (WFDR Compliance Assessment)), in accordance with the WFD Regulations, to demonstrate to the Examining Authority and the Secretary of State that the proposed scheme would comply with the requirements of the WFD.

1.2.5 Section 1.1 Purpose of the report in the WFDR Compliance Assessment states that "*This compliance assessment has been prepared for the A12 Chelmsford to A120 Widening Scheme (hereafter referred to as the 'proposed scheme') following the legislation of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (hereafter referred to as the WFD Regulations).*

1.2.6 *Compliance with the provisions of the legislation needs to be taken into account in the planning of all new activities in the water environment. The Environment Agency, as competent authority in England, must exercise its relevant functions so as to secure compliance with the WFD Regulations (including determining any authorisation for an environmental permit or a licence to abstract or impound water)…".*

1.2.7 The WFDR Compliance Assessment [APP-159] assesses whether activities of the proposed scheme would have an impact on the Anglian RBMP objectives for relevant water bodies and concludes that, at a water body scale, the proposed scheme would be compliant for all designated water bodies assessed. Some of the construction and operation activities of the proposed scheme would lead to localised negative changes to water quality elements. However, with the additional mitigation provided, these impacts are unlikely to lead to deterioration in classification and/or prevent

the water quality elements from either achieving good classification or achieving their RBMP objectives.

1.2.8 The WFDR Compliance Assessment [APP-159] concludes that the proposed scheme is compliant with the requirements of the WFD Regulations and, in particular (at Table 6.7 Compliance with the environmental objectives of the WFD Regulations; page 62), that there will be:

- No changes affecting high status sites (there are none present).
- No changes that will cause failure to meet surface water Good Ecological Status or Potential (Note: the relevant test for all main river water bodies over which the proposed scheme is required to cross is that related to the achievement of good ecological potential and not good ecological status as they are all designated as heavily modified water bodies) or result in a deterioration of surface water Ecological Status or Potential.
- No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies.
- No changes that will cause failure to meet good groundwater status or result in a deterioration of groundwater status.

1.2.9 The Examination started on 12 January 2023 and closed on 12 July 2023.

1.2.10 The Environment Agency, which has responsibility for Main Rivers, expressed concerns over the proposed scheme proposals for extending existing structures and creating new culverts on the off-line section of the proposed scheme in several submissions to the Examining Authority in the Development Consent Order (DCO) examination of the proposed scheme.

1.2.11 The Applicant submitted document 9.68 Technical Note on Proposals for Main River Crossings [REP6-095] at deadline 6. This provides a detailed assessment of the relevant legal and policy framework for the determination of the DCO Application, a literature review and a review of the proposed crossings. It reaches conclusions on engineering feasibility, environmental impacts and the legal and policy position. It concludes that: "The Applicant has developed proposals for the Main *River crossings which do not lead to significant adverse effects on ecology and the water environment and therefore accord with the NNNPS. There is therefore no need for alternatives to be assessed and no duty upon the decision maker to consider whether a yet more acceptable alternative can be identified. Nevertheless, the review of the engineering designs contained in this note demonstrates that either the replacement of existing bridges is not required for environmental reasons or that the option of providing a bridge instead of a culvert would not lead to significantly better environmental outcomes given in particular the low lying nature of the terrain, but also the opportunities to provide mammal ledges and natural substrate in the culverts to benefit movement of riparian mammals and fish. Replacing the*

proposed Main River crossings with open span bridges would be disproportionate in terms of whole life cost, embodied carbon, and adverse construction impacts compared with any environmental gains manifest during the operational phase".

1.2.12 The Examining Authority heard from both the Applicant and the Environment Agency at Issue Specific Hearing 5 Session 2 on 27 June 2023 (Transcript – 27 June 2023 [EV-055]). The Examining Authority noted that the Environment Agency did not agree with the Applicant's WDFR Compliance Assessment. The Examination was scheduled to close on 12 July 2023. As there was limited time before then for the Applicant and the Environment Agency to reach agreement on WFD Regulations compliance and enable the Examining Authority to get to the Secretary of State, as the appropriate authority in respect of the DCO application, information regarding a derogation under Article 4(7) of the WFD, the Examining Authority requested that the Applicant set out the information required to consider the application of the Article 4(7) derogation, without prejudice to the Applicant's case that the proposed scheme is fully compliant with the requirements of the WFD Regulations.

1.2.13 The final Statement of Common Ground between the Applicant and the Environment Agency is dated 3 July 2023 [REP7-020] and was submitted at Deadline 7. The record of engagement between the Environment Agency and the Applicant is set out in Section 2 and in Table 2.1 Record of engagement of the Statement of Common Ground [REP7-020].

1.2.14 The Environment Agency responded to document 9.68 Technical Note on Proposals for Main River Crossings [REP6-095] in the Environment Agency's Final Position Statement dated 12 July 2023 [REP8-024]. In summary, the Environment Agency stated that "*We remain of the view that highlighted main river crossings will cause unnecessary and avoidable environmental damage, and the Applicant has failed to demonstrate conclusively otherwise"* and *"We cannot agree with the results of the Applicant's Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159] which we believe undervalue the significant damage and risk of deterioration to the water bodies*".

1.2.15 Subsequent to the closure of the Examination on 12 July 2023 the Applicant has continued to consult with the Environment Agency. It is considered that good progress has been made in seeking to resolve the concerns of the Environment Agency in respect of the proposed main river crossings. Table 1 Description of proposals and changes in this document provides an update on the progress made. For the purposes of the assessment of the regulation 19 conditions this document appraises the proposed scheme as described at the closure of the examination. Consideration is given to the proposals subsequently agreed with the Environment Agency post-Examination (columns 2 and 3 of Table 1) and outlined in the letter 20 Oct 2023 (ref: AE/2023/128756/02-L01) (also see Table 2 of this document; Section 3 and Appendix A).

1.2.16 This document considers the legislative framework relevant to regulation 19 of the WFD Regulations and the application of the provisions of regulation 19 of the WFD Regulations to the proposed scheme. Documents in the Examination Library to which reference is made in this document are listed below:

- Environmental Statement chapters: Chapter 2: The proposed scheme [APP-069].
- Chapter 3: Assessment of Alternatives [APP-070].
- Chapter 4: Consultation [APP-071].
- Chapter 9: Biodiversity [APP-076].
- Chapter 14: Road Drainage and Water Environment [APP-081].
- Environmental Statement Appendices:
  - Appendix 9.1 Aquatic Ecology Report [APP-125].
  - Appendix 14.2 Water Environment Regulations (WFD Regulations) Compliance Assessment (August 2022); [APP-159].
  - Appendix 14.3: Hydromorphology Assessment [APP-160].
- 9.68 Technical note on Proposals for Main River Crossings [REP 6-095].
- Case for the Scheme [APP-249 to APP-252].
- First Iteration EMP Appendix A REAC [REP7-015].
- Combined Modelling and Appraisal Report (ComMA) [APP-261].
- National Highways Closing statement [REP7-078].
- Deadline 8 submission from Environment Agency – Any further information requested by ExA [REP8-024].

2 Legislative Context

2.1 Introduction

2.1.1 The Water Environment (Water Framework Directive) Regulations 2017 (WFD Regulations) transposed the provisions of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (the 'Water Framework Directive') and by virtue of the European Union (Withdrawal) Act 2018 continue to have effect following the exit of the United Kingdom from the European Union.

2.1.2 The legislative framework that is of relevance to the consideration of regulation 19 of the WFD Regulations is set out below. Planning Inspectorate Advice Note Eighteen: The Water Framework Directive (June 2017 version) (PINS Advice Note Eighteen) explains the information that the Inspectorate considers an Applicant must provide with an application under the Planning Act 2008 but predates the withdrawal of the UK from the EU and does not provide an entirely up-to-date legal context. This document sets out the current legal framework, which is principally set out in the WFD Regulations, and describes the effect of the UK's withdrawal from EU membership so far as it affects the interpretation of the WFD Regulations.

2.1.3 PINS Advice Note Eighteen states that "*The 2017 Regulations place a general duty on the Secretary of State (SoS), the Welsh Ministers, the Environment Agency (EA), and Natural Resources Wales (NRW) to exercise their 'relevant functions' so as to secure compliance with the WFD (Regulation 3). Functions under the Planning Act 2008 (as amended) (PA2008) are not 'relevant functions' for this purpose*."

2.1.4 *However, the SoS, the Welsh Ministers, EA, NRW, and each public body have a specific duty to have regard to the relevant River Basin Management Plan (RBMP) (Article 13.1 of the WFD requires EU Member States to produce river basin management plans for each river basin district within their territory), and any supplementary plans made under it, in exercising their functions (regulation 33) ('Having regard to' river basin management plans includes taking account of and considering the environmental objectives and summary of measures contained within the plan when exercising any functions and the effects of those functions on the objectives and measures within the plan); this would include functions under the PA2008*."

2.1.5 Whilst functions of the Planning Act 2008 are not relevant functions for the purposes of regulation 3, it is considered that the Secretary of State would have been undertaking a relevant function for the purposes of regulation 3 in considering the Applicant's request for the disapplication of regulation 12 of the EPR 2016 in relation to the requirement for environmental permits for the carrying on of a flood risk activity or a water discharge activity. However, as explained in Section 2.1 of the Technical Note on proposals

for Main River Crossings [REP6-095], as the Environment Agency had not agreed to the disapplication of regulation 12 of the EPR 2016 by the end of the examination, the Applicant is no longer seeking the disapplication of regulation 12 of the EPR 2016 and will have to apply for environmental permits under the EPR 2016 following the grant of a DCO.

2.1.6 In determining the DCO Application the Secretary of State will be subject to the general duty under regulation 33. In discharging this duty, it will be relevant for the Secretary of State to consider whether the proposed scheme will comply with the Anglian RBMP. If the conclusion is that it will then there is no need to consider the provisions of regulation 19 of the WFD Regulations. If the Secretary of State concludes that, as a result of the proposed scheme, there will be a failure to achieve good ecological potential or to prevent deterioration in the status of a body of surface water then consideration will need to be given to the conditions set out in regulation 19(3) – (5).

2.2 The Water Framework Directive

2.2.1 Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (the 'Water Framework Directive') was adopted and came into force in 2000 and represented a culmination in European Union (EU) water resource protection. It established a legislative framework for the protection of surface waters (including rivers, lakes, transitional waters[1] and groundwater) throughout the EU. As a member state of the EU at that time the UK was required to transpose the WFD by implementing legislation no later than 22 December 2003.

2.2.2 The provisions of the WFD are implemented in England and Wales by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the WFD Regulations) (SI 2017/407). These revoked and replaced the original transposing legislation, The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. Both sets of the WFD Regulations were made under powers in the European Communities Act 1972 (ECA) s2(2).

2.2.3 The UK withdrew from the EU on exit day, 31 January 2020 at 11pm, and there followed a transition period during which the UK-EU relationship was governed by transitional provisions under the European Union (Withdrawal) Act 2018 (EUWA). The transition period ended at 11pm on the 31 December 2020, 'IP completion day' (defined in the European Union (Withdrawal Agreement) Act 2020.

2.2.4 EUWA repealed the European Communities Act 1972 and made other provisions in connection with the UK's withdrawal from the EU. This

[1] Article 2 of 2000/60/EC defines 'Transitional waters' as bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows.

included creating a new body of law, 'retained EU law', as at IP completion day that preserved categories of EU law in the UK, including that which might otherwise have fallen away with the repeal of the ECA.

2.2.5 Under s2 EUWA, retained EU law includes EU derived domestic secondary legislation that gave effect to EU directives as they had effect immediately before the end of the transition period. It specifically includes those made under s2(2) of the ECA.

2.2.6 The WFD Regulations were made under s2(2) ECA and transpose an EU directive. They therefore fall within the definition of retained EU law under EUWA. Under s2(1) EUWA the WFD Regulations, as retained EU law, continue to have effect in domestic law on and after IP completion day in the form they were immediately before IP completion day.

2.2.7 The EUWA contains powers to amend retained EU law in order for it to continue to be effective and consequential amendments were made under the EUWA to the WFD Regulations.

2.2.8 The WFD Regulations were amended by The Floods and Water (Amendment etc) (EU Exit) Regulations 2019 (effective from IP completion day) to enable them to operate effectively following the withdrawal of the United Kingdom from the EU. The amendment introduced provisions as to how references to the WFD in the WFD Regulations should be interpreted following IP completion day. From IP completion day, references to the WFD are to be read in accordance with Schedule 5 of The Floods and Water (Amendment etc) (EU Exit) Regulations 2019.

2.2.9 There are a number of references to the WFD in the WFD Regulations. Under paragraph 2A(4), Schedule 8, EUWA these refer to the versions of the WFD that was in force at the point in time that the WFD Regulations were made (which is 10 April 2017). There have been no changes to the WFD since the WFD Regulations were brought into force and so no changes since IP completion day. Proposals adopted in October 2022 by the Commission to revise the list of pollutants in surface water and groundwater have not as yet been agreed by the European Council and the European Parliament.

2.2.10 Section 5(2) of the EUWA requires UK law passed or made before the end of the transition period to be interpreted, as far as possible, in accordance with EU law (as distinct from retained EU law). Regulations made before IP completion day that implement EU Directives, such as the WFD Regulations, should therefore continue to be interpreted in light of the wording and purpose of the EU Directive, in this case the WFD, so far as relevant and consistent with the modifications made by The Floods and Water (Amendment etc) (EU Exit) Regulations 2019 (which under s5(1) EUWA will take precedence). Schedule 1 para 5(2) EUWA further clarifies that in the interpretation provisions in ss5(2) and (3) EUWA, references to the principle of the supremacy of EU law do not include anything which would bring into domestic law any modification of EU law which is adopted or notified, comes into force or only applies on or after IP completion day. Where guidance on the application and interpretation of the WFD has been

provided by the European Commission during the period of the UK's membership, reference is made to it in this document. The WFD Regulations place a general duty on the Secretary of State (SoS), and the Environment Agency for WFD in England, to exercise their 'relevant functions' so as to secure compliance with the WFD (regulation 3).

2.2.11 The WFD requires EU Member States to consider a single system of water resource management through characterisation, protection and enhancement of water resources considered within the context of a river basin district (RBD). Within England and Wales 11 RBDs have been identified, including three cross-border RBDs, one of which crosses the borders of England and Scotland. The WFD Regulations require 'the appropriate agency' (the Environment Agency in England) to prepare RBMPs for each RBD, for the approval of 'the appropriate authority'.

2.2.12 The RBMPs describe the current state of the water environment for each RBD, the pressures affecting the water environment, the objectives for protecting and improving it, and the programme of measures needed to achieve the statutory environmental objectives of the WFD. RBMPs are subject to a six-year planning cycle and are to be routinely reviewed and updated to ensure compliance with the overall WFD objectives. RBMPs were first published in 2009 and were subsequently updated in 2015, with the latest iteration of the Anglian RBMP updated in December 2022 (see Section 2.5 of this document).

2.2.13 The Secretary of State must consider the implications of the proposed development, firstly in relation to the specific duty to have regard to the RMBP and supplementary plans, and secondly, in more general terms in relation to the UK's ability to comply with the WFD, including (if applicable) the derogation provisions of regulation 19 (Article 4 (7)). The Anglian RMBP is the relevant RBMP for the proposed scheme. No supplementary plans are identified as relevant.

2.3 Water Environment (Water Framework Directive) Regulations 2017 (WFD Regulations)

2.3.1 Regulation 3 of the WFD Regulations places a duty on the Secretary of State (SoS) and the Environment Agency (EA) to exercise their relevant functions so as to secure compliance with the requirements of the WFD and other directives. Functions under the Planning Act 2008 (as amended) (PA 2008) are not "relevant functions" for that purpose. The determination of an authorisation, including an application for an Environmental Permit under the EPR 2016, is a relevant function.

2.3.2 Regulation 33 of the WFD Regulations provides that the SoS and the EA must, in exercising their functions so far as affecting a river basin district, have regard to (a) the river basin management plan for that district as approved under regulation 31, and (b) any supplementary plan prepared under regulation 32.

2.3.3 Regulation 12 of the WFD Regulations sets out the duties placed on the Environment Agency to direct, prepare and submit to the Secretary of State environmental objectives for each river basin district and a programme of measures to be applied in order to achieve those objectives. Regulation 13 of the WFD Regulations sets out the environmental objectives referred to in regulation 12 for surface waters, shellfish water protected areas and groundwater bodies. Regulation 14 specifies that regulations 15 to 19 must be applied in such a way that:

a) does not permanently exclude or compromise the achievement of the environmental objectives set in relation to any other water body within the same river basin district;

b) is not inconsistent with any other retained EU law;

c) guarantees at least the same level of protection for bodies of water as the EU instruments repealed by Article 22 of the WFD.

2.3.4 Regulation 15 concerns the designation of artificial or heavily modified water bodies. All of the water bodies over which crossings are necessary as part of the proposed scheme are designated as heavily modified water bodies. Article 2 (8) of the WFD defines an artificial water body as a 'body of surface water created by human activity'. Article 2 (9) defines a heavily modified water body as a 'body of surface water which as a result of physical alterations by human activity is substantially changed in character, as designated by the Member State in accordance with the provisions of Annex II (of the WFD).' Those water bodies that have been significantly modified for reasons such as flood protection, navigation, etc., where achieving 'good status' would require changes to a water body's hydromorphology that would have significant adverse effects on the social or economic activity, can be designated as an artificial or heavily modified water body. Designation of water bodies as heavily modified means that they should achieve Good Ecological Potential rather than Good Ecological Status.

2.3.5 Regulations 16 to 19 set out the conditions relevant to extended deadlines for environmental objectives (regulation 16), setting less stringent environmental objectives (regulation 17), natural causes of change (regulation 18) and modifications to physical characteristics of water bodies (regulation 19).

2.3.6 Regulations 16 to 18 are not considered to be relevant to the Environment Agency's concerns about the identified main river crossings for the proposed scheme and are not considered further in this document. Regulation 19 transposed WFD Article 4(7) and is therefore the relevant legislative provision that will apply if the Secretary of State considers that one or more of the proposed main river crossings will cause a breach of the environmental objectives set for the relevant water body/ies by the Anglian RBMP. The proposed scheme necessitates modifications to the physical characteristics of water bodies within the Anglian RBD. Regulation 19 sets out the circumstances in which failure to achieve a specified water body

status or to prevent a specified deterioration in the status of a body of water will not be a breach of the environmental objectives set for the water body under regulation 12.

2.3.7 Regulation 19(1) provides that a failure to achieve good groundwater status, good ecological status or (where relevant) good ecological potential, or to prevent deterioration in the status of a body of surface water or groundwater, is not a breach of the environmental objectives set for it under regulation 12 if:

(a) the failure is the result of new modifications to the physical characteristics of the body of surface water or alterations to the level of the body of groundwater,

(b) and (b)all the conditions in paragraphs (3) to (5) are or will be met.

2.3.8 Regulation 19(2) provides that a failure to prevent deterioration from high status to good status of a body of surface water is not a breach of the environmental objectives set for it under regulation 12 if:

(a)the failure is the result of new sustainable development activities, and

(b)all the conditions in paragraphs (3) to (5) are or will be met.

2.3.9 For both regulations 19(1) and 19(2) the conditions set out in paragraphs (3) to (5) are that:

- all practicable steps are taken to mitigate the adverse impact on the status of the body of water – the regulation 19(3) condition:
- one or both of the following is the case:
- (a)the reasons for the modifications or alterations, or for the sustainable development activities, are of overriding public interest – the regulation 19(4)(a) condition;
- (b)the benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development – the regulation 19(4)(b) condition.
- the beneficial objectives served by the modifications or alterations, or by the sustainable development activities, cannot, for reasons of technical feasibility or disproportionate cost, be achieved by other means which are a significantly better option – the regulation 19(5) condition.

2.3.10 In addition, regulation 19(6) states that where paragraph (1) or (2) applies, the reasons for the modifications or alterations, or for the sustainable development activities, must be set out and explained in the river basin management plan, and the environmental objectives must be reviewed every six years.

2.3.11 The Environment Agency is concerned about "*a very real risk of contributing to or causing water body deterioration or the ultimate inability to achieve good potential or status on these water bodies*" [REP7-058 - Deadline 7 Submission - Any further information requested by the ExA]. The concerns therefore relate to regulation 19(1). Regulation 19(2) is not relevant as none of the water bodies have high status.

2.3.12 In applying the provisions of regulation 19 of the WFD Regulations (Article 4(7)) to the proposed scheme regard has also been had to the following policy and guidance documents:

- Planning Inspectorate Advice Note Eighteen: The Water Framework Directive (June 2017).
- European Commission. 2009. *Common Implementation Strategy for the Water Framework Directive (2000/60/EC).* Technical Report – 2009 – 027. Guidance document No. 20. Guidance document on exemptions to the environmental objectives.

WFDR Compliance Assessment

2.3.13 The WFDR Compliance Assessment (Environmental Statement Appendix 14.2: Water Environment Regulations (WFD Regulations) [APP-159]) presents a detailed assessment of the impact of the proposed scheme on the water bodies and construction/operation activities identified in and carried forward from the WFD screening stage. The Applicant's Document 9.68 Technical Note on Proposals for Main River Crossings [REP6-095] builds on that document and at Section 4 provides a detailed description of the proposed works for each watercourse, the mitigation proposals and ecological effects, scope for alternative structures, the environmental implications and a statement on the feasibility of providing the alternative solution.

2.3.14 This document is provided without prejudice to the Applicant's position that there is no need to consider the regulation 19 conditions because the proposed scheme will not give rise to a failure to comply with the WFD Regulations. The information provided in this document is in addition to the WFDR Compliance Assessment [APP-159] and 9.68 Technical Note on Proposals for Main River Crossings [REP6-095] and is intended to inform the application of the conditions set out in regulation 19 (Article 4(7)), should the Secretary of State consider this necessary notwithstanding the Applicant's position that regulation 19 is not engaged. The overall compliance assessment process is set out in Figure 3.1 below. Stage 3 of Figure 1 summarises the process where consideration is given to the need for a regulation 19 (Article 4(7)) derogation and the process to be followed in that case.

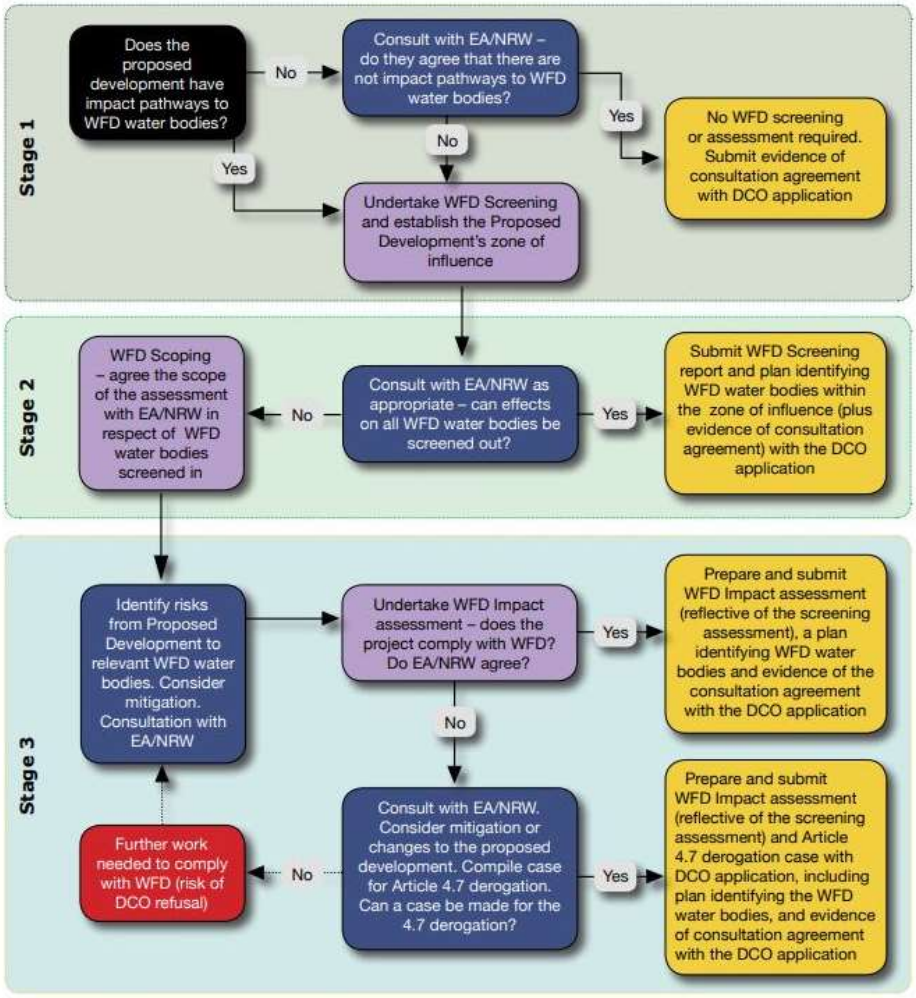

Figure 1: WFD Regulations compliance assessment process

2.3.15 In the event that the environmental objectives set out in the Anglian RBMP cannot be met, a failure to achieve good groundwater status or (where relevant) good ecological potential, or to prevent deterioration in the status of a body of surface water or groundwater, will not constitute a breach of the environmental objectives set for it in specified circumstances where the case for an Article 4(7) derogation can be made. The Applicant has sought throughout the design of the proposed scheme to avoid deterioration of the water environment.

2.4 Regulation 19/Article 4(7) Derogation

2.4.1 Article 4(7) of the WFD provides that in certain circumstances member states of the EU will not be in breach of the WFD notwithstanding a failure to achieve good water body status or the prevention of deterioration in status, or a failure to prevent deterioration from high status to good status provided that certain conditions are met. This is known as the Article 4(7) Derogation.

2.4.2 In England, the derogation mechanism provided for in Article 4(7) is given effect by Regulation 19 in the WFD Regulations, the provisions of which are set out at paragraphs 2.3.6 - 2.3.9 of this document. None of the water bodies that would be affected by the proposed scheme have a high status so the provisions of regulation 19(2) of the WFD Regulations are not relevant and are not considered further in this document.

2.4.3 As provided for in regulation 14 of the WFD Regulations, the development must not permanently exclude or compromise achievement of the WFD objectives in other bodies of water within the same RBD (regulation 14(a)) and must be consistent with the implementation of other retained EU environmental legislation (regulation 14(b)). In applying regulation 19, steps must also be taken to ensure the new provisions guarantee at least the same level of protection as EU instruments repealed by Article 22 of the WFD (see Section 8 of this document).

2.4.4 As advised in PINS Advice Note eighteen, paragraph 4.33, consideration of regulation19 (the Article 4(7) derogation) requires significant and often complex evidence to be made available and assessed. Although advice is to consider the potential requirement for a regulation 19 (Article 4(7)) derogation as early as possible in the pre-application stage of the planning process, in the case of the proposed scheme, the Applicant considered the WFDR Compliance Assessment demonstrated that the proposed scheme met the requirements of the WFD Regulations and so did not consider that information to support consideration of a regulation 19 (Article 4(7)) derogation would be required.

2.4.5 The concerns identified by the Environment Agency are within the scope of regulation 19(1) in that they express concerns that the proposed scheme "*may cause a deterioration of the status of a water body or will jeopardise the attainment of good status*". As there are no water bodies that have high status the provisions of regulation 19(2) do not apply.

2.4.6 If the proposed scheme would lead to failure to achieve good groundwater status, good ecological potential, or prevent deterioration in the status of a body of surface water or ground water then, notwithstanding this, regulation 19(1) of the WFD Regulations provides that there would not be a breach of the environmental objectives set out in the Anglian RBMP if (a) the failure is the result of new modifications to the physical characteristics of the body of surface water and (b) all of the conditions in regulation 19 paragraphs (3) to (5) are met.

2.4.7 The modifications that are proposed to two existing main river crossings and the six new main river crossings that form part of the proposed scheme are modifications to the physical characteristics of the bodies of surface water within which the crossings are located. Therefore, the condition in regulation 19(1)(a) is met.

2.4.8 The conditions set out in regulations 19(3) to (5) are described as tests in PINS Advice Note Eighteen, which also presents a different order in which the relevant factors are considered to that set out in regulation 19. As previously noted, this document applies regulation 19 of the WFD

Regulations but for, ease of information, also provides the corresponding test from PINS Advice Note Eighteen. The conditions that must be satisfied are:

- The regulation 19(3) condition/PINS advice Note Eighteen test (a): All practicable steps are taken to mitigate the adverse impact on the status of the body of water (see Section 3 of this report).
- Either one or both of the following two conditions set out in regulation 19(4) must be met:
- The regulation 19(4)(a) condition (PINS Advice Note Eighteen test (c)(1): the reasons for the modifications or alterations, or for the sustainable development activities, are of overriding public interest (see Section 4) and/or
- The regulation 19(4)(b) condition (PINS Advice Note Eighteen test (c)(2))/regulation 19(4)(b): the benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development (see Section 5).
- Regulation 19(5) condition/PINS Advice Note Eighteen test (d): the beneficial objectives served by the modifications or alterations, or by the sustainable development activities, cannot, for reasons of technical feasibility or disproportionate cost, be achieved by other means which are a significantly better option (see Section 6).
- Regulation 19(6) requires that the reasons for modifications or alterations are specifically set out and explained in the RBMP, whose objectives are required to be reviewed every six years (see Section 7). This is an obligation placed on the Environment Agency in accordance with regulation 12 of the WFD Regulations and would be undertaken at the next periodic review of the Anglian RBMP, which must be undertaken by December 2028.

2.4.9 Where a derogation may be sought in relation to an NSIP, an applicant will need to provide the necessary information for the Secretary of State to exercise their functions having regard to the RBMP for the relevant district as approved under regulation 31 of the WFD Regulations and to any supplementary plan prepared under regulation 32. For the proposed scheme that information is provided in the WFDR Compliance Assessment and in this document, which together will enable the Secretary of State to determine if the DCO Application meets the tests and therefore whether a derogation may be justified under regulation 19 (Article 4(7)).

2.5 Anglian River Basin Management Plan

2.5.1 The Anglian RBMP was updated in December 2022 and so postdates preparation of the Water Environment Regulations (WFD Regulations) Compliance Assessment (August 2022); [APP-159].

2.5.2 The updates to the RBMP[2] in December 2022 have been taken into account in this document. The updates include the following:

- "Since the current plans were published in 2016 the approach to chemical status classification has changed. A more advanced and sophisticated approach to classifying the chemical status of English water bodies is being used. This helps to more accurately reflect the accumulation of some of the more persistent substances which can be underestimated by monitoring water alone.
- The water body status objectives set in the 2015 river basin management plans have been reviewed and, where necessary, updated, based on the latest evidence and understanding. Target dates have been updated to 2022.
- There are additional biodiversity objectives which must be taken into account when considering action which could affect the water environment. These include objectives for:
- (A) water dependent sites of special scientific interest – these protected sites support many, rare and endangered species, habitats and natural features.
- (B) marine conservation zones – these are marine protected areas that protect a range of nationally important, rare or threatened habitats and species along the coastal and offshore areas of the English seas.
- (C) protected species and species of most conservation concern (priority species) such as freshwater pearl mussel, salmon, and white-clawed crayfish.
- (D) important habitats such as lakes and chalk streams.
- (E) rivers, lakes, ponds, wetland, coastal habitats and the sea form natural corridors and stepping stones for wildlife that intersect and connect many landscapes. Action to protect and improve the water environment will help restore connectivity across the landscape, allowing species to migrate and adapt, and increasing the resilience of wetland and water dependent habitats and species to pressures from climate change".

[2] Department for Environment, Food and Rural Affairs, and Environment Agency. 2022. Anglian River Basin District River Basin Management Plan.

2.5.3 The Applicant has considered all technically feasible options. The Applicant has considered fish permeability, and incorporated fish passage measures through best practice. The Applicant is cognisant of maintaining water levels to enable fish passage even during lower water levels; providing resting areas where onward flows may be too fast for fish; reducing the height of existing barriers, providing gravels and a suitable bed for continuous substrate to improve morphological continuity and bed refugia.

2.5.4 In light of further engagement with the Environment Agency post-Examination, designs specifically for Rivenhall Brook and Domsey Brook east have been refined by the Applicant to make the structures wider and higher to improve light levels within the culverts. For Domsey Brook, the riparian zone will be 3.5m wide either side of the 5m wide channel. The structure will be higher to accommodate free board from the water level and to provide sufficient natural light levels.

2.5.5 For Rivenhall Brook, the proposed new box culvert will have a wider and taller portal culvert to better facilitate natural processes within a realigned channel (see row 3, column 3 of Table 1 Description of proposals and changes). A light well will be introduced within the proposed central reserve to increase the levels of natural light within the proposed culvert. Channel width is 5m and bounded on both sides by riparian zones 3.5m each.

2.5.6 Specifically for Brain Bridge, a rock ramp was suggested in discussions with the Environment Agency to improve fish passage. However, as a result of appraising the channel parameters and levels relative to the structure, the channel's situation would make this unviable. In summary, the topographic bed levels indicate that installing a rock ramp at the downstream end of the culvert would not be practicable because the average natural bed level is only marginally lower than the culvert outlet and rising bed level downstream. Preliminary analysis of a range of flows within the river has indicated water depths within the culvert will be below the minimum required depth for the Q99 and Q50 flows. Similarly, due to rising bed levels just downstream of the culvert outlet, the water depth will reduce to 0.2m within a short distance, for the Q99 flow. Whilst it may be possible to raise the water levels within the culvert and the downstream channel as well to provide the necessary flow depths for eel, coarse fish and shad passage, this would require infill channel surveys and hydraulic assessment as the proposed modifications could have an adverse impact on flood risk. The appraisals undertaken concluded that this option would not be practicable and the Applicant has not included this within the proposed changes to the REAC [REP7-015].

2.5.7 On Ashman's Bridge, the Applicant is cognisant that scour may be an issue around the structure so scour protection measures need consideration. For example, different types of scour protection measure would create a change in hydraulic condition within the section of bridge and may trigger localised scour. Similarly, a stone mattress can create a similar effect. In terms of choosing grasscrete and stone mattress, the design life of stone is

less than concrete slab and there may be some maintenance issues over the period.

2.5.8 On Domsey Brook bridge west, the proposal for this crossing is to widen the wingwalls to open up the riverine corridor and support riverine process and the associated aquatic habitat.

2.5.9 On Roman River, to support fish passage through the culvert, baffles have been considered with an update to be provided in the detail design.

2.5.10 Additional measures identified and proposed post closure of the Examination have been set out in Section 3 (Assessment of the Regulation 19(3) condition). Combined, the Applicant considers that these measures form a discernible beneficial contribution to the overall biodiversity of the catchment as they have been incorporated with other already existing measures to benefit fish passage, overall riparian corridor condition, and morphological continuity. They would best be described as providing enhancement over the existing condition, rather than mitigation as the WFDR compliance assessment had already described that, with the inclusion of mitigation identified prior to the Examination, the proposed scheme would be compliant with WFD Regulations.

2.5.11 Within the Anglian RBMP there is a list of mitigation measures or environmental improvements specifically for artificial or heavily modified water bodies (A/HMWBs), which have been identified for implementation as part of the RBMP cycle and previously supplied by the Environment Agency for completing the WFDR Compliance Assessment [APP-159].

2.5.12 The relevant water bodies are the River Chelmer (downstream confluence with the Can), River Brain, Domsey Brook, River Blackwater and Roman River, which are all surface water bodies. The specific mitigation measures identified for these water bodies are presented in Table 6.5 Effect of the proposed scheme on A/HMWB mitigation measures of Appendix 14.2 [APP-159]. This table provides an indication as to whether they are already in place, and whether the proposed scheme can contribute to their implementation; or would obstruct any of them from being delivered.

2.5.13 Only one RBMP measure of the four is noted as not already in place, and would be affected by the proposed scheme, namely the mitigation measure to remove or soften hard banks. Further, it would not prevent implementation of the other three: preserve or restore habitat; in-channel morphological diversity and bank rehabilitation.

3 Assessment of the Regulation 19(3) Condition

All practicable steps are to be taken to mitigate the adverse impacts on the water body concerned.

3.1.1 Regulation 19(3) of the WFD Regulations (WFD Article 4(7)(a) and PINS Advice Note Eighteen test (a)) requires that all practicable steps are taken to mitigate the adverse effect on the status of the body of water. This is understood to mean that, in respect of the design options selected by the Applicant and forming part of the proposed scheme, the Applicant has taken all reasonable steps to mitigate adverse effects on the relevant water bodies. Consideration of the design options chosen are addressed in the regulation 19(5) condition at Section 6 of this document.

3.1.2 Mitigation requirements are based on the need to reduce effects to receptors/water bodies as a result of negative impacts predicted to cause a potential risk to quality elements within a water body as assessed in Section 6 of the WFDR Compliance Assessment [APP-159].

3.1.3 The WFDR Compliance Assessment included the production of a preliminary compliance assessment at scoping and PEIR stages (October 2020 and June 2021), and a detailed assessment at Environmental Statement stage. For all reports, the impact assessment included an assessment against the proposed scheme elements per water body per water quality element and recommendations for mitigation should an impact be considered sufficient to necessitate mitigation to ameliorate those impacts.

3.1.4 A summary table of the WFD designated water bodies and status for all elements is provided in Appendix D of this document.

3.1.5 All submissions of compliance assessment reports were supported by consultation at various stages of the environmental assessment process through scoping to Environmental Statement.

3.1.6 In parallel, and in accordance with the Scoping Opinion, the Environmental Statement and specifically Chapter 9: Biodiversity [APP-076] and Chapter 14: Roads Drainage and Water Environment [APP-081] identified and assessed likely significant effects of the proposed scheme, including construction and operational phases (but not the decommissioning phase) and the mitigation for each.

Mitigation

3.1.7 Information about predicted construction and operation impacts on screened-in WFD Regulations surface water and groundwater bodies are presented in Tables 6.1 to 6.4 in the WFDR Compliance Assessment [APP-159] along with recommended measures to ameliorate predicted impacts and to negate risk of potential deterioration (see Section 6.1; Tables 6.1 to 6.4).

3.1.8 Further description of the proposed works to the watercourse crossings is set out in Section 4 of 9.68 Technical Note on Proposals for Main River

Crossings [REP6-095]. This information has been updated in this document at Table 1 Description of proposals and changes to include the changes to the design of structures and proposed additional measures identified through discussions with the Environment Agency subsequent to the closing of the examination on 12 July 2023 and October 2023. A copy of the letter sent to the Applicant by the Environment Agency (Appendix A: Environment Agency letter 20 Oct 2023 (ref: AE/2023/128756/02-L01) comments on the further proposals made by the Applicant after the closure of the Examination as at 20 October 2023. Subsequent to the receipt of that letter the Applicant has proposed further changes that are included in the descriptions in column 3 of Table 1 Description of proposals and changes. These are secured in revised engineering drawings that will be certified as part of the DCO Application documents and that are described in the proposed changes to the REAC [REP7-015] that are set out in Appendix B, Table 3 titled "Post Examination proposed additions to the REAC". Mitigation recommended for hydromorphology changes to channel stability includes measures such as energy dissipation, incorporation of open channel features (pool-riffle sequences) and realignment of watercourse sections (where appropriate) to alleviate potential risks to in-channel morphological instability (also see 9.68 Technical Note on Proposals for Main River Crossings [REP6-095]). Placement of natural substrate in the culverts would mitigate the effects of the culverts on the movement of fish (see commitments RDWE 39, RDWE 42 and BI32 in the First Iteration EMP Appendix A REAC [REP7-015]).

3.1.9 The Environment Agency considered that the proposed scheme's mitigation measures (see REP2-053: 1.7.1 to 1.7.3) 'appears to give undue weighting to relatively minor pieces of mitigation (e.g., the addition of a short, realigned meandering section downstream of the A12 on the Roman River) compared to the numerous major negative impacts such as the long, dark confined narrow bridges and culverts…'.

3.1.10 Post-Examination, the Applicant has engaged further with the Environment Agency. In addition to the mitigation put forward as part of the WFDR Compliance Assessment (Section 6; APP-159]), the Applicant has proposed additional measures, including some structure design changes, at the request of the Environment Agency. It is considered that the package of measures now proposed will provide enhancement in addition to mitigation. The descriptions of the changes that have been proposed post Examination are summarised in column three of Table 1 Description of proposals and changes of this document. For example, the Applicant has updated the designs to incorporate a wider riparian zone within the culverts (specifically Rivenhall and Domsey Brook east), increased dimensions of structures to increase light levels within, and provided that a natural bed will be added to support a natural substrate. This is in addition to the mitigation put forward as part of the WFDR Compliance Assessment (Section 6; [APP-159]). The Applicant has considered fish permeability, and incorporated mammal and fish passage measures through best practice.

3.1.11 Correspondence on design considerations from October 2023 is included in Table 2 (Appendix A: Environment Agency letter dated 20 Oct 2023 (ref: AE/2023/128756/02-L01)). The correspondence is summarised for each of the main river crossings at Table 2 below:

Table 2: Description of Environment Agency comments

Brain Bridge	We are pleased to see that the revised proposals will now not extend the concrete bed. On 18th September 2023 we discussed … with the installation of a rock ramp on the downstream side of the Brain bridge. This is to enable fish passage over the existing sill, and we will need to see how this will fit in with the updated design. At that meeting we also asked for further measures to improve fish passage to be added to the concrete bed under the bridge, these may include rocks placed under the bridge (preferred), coir roll or woody debris. We understand that this is being considered and we await further consultation on that issue. All measures to be installed will need to be approved by the Environment Agency's fish pass panel. Subject to agreement and approval of the rock ramp and further measures on the concrete bed, we would agree that the updated proposals have the potential to provide an enhancement over the existing situation.
Rivenhall Brook	The latest proposals represent a significant improvement over what was proposed as part of the DCO. We welcomed the discussion and information regarding options for introducing light within the structure. This will be an essential element for facilitating mammal passage. The options to introduce light tubes, glass bricks and reflective surfaces should be explored further, with consideration also given to any potential impacts on bats. Further consideration should also be given to how the river channel and embankments will be formed. In each case these should be as 'natural' as possible. For the channel we would expect to see a two-stage channel with a gravel bed, potentially utilising a firm bed of flints and gravel and avoiding the use of gabion baskets. Similarly, the embankments and channel margins should as far as possible present an opportunity for vegetation to establish.
Ashman's Bridge	Our concern with this crossing was the loss of natural banks and the installation of concrete revetment. We welcome the undertaking to look at how to achieve scour protection of the piers through other means, including rock mattress, and the use of materials such as 'grasscrete' type products for the floodplain facing revetments.
Domsey Brook west	The new meandering downstream section outside the crossing extension will be an improvement. But the existing structure is problematic, particularly for mammal passage. Because of the position of this crossing the doubling of the culvert length through the extension will have the potential to cut off almost the whole of the Domsey Brook from the rest of the Blackwater catchment. Mammals which cannot cross here due to the dark long crossing and or high flows will be forced to use the Feering Road crossing to the South and are therefore likely to become road traffic casualties. Our experience is that fencing will unfortunately not work to prevent this. The current opening is narrow and gives little scope for any riverine processes in the channel. A wider extension will need to take account of this and would be more accommodating. The extension should be designed with a wider opening which tapers to match the existing structure if the existing structure cannot be improved. As the lengthening of the culvert will make mammal passage more problematic (and unlikely), it will be essential to find a way to install good mammal ledges throughout the crossing length. As with the Rivenhall Brook crossing, the

	length means that lighting will also need to be improved and similar methods of introducing natural light should be assessed.
Domsey Brook east	Again, the channel and embankments should be formed in as 'natural' a way as possible, with similar techniques utilised. Additionally, for Domsey Brook the opportunity to create a two-stage channel which also includes some sinuosity should be explored.
Roman River	We welcome the reduction in length for the culvert extension (from 12m to 6m), and the wide opening. The addition and retrofitting of mammal ledges, along with the realigned channel on the south side do provide enhancements. We understand that baffles are to be installed also, and we would like to see more details of these to consider where and how these will be fitted in conjunction with our fisheries team.

3.1.12 The most recent additions to design include light wells, gravel bed, wider portals and widening of the position of the wingwalls to accommodate fish passage and morphological processes.

3.1.13 The Applicant is cognisant of using best practice to maintain water levels to enable fish passage even during lower water levels; providing resting areas where onward flows may be too fast for fish; reducing the height of existing barriers, providing gravels and a suitable bed for continuous substrate, and designing pool/riffle sequences into new alignments to improve morphological continuity and bed refugia.

3.1.14 For Domsey Brook east, the Applicant is proposing to replace the proposed box culvert with a wider and taller portal culvert to better facilitate natural processes within a realigned channel (Table 1 Description of proposals and changes, row 6, column 3). The height of the structure to be provided will be increased to provide sufficient natural light levels. The width of Domsey Brook east structure is increased to 13m. Inside the structure, there will be a channel (5m wide) bounded by a riparian zone on each side (each are 3.5m wide).

3.1.15 For Rivenhall Brook, the Applicant is proposing a box culvert with a wider and taller portal culvert to better facilitate natural processes within a realigned channel. The height of the structure will be increased but is constrained by the highways. To mitigate this a light well will be introduced within the proposed central reserve to increase the levels of natural light within the proposed culvert. A riparian passage will be facilitated through the provision of a natural bank.

3.1.16 Further, a gravel bed has been recommended to improve the bed configuration and naturalness of the bed substrate. This will be looked at as part of the detailed design. The benefits of this addition would be to improve channel heterogeneity, improvement to bed substrate, increasing the sediment distribution of the channel bed, increasing the morphological variability in the bed, and providing additional habitat as a result for sessile and mobile invertebrates on/in the bed. Currently, the bed is quite homogenous with a propensity for silts and very few coarse clasts. This measure would provide benefit to the morphology and indirectly to the water quality and ecology elements under the WFD Regulations 2017.

3.1.17 Measures put forward for Domsey Brook west include a wider opening which tapers to match the existing structure; this includes the provision of widening the wingwalls rather than the culvert opening to match the existing channel width. This maintains natural channel width and additional marginal habitat as a result.

3.1.18 The Applicant maintains that the channel crossings will be designed to be as natural as possible to ameliorate fish passage issues and to support a degree of naturalness to the catchment. The design includes a two-stage channel which also creates some sinuosity and heterogeneity within the channel form, and to the bed as a result. This additional naturalness would support natural processes and encourage heterogeneity in channel form, sediment and flow, which would support the objectives of the WFD Regulations 2017.

3.1.19 The Applicant has reduced the length of the culvert extension for Roman River in conjunction with the wide opening around mammal ledges and retrofitting baffles. Details of these are to be provided in the detailed design. The purpose of the baffles would be to maintain flows within the channel to enable fish passage at all flow levels. Updates will be made to the REAC [REP7-105].

3.1.20 The Applicant is of the view that cumulatively the mitigation measures now proposed would contribute to enhancement whilst ameliorating the concerns of the Environment Agency. They are additional to the mitigation proposed in the WFDR Compliance assessment (Impact Assessment, Section 6; [APP-159]). Overall, the provision of these additional measures (including enhancements) will not make a difference to the conclusions of the Applicant's WFDR Compliance Assessment, which remains that the proposed scheme as submitted for consent was compliant with the WFD Regulations 2017. With the revisions now proposed to the main river crossings there will be additional benefit to the water bodies and the proposed scheme will continue to be in compliance with the Anglian RBMP.

3.2 Summary

3.2.1 Section 3 has provided all the information available to support a without prejudice appraisal of the regulation 19(3) condition.

3.2.2 In summary, the WFDR Compliance Assessment was undertaken in a manner prescribed in the PINS Advice Note eighteen; with a preliminary assessment and a detailed assessment. All were consulted on with the Environment Agency and supported by consultation at various stages of the environmental assessment process through Scoping to Environmental Statement.

3.2.3 Based on the outcomes of the WFDR Compliance Assessment [APP-159] and the recommendations for mitigation, the compliance assessment concluded no adverse effects, and therefore no deterioration to water body status. Further evaluation and description of the proposed crossings is provided in document 9.68 Technical Note on Proposals for Main River Crossings [REP6-095]. With the mitigation proposed, the WFDR

Compliance Assessment [APP-159] and 9.68 Technical Note on Proposals for Main River Crossings [REP6-095] do not identify any deterioration to WFD designated water bodies (either surface water or groundwater). This is further supported by the conclusion of the assessment presented in Chapter 14: The Road Drainage and Water Environment [APP-081], which does not identify the crossings as giving rise to likely significant effects in the water environment. Chapter 9: Biodiversity [APP-076] also supports this assessment, concluding there would be no significant adverse effects to rivers and associated species (including freshwater fish, freshwater macro-invertebrates, and freshwater macrophytes) (Section 9.11, and summarised within Tables 9.29 and 9.31).

3.2.4 The measures outlined in the environmental assessment (pre-application) were deemed to be sufficient to meet the requirements of the WFD Regulations 2017. However, additional, post Examination proposed changes will be secured through revisions to the relevant Engineering drawings to be certified as part of the DCO Application following final comment from the Environment Agency, and further proposed measures will be set out in the REAC (First Iteration EMP Appendix A REAC) [REP7-015], as set out in Table 3 of Appendix B of this document. The combination of these additional measures in addition to the measures outlined in the WFDR Compliance Assessment (Impact Assessment, Section 6 [APP-159]), means that the riverine conditions are likely to be enhanced compared to the existing situation; measures will improve the bed, the banks, the riparian corridor, potentially opening up the catchment; and benefiting the wider riverine corridor where, currently, this is deficient in places.

3.2.5 Based on the measures put forward to the Environment Agency for all structures post-Examination, the Applicant considers that these provide additional benefits for riparian habitat, improved riverine heterogeneity, and supportive to fish migration, whilst complementing riverine processes and continuity. These measures provide improved amelioration of impacts compared to the measures put forward during Examination. For example, additional measures identified for relevant main river crossings include a wider riparian corridor within a culvert on each side of the channel; revised dimensions for structures, including increased widths and height to achieve higher light levels, and improving conditions for fish.

3.2.6 Overall, the Applicant has taken all practicable steps to support compliance with the WFD Regulations and in the package of measures now proposed and secured as part of the proposed scheme the Applicant is now also providing enhancement through improvements over the existing conditions in parts of the heavily modified water bodies over which main river crossings are required in order to deliver the proposed scheme.

3.2.7 These measures provide improved mitigation compared to the measures put forward during Examination, which the Applicant considered to meet the requirements of the WFD Regulations. In addition to those, the additional measures put forward post-Examination are considered to be enhancement

to make the design more robust and the environmental condition better as a result.

4 Assessment of the Regulation 19(4)(a) Condition

The reasons for the modifications or alterations, or for the sustainable development activities, are of overriding public interest.

4.1 Introduction

4.1.1 As set out in regulation 19(4) (WFD Article 4(7)(c) PINS Advice Note Eighteen test (c)(1)) and recognised in PINS Advice Note eighteen at paragraph 4.38, only one of the two conditions set out in regulation 19(4) requires to be met, along with the conditions at regulation 19(3) and (5). As advised in PINS Advice Note eighteen, this document provides information to support both cases. The regulation 19(4)(a) condition is considered in Section 4 of this document and the regulation 19(4)(b) condition is considered in Section 5.

4.1.2 European Commission. 2009. *Common Implementation Strategy for the Water Framework Directive (2000/60/EC).* Technical Report – 2009 – 027. Guidance document No. 20. Guidance document on exemptions to the environmental objectives sets out the basis for distinguishing between public interests and overriding public interests. The guidance concludes that it is reasonable to consider that the reasons of overriding public interest refer to situations where plans or projects envisaged prove indispensable within the framework of:

- actions or policies aiming to protect fundamental value for citizens' lives (health, safety, environment);
- fundamental policies for the state and the society; and
- carrying out activities of an economic or social nature, fulfilling specific obligations of public services.

4.1.3 The compelling need for the proposed scheme demonstrates that there is an overriding public interest in the scheme proceeding as set out below. This includes considerations relating to need as evidenced in national and local policies, the economic case, severance and safety.

4.2 The Need for the Scheme

4.2.1 The A12 is an important economic link in Essex and across the east of England. It provides the main south-west/north-east route through Essex and Suffolk, connecting Ipswich to London and to the M25.

4.2.2 In the east of England, the A12 is among the most heavily trafficked roads. The section between Chelmsford and Colchester (junction 19 Boreham Interchange to Junction 25 Marks Tey Interchange) carries high volumes of traffic, with up to 90,000 vehicles per day. Heavy goods vehicles are between 9% and 12% of the traffic on this section due to it connecting with important freight destinations especially Felixstowe and other Haven Ports.

These ports are important links between the UK and the global supply chain, and the A12 therefore plays a significant role at a national level as a link to an international gateway. The A12 also provides a strategic connection via the A120 to Stansted Airport.

4.2.3 The A12 has previously been improved in stages and is now a dual carriageway for its entire length between the M25 and A14. However, this has resulted in a road constructed to varying standards with sections that are dual two- and three-lane, and locations where at-grade accesses to residential, commercial and agricultural properties have been retained.

4.2.4 The proposed scheme has been prepared to address the traffic related issues arising between Junctions 19 and 25 and the direct connections, and is proposed to improve highway performance and safety, and improve non-vehicular routes along the A12 for walkers, cyclists and horse riders.

4.2.5 The proposed scheme has been promoted for many years and is identified as a national priority in the National Infrastructure Delivery Plan, East of England Route Strategy, various Highways England plans and the DfT's RIS1 and RIS2. The proposed scheme meets a national need to increase the capacity of the SRN, improve the safe operation of the network for all users, improve the freight connections to the three Haven ports, and would be fundamental to provide the necessary highway capacity to support the traffic growth generated by the wider housing and employment development plans for Essex.

4.2.6 There is a clear need to take action to address the increasingly congested A12 between Junctions 19 and 25. Intervention is required to meet the objectives which include: alleviating congestion, reducing journey times, improving safety, creating additional capacity which would remove a barrier to planned economic growth and improve the SRN.

4.2.7 The key drivers underpinning the need for the proposed scheme are as follows:

- Relieve congestion: the A12 is an important commuter route between Chelmsford and Colchester. The resulting congestion leads to delays and means that, during the morning commute, a driver's average speed is particularly slow in both directions for a dual carriageway A-road of its kind. If no intervention is made, this situation is expected to continue to worsen and the route will exceed capacity by the design year (2042) and beyond, resulting in continued and worsened unreliable journey times and delay. The proposed scheme will save motorists as much as 1.5 hours in a working week if they travel daily between Junctions 19 and 25. The proposed scheme will take long-distance traffic off the local roads and put it back on to the A12 where it belongs, so that local roads aren't used as rat runs, affecting local villages and their communities. It will ensure that the road can cope with the predicted increase in traffic from more jobs and homes in the area, and it will make improvements for walkers, cyclists, horse riders and public transport users, to give them better connections and safer, more enjoyable journeys.

- Critical need: The National Policy Statement for National Networks (NNNPS) identifies a "critical need" to improve the national networks to address road congestion and crowding on the railways to provide safe, expeditious and resilient networks that better support social and economic activity; and to provide a transport network that is capable of stimulating and supporting economic growth. All the sections of the A12 between Junctions 19 to 25 are in the worst performing 10% of the SRN in the east of England. The proposed scheme is one of a group of highway schemes that would improve the SRN across Essex between the M11/M25, Stansted Airport, Chelmsford, Braintree, Colchester, Ipswich and the Haven ports at Harwich, Felixstowe and Ipswich.

- Improved safety for road users (including road worker safety during maintenance operation) especially at the junctions and slip roads through better design while also removing the current direct private accesses onto the A12. Due to variability in the standard of the corridor and limited suitable diversion routes, the A12 is vulnerable to collisions and incidents, which can cause significant disruption over a wide area. The collision history for the proposed scheme shows that the collision rate per mile travelled on this section of A12 has increased and is above the average for this type of road, whereas before it was below the average. There are concentrations of collisions at junctions, as is typically seen on most roads, but the reason for the increase in the frequency of collisions in the more recent period is not clear at present. There are no particular differences in terms of which types of vehicles are involved or road user groups, such as pedestrians, cyclists, motorcyclists and so on.

- Remove a barrier to planned economic growth: the proposed scheme supports the growth identified in Local Plans by reducing congestion related delay, improving journey time reliability and increasing the A12's overall transport capacity. The proposed scheme lies wholly within the upper tier authority and local highway authority of Essex County Council and passes through the administrative areas of Braintree District Council, Chelmsford City Council, Colchester Borough Council and Maldon District Council (the 'host authorities'), although there is a need to be mindful of the planned growth in the administrative areas of other local authorities between the M25 (A12 Junction 11) and the A12/A120 (A12 Junction 29). Substantial housing and employment growth is planned to be delivered in the four host authorities identifying significant growth in their current and emerging Local Plan periods. The population growth in Essex is expected to remain high with a projected increase of 13% between 2018 and 2043 (ONS, 2020). Employment growth is expected, particularly due to the ongoing major developments at Felixstowe and Harwich, business investment and the year-on-year growth of Stansted Airport. The Essex Economic Commission (2018) cited several challenges to achieving growth, which included the growing

pressure on transport infrastructure. The proposed scheme will have a marked impact on the economy, connectivity and accessibility, and is needed to unlock both planned and long-term future growth.

- Improve Connectivity: The proposed scheme would address historic severance across the proposed scheme area, by creating new active travel connections between north and south of the A12. It would also improve network resilience by reducing congestion, delays and preventing accidents which would result in closure of the road and divert traffic to local roads.

National Planning Policy

4.2.8 National planning policy, local policy and the economic case underpin the overriding public interest in and need for the scheme (see Case for the Scheme [APP-249 to APP-252] submitted as part of the DCO application).

4.2.9 The National Networks National Policy Statement (NNNPS) (DfT, 2014)[3] sets out the need for development of the national networks, the Government's policy and strategic vision and objectives. Paragraph 2.2 of the NNNPS states: 'There is a critical need to improve the national networks to address road congestion and crowding on railways to provide safe, expeditious and resilient networks that better support social and economic activity; and to provide a transport network that is capable of stimulating and supporting economic growth.'

4.2.10 A review of national planning policies is included within the Case for the Scheme (Section 7 [APP-249], the Policy Accordance Tables on Appendix A to F [APP-250 to APP-252]) where the proposed scheme is assessed against national and local policies, and the Technical Note for culverts (9.68 Technical Note on Proposals for Main River Crossings [REP6-095]).

4.2.11 Chapter 14: Road Drainage and the Water Environment Table 14.5 and paragraphs 14.4.6 to 14.4.9 [APP-081] outlines the relevant policy in relation to road drainage and the water environment.

4.2.12 The Case for Scheme [APP-249] on Table 8.1 (page 70- extract overleaf) shows how the proposed scheme addresses the NNNPS vision and Strategic Objectives. The proposed scheme would deliver benefits in terms of resolving local transport, economic and environmental concerns and the Government's recognised national commitment to improving the SRN.

Local Policies

4.2.13 A full commentary on local policy is presented in Section 7.4 of Case for the Scheme [APP-249 to APP-252] with a further summary in Chapter 14: Road Drainage and the Water Environment Table 14.6 [APP-081].

[3] Department for Transport. (2014). National Policy Statement for National Networks. Presented to Parliament pursuant to Section 9(8) and Section 5(4) of the Planning Act 2008.

4.2.14 The core of the literature for local policy has been produced by Chelmsford, Braintree, Colchester, Maldon and Essex. Chelmsford and Braintree in their adopted local plan have a strategic policy for Infrastructure (policy S9 for both authorities) where the A12 is listed as a project to support their local plan delivery. Colchester city's adopted local plan, Section 2, has Policy WC5 - Transport where it mentions the A12 (Junction 25) and the need to reduce congestion. The Essex Local Transport Plan[4] has several mentions on how the A12 is crucial for Essex development as seen in Policy 3 and Appendix D – The Essex Area Priorities where it mentions the Journey Time Reliability in Chelmsford and Enhancements required on the A12 corridor.

Table 8.1 Proposed scheme compliance with NNNPS vision and strategic objectives

NNNPS vision and strategic objectives	The proposed scheme's conformity with the NNNPS
The Government will deliver national networks that meet the country's long-term needs; supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system	The proposed scheme would reduce journey times, congestion and delays for the local and longer distance road users, as explained in Sections 5 and 6 of this report. The proposed scheme would be part of the national network and would significantly improve the link between junction 19 and junction 25 and improve the connecting junctions to nearby smaller towns to provide easier access to the A12.
Networks with the capacity, connectivity and resilience to support national and local economic activity and facilitate growth and create jobs	The overall network improvement would help to achieve the planned delivery of housing and employment across the administrative areas the proposed scheme passes through (Chelmsford, Braintree, Maldon and Colchester). The adopted and emerging plans total a planned provision of 52,663 homes across all councils and 18,675 jobs (in Chelmsford and Maldon) and between 20ha and 40ha of employment space in Braintree and Colchester.
Networks which support and improve journey quality, reliability and safety	With the proposed scheme in place, there is predicted to be an overall decrease in the number of fatal and serious casualties. With a reduction in journey times, journey quality would be improved. The proposed scheme would also improve the quality and capacity of existing WCH infrastructure, seek opportunities for new routes and address historic severance. This includes controlled and uncontrolled crossings at junctions and adjacent local roads.
Networks which support the delivery of environmental goals and the move to a low carbon economy	The proposed scheme seeks to maximise biodiversity delivery and the increase in carbon emissions resulting from the proposed scheme are not so significant that it would have a material impact on the ability of Government to meet its carbon reduction targets as set out in section 8.8 Biodiversity and 8.14 Climate of this report. The management of materials and waste will be done in a way that promotes to the use of recycled aggregates to minimise waste (see Section 8.11).
Networks which join up our communities and link effectively to each other	The proposed scheme would provide greater connectivity to and integration with the SRN and Local Road Network through improved junctions, which would increase capacity and improve accessibility between communities.

4.2.15 The main focus for all policies and the need for the scheme is essential to support the needs of the local community; on the basis of housing need; the requirement for better infrastructure on safety grounds; to reduce

[4] https://www.essexhighways.org/uploads/downloads/essex_ltp.pdf

congestion, jobs and community improvements, and to enable major economic growth, in particular:

- The A12 is an arterial route to London, local airports, ports (freight) and other key regional links which is a focus for economic growth through trade - particularly freight movements in the Haven Gateway, minimising the impacts of traffic on the rural area network.
- The Case for the Scheme [APP-249 to APP-252] describes how the throughput of containers through Felixstowe port is predicted to increase by 40% between 2017 and 2036. The A12 corridor is identified by Essex Highways (Local Transport Plan) and the government (RIS2) as the main road corridor to convey the HVG traffic increase coming from the Ports. The section between Chelmsford and Colchester (Junction 19 to Junction 25) carries high volumes of traffic, with up to 90,000 vehicles every day. Heavy Goods Vehicles are between 9% and 12% of the traffic on this section due to its important freight connection, especially to Felixstowe and Haven ports which are vital to the UK's economy.
- The A12 provides an important link via the A120 to Stansted Airport, facilitating the movement of passengers and employees from Essex and Suffolk, and linking local firms with global markets.

The Economic Case

4.2.16 The planning balance and conclusions in Section 9 of the Case for the Scheme [APP-249] explain why it is essential for the proposed scheme to proceed; outlining there is a compelling and crucial need for the proposed scheme, as supported by national policy through the NNNPS and Road Investment Strategy 2 (RIS2) (DfT, 2020)[5] (Section 9 of APP-249 to APP-252; paragraph 9.1.1.]).

4.2.17 The economic case is outlined in the Case for the Scheme chapter 6 [APP-249]. Section 6.6 provides the conclusions which shows the proposed scheme would deliver medium value for money, with a Benefit Cost Ratio (BCR) of 1.7. The Combined Modelling and Appraisal Report (ComMA) [APP-261) and Appendix D: Economic Appraisal Package Report [APP-265], includes details on the numerical benefit of factors. A summary is presented below:

- The overall proposed scheme cost calculated for use in economic appraisal was calculated as £452.1 million (2010 prices). This comprises construction-related investment costs (including construction, land and property, preparation and administration, and

[5] Department for Transport and Highways England. (2020) Road Investment Strategy 2 (RIS2): 2020 to 2025.

supervision) of around £463.1 million and a reduction in maintenance costs of -£11.0 million.

- Economic efficiency provides a benefit of £434.8 million.
- Increased tax revenue: £29.1m.
- Improved safety: £13.1m; improved journey time reliability provides a benefit of £180.7m; and productivity improvements in the wider economy generate £253.9m.
- Present Value of Benefits: £775.4 million.
- Disbenefits include increased greenhouse gases with a cost of £113.4m; Local Air Quality with an impact of £16.3m and a disbenefit of £6.6m.

Table 5-20 Adjusted BCR and overall PVBs in 2010 prices, discounted to 2010 (£000s)

	Benefit (£000's)
Initial Present Value of Benefits (PVB)	**£340,773**
Present Value of Costs (PVC)	£452,122
Initial Benefit to Cost Ratio (BCR)	**0.8**
Wider Impacts (WI)	£253,917
Journey Time Reliability Benefits (JTR)	£180,747
Adjusted Present Value of Benefits (PVB)	**£775,438**
Adjusted Benefit to Cost Ratio (BCR) including JTR and WI	**1.7**

- The adjusted BCR adds the benefits and disbenefits with wider impacts and Journey Time reliability benefits to reach the adjusted BCR of 1.7 as shown on Table 5-20 (page 37) of Appendix D of the ComMA report [APP-265].

4.2.18 The proposed scheme has an adjusted Benefit-Cost Ratio (BCR) of 1.7 (which means that for every £1 spent on the proposed scheme there will be a £1.70 return to society in benefits) when compared to a Present Value of Costs of £452.1 million.

4.2.19 The NNNPS explains that improvements to the road network are critical to supporting economic growth and to enable the delivery of housing and employment opportunities. This is emphasised in paragraph 2.22 of the NNNPS:

Without improving the road network, including its performance, it will be difficult to support further economic development, employment and housing and this will impede economic growth and reduce people's quality of life. The Government has therefore concluded that at a strategic level there is a compelling need for development of the national road network'.

4.2.20 The NNNPS and local policies demonstrate a compelling case to support the need for the proposed scheme on grounds of safety, severance, connectivity, resilience, delivery of environmental goals and country long term needs for a competitive economy and improving quality of life as part of wider transport system. The need for the scheme has been established with the national and local policies which supported by a positive economic case (BCR 1.7) supports the compelling case of overriding public interest.

4.3 Overriding Public Interest

4.3.1 The proposed scheme will provide tangible wider benefits and enhancement to traffic and the economy as a result of better connections, less congestion, greater ease of travel.

4.3.2 The public interest is defined by the need for the scheme (see Section 5.2), the growth generation, the economic case (paragraphs 5.2.9 and 5.2.10) and the public safety (see Section 5.2).

4.3.3 Intangible benefits include better river corridor setting adjacent to culverts, and increased catchment connectivity local to the river crossings.

4.3.4 The overriding nature of the public interest served by the proposed scheme alignment is evidenced by the suite of legislation and policy documentation summarised above related to economic growth (Sections 4.2 and 4.3).

4.4 Summary

4.4.1 This section has set out the case for the overriding public interest in the delivery of the proposed scheme, supported by the NNNPS, local planning policies that identify the importance of the A12 corridor to sustainable growth in Essex, and the need for the proposed scheme.

5 Assessment of the Regulation 19(4)(b) Condition

The benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development.

5.1 Introduction

5.1.1 The second of the alternate regulation 19(4) (Article 4(7)(c) and PINS Advice Note Eighteen test (c)(2)) conditions is that the benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development.

5.1.2 The Applicant considers that the assessment presented in Section 4 demonstrates that the proposed scheme satisfies the first of the test (c) tests, which is sufficient to discharge the requirements of regulation 19(4). However, as either or both of the tests can be met this document provides information to support both cases in accordance with PINS Advice note eighteen.

5.1.3 This section presents the evidence for the justification of the proposed scheme with regards to test (c)(2), human health, human safety or sustainable development and whether this outweighs the benefits of achieving the objectives of WFD Regulations outlined in Section 2 of this document.

5.1.4 As the modifications or alterations are proposed only because they are necessary to facilitate the proposed scheme, the benefits of the modifications or alterations are those of the proposed scheme.

5.1.5 The assessment of the impacts of the proposed scheme on human health are presented in Chapter 13: Population and human health, of the Environmental Statement [APP-080]. The assessment considered communities within the study area, as well as potential vulnerable groups (see Table 13.13 of the chapter).

5.2 Benefits to Human Health and Human Safety

5.2.1 Based on current population and employment growth forecasts, traffic levels and congestion are expected to worsen, which would increase existing safety problems. Without further interventions, the issues of future predicted congestion, road safety and impact on the economy as described above are anticipated to worsen in the future, exacerbated by forecast traffic growth both locally and strategically.

5.2.2 The assessment of the impacts of the proposed scheme on human health are presented in Chapter 13: Population and human health, of the Environmental Statement [APP-080]. The assessment considered communities within the study area, as well as potential vulnerable groups (see Table 13.13 of the chapter).

5.2.3 During operation there are a greater number of dwellings that would experience a significant positive effect from a reduction in noise levels than those predicted to experience significant adverse effects. There are predicted to be 806 dwellings and 18 other sensitive receptors that would experience a significant beneficial effect from a reduction in noise levels as a result of the operation of the proposed scheme. This has been achieved through route alignment and the adoption of mitigation measures including noise barriers and low noise surfacing. Some of the predicted reductions in noise are over 10dB(A). This should contribute to improvements to health and quality of life in relation to noise.

5.2.4 An objective of the proposed scheme is to improve accessibility for WCH and public transport users. The design of the proposed scheme includes new, improved and replacement provision for WCH, which would help support and provide continued opportunities for active travel and access to outdoor recreation. The proposed scheme would provide several improvements over the baseline walking and cycling infrastructure, as assessed under 'Walkers, cyclists and horse riders' in Section 13.10 of Chapter 13: Population and human health, of the Environmental Statement [APP-080]. Separate links for these groups would be provided to help cyclists to bypass junctions and slip roads, including National Cycle Route 16 that crosses the A12 at Junction 22. The design of the proposed scheme would also address some issues of past severance of PRoWs. The WCH provision that makes up the proposed scheme is presented in Table 8.3 of the Case for the Scheme [APP-249 to APP-252]) and shows a net gain in provision (comprising new provision and upgraded from footway).

5.2.5 Overall, new and replacement walking and cycling routes provided by the proposed scheme would offer an improved standard of accessibility and safety that would bring advantages for people who do not, or cannot, use a car and help reduce inequalities relating to accessibility. This would result in a positive effect on human health of improved physical and mental health (various outcomes associated with regular exercise).

5.2.6 The assessment of impacts on population and human health in the operational phase in Chapter 13: Population and human health, of the Environmental Statement [APP-080] identified positive health effects: improved physical and mental health by access to facilities, services, employment, education and skills; reduced differences in health outcomes associated with accessibility (various physical and mental health outcomes) and improved social interaction and associated impacts on wellbeing in Hatfield Peverel and Rivenhall End.

5.2.7 The proposed scheme would apply a consistent standard of design along the route with a three-lane all-purpose road throughout and the removal of

direct accesses onto the road, reducing risks to road users, road workers and residents. The number of accidents and their associated costs was estimated for the situations with and without the proposed scheme and shows the monetised benefit from improved safety is £13.1 million (Section 6.3 of the Case for the Scheme [APP-249 to APP-252]). The health impact of this is assessed as positive, owing to the reduction in serious and fatal collisions, but not significant, owing to the overall increase in slight casualties from collisions (see paragraph 13.18.66 of Chapter 13: Population and human health, of the Environmental Statement [APP-080]).

5.3 Benefits of Sustainable Development

5.3.1 Sustainable development is used to describe policies and projects that provide benefits today without affecting/sacrificing environmental, social and health factors for future generations.

5.3.2 Both the NNNPS (DfT, 2014) and NPPF paragraph 8[6] (Ministry of Housing, Communities and Local Government, 2021) seek to encourage development proposals to achieve a high level of sustainable development.

5.3.3 As outlined in Chapter 13: Population and human health [APP-080], the proposed scheme would fulfil the economic objective of sustainable development by providing improved and reliable road infrastructure required to build a strong, responsive and competitive economy.

5.3.4 Economic growth would be supported through reducing congestion and improving journey times and reliability along the route to connecting towns and cities. This would assist the movement and transportation of goods and workforce.

5.3.5 For social objectives highlighted in the NNNPS and NPPF, the proposed scheme would increase the capacity of the existing A12 and reduce congestion whilst improving connectivity between local communities.

5.3.6 The proposed scheme has been designed to maintain or, where applicable, replace and enhance existing walking/-cycling/horse riding routes, as well as access to property and farmland. The consideration of these contributes towards the health, social and cultural wellbeing of communities in accordance with the social objective of sustainable development.

5.3.7 To accord with the environmental sustainability objectives, measures are proposed to be incorporated to avoid and mitigate adverse environmental effects, including the following (refer also to Chapter 13: Population and human health [APP-080] for further detail):

- Careful integration of the proposed scheme into the surrounding landscape.

[6] Ministry of Housing Communities and Local Government. (20121). National Planning Policy Framework.

- Seeking to maximise biodiversity delivery and avoid loss of ancient woodland and veteran trees where practicable.
- Minimise adverse noise and air quality impacts.
- Utilise sustainable drainage systems, including measures to adapt to changing climate and flood events.
- Avoid adverse effects on cultural heritage as far as possible and, where substantial harm is unavoidable, ensure it is only necessary in achieving substantial public benefit that outweighs the harm.
- Sustainability objectives of extensions and proposed new culverts would involve the consideration of carbon costs, utilisation of low carbon materials, decreasing the footprint sufficiently to provide less interruption of natural features. If bridges were designed instead of culverts for example, the amount of material is likely to be more than that for extensions.
- Incorporating mitigation as part of the proposed scheme, including through the WFDR Compliance Assessment (Appendix 14.2, [APP-159]), to secure least likely significant effects and no considered deterioration to water bodies covered under the WFD Regulations.

5.4 Benefits of the Environmental Objectives

5.4.1 The WFDR Compliance Assessment (Appendix 14.2, Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159]) concludes that the proposed scheme would not compromise the achievement of the environmental objectives in any other water body within or beyond the Anglian RBD.

5.4.2 There would be no negative effect on benefits to the environment and society attributable to the proposed scheme in respect of the status of any of the water bodies over which the proposed main river crossings will pass. As there are no 'water costs' or negative benefits of the proposed scheme to be weighed against the alterations to human health, human safety and sustainable development, any such benefits of the proposed scheme will weigh positively in the balance.

5.4.3 By adding proposed mitigation, as outlined in the WFDR Compliance Assessment (Impact Assessment, Section 6 [APP-159]), and additional measures as requested by the Environment Agency and agreed by the Applicant following the closing of the Examination, the riverine conditions are likely to be the same or better than currently, in the Applicant's view. Combined, these will improve the bed, the banks, the riparian corridor, potentially opening up the catchment and benefiting the wider riverine corridor where currently this is deficient in places. By providing additional measures as a result of post-Examination discussions, these measures will provide enhancements benefitting environment and society that will also weigh positively in the balance.

5.5 Summary

5.5.1 The second of the test (c) tests, set out in regulation 19(4) (Article 4(7)(c)) is that the benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development.

5.5.2 The Applicant considers that the assessment presented in Section 5 demonstrates that the proposed scheme satisfies the first of the test (c) tests, which is sufficient to discharge the requirements of regulation 19(4). However, as either or both of the tests can be met this document provides information to support both cases in accordance with PINS Advice note eighteen.

5.5.3 This test presents the evidence for the justification of the proposed scheme with regards to test (c)2, human health, human safety or sustainable development and whether this outweighs the benefits of achieving the objectives of WFD Regulations outlined in Section 2 of this document.

5.5.4 On a scheme level, the outcomes of the regulation 19(4)(b) condition support the view that there are benefits as the proposed scheme will deliver important benefits to local residents even though others will be adversely affected, who will see both economic and public health benefits and disbenefits associated with a strategic road asset operating within its capacity (traffic drawn onto the road network freeing local roads, improved air quality, increased economic growth) and wider regional benefits (reduction in commuting times, better links between regionally important population /industrial hubs).

5.5.5 With reference to Sections 2 and 3 of this document, the crossings (both online and offline) do not impede the objectives of the WFD Regulations. The Environment Agency state that the culverts will disconnect catchment corridors (Section 1.2) and impede fish passage and permeability. The Applicant does not see this is the case. As the overall effects to WFD Regulations 2017 will be to maintain status quo, and the benefits of the proposed scheme will be likely positive to human health, human safety and sustainable development, the benefits of the proposed scheme are concluded to outweigh WFD considerations.

5.5.6 Further, the additional measures put forward by the Applicant post-Examination add additional enhancements to make the Scheme more robust in terms of holistic environmental support and functioning and add weight to the overall benefits to the proposed scheme.

5.5.7 Accordingly, there is an imperative need to improve transport links to grow the economy and support local communities. Coupled with this is a proven benefit to human health, sustainability, and safety (Section 5.2 of this document). In the Applicant's assessment, the localised negative changes to water quality elements, with additional mitigation, will not cause

deterioration in water body classification and/or prevent the water quality elements from either achieving good classification or achieving their RBMP objectives. The proposed scheme is considered to be compliant with the WFD Regulations and provides a vehicle for enhancement through the additional measures proposed post-Examination. The objectives of any proposed scheme are to not cause deterioration under the WFD Regulations. The Applicant concludes that the proposed scheme does not cause deterioration.

6 Assessment of the Regulation 19(5) Condition

The beneficial objectives served by the modifications or alterations, or by the sustainable development activities, cannot, for reasons of technical feasibility or disproportionate cost, be achieved by other means which are a significantly better option.

6.1 Introduction

6.1.1 The regulation 19(5) condition (WFD Article 4(7) (d)) and PINS Advice Note Eighteen test (d)) requires that the beneficial objectives served by the modifications or alterations, or by the sustainable development activities, cannot, for reasons of technical feasibility or disproportionate cost, be achieved by other means which are a significantly better option.

6.1.2 In applying the regulation 19(5) condition, European Commission guidance suggests that both qualitative and quantitative costs and benefits are considered and that, if there is disproportionate cost, then this should consider the ability of those incurring the cost of the measures, to pay.

6.1.3 The European Commission guidance places emphasis on implementing all measures that can be taken without involving disproportionate costs to reach the best status possible. It also states that technical infeasibility is justified where no technical solution is available; it takes longer to fix the problem than there is time available; and where there is no information on the cause of the problem so a solution cannot be identified.

6.1.4 For the purposes of this derogation document, disproportionate costs are assumed to be those that would make the proposed river crossings financially unviable to construct.

6.2 Outline of the Test

6.2.1 The application of the regulation 19(5) condition requires consideration to be given to whether alternative means would be technically feasible or not have a disproportionate cost and, if so, whether they would constitute significantly better options to those proposed. This section first explains the beneficial objectives of the modifications and/or alterations of the structures that form part of the proposed scheme. Consideration is then given firstly to structure types and then to each of the main river crossings. In the case of each, the alternative designs are identified and their constraints and benefits evaluated.

6.2.2 In terms of the determination of technical feasibility, the information presented in this document demonstrates the careful and extensive appraisal of engineering designs that has been undertaken by the Applicant. Information on alternative structures discounted in favour of the crossings put forward in the application for the proposed scheme have been described in the Technical Note on Proposals for Main River Crossings (9.68 Technical Note on Proposals for Main River Crossings, [REP6-095]).

6.2.3 The primary drivers for the selection of the main river crossings that have been proposed as part of the proposed scheme are those set out in the Technical Note on Proposals for Main River Crossings (9.68 Technical Note on Proposals for Main River Crossings, [REP6-095]). Detailed costings for the alternatives considered were not undertaken as part of the optioneering process. As the Applicant did not consider that the proposed scheme would compromise either the attainment of good ecological potential or the prevention of the deterioration of water quality status in the relevant water bodies, the progressing of alternatives through a full costed process was not undertaken.

6.2.4 To assist in the consideration now as to whether disproportionate cost could be a factor to be taken into account in the application of the regulation 19(5) condition by the Secretary of State, the Applicant has compiled a table in which the approximate construction costs of different types of structure have been provided. The table is at Appendix C. The costs are not applied to the particular alternatives that the Applicant had assessed as part of the design of the proposed scheme, and some of the structures for which costings have been prepared are not structures that the Applicant has considered. Further, as the Applicant has made changes to some of the structure designs since closure of the Examination and the technical assessments necessary to inform the designs have taken time to undertake, it has not been possible to provide an up-to-date and accurate costing for each of the revised designs against which to compare alternatives.

6.2.5 Notwithstanding these limitations, the relative differences between the costs of providing different types of structures can still provide a context that can inform consideration of the regulation 19(5) condition by the Secretary of State, and the information in Appendix C is provided on that basis.

6.2.6 Taking into account these factors and the respective effects of alternatives on relevant water bodies and the environmental objectives of the Anglian RBMP, consideration is then given as to whether any of the alternatives considered would provide significantly better options to those that form part of the proposed scheme.

6.3 Beneficial Objectives

6.3.1 The project objectives of the proposed scheme are set out in the Environmental Statement (ES) Chapter 2: The Proposed Scheme [APP-069] which describes the design and construction of the scheme. The table shows how the proposed scheme objectives are aligned with the RIS2 and Department of Transport strategic objectives:

6.3.2 A detailed description and analysis of the options considered and the development of the preferred option is available in ES Chapter 3: Assessment of Alternatives [APP-070]. This is also explained in the Case for the Scheme (Section 3.2; [APP-249]). In addition, the Chapter 3: Consultation Report [APP-071] provides further detail on how comments

made by stakeholders have been taken into account in the development of the proposed scheme.

6.3.3 The proposed scheme was identified in RIS1 and RIS2 and was subject to consideration of alternatives as part of the investment decision-making process that informed its inclusion as a committed scheme in those documents.

6.3.4 The Preferred Route Announcement for the proposed scheme is the result of a lengthy process of evaluation and refinement and was selected based on several factors, including environmental impacts, journey times, complexity of build, affordability, feedback from the public and the policies of the adopted joint Local Plan for the area.

6.3.5 There have been many different options identified and assessed during a number of stages of the proposed scheme that began in August 2015 with options identification, assessment and short listing for consultation. A long list of 23 options that could meet the overall objective of improving the A12 were set out in an Options Assessment Report (Highways England 2016) and ended with a short-list of four options that were taken forward to the non-statutory public consultation in 2017.

6.3.6 The main development stages included up to DCO submission were as follows:

- Initial options identification, assessment and sifting.
- Options development and short listing.
- Assessment of short-listed options to identify viable options for consultation.
- Consultation and option selection.
- Preferred Route Announcement (PRA).
- Design development for statutory consultation.
- Continued design development post statutory consultation.

Table 2.2 Proposed scheme-specific objectives

Objective	How it aligns with DfT strategic objectives	How it aligns with RIS2 strategic outcomes
Proposed scheme supports the growth identified in Local Plans by reducing congestion related delay, improving journey time reliability and increasing the overall transport capacity of the A12	Grow and level up the economy	Providing fast and reliable journeys (supporting economic growth)
Improved safety design: private accesses to the strategic road network closed off and alternative access to local roads provided by the proposed scheme	Improve transport for the user	Improving safety for all
Proposed scheme improves road user safety		
Proposed scheme improves road worker safety during maintenance and operation		
Proposed scheme reduces current and forecast congestion related delays and therefore increases journey time reliability	Improve transport for the user	Providing fast and reliable journeys
Proposed scheme understands the impacts of other schemes and recognises other RIS schemes		
Reduce the visual, air and noise quality impacts of the proposed scheme on affected communities on the route	Reduced environmental Impacts	Delivering better environmental outcomes
Reduce the capital carbon and biodiversity impact of the proposed scheme		
Proposed scheme reduces the impact of severance of communities along the route	Improve transport for the user	Meeting the needs of all users
Proposed scheme improves accessibility for walkers, cyclists, horse riders, and public transport users		
Improve customer satisfaction, and reduce customer impact during construction		

6.3.7 A number of alternatives to improve the A12 were assessed though the National Highways Project Control Framework (PCF) process, including junction modifications, online/offline widening and complementary sustainable transport measures over three development stages in order to address or ameliorate the problems faced on the A12 between Junctions 19 and 25 (refer to Chapter 2 of the Environmental Statement [APP-069] and Chapter 3: Assessment of Alternatives [APP-070]).

6.3.8 A six-week non-statutory consultation was held from Monday 23 January until Friday 3 March 2017 on the four route options. The feedback from this consultation identified that the most popular option with the public was Option 2.

6.3.9 A Scheme Assessment Report was produced in 2017 that recommended Option 2 as the preferred route and further design changes and route refinements were made to address environmental concerns and NNNPS policy requirements.

6.3.10 In the same year, the local authorities of Colchester, Braintree and Tendring put forward a joint Local Plan, including the Colchester Braintree Borders Garden Community (CBBGC). This affected the route options presented in 2017, specifically the sections between Junctions 23 and 25.

6.3.11 Alternative routes were considered between these junctions that took account of the potential footprint for the CBBGC and were the subject of a second non-statutory consultation in 2019. In May 2020, the Planning Inspectorate concluded that the proposals for the CBBGC were not sound and the CBBGC was removed. The route between Junctions 23 and 25 reverted back to Option 2 from the 2017 non-statutory consultation and further refinements were considered to improve the design. An addendum to the Scheme Assessment Report (Highways England 2020d) was produced.

6.3.12 Following feedback from the consultation and further technical, economic and environmental assessments, the preferred route option was based on Option 2.

6.3.13 PRAs were made for the proposed scheme in 2019 and 2020: one covering Junctions 19 to 23 announced in October 2019, and another covering Junctions 23 to 25 announced on 28 August 2020 following the decision to remove the CBBGC from the North Essex Authorities' draft Section 1 Local Plan.

6.3.14 Statutory consultation was undertaken in 2021 and further consultations (a supplementary consultation in November to December 2021 and targeted consultation in February to March 2022) were undertaken and further details of how these have been considered in the scheme design is set out in the Consultation Report and Annex N to it [APP-5.1 and APP-5.2].

6.3.15 The iterative process of identifying and assessing likely significant effects has influenced the route options selection and design development and alterations to scheme design have been made to avoid or reduce environmental effects. Examples are set out in the Statement of Reasons paragraph 2.5.11 [APP-4.1].

6.3.16 The description of the proposed scheme is detailed in Section 4.4 of the Case for the Scheme [APP-7.1].

6.3.17 To implement the proposed alignment, several alterations need to be made to junctions along the road and main river crossings beneath the road. These crossings lead to a requirement for the bridges and culverts forming part of the proposed scheme.

Alternative Design Solutions for the Crossings

6.3.18 The test is to appraise whether an alternative design is feasible and if there is a significantly better option. This section describes options considered and the alternatives (which are the proposed designs). All options considered were reviewed against the likelihood of significant impacts to WFDR objectives and against likely significant effects identified and assessed in the Environmental Statement. Measures to secure the benefits to the chosen design will be secured via the REAC.

6.3.19 Constructing a bridge at any of the proposed crossings would require piling and excavation and substantial intrusion into the watercourse, which would have a negative effect to the water body. For example, construction would

potentially require dewatering and cofferdams, which would impinge on water levels and cause a local impediment to fish passage. Macrophytes would be disturbed, and sessile invertebrates could die if they were unable to move out of the way quickly enough. Suspended sediments from construction would be readily available to enter the receiving watercourse and potentially cause homogeneity to the local bed with a propensity for finer materials to settle.

6.3.20 During operation, a wide span bridge would be positive for the riparian corridor and for allowing space for the river to wander within the corridor. Best practice always recommends that bridges are clear span to prevent river erosion over-modification of the river planform, destabilisation of the planform and allowance for river channel wandering. However, there may be a change to light levels below the bridge (depending on dimensions); there may be over-shading which impinges on water temperature, pH, and other physico-chemical elements, and there will be displacement of macrophytes and invertebrates – depending on bridge structure (piers, wingwalls, abutments etc.). If piers/abutments are constructed mid-channel, this would impinge flow (hydromorphology), cause loss of substrate, and alter morphological continuity. There may still be a requirement for some bed/bank protection to secure the integrity of the bridge structure adjacent to the channel.

6.3.21 Portal structures, whilst having a natural bed and a less constrained channel, still require scour protection and a tie-in to adjacent channel features/banks. Negative effects would probably occur to macrophytes and invertebrates, hydromorphological elements (particularly channel width and depth) and physico-chemical elements such as light and temperature. Lower water levels would need to be ameliorated by changes in channel dimensions to maintain fish passage.

6.3.22 An alternative design could include complete realignment of the channel or a bypass channel to avoid the existing culvert. This would involve substantial appraisal of the feasibility of the alternative location, design, and impact on the proposed scheme, and whether this would be a significantly better option.

6.3.23 A realignment can create substantial risk to the longevity of the morphological continuity of a fluvial system, as well as risk fish passage and ecological elements. Whilst a river realignment may increase the river channel's footprint, it may detrimentally impact hydromorphology without careful design and suitable mitigation. Impacts include lack of variable sediment, insufficient and unsustainable flow, lack of conveyance of all sediment types, and lack of compatibility of the realignment with the remainder of the catchment. Ecological impacts can include habitat loss and/or change, interruption to fish passage, loss of redds for spawning, lack of fish refugia, and poor water quality.

6.3.24 The last alternative option would be to do nothing. This situation would maintain the current baseline for each water body.

6.3.25 Replacing the proposed crossings with open span bridges would be disproportionate in terms of whole life cost, embodied carbon, and adverse construction impacts compared with any environmental gains manifest during the operational phase. Accordingly, these structures have been discounted in favour of the crossings put forward in the application for the proposed scheme as explained in the Technical Note on Proposals for Main River Crossings (9.68 Technical Note on Proposals for Main River Crossings [REP6-095]), which the Applicant submitted at Deadline 6 in June 23.

6.3.26 The alternatives considered in the case of each of the main river crossings are described and considered in the following sections.

Ashman's Bridge

6.3.27 As part of the proposed scheme, the existing Ashman's Bridge structure will be asymmetrically widened 10.1m to the south. The span (39.4m) and the height (4.9m) will remain unchanged.

6.3.28 The Environment Agency has not suggested an alternative structure to Ashman's Bridge for consideration and the Applicant has not considered alternative structures to Ashman's Bridge. The horizontal curvature of the highway's alignment requires a significant widening of the central reserve and southern verge to ensure minimum safe stopping sight distances are achieved.

6.3.29 The design of the widened sections aims to mirror the existing structural form to ensure there is no deterioration to the condition of the river environment. Scour protection is required to the pier foundations in line with the existing structure, however, a natural river bed can be maintained. Ashman's Bridge already provides a more open structure underneath which allows for the passage of fish. To replace this with a larger structure is not justified, a position accepted by the Environment Agency in its Deadline 7 response [REP7-059] to the Applicant's document 9.68 Technical Note on Proposals for Main River Crossings [REP6-095]. Additional measures requested by the Environment Agency have been accepted and are considered in Section 3 as mitigation measures.

Roman River

6.3.30 As part of the proposed scheme the existing Roman River culvert, which is currently 40.05m in length, will be retained and extended. The culvert extension length proposed during the Examination was 12m. Subsequent to the closure of the Examination, as a result of discussions with the Environment Agency, the extension length has been reduced by 6m to 6m, which means that the total length of the extended culvert will be 46.05m, which compares to the existing 40.05m length. In addition, mammal ledges have been included in the revised design of the culvert. Revised engineering drawings are being submitted to the Secretary of State to form part of the DCO Application documents in order to secure these changes if the DCO is granted.

6.3.31 Whilst early consideration was given to a more open structure in this location in place of an extension to the existing open-box culvert, the relative benefits needed to be considered against the increased cost, technical risk and programme impacts. The proposed extension of the existing box culvert does not provide any significant environmental effects when compared to the baseline. When considered against the limited benefits of the alternative, the increased costs and scheme risks were not considered to be justifiable.

6.3.32 The Environment Agency considers that large scale infrastructure projects such as the Proposed Scheme provide an opportunity to upgrade crossings such as that at Roman River and has requested a further assessment of design options, seeking a more open and natural river channel [REP7-059].

6.3.33 The biggest constraint in replacing the existing Roman River culvert with a wider, more open structure is its location under the existing A12 mainline carriageway and southbound Junction 25 off-slip. The Applicant identified in 9.68 Technical note on Proposals for Main River Crossings [REP 6-095] (see paragraph 4.2.62) that replacement could be achieved only through open excavation of the A12 mainline, which would necessitate large numbers of full and partial closures of the A12 carriageway over a number of months. This would have significant impacts on the community of Marks Tey and Copford due to the required diversions as well as causing significant disruption to the wider strategic road network.

6.3.34 There is little vertical clearance between the existing culvert structure and finished road level of the A12 mainline in this location. Whilst a wider portal frame bridge structure could be installed in place of the current culvert, which would allow for a more natural channel, very little increase in vertical clearance (<1m) would be achieved. This would have limited relief on light levels through the structure, which will also be affected by the relative variations in elevations of the highway and river channel. This would negate one of the objectives in seeking replacement of this structure, which is to increase natural light. Whilst a wider structure might improve permeability for fish, the relatively small change in overall dimensions is not considered to have a material impact on fish. The Applicant does not consider that there is a likelihood of a material difference in water quality status of the water body. Further, any intervention here would be difficult to implement because of the resulting technical risk and programme implications (paragraphs 4.2.62 to 4.2.64; 9.68 Technical note on Proposals for Main River Crossings [REP 6-095]).

6.3.35 It is estimated that the installation of a portal frame structure at the Roman River crossing would add approximately £6 million to the cost of the proposed scheme (see Appendix C), which is considered to be a disproportionate cost relative to the predicted non-material effects on water quality status that such a structure would have.

6.3.36 Measures put forward as a result of consultation with the Environment Agency (letter 20 Oct 2023 (ref: AE/2023/128756/02-L01) and to be secured through the revised REAC [REP7-015] comprise baffles on the

channel bed. These have been considered in Section 3: Assessment of the regulation 19(3) condition. The measures put forward further reduce any relative advantage of the portal frame structure alternative.

Rivenhall Brook (Existing)

6.3.37 The existing Rivenhall Brook bridge structure is 28.7m in span length. It is proposed to retain the existing structure, which will become part of the de-trunked section of the highway. Given the lack of impact on the river that the proposed scheme is having at this river crossing there is no obvious need to replace the existing structure. The structure will keep its existing length, width and height.

6.3.38 The existing Rivenhall Brook bridge structure is highly constrained vertically, with the A12 mainline pavement construction sited directly on top of the structure. However, consideration has been given to the feasibility of a clear span bridge. It is concluded (paragraph 4.233; 9.68 Technical note on Proposals for Main River Crossings [REP 6-095]) that a wider span structure would lead to encroachment upon the vertical clearance above the watercourse, creating a darker, more enclosed space compared to the current structure. The works themselves would require the open excavation of the existing A12 mainline over a two-to-three-month period causing significant impact on the community of Rivenhall End and directly impacting businesses. Both verges contain a large number of statutory undertakers' equipment which would need to be diverted to allow for any proposed upgrade works, significantly increasing their cost and complexity.

6.3.39 In the case of the proposed scheme, where no change to the structure is proposed and neutral (not significant) effects are predicted on receptors, as explained in 9.68 Technical note on Proposals for Main River Crossings [REP 6-095] at paragraphs 4.2.33 - 4.2.34, the replacement of the existing structure with anything else would not be a significantly better option.

Rivenhall Brook (New)

6.3.40 As part of the proposed scheme submitted as part of the DCO Application the Rivenhall Brook structure was proposed to be 46m long. Subsequent to the closure of the Examination, as a result of discussions with the Environment Agency (letter 20 Oct 2023 (ref: AE/2023/128756/02-L01) to be secured through the revised REAC [REP7-015], the extension length has been reduced by 2m to 44m. In addition, the width has been increased from the originally proposed 4.5m to 13m, compromising of riparian zone of 3.5m either side of a 5m wide channel. The resultant change is 8.5m increase in width. The proposed inner height has increased post-Examination by 0.85m from 3.1m to 3.95m. Whilst a soft bed comprising natural material and mammal ledges were proposed, and are being retained within the current design, the soft bed includes a two-stage channel. There will also be a light well in the central reserve. Scour protection will be considered during detailed design.

6.3.41 Revised engineering drawings are being submitted to the Secretary of State to form part of the DCO Application documents in order to secure this if the DCO is granted.

6.3.42 Whilst early consideration was given to a more open structure in this location, the relative benefits needed to be considered against the increased cost, technical risk and programme impacts (Technical note on Proposals for Main River Crossings [REP 6-095]).

6.3.43 An alternative 10m pre-cast portal bridge was considered prior to the submission of the DCO Application. However, while this would allow for the retention of a more natural bank along the watercourse, it would result in a slight reduction in headroom compared to the proposed box culvert due to the constraints of the vertical alignment of the proposed highway. As a result, there would not be much to differentiate between the two options in terms of natural light ingress. The estimated cost of providing a portal structure is nearly £1million more than the cost of the proposed option (Appendix C), which is considered to be a very substantial cost relative to the predicted non-material effects on water quality status that such a structure would have. The Applicant had discounted the cheapest option, which is the corrugated steel arch pipe (£567k). This option was discounted due to technical risk and concerns about the integrity of the materials used to construct such a structure.

6.3.44 Further, the amendments proposed as a result of post-Examination discussions with the Environment Agency, comprising a light well in the central reserve and an increase in the inner height of the proposed structure by 0.85m, would negate one of the objectives in seeking replacement of this structure, which is to increase natural light. Overall, the relatively small change in overall dimensions is not considered to have a material impact on fish. The measures being put forward as part of the proposed scheme, which have been considered in Section 3: Assessment of the regulation 19(3) condition, further reduce any relative advantage of the portal frame structure alternative.

Brain Bridge

6.3.45 As part of the proposed scheme submitted with the DCO Application, the existing Brain Bridge structure proposals included widening the deck and abutments by 12m (7m to the east and 5m to the west) whilst retaining the span unchanged at 12.8m. A headroom of 3.5m to average river level was proposed in conjunction with a flexible stone mattress to be provided on the widened invert slab to or scour protection. Post-Examination, the proposals have left the span of 12.8m and the headroom of 3.5m unchanged. Measures put forward as a result of consultation with the Environment Agency (letter 20 Oct 2023 (ref: AE/2023/128756/02-L01) to be secured through the revised REAC [REP7-015] include the reorientation of the proposed wingwalls to remove the requirement to extend the existing concrete invert slab within the river channel. The inclusion of other measures to improve fish passage (including coir rolls rocks etc placed in the existing low flow channel) remain under consideration by the scheme

and will be implemented subject to flood impact assessment and approval from the Environment Agency's fish pass panel.

6.3.46 The Environment Agency has agreed that the widening of the River Brain Bridge will not reduce its permeability to riparian mammals and has not requested that it be replaced with a larger structure [REP7-059]. The Applicant confirms the ability to develop the structure presented to Examination [APP-032REP6-029] so that there will be no need to extend the concrete invert slab of the existing structure, as originally envisaged.

6.3.47 At the request of the Environment Agency the Applicant has evaluated the alternative design option of installing a rock ramp on the downstream side of Brain Bridge. The Applicant has carried out further topographical surveys of the channel and the cross sections in the River Brain hydraulic model and other supporting information, including the culvert's concrete invert levels from archived design drawings. It has been concluded that the installation of a rock ramp in this location is not viable because the average natural river bed level is only marginally lower than the culvert outlet and rising bed level downstream. This design alternative is not considered to be technically feasible.

6.3.48 Although a rock ramp would not be possible, the Applicant is committing to consideration of further measures to improve fish passage on the concrete bed under the bridge; these may include rocks placed under the bridge (preferred), coir roll or woody debris. The provision of additional measures as part of the detailed design of the proposed structure will be considered in consultation with the Environment Agency and this is provided for in the revised REAC [REP7-015) and considered in Section 3: Assessment of the regulation 19(3) condition. Combined, these measures would further reduce any relative advantage of an alternative.

Domsey Brook East

6.3.49 As part of the proposed scheme submitted as part of the DCO Application, the proposed structure for the main river crossing at Domsey Brook East comprised the construction of a new offline box culvert with a proposed length of 60m. Post-Examination, the culvert has been modified to become a portal culvert. The length has been reduced by 15.75m from 60m to 44.25m. The proposed pre-Examination width of 2.9m has been increased by 10.1m to 13m. This will include 5m wide riparian zones along both banks of the channel (which is 3m wide). The inner height of the culvert has been increased by 1.93m from 2.7m to 4.63m in order to provide 2.1m vertical clearance above the 1:100-year flood level. Through Examination, a soft bed comprising natural material was included in the proposals along with a mammal ledge. Additional measures identified post-Examination as a result of consultation with the Environment Agency (Appendix A: Environment Agency letter dated 20 Oct 2023 (ref: AE/2023/128756/02-L01) are proposed to be considered in consultation with the Environment Agency through the revised REAC [REP7-015]. Measures include scour protection, which is to be considered during detailed design. Whilst a wider structure might improve permeability for fish as a result of light level increases, the

relatively small change in overall dimensions is not considered to have a material impact on fish. The Applicant does not consider that there is a likelihood of a material difference in water quality status of the water body.

6.3.50 All measures have been considered in Section 3: Assessment of the regulation 19(3) condition. Overall, this would provide a significantly better option than the alternatives.

Domsey Brook West

6.3.51 The existing Domsey Brook west crossing consists of a single span cast in-situ reinforced concrete arch structure with a relatively complex geometry compared to an equivalent box culvert.

6.3.52 The existing length is 35.5m; inner width is 7m; and height is 6m. As part of the proposed scheme, the proposals through Examination comprised the widening of the existing arch structure by 34.6m to 70.1m in total. Length and height would not change. Mammal ledges would be provided. The additional measure proposed post-Examination as a result of consultation with the Environment Agency (letter 20 Oct 2023 (ref: AE/2023/128756/02-L01) includes scour protection in form of rip rap at inlet, as required to be secured through the revised REAC [REP7-015].

6.3.53 The applicant notes the Environment Agency's point (20 Oct 2023 (ref: AE/2023/128756/02-L01)) in *that the new meandering downstream section outside the crossing extension will be an improvement. However, the existing structure is problematic, particularly for mammal passage.* The revisions are constrained by the need to maintain a maintenance walkway throughout the existing and proposed structures. The Environment Agency has expressed concerns about mammals and the implications for crossings and states that the current opening is narrow and gives little scope for any riverine processes in the channel. It has requested a wider extension to take account of this and to be more accommodating. The Applicant is proposing to widen the wingwalls to match the existing channel width. This maintains natural channel width and additional marginal habitat as a result.

6.3.54 The full replacement of the structure was discounted due to significant costs, programme impacts and the disruption impacts of having to excavate across the A12 on a section of on-line highways widening. The most expensive option of widening the structure would be the in-situ parabolic arch (£2,321k). The option proposed is the widening of the structure with a pre-cast concrete arch (£1,735k). This is not the cheapest option but is almost £600k cheaper than the most expensive option. The in-situ parabolic arch option was discounted as it was the most technically difficult to construct and the relative environmental benefits were not evidently greater. With the additional design changes and measures proposed and considered in Section 3: Assessment of the regulation 19(3) condition, any differential between the in-situ parabolic arch and the proposed option would be further reduced.

6.3.55 In summary, no option has been identified that would be a significantly better option that that proposed as part of the proposed scheme. Summary of Consideration to Alternative Designs

6.3.56 In summary, the consideration of alternative designs has made it clear that there are no better options than those put forwards for cost, technical feasibility and environmental betterment, and none that were identified to be significantly better options.

6.3.57 Post-Examination, measures agreed with the Environment Agency and secured via updated engineering drawings and the REAC [REP7-015] will include increasing the width of the riparian corridor, increasing light, and incorporating a natural channel bed wherever practicable.

6.3.58 By adding proposed measures to all crossings wherever practicable, which are additional to those outlined in the WFDR Compliance Assessment (Impact Assessment, Section 6 [APP-159]), the riverine conditions are likely to be better than currently, in the Applicant's view, for all crossings. Any option proposed post-Examination is likely to further reduce any relative advantage of any alternative. All are further supported by the enhancements likely to result from the measures added to designs in the post-Examination period.

Consideration of Whether Other Means Would be a Significantly Better Option

6.3.59 This step assesses whether other means, in the form of different structures would be a significantly better option. The alternatives described in the preceding section of this document were not assessed in the WFDR Compliance Assessment (Appendix 14.2: Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159]) but they were considered on their environmental merits (as well as technical feasibility and/or disproportionate costs).

6.3.60 Applying professional judgment, it is considered that whilst alternative options may support easier fish passage and prevent disconnection to the wider catchment, there are likely other impacts which may contribute more to likely significant adverse effects.

6.3.61 The construction of a bridge would be more invasive to the local terrain and inevitably has a far higher carbon footprint in terms of concrete and other materials that the proposed scheme. In a culvert, there may be a possibility to use carbon substitutes, whereas a bridge is required to meet high structural strength standards. In addition, the transport to site, the installation, the production of other elements/components of the bridge, the workforce to construct, the interruption to the road network via diversions/closing the road etc. is likely to have a much higher carbon, and NO2 impacts than extensions or addition of new culverts.

6.3.62 The proposed scheme benefits include decreased travel time and alleviation of congestion. Congestion, i.e. slow moving or stopped traffic, causes poor air quality and danger to health with long-term effects to

people's quality of life and expectancy. The benefits of the proposed scheme seek to alleviate exhaust emissions, and the causes of poor air quality, reducing additional travel time, number of cars, congestion through stationary cars etc. This also contributes to economic loss as whilst people are delayed, there is no income generated through being at work or through delays in trade.

6.3.63 The culverts, including the extensions, do not have comparative issues of technical infeasibility or disproportionate costs. Further, the environmental effects are possibly diminished compared to other structures.

6.3.64 The current proposals are more viable than the costs of bridges for example, which would be much more expensive than the cost of culverts, be more invasive and outweigh the costs of culverts for the same level of crossings.

Proposed Scheme Options for Structures

6.3.65 The designs taken forward through Examination are assessed in Appendix 14.2: Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159]) (also see Technical Note on Proposals for Main River Crossings (Section 4, 9.68 Technical Note on Proposals for Main River Crossings [REP6-095]). Also see Table 1 Description of proposals and changes of this document, Column 3.

6.3.66 The requirement is to deliver the proposed scheme. The design of the specific features attributed to road crossings over rivers/watercourses is multi-faceted. At the same time, the proposed scheme is designed so that these structures (amendments or new) provide as much environmental benefits to the baseline environment, including reducing potential development within the floodplain.

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6.3.67 Updates to the design of crossings have been produced post-Examination as a result of ongoing dialogue with the Environment Agency (reference to 20 Oct 2023 (ref: AE/2023/128756/02-L01)). Proposals for design changes have been developed in discussion with the Environment Agency post-Examination. Table 1 Description of proposals and changes in this document identifies in Column 1 the measures proposed when the DCO Application for the proposed scheme was submitted for examination. Changes proposed prior to the closure of the Examination process are set out in Column 2 of Table 1. Changes proposed following closure of the Examination are set out in Column 3 of Table 1.

6.3.68 The design has evolved through the detailed design process and is cognisant of the need to provide increased light where practicable to encourage fish passage or make the culverts more attractive to pass through. Specifically, at Rivenhall Brook the Applicant is replacing a proposed box culvert with a wider and taller portal culvert to better facilitate natural processes within a realigned channel. Where light levels are low, a light well will be introduced within the proposed central reserve to facilitate

fish passage. A riparian passage will be incorporated through the provision of a natural bank either side of the channel in the portal culverts of Rivenhall and Domsey Brook east. At Brain Bridge, baffles will be installed alongside mammal passage. At Ashman's Bridge, measures will be incorporated to facilitate fish passage and improve bed conditions.

6.4 Risk of Harm to the Integrity of Designated Water Bodies

6.4.1 The risk of harm to the integrity of the designated water bodies under regulation 19 is linked to potential changes resulting from the proposed scheme that would impact each of the quality elements (hydromorphology; biology; and physico-chemical) considered in the WFDR Compliance Assessment (Appendix 14.2: Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159]). The risk is based on how much change the proposed scheme would cause, and the potential for any such change to have an effect on the WFD status of each and whether there would be degradation of the status of a relevant water body as a result. All of the water bodies concerned are designated as heavily modified water bodies.

6.4.2 The character of the watercourses assessed can be summarised as follows:

- The River Blackwater (Ashman's Bridge) has a varied geomorphological character with differing platform, width, depth and substrate, supporting varied habitat throughout its catchment. There are modifications through the catchment including channel crossings (bridges), and various points where the channel has either been widened or constricted.
- The River Chelmer is artificially straightened with a semi-sinusoidal planform and a trapezoidal cross section.
- The River Brain is characterised by artificial sections and a near-restored reach exhibiting near natural conditions, between the B1389 and B1018 (approximately 450m upstream of the existing A12). This reach is fed by an historically dredged secondary channel.
- Roman River upstream is gently sinuous and contrasts with downstream where it is artificially straightened and realigned to make way for the existing A12.
- Rivenhall Brook is artificially straightened and trapezoidal in cross section.
- Domsey Brook is artificially straightened with a semi-sinusoidal planform and a trapezoidal cross section, and either bridged or culverted under the A12 and Inworth Road. There is bankside reinforcement throughout the reach surveyed as part of the

hydromorphology assessment (Appendix 14.3: Hydromorphology Assessment [APP-160]).

6.4.3 As summarised in Table 5.1 of the WFDR Compliance Assessment (Appendix 14.2 [APP-159]), the biology element of the assessment scopes in fish, specifically composition, abundance, and age of structure of fish fauna, and presence of sensitive species.

6.4.4 Note Appendix 14.2 [APP-159] was informed by field and desk-based data (Appendix 9.1 of the Environmental Statement, Aquatic Ecology Report [APP-125]). Fish data are summarised in the following sections for each relevant water body.

Fish Data and WFD Compliance

6.4.5 This section outlines why the Applicant feels there is connectivity through the catchment due to fish data collated and appraised for completion of the WFDR Compliance Assessment (Appendix 14.2 [APP-159]), and in response to Environment Agency concerns on the lack of connectivity between the upper and lower reaches of a catchment due to culverts.

River Blackwater

6.4.6 As presented within Table 6.1 of the WFDR Compliance Assessment (Appendix 14.2 [APP-159]), there is potential for impacts to fish from fine sediment and pollutant delivery to the watercourse, as well as noise from construction which could reduce the fish population, through fatalities; reduced spawning habitats through fine sediment smothering these areas (redds); and interruption to fish passage.

6.4.7 Ten species of freshwater fish were recorded within the River Blackwater (downstream) of Ashman's Bridge (Table 6.6, Appendix 9.1 Aquatic Ecology Report [APP-125]). Monitoring data from the Environment Agency (Table 6.3, Appendix 9.1 Aquatic Ecology Report [APP-125]) recorded all ten of these species of freshwater fish upstream of the River Blackwater, indicating that the existing crossing is not a barrier to fish passage.

6.4.8 With respect to fish passage, it is assessed that the proposed changes would not reduce fish permeability to fish and would continue to support movement of these species.

Roman River

6.4.9 The WFDR Compliance Assessment (Table 6.1; Appendix 14.2, [APP-159]) concluded that any changes as a result of the proposed scheme would be insufficient to cause deterioration to the quality elements of this water body, including fish.

6.4.10 Three species of freshwater fish were recorded downstream of the A12 crossing of the Roman River (Table 6.6 of Appendix 9.1 Aquatic Ecology Report [APP-125]). As there were no fish monitoring points within the upstream section of the Roman River (including monitoring data from the Environment Agency) it is not possible to infer the permeability of the

existing structure to fish because the current situation is not understood due to no data for the Roman River.

6.4.11 Commitments in the REAC [REP7-015] include baffles through the existing culvert to improve potential; fish passage.

River Brain

6.4.12 As above, the WFDR Compliance Assessment (Table 6.1; Appendix 14.2, [APP-159]) concluded that any changes to the quality element would be insufficient to cause deterioration to this water body. Corroborative data from Table 6.6 of Appendix 9.1 Aquatic Ecology Report [APP-125] suggests ten species of freshwater fish were recorded within the River Brain, downstream of the crossing of the A12, including European eel. Environment Agency data (Table 6.3, Appendix 9.1 Aquatic Ecology Report [APP-125]) recorded nine out of these ten species of freshwater fish upstream of the River Brain (the exception being three-spined stickleback), indicating that the existing Brain Bridge is not a barrier to fish passage.

6.4.13 The lengthening of the Brain Bridge would not affect the permeability to fish as the height and span would be maintained (Table 1 Description of proposals and changes, Row 4). In addition, as per commitment RDWE42 of the REAC at Deadline 7 [REP7-015], enhancements of the existing Brain Bridge include the introduction of natural substrates along the riverbed to support natural flow regulation and improve overall channel heterogeneity, therefore ensuring there is no barrier to migration of fish and eels.

6.4.14 Potential opportunities for improvements to this crossing, such as the installation of coir rolls rocks etc. placed in the existing low flow channel) remain under consideration by the scheme and will be implemented subject to flood impact assessment and approval from Environment Agency's fish pass panel.

Rivenhall Brook

6.4.15 No fish data are available for the Rivenhall Brook. However European eel and brown trout have been reported from the Blackwater downstream of the confluence with the Rivenhall Brook. As such, these species could be expected to be present within the brook.

6.4.16 The proposed Rivenhall Brook structure is designed to improve fish passage and provide multiple benefits to the wider riverine corridor even though there are no data available currently. There is potential to improve daylight conditions inside the structure. For Rivenhall, the Applicant is proposing to increase the size of portal entrance there is potential to install a lightwell solution; further measures to support include a two-stage channel bed.

Domsey Brook East

6.4.17 A new Domsey Brook east crossing is required on the off-line section of the proposed A12. This would comprise a portal culvert of 44.25m, with an increased width to 13m. The Domsey Brook would be realigned through

the new culvert. The invert of the proposed new culvert would be buried beneath the natural bed of the watercourse to allow the continuation of sediment conveyance and reduce the impact on local flow dynamics (as committed to in RDWE 39 [REP7-015]). This would replicate the natural stream bed material within the structure to aid permeability to fish and eels.

6.4.18 The WFDR Compliance Assessment (Appendix 14.2 [APP-159]) concluded that there would be no deterioration to the water body as a result of the proposals. However, it is noted that the Domsey Brook (east) crossing is not identified as a 'high priority' or 'super-critical' obstruction as per the Environment Agency's fish and eel migration barriers database (Environment Agency, 2016), suggesting that this structure is not currently considered a significant barrier to fish passage. Six species of freshwater fish were recorded within the Domsey Brook, downstream of the crossing with the A12, including European eel (Table 6.6 of Appendix 9:1 [APP-125]). As there were no fish monitoring points within the upstream section of Domsey Brook (including monitoring data from the Environment Agency) it is not possible to infer the permeability of the existing structure to fish.

6.5 Technical Feasibility and Cost Proportionality

6.5.1 The need to look at technical feasibility and cost proportionality of mitigation is a requirement of the regulation 19(5) condition. A summary of construction and operation mitigation measures is provided in Tables 1 and 2 in Appendix B of this document. These are taken from the measures proposed in the First Iteration EMP Appendix A REAC [REP7-016] and in Chapter 14: Road Drainage and the Water Environment [APP-081] and Chapter 9: Biodiversity [APP-076].

6.5.2 Post-Examination measures proposed include modifications to the structure, increased riparian corridor in the portal culverts, and improved light measures. Table 1 Description of proposals and changes outlines the modifications. In summary, these are:

- For Domsey Brook east: increased width. The structure will be higher to accommodate free board from the water level; the height of the structure to provide sufficient natural light levels.
- Domsey Brook west: widening the existing structure to provide a more attractive opening to encourage passage of fish in combination with more naturalised riverine processes.
- Rivenhall: proposed box culvert with a wider and taller portal culvert to better facilitate natural processes within a realigned channel. A light well will be introduced within the proposed central reserve to increase the levels of natural light within the proposed culvert.
- Roman River: the provision of baffles on the culvert bed to maintain flows within the channel for continual fish passage.

- Brain Bridge: the inclusion of other measures to improve fish passage (including coir rolls rocks etc placed in the existing low flow channel) remain under consideration by the scheme and will be implemented subject to flood impact assessment and approval from the Environment Agency's fish pass panel.

- Ashman's Bridge: widening the existing structure to provide a more attractive opening to encourage passage of fish in combination with more naturalised riverine processes.

6.5.3 All of the measures outlined in Table 1 Description of proposals and changes are technically feasible and implementable. None of the measures put forward would be disproportionately costly. Approximate costings for each individual structure are presented in Appendix C. Note, it has not been possible to undertake updated costings for changes proposed following closure of the Examination.

6.6 Summary

6.6.1 In summary, taking all the above into account, there are no significantly better options for any of the main river crossings than those which the Applicant has proposed and assessed.

7 Regulation 19(6)

The reasons for modifications or alterations are specifically set out and explained in the RBMP and the objectives reviewed every six years.

7.1 Introduction

7.1.1 Regulation 19(6) of the WFD Regulations (Article 4(7)(b) and PINS Advice Note Eighteen test (b)) states that any alterations or modification to water bodies that necessitate derogation must be set out and explained in the RBMP, and the environmental objectives must be reviewed every six years.

7.1.2 Although described in PINS Advice Note Eighteen as a test, the provisions of both Article 4(7)(b) and regulation 19(6) of the WFD Regulations are not a test or condition that an applicant for consent for the relevant modifications is required to discharge. Instead, the provision is to ensure that RMBPs are updated to include modifications by setting out and explaining the reasons for them. This would be undertaken by the Environment Agency when complying with the duties placed on it by regulations 12 and 13 of the WFD Regulations.

8 Test Against Other EU-derived Regulations

8.1.1 Part V (regulations 12 – 25) of the WFD Regulations sets out provisions on environmental outcomes and programmes of measures. The procedure for setting environmental objectives and programmes of measures is set out in regulation 12, the environmental objectives are set out in regulation 13 and regulation 14 provides that *regulations 15 to 19 must be applied in a way that— (a) does not permanently exclude or compromise the achievement of the environmental objectives set in relation to any other water body within the same river basin district; (b) is not inconsistent with the implementation of any other EU instrument; (c) guarantees at least the same level of protection for bodies of water as the EU instruments repealed by Article 22 of the WFD.*

8.1.2 The WFDR Compliance Assessment (Appendix 14.2, Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159]) concludes that the proposed scheme would not compromise the achievement of the environmental objectives in any water body within or beyond the Anglian RBD.

8.1.3 The assessment methodology applied within the WFDR Compliance Assessment for the proposed scheme considered the potential deterioration of a scheme element on downstream water bodies and concluded that no indirect effects would result in a water body downstream being at high risk of non-compliance of the WFD Regulations.

8.1.4 The assessment considered there would be no compromise to other WFD objectives noted in regulations 15 to 19 (paragraph 8.1.2 above): those relevant have been taken from Table 3.1 in the WFDR Compliance Assessment and assessed in Tables 6.1 to 6.4 under the classification of 'Protected Areas':

- Nitrate Pollution Prevention Regulations 2015 (Blackwater (Combined Essex); Boreham Tributary; River Brain; River Chelmer (downstream confluence with River Cam); Roman River; River Ter).
- Drinking Water Safeguard Zones under The Water Supply (Water Quality) Regulations 2016 (Blackwater (Combined Essex); River Chelmer (downstream confluence with River Cam).
- The Urban Wastewater Treatment (England and Wales) (Amendment) Regulations 2003 (Blackwater (Combined Essex); River Chelmer (downstream confluence with River Cam).
- The Conservation of Habitats and Species Regulations 2017 (River Chelmer (downstream confluence with River Cam).Negligible effects for nitrates, and urban wastewater treatment were also concluded; safeguard zones for drinking water were assessed as no change and the status would not be affected given the size of the designated groundwater body (Tables 6.1 to 6.4 of the WFDR Compliance Assessment; Appendix 14.2, [APP-159]).

8.1.5 The water quality assessment report (Appendix 14.1; Water Quality Assessment Report [APP-158]) concludes that the risk to groundwater quality would be very low and, therefore, the quality of the overall groundwater body would not be affected, as supported by the WFDR Compliance Assessment (Appendix 14.2, [APP159]).

8.1.6 The Environmental Statement concluded that there are no likely significant effects predicted on sites that comprise water that have designations and/or those that are designated for water quality reasons and protected under other legislation (Chapter 14: The Road Drainage and Water Environment [APP-081] and Chapter 9: Biodiversity [APP-076]).

9 Conclusions

9.1.1 The Applicant was asked by the Examining Authority to submit this derogation document on a without prejudice basis in light of submissions made by the EA that, in its opinion, the proposed scheme will not comply with The Water Environment (WFD) (England and Wales) Regulations 2017.

9.1.2 The Water Environment (WFD) (England and Wales) Regulations 2017 provides that all water bodies that are designated as heavily modified water bodies, which is the case for all of the water bodies relevant to the main river crossings for the proposed scheme, should meet Good Ecological Potential by a set timeframe.

9.1.3 Under the provisions of the WFD Regulations, the SoS and the Environment Agency have a duty to exercise their relevant functions so as to secure compliance with the WFDR, in particular to have regard to the relevant RBMP, and any supplementary plans made under it, in the determination of applications for DCOs under the Planning Act 2008.

9.1.4 To ensure that the SoS has the necessary information to undertake a WFDR assessment, regulation 5(2)(l)(iii) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 require an applicant for a DCO to provide with the application a plan accompanying information identifying water bodies in a RBMP, together with an assessment of any effects on such water bodies likely to be caused by the proposed development. For the Proposed Scheme, this has been undertaken in the WFDR Compliance Assessment submitted as Appendix 14.2, Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159]).

9.1.5 The assessment concluded there were no risks of deterioration to the overall water body status as a result of the proposed scheme.

9.1.6 Usually, consideration of a derogation under regulation 19 (Article 4 (7)) is only required where an assessment shows that a scheme will not comply with the WFDR. As the Applicant's WFDR Compliance Assessment concluded that the proposed scheme would not give rise to a breach of the WFDR the information needed to support consideration of a derogation was not submitted with the DCO Application. In light of the objections raised by the Environment Agency, the ExA has asked the Applicant to submit information necessary to support consideration of a derogation under regulation 19. This information is being submitted by the Applicant without prejudice to its own conclusions that the Proposed Development complies with the WFD Regulations.

9.1.7 The compliance of the proposed scheme with the conditions set out in regulations 19(3) – (5) has been demonstrated in this submission and summarised as follows:

- **The regulation 19(3) condition:** The WFD compliance assessment was undertaken in a manner advised in the PINS Advice note

eighteen; with a preliminary assessment and a detailed assessment. These were consulted on with the Environment Agency and supported by consultation at various stages of the environmental assessment process from scoping stage to the Environmental Statement, and post-Examination. Based on the outcomes of the WFDR Compliance Assessment (Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159]) and the recommendations for mitigation, the compliance assessment concludes no adverse effects on water body status and to quality element status. The Applicant has taken all practicable steps to mitigate adverse impacts on the status of the water bodies (including the provision of enhancement). Therefore, there is no deterioration to water body status as a result of the proposed scheme. All measures, including those that will provide enhancement, will be secured as part of the proposed scheme through updated engineering drawings and the First Iteration EMP Appendix A REAC [REP7-016].

- **The regulation 19(4)(a) condition:** The information provided in the WFDR Compliance Assessment and this document confirms that the reasons for the modifications or alterations are of overriding public interest. In particular: **NNNPS:** The NNNPS makes it clear that at a strategic level, there is a compelling need for development of the national network, and further supported by local planning policies that identify the importance of the A12 corridor to sustainable growth in Essex, and the need for the scheme. **Risk of harm:** Given the baseline character of the (proposed) scheme-relevant water bodies, in conjunction with the status of WFD quality elements and professional judgement, the Water Environment Regulations (WFD Regulations) Compliance Assessment (Appendix 14.2, Water Environment Regulations (WFD Regulations) Compliance Assessment [APP-159]) concludes no likely risk of harm to the relevant designated water bodies as the scale of the impacts to water bodies and their integrity is minimal. The proposed scheme would deliver many benefits relating to public safety, human health and beneficial consequences of primary environmental importance. Considerations relating to the need for the scheme and the beneficial consequences to the environment carry greatest weight and override the competing interest of the Water Environment (WFD) Regulations 2017. **Overriding Public Interest:** The overriding nature of the public interest served by the river crossings is related to reduced flood risk to downstream communities as a result of the culverts.

- **The regulation 19(4)(b) condition:** The Applicant has demonstrated that the benefits to the environment and to society of achieving the environmental objectives in the Anglian RBMP are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development. On the basis of a rigorous compliance assessment (Appendix 14.2, Water Environment

Regulations (WFD Regulations) Compliance Assessment [APP-159]), the 9.68 Technical Note on Proposals for Main River Crossings [REP6-095], and post-Examination amendments/secured measures, it can be concluded that the proposed scheme crossing designs do not impede the objectives of the RBMP and WFD Regulations. Mitigation is implemented to improve fish passage and lessen the disconnection in the catchment, which should provide the same, if not better, certainly no worse than the current environment. There is an imperative need to improve transport links to grow the economy and support local communities. Coupled with this is a proven benefit to human health, sustainability, and safety (see Section 5 of this document; and Chapter 13: Population and human health, of the Environmental Statement [APP-080]. The Applicant has identified localised negative changes to water quality elements that, with additional mitigation, will not cause deterioration in water body classification and/or prevent the water quality elements from either achieving good classification or achieving their RBMP objectives. Overall, the environmental and societal benefits of achieving the environmental objectives (which the Applicant does not consider would be compromised by the proposed scheme) are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development.

- **The regulation 19(5) condition:** The Applicant has demonstrated that there are no options better than those put forwards in terms of cost, technical feasibility and environmental betterment, and overall, no alternative provides a significantly better option that those proposed as part of the proposed scheme. All technically feasible options are designed to provide positive biodiversity measures, such as improved fish permeability, mammal passage measures, better riverine conditions (morphology) and overall improved riverine habitat.

9.1.8 In accordance with regulation 14, the Applicant has demonstrated that the proposed scheme will not permanently exclude or compromise the achievement of the environmental objectives set in relation to any other water body within the same river basin district; is not inconsistent with any other retained EU law; and guarantees at least the same level of protection for bodies of water as the EU instruments repealed by Article 22 of the WFD.

9.1.9 Overall, the Applicant maintains that the WFDR assessment is compliant with the objectives of the 2017 Regulations. The proposed scheme will avoid unnecessary damage, will not risk causing deterioration to the elements identified and thus accord with the Anglian RBMP. In the event that the SoS considers that the provisions of regulation 19 should be applied then the evidence as cited and assessed in this document

demonstrates that the tests are all met and there will not be any breach of the environmental objectives set for the relevant water bodies.

Appendix A Environment Agency letter dated 20 Oct 2023 (ref: AE/2023/128756/02-L01)

Our ref: AE/2023/128756/02-L01
Your ref: TR010060

Date: 20 October 2023

Dear Chris

A12 CHELMSFORD TO A120 WIDENING SCHEME: A12 STRUCTURES - DISCUSSIONS ON MAIN RIVER CROSSINGS

Thank you for presenting the updated details for the main river crossings associated with this scheme at our meeting on 4 October 2023. We welcome the progress that has been made in seeking to improve the designs previously submitted as part of the DCO. Please find below our comments on each of the crossings, but note that this should not be considered as approval for the designs.

Brain Bridge

We previously commented that the proposed design to extend the existing bridge. This replicated and therefore extended the existing concrete bed of the channel which is known to cause problems for fish and eel passage, especially in times of lower flows.

We are pleased to see that the revised proposals will now not extend the concrete bed. On 18th September 2023 we discussed with the installation of a rock ramp on the downstream side of the Brain bridge. This is to enable fish passage over the existing sill, and we will need to see how this will fit in with the updated design. At that meeting we also asked for further measures to improve fish passage to be added to the concrete bed under the bridge, these may include rocks placed under the bridge (preferred), coir roll or woody debris. We understand that this is being considered and we await further consultation on that issue. All measures to be installed will need to be approved by the Environment Agency's fish pass panel.

Subject to agreement and approval of the rock ramp and further measures on the concrete bed, we would agree that the updated proposals have the potential to provide an enhancement over the existing situation.

Rivenhall Brook

The latest proposals represent a significant improvement over what was proposed as part of the DCO. We welcomed the discussion and information regarding options for introducing light within the structure. This will be an essential element for facilitating mammal passage. The options to introduce light tubes, glass bricks and reflective surfaces should be explored further, with consideration also given to any potential impacts on bats.

Further consideration should also be given to how the river channel and embankments will be formed. In each case these should be as 'natural' as possible. For the channel we would expect to see a two-stage channel with a gravel bed, potentially utilising a firm bed of flints and gravel and avoiding the use of gabion baskets. Similarly, the embankments and channel margins should as far as possible present an opportunity for vegetation to establish.

Ashmans Bridge (River Blackwater)

Our concern with this crossing was the loss of natural banks and the installation of concrete revetment. We welcome the undertaking to look at how to achieve scour protection of the piers through other means, including rock mattress, and the use of materials such as 'grasscrete' type products for the floodplain facing revetments.

Domsey Brook bridge (west)

The new meandering downstream section outside the crossing extension will be an improvement. But the existing structure is problematic, particularly for mammal passage. Because of the position of this crossing the doubling of the culvert length through the extension will have the potential to cut off almost the whole of the Domsey Brook from the rest of the Blackwater catchment.

Mammals which cannot cross here due to the dark long crossing and or high flows will be forced to use the Feering Road crossing to the South and are therefore likely to become road traffic casualties. Our experience is that fencing will unfortunately not work to prevent this.

The current opening is narrow and gives little scope for any riverine processes in the channel. A wider extension will need to take account of this and would be more accommodating. The extension should be designed with a wider opening which tapers to match the existing structure if the existing structure cannot be improved.

As the lengthening of the culvert will make mammal passage more problematic (and unlikely), it will be essential to find a way to install good mammal ledges throughout the crossing length. As with the Rivenhall Brook crossing, the length means that lighting will also need to be improved and similar methods of introducing natural light should be assessed.

Domsey Brook (East)

As with the proposals for the Rivenhall Brook crossing, we welcome the improved structure design proposals. Again, the channel and embankments should be formed

in as 'natural' a way as possible, with similar techniques utilised. Additionally, for Domsey Brook the opportunity to create a two-stage channel which also includes some sinuosity should be explored.

Roman River

We welcome the reduction in length for the culvert extension (from 12m to 6m), and the wide opening. The addition and retrofitting of mammal ledges, along with the realigned channel on the south side do provide enhancements. We understand that baffles are to be installed also, and we would like to see more details of these to consider where and how these will be fitted in conjunction with our fisheries team.

General comments

It all cases it will need to be demonstrated that the new or extended crossings do not make fish and mammal passage more difficult. We wish to see all existing and new crossings have safe mammal passage, easy fish passage and be designed to permit sediment transport and natural fluvial processes.

River Ter Crossing

This river crossing is set on a flat concrete bed which is very poor habitat for fish (similar to the River Brain crossing) but also has a very large (c.2 metre high) concrete weir just upstream which appears to be part of the structure or at least built concurrently with the bridge. This weir impounds the upstream flows where the former Hatfield watermill was in the 1960s prior to the dualling of the A12. Whilst there is a bypass channel which we also wish to investigate, the main channel is an over-large silty ponded section which is of poor habitat and water quality and would benefit from being re-naturalised.

The height and width of the impoundment is both unnecessary and undesirable and dam failure could cause a considerable flood and structural problem for the bridge immediately downstream.

As part of our whole catchment approach, we would be interested in investigating better options here for the longer term ideally to remove the dam altogether and thus relieve any future liability and risk to the A12 bridge. It would be useful to know who owns this structure. Whilst it appears to have been built concurrently with the 1960s bridge, we believe it may not be serving any useful function and be a long-term liability.

The Environment Agency would be interested in finding out more about the weir structure and working towards a more sustainable solution for removing the barrier to fish passage and restoring the upstream channel to a more natural one. We recognise this would be a large undertaking, but it is the largest barrier to fish on the River Ter which is one of the least ecologically damaged rivers in Essex. We wish to fully connect the natural corridor linking the superb and rare brown trout and brook lamprey spawning grounds in the SSSI river habitat upstream with the Chelmer catchment through to the Blackwater estuary SSSI, SPA, SAC and Ramsar site downstream. This weir and the harsh concrete bed and banks of the A12 are a major problem in achieving this key vision.

We recognise that the weir removal would be a longer-term fix which will need some planning but we would be keen to explore some river habitat enhancement under the A12 Ter crossing in a similar way to the River Brain crossing as we believe that there would be cost savings considering these two channels together at the same time as the 1960s treatment replaced all natural habitat with similar concrete river bed and bank surfaces at both locations. We acknowledge that this may be outside of the scope of the A12 Chelmsford to A120 widening scheme, but we would welcome the opportunity to discuss this further with National Highways.

We look forward to continuing to work with you on this project.

Yours sincerely

Appendix B REAC

Measures included in the Register of Environmental Actions and Commitments (REAC) (First Iteration EMP Appendix A REAC [REP7-016])

This Appendix sets out, at Tables 1 and 2, the measures that have been included in the REAC (First Iteration EMP Appendix A REAC [REP7-016]) for the construction and operation periods of the proposed scheme respectively. Table 3 sets out the measures that have been proposed, post Examination for inclusion within the REAC as a result of discussions with the Environment Agency.

Table 1: Mitigation measures considered for construction

REF No. in the REAC	Mitigation Measure	Description	Level of uncertainty[7]	Potential impact of the mitigation measure
REAC-BI1	Construction timing	Works timed to avoid sensitive periods for protected species where reasonably practicable and appropriate.	Low – dependent on time constraints.	Reduces the risk of substantial loss to fauna and flora populations.
REAC-BI2	Fauna retention	Important commuting features such as mammal pathways and river channels would be left clear of obstruction.	Low – dependent on conditions.	Reduces risk of substantial loss and fragmentation to fauna and flora populations and movement pathways.
REAC-BI3	Buffer zones	Appropriate buffers would be implemented around watercourses where suitable, using physical barriers during construction works.	Low - based on on-site judgement (ECoW).	Reduces risk of bank disturbance and the loss or displacement aquatic habitats and species.
REAC-BI3	Invasive non-native species management	The Invasive Species Management Plan (ISMP) would be developed and implemented based on the measures and approaches detailed in the first iteration EMP [TR010060/APP/6.5].	No uncertainty.	Prevents further adversity arising from the accidental spread of Invasive species.
REAC-BI4	Construction supervision	An ECoW would be employed where relevant to the works being undertaken.	No uncertainty.	Supervision will limit damage or destruction to habitats.
REAC-BI5	Fluming	Where sections of watercourses are to be isolated as part of construction work, fluming would be used to protect any fish species present preventing direct mortality of	Low - some uncertainty at Roman River, given the pre-cast nature of the extension.	Will allow fish passage to continue during construction.

[7] Levels of uncertainty are assigned using professional judgement based on the following criteria:

- Low: there is some uncertainty related to either the measure's feasibility or the benefit it would result in; however, the measure is likely to be effective.
- Medium: there is a moderate level of uncertainty related to either the measure's feasibility or the benefit it would result in, possibly related to limited scientific evidence of its effectiveness.
- High: there is no evidence of the measure's feasibility or the benefit it would result in, and no scientific evidence of its effectiveness.

REF No. in the REAC	Mitigation Measure	Description	Level of uncertainty[7]	Potential impact of the mitigation measure
		fish.		
ES-BI1	Noise control	Minimise work outside normal working hours and use lower-noise emitting equipment.	No uncertainty.	Prevents fish fatalities and fauna displacement.
ES-BI2	Fish rescues	To be authorised by EA.	No uncertainty.	Limits fish fatalities.
ES-RDWE1	Over-pumping	Any requirement for over-pumping would involve appropriately sized and consulted upon with regulators.	No uncertainty.	Allows for flow to continue and limits scour of bed and bank material.
ES-RDWE2	Construction timing	Construction of culverts and realignments would be timed during low flow conditions where practicable.	Medium – could contrast with potential migratory periods for fish.	Reduces any adversity on flow and sediment transport dynamics.

Table 2: Mitigation measures considered for operation

Ref	Mitigation measure (MM)	Description	Is the MM technically feasible	Level of uncertainty	Potential impact of the MM
REAC-RDWE1	River realignment design	Excavation of a two-stage channel along Rivenhall Brook and Domsey Brook	Yes	No uncertainty	Improved opportunity to replicate a naturally functioning watercourse and improved floodplain connectivity
REAC-RDWE2		Excavation of a two-stage channel along Roman River.	No	High – no space available for two-stage channel.	
REAC-RDWE3		Excavation of a two-stage channel along Ordinary Watercourses.	Yes	Medium – some ordinary watercourses would lack the space for a two-stage channel. Assessment of uncertainty to be carried out on an individual basis.	
REAC-RDWE4		Retain existing length of watercourse.	No	High – no space available, whilst mitigation for increased sinuosity will at times increase the channel length.	Maintain channel length and gradient to prevent substantial changes in hydromorphological processes.
REAC-RDWE5		Retain gradient of existing channel.	No	High – very difficult to achieve without retaining the exact length of the channel.	
REAC-RDWE6		Excavating a gently sinuous channel for main river realignments.	Yes	Low – depending on the space available.	Facilitates natural processes along a watercourse, including flow and sediment transport dynamics.

Ref	Mitigation measure (MM)	Description	Is the MM technically feasible	Level of uncertainty	Potential impact of the MM
REAC-RDWE7		Excavating a gently sinuous channel for main river realignments	Yes	Medium – depending on the space available.	
REAC-RDWE8		Reinstating natural bed material present along the existing channel.	Yes	Low – some uncertainty around those realignments that will be longer than the existing channel.	Allows for the retainment of bed material type and size along a watercourse.
REAC-RDWE9		Installing decomposable geotextile bank protection along the upper banks.	Yes	No uncertainty	Facilitates channel stability and vegetation establishment.
REAC-RDWE10	Culvert design	New culverts to include culvert diameters that match the natural channel.	Yes	Low – some uncertainty along any one-stage channel realignments as their banks tops would be based on local ground tie-in points.	Reduces the impact of a culvert on flow and sediment transport dynamics.
REAC-RDWE11		Limit the length of newly constructed culverts and extensions.	No	High – length of culvert depends on the length of the highway footprint. Any reduction in the length of the culvert may result in destabilisation of earthworks.	Reduces the loss of natural bed and bank material.
REAC-RDWE12		Bury the invert of a new culvert under natural bed of watercourse.	Yes	No uncertainty	Facilitates the continuation of sediment transport and flow dynamics.
REAC-RDWE13		Bury the invert of any culvert extension.	No	High – tie-in point of the outlet dependent on existing gradient of culvert. Could involve complete reconstruction of culvert, which would be impracticable.	
REAC-RDWE14		Tie-in new and extended culverts with the banks to prevent outflanking of culvert by hydromorphological processes.	Yes	No uncertainty.	Prevents significant scour at the inlet and/or outlet of a culvert. Allows for a smooth transition between the culvert walls and natural bank material.

Ref	Mitigation measure (MM)	Description	Is the MM technically feasible	Level of uncertainty	Potential impact of the MM
REAC-RDWE15		Where the inlet and/or outlet tie-in with the channel or realignment, these tie-in points would involve realigning the channel to a gentle bend rather than a perpendicular bend.	Yes	No uncertainty	
RDWE-ESBI1		Baffles along the proposed invert of Domsey Brook bridge.	No	High – Baffles not required due to bridge not being a closed system akin to a culvert, not providing any benefit to fish passage given the observed depths of flow and not required for sediment retention, given the gradient.	Improves flow dynamics, sediment retention and fish passage.
RDWE-ESB3		Baffles along the existing Domsey Brook bridge.	No	High – installing baffles would be impracticable from a constructability perspective.	
RDWE-ESB3		Baffles along Domsey Brook (east) culvert.	Yes	No uncertainty.	
RDWE-ESB4		Baffles along the proposed Roman River Culvert extension.	No	High – Only one baffle can be realistically included along the extension. Therefore, the benefit would be negligible.	
RDWE-ESB5		Baffles along the existing Roman River Culvert.	No	High-retrofitting baffles along a confined space raise significant health and safety concerns. Therefore, it would not be constructable.	
REAC-RDWE1	Bridge design	Bed and bank reinforcement at proposed bridges widenings would only be considered if potential erosion due to new or extended structures	Yes	No uncertainty	Prevents significant scour both undermining the bridge and adversely impacting baseline hydromorphological processes.

Ref	Mitigation measure (MM)	Description	Is the MM technically feasible	Level of uncertainty	Potential impact of the MM
		cannot be prevented.			
REAC-RDWE2		If piers are required for the new or existing bridges, they would be designed to allow the passage of large woody debris.	No	High – no piers present for any watercourse crossing.	Prevent significant change in sediment transport dynamics.
REAC-RDWE3	Monitoring	Monitoring of Ordinary Watercourse 11 (within the River Blackwater catchment) to identify whether bank protection is necessary.	Yes	No uncertainty	Prevents further adversity arising from scour and channel adjustment along the retained open channel.
REAC-RDWE4	Sediment augmentation and natural flow regulation	Introduce sediments along the realignments of Rivenhall Brook to replicate a pool-riffle sequence.	Yes	No uncertainty	Provide natural flow regulations via the sequence of varying bed levels. Improved flow dynamics and sediment transport dynamics. Further opportunity for habitat creation.

Table 3 Post Examination proposed additions to the REAC

The changes that the Applicant has proposed to the REAC (First Iteration EMP Appendix A REAC [REP7-016]) following the closing of the Examination are set out below. These are subject to final comment by the Environment Agency and the revised REAC (First Iteration EMP Appendix A REAC [REP7-016]) will then be submitted to the Secretary of State.

Ref No	Source Ref.	Topic	Action/commitment	Monitoring required	Objective	Assumption
BI53		Rivenhall Brook	Introduction of natural light into the structure corridor.	Yes (see BI49)	To encourage mammal passage.	N/A
BI54		Rivenhall Brook	The design of the river channel and embankments to create a more 'natural' form, where practicable. Subject to hydraulic and sectional constraints, a two-stage channel with a gravel bed would be formed potentially utilising a firm bed of flints and gravel and avoiding the use of gabion baskets. The embankments and channel margins should as far as practicable present an opportunity for vegetation to establish.	No	To improve the hydromorphology of the watercourse	Measures to be installed would need to be approved by the Environment Agency.
BI55		Ashmans Bridge	Scour protection of the new piers should be through	No	To reduce the loss of natural banks.	N/A

Ref No	Source Ref.	Topic	Action/commitment	Monitoring required	Objective	Assumption
			means such as including rock mattresses, and/or the use of materials such as 'grasscrete' type products for the floodplain facing revetments where practicable.			
BI56		Domsey Brook Underbridge (West)	Where the structure is being extended the existing parallel wing walls will be replaced with splayed wing walls to widen the opening of the proposed structure and minimise the restriction on riverine processes.	Yes (see BI49)	To encourage riparian mammals to cross the A12 under the carriageway reducing road traffic casualties and to improve the hydromorphology of the watercourse	N/A
BI57		Domsey Brook East	The design of the river channel and embankments to create a more 'natural' form, where practicable. Subject to hydraulic and cross-sectional constraints a two-stage channel with a gravel bed, would be formed potentially utilising a firm bed of flints and gravel and avoiding the use of gabion baskets.	No	To improve the hydromorphology of the watercourse	Measures to be installed would need to be approved by the Environment Agency.

Ref No	Source Ref.	Topic	Action/commitment	Monitoring required	Objective	Assumption
			The embankments and channel margins should as far as practicable present an opportunity for vegetation to establish.			
BI58		Roman River	Installation of baffles in the culvert invert.	No	To improve fish passage through the structure.	Measures to be installed would need to be approved by the Environment Agency.

Appendix C Approximate costs for proposed structures and alternatives

Structure	Description	Cost
Brain Bridge widening	a) Widen deck on both sides with precast concrete beams and deck slab, not matching existing, supported on reinforced concrete substructure to match existing on piled foundations.	1,895k
	b) Widen deck on both sides with braced steel girders and deck slab, not matching existing, supported on reinforced concrete substructure to match existing on piled foundations.	1,989k
Redesign and rebuild Brain Bridge	Decommission bridge, construct an offline diversion road for traffic management and then construct a new clear span structure.	Almost unquantifiable - noting that as an existing underbridge carrying the A12, this would drive the full realignment of the A12 (either temporarily or permanently) in order to replace this structure.
Modification to the existing invert slab during the bridge widening	Either remove the concrete invert sill or cut a low flow channel into it.	400k
Rivenhall Brook	In situ concrete box culvert.	716k
	Corrugated steel pipe arch.	567k
	Single span concrete portal frame on piled foundations or spread footings.	1,530k
	Precast single span portal frame on spread footings.	1,689k
Domsey Brook Bridge extension	Widening the structure with an in situ parabolic arch to match the existing supported on piled foundations.	2,321k
	Widening the structure with reinforced concrete slab supported on reinforced concrete wall abutments.	1,732k
	Widening the structure with multi-plate steel high profile arch culvert.	2,109k
	Widening the structure with a precast concrete arch supported on kicker walls on piled foundations.	1,735k
Domsey Brook culvert	Online precast concrete box culvert.	813k
	Offline in situ concrete box	894k
	Offline corrugated steel pipe arch culvert.	751k
	Precast single span portal frame on spread footings.	1,792k
Roman River culvert redesign	De-commissioning of Roman River culvert, reconstruction of a clear span structure.	6,583k
	Roman River extension for comparison	500k

Appendix D WFD Classification data

WFD classification – 2022 data from Catchment Data Explorer

Structure	Ashman's	Brain Bridge	Chelmer	Domsey	Roman River
Designated water body	Blackwater (combined Essex)	Brain	Chelmer (downstream of Can)	Domsey Brook	Roman River
ID	GB10503704 116 0	GB10503704 1140	GB10503703 3530	GB10503703 3870	GB10503703 4150
Length (km)	38.63	30.53	19.8	7.27	19.52
Catchment area (km^2)	131.63	69.94	54.48	24.15	61.11
Overall status	Mod erate	Moderate	Good	Good	Moderate
Ecological	Moderate	Moderate	Poor	Good	Moderate
Biological	Moderate	Good	Poor	Good	Moderate
Fish	High	No data	Good	No data	Moderate
Invertebrates	High	Good	High	Good	Good
Macrophytes and phytobenthos combined	Moderate	-	Poor	High	Moderate
Macrophytes sub element	Moderate	Poor	Poor	-	Moderate
Phytobenthos sub element	Moderate	-	High	High	-
Physico-chemical	High	Moderate	Moderate	Good	Moderate
Acid neutralising capacity	High	High	High		
Ammonia (phys-chem)	High	Moderate	High	High	Good
Biochemical Oxygen Demand	High	High	High		High
Dissolved oxygen	High	Moderate	High	Good	High

Structure	Ashman's	Brain Bridge	Chelmer	Domsey	Roman River
Phosphate	High	Poor	Poor	Good	Poor
Temperature	High	High	High	High	High
pH	High	High	High	High	High
Hydromorphology designation	No data	Supports Good	Supports Good	Supports Good	Supports Good
Hydrological regime		Supports Good	Does not support Good	High	Does not support Good
Supporting elements (surface water)	Moderate	Moderate	Moderate	Good	Moderate
Mitigation measures assessment	Moderate or less	Moderate or less	Moderate or less	Good	Moderate or less
Specific pollutants	High	High	High		High
Arsenic	High	-	High		
Chlorothalonil	High		High		
Chromium (VI)			High		
Copper	High	High	High		
Iron	High	High	High		
Manganese	High		High		
Pendimethalin	High		High		
Triclosan	High	High			
Zinc	High		High		
Chemical	Fail	Does not require assessment		Does not require assessment	Does not require assessment
Priority hazardous substances	Fail (all good except Benzo(g-h-i)perylene; mercury and its compounds; Perfluorooctane	Does not require assessment	Does not require assessment	Does not require assessment	Does not require assessment

Structure	Ashman's	Brain Bridge	Chelmer	Domsey	Roman River
	sulphonate (PFOS); and Polybrominated diphenyl ethers (PBDE) which are at fail				
Priority substances	-	-	Does not require assessment	Does not require assessment	Does not require assessment
Other pollutants	Good	Does not require assessment	Does not require assessment	Does not require assessment	Does not require assessment