The Sizewell C Project

5.6Ad Sizewell Link Road Flood Risk Assessment Addendum

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EXECUTIVE SUMMARY

NNB Generation Company (SZC) Limited (SZC Co.) submitted an application for a Development Consent Order (DCO) to the Planning Inspectorate under the Planning Act 2008 for the Sizewell C Project (referred to as the 'Application') in May 2020. The Application was accepted for examination in June 2020. As part of the submission, the **Sizewell Link Road Flood Risk Assessment** [APP-136] and its accompanying appendices were provided to assess the existing flood risk from all sources of flooding both to and from the proposed Sizewell link road development.

The **Sizewell Link Road Flood Risk Assessment** [APP-136], in the Application, confirmed that the proposed Sizewell link road would be at low risk of fluvial flooding throughout the development lifetime, including climate change allowances.

Following submission of the Application, review of the **Sizewell Link Road Flood Risk Assessment** [APP-136], and continuing engagement with the key stakeholders (including the Environment Agency), a number of comments have been received. These comments were primarily in relation to the level of detail provided on the proposed design, the surface water design drainage strategy and hydraulic modelling, where the stakeholders were seeking more information and evidence to support the outcomes of the assessment of flood risk.

The design and hydraulic modelling presented within the Application were based on limited information on the existing conditions, therefore requiring the use of some assumptions and less detailed assessment, such as brief evaluation of flood risk to the site and its users during the construction phase of the development and the lack of modelling of crossing 7. Further comments were also received in relation to the hydraulic modelling, including queries on general model schematisation, flood risk mapping, blockage assessment as well as comments on surface water drainage and the need for a flood risk emergency plan. Further assessment and analyses carried out in response to these comments are discussed within this **Sizewell Link Road Flood Risk Assessment Addendum**.

In response to additional engagement with the key stakeholders, SZC Co. has further developed and revised the design of some aspects of the scheme to provide better alignment with the existing conditions and ensure there is appropriate mitigation against potential flood risk and environmental impacts.

As a result, some changes to the Order Limits (site boundary) for works on the Sizewell link road have been proposed and submitted to the Planning Inspectorate in January 2021 (**Volume 1**, **Chapter 6** of the **ES Addendum** [AS-185]. Where necessary, these include updates to accommodate small changes to the design or restrictions during construction. No substantial changes are proposed to the concept design of the portal culvert for the watercourse crossings, however further development of the design has

enabled the provision of more details on specific elements, such as flat soffit of the culverts, minimum headroom allowance for mammal passage and alignment of the crossings.

The design of the culvert at crossing 1 has been changed. In the Application, a T-shaped concrete cross-section through the culvert was proposed, whereas the updated design assumes a portal culvert fitted into the diverted channel whilst retaining the 1 in 3 bank slopes.

Additional topographical survey was undertaken following the Application submission which provided further information on the existing conditions at the proposed crossings, such as cross-sections of existing watercourses and dimensions of existing culverts under the B1122 and a number of field crossings. This additional information was used to further inform the design and update the hydraulic modelling, including the development of a model for crossing 7, and consequently the assessment of flood risk.

Following the updates to the hydraulic modelling, site-specific Flood Zone and flood depth maps have been produced for each of the crossings to inform and confirm the Sequential and Exception test evaluation for the proposed Sizewell link road. In line with the conclusions drawn in the Application, the updated modelling results and mapping show that the proposed development is primarily located in Flood Zone 1 and the proposed design (with mitigation measures, where appropriate) results in minimal or no impact on flood risk to the surrounding areas. This therefore demonstrates that the proposed Sizewell link road passes the Sequential Test and all elements of the Exception Test.

In the Application, the drainage strategy for surface water management was based on infiltration. However, ground investigation undertaken after the submission showed that the removal of all highway surface water runoff by infiltration alone is not possible. Therefore, following discussions with Suffolk County Council, the approach to highway drainage has changed to hold water in attenuation basins and manage the release of the water to local watercourses.

Revised design details and additional information were used to update the hydraulic models for all of the crossings. The updated hydraulic models were simulated for a series of return period events (1 in 5-year, 20-year, 100-year and 1,000-year) and two climate change scenarios, i.e. 35% (higher central) and 65% (upper end) to assess flood risk throughout the lifetime of the development.

Results of the updated modelling show that the proposed Sizewell link road would not be at risk of fluvial flooding throughout the development lifetime up to the 1 in 1,000-year event with 65% climate change allowance. This flood risk is consistent for all watercourse crossing locations.

The extent of flooding along the watercourses is not significant, in some cases water is solely maintained within the channels. As such, the impact of the scheme is localised and often limited to minimal increases in flood levels. Where there is an increase in flood depth within the floodplain, as a result of the scheme, there are no residential or non-residential properties experiencing an increase in flood risk and only small areas of agricultural land would be affected, mostly within the site boundaries, therefore the overall impact of the Sizewell link road on flood risk is not significant.

Details of the management of flood risk during the early construction phase and throughout the operational and decommissioning phases are set out in the Sizewell Link Road Flood Risk Emergency Plan, appended to this document, where safe access and egress, flood warning, evacuation procedures and need for safe refuge in response to a flooding event are described.

Further clarifications relating to the surface water drainage strategy are also included in this **Sizewell Link Road Flood Risk Assessment Addendum**.

Additionally, this document and its accompanying appendices provide a response to the comments received with regard to hydraulic modelling undertaken for the Application, discussing updates to the hydraulic modelling in terms of fluvial flooding and the additional sensitivity testing carried out to inform the assessment of on-site and off-site impacts.

1 INTRODUCTION

1.1.1 NNB Generation Company (SZC) Limited (SZC Co.) submitted an application for a Development Consent Order (DCO) to the Planning Inspectorate under the Planning Act 2008 for the Sizewell C Project (referred to as the 'Application') in May 2020. The Application was accepted for examination in June 2020.

1.1.2 Since the submission of the Application, SZC Co. has continued to engage with the local authorities, environmental organisations, local stakeholder groups and the public to gather their responses to the Application. This process has identified potential opportunities for changing the Application to further minimise impacts on the local area and environment, whilst reflecting the further design detail that has come forward in preparation for implementation of the Sizewell C Project. Description and reasoning for these proposed changes have been submitted to the Planning Inspectorate in January 2021 (**Volume 3**, **Chapter 6** of the **Environmental Statement (ES) Addendum** [AS-248].

1.1.3 In addition to the proposed changes, SZC Co. has continued to develop the detail of its proposals for the implementation of the Sizewell C Project (the 'Project') and has undertaken additional engineering design and environmental assessment work in response to the ongoing engagement with stakeholders. This 'Additional Information' adds to the information supporting the Application and should assist interested parties in their understanding of flood risk matters.

1.1.4 The proposed changes and the Additional Information are described and assessed in a number of updates and Addenda to the originally submitted application documents (**Volume 1**, **Chapter 6** of the **ES Addendum** [AS-185].

1.1.5 This report provides additional information to support the **Sizewell Link Road Flood Risk Assessment** [APP-136] for the Project, which was provided in support of the Application, focusing on the flood risk to and from the proposed development in relation to the watercourse crossings along the route.

1.1.6 The locations of the seven watercourse crossings along the route of the proposed Sizewell link road are presented in **Figure 4** of the **Sizewell Link Road Flood Risk Assessment** [APP-138].

1.1.7 This **Sizewell Link Road Flood Risk Assessment (FRA) Addendum** presents additional information provided in response to further engagement

with key stakeholders including the Environment Agency's Relevant Representation on the Sizewell C Development Consent Order, dated 30th September 2020 (Ref. 1). An overview of the Relevant Representation on flood risk matters in connection with the proposed Sizewell link road development is provided in **Appendix A** of this document.

1.1.8 This **Sizewell Link Road FRA Addendum** also presents additional information in response to further comments from the Environment Agency received on 5th February 2020 and subsequently, post Application, on 4th August 2020 (collated in **Appendix B** of this document).

1.1.9 A review of the Relevant Representation and further comments from the Environment Agency to identify key focus areas for further assessment in relation to flood risk, are discussed in **Section 2** of this document.

1.1.10 Additional assessment was undertaken in response to comments received as well as the proposed changes to the scheme design. The updated understanding of the flood risk for the baseline scenario is discussed in **Section 3** of this document, and the updated assessment of flood risk post-development is presented in **Section 4** of this document. Further clarifications in response to additional issues raised by the Environment Agency are provided in **Section 5** of this document.

1.1.11 Note that this document presents additional work only and should be read alongside the original documentation submitted as part of the Application.

2 SUMMARY OF COMMENTS RECEIVED FROM THE ENVIRONMENT AGENCY

2.1 Summary of Relevant Representation

2.1.1 Extract of the Environment Agency Relevant Representation related to flood risk at the Sizewell link road development states:

> *"There are missing elements from the hydraulic model which mean the evidence to support the FRA is lacking in the detail we would expect. […] crossing SW7 has not been represented in the model and therefore third party flood risk impacts cannot be properly understood. […] Flood risk in the baseline and 'with crossing' scenarios has not been mapped so it's very difficult to properly understand third party impacts, particularly where there are out of bank flows such as at SW1 and SW3.*

As the FRA does not show the road will be safe for its lifetime without increasing flood risk elsewhere, it is contrary to paragraph 5.7.3 and 5.7.16 of National Policy Statement EN1."

2.1.2 The **Sizewell Link Road Flood Risk Assessment** [APP-136] concluded that the finished road surface levels of each of the crossings are well above the corresponding modelled peak flood levels for the design flows (1 in 100-year with 65% climate change) and therefore, the proposed Sizewell link road would be safe from flood risk for users for the design event (including allowance for climate change) throughout the lifetime of the development.

2.1.3 While there was a slight increase in flood risk as a result of the proposed crossings, the impact was concluded as being low and localised in nature (i.e. in the vicinity of the proposed road crossings) for the crossings and contained within the existing channels at a number of the proposed crossing locations. Where flood waters were above bank levels, the only receptor likely to be affected by the increase in water level was identified as agricultural land.

2.1.4 Overall, the Environment Agency has raised concerns with regard to the level of detail of the assessment and corresponding hydraulic modelling, and general justification of the proposed design of the crossings.

2.1.5 The **Sizewell Link Road Flood Risk Assessment** [APP-136] acknowledged that the hydraulic modelling undertaken was simplified due to the limited information available at the time of the assessment, in particular the topographical data and details of the proposed design for some of the crossings.

2.1.6 To address these matters SZC Co. has undertaken additional assessment to update its understanding of the existing flood risk as well as the future flood risk with the proposed development in place. The outcomes of the additional assessment are discussed in **Section 3** and **Section 4** of this document.

2.2 Further technical comments raised by Environment Agency

2.2.1 In their review of the Application and associated modelling, the Environment Agency also identified additional issues regarding other technical elements of the **Sizewell Link Road Flood Risk Assessment** [APP-136] and **Appendix A: Sizewell Link Road Modelling Report** [APP-137]. These comments (collated in **Appendix B** of this document) relate to the model

schematisations, other model parameters, and the level of detail of the proposed design for the individual crossings.

2.2.2 One of the Environment Agency's comments (collated in **Appendix B** of this document) states that:

> *"FRA states & concludes that the SLR site is in Flood Zone 1 which has not been proven in the FRA. […] FRA concludes the proposed development takes the sequential approach based on existing flood zones which do not map the flood risk from the watercourses in question."*

2.2.3 In the **Sizewell Link Road Flood Risk Assessment** [APP-136], the Environment Agency's Flood Map for Planning (Ref. 2) was used to determine the level of risk at the proposed development site, although it was acknowledged that detailed modelling may not have been carried out for the derivation of the Flood Map to properly delineate these fluvial flood zones around the upper end of the catchments where the crossings are proposed.

2.2.4 In their response to the Application, the Environment Agency suggested that the hydraulic modelling undertaken, and specific to the Project, should be used instead to inform and evidence the assessment of flood risk within the proposed development and impacts to off-site receptors. This is highlighted in the Environment Agency's general comment (collated in **Appendix B** of this document) that states:

> *"The watercourses that will be crossed by the SLR have been modelled, although Flood Zone mapping has not been provided. […] No mapping of baseline and proposed scenario flood risk hence it is difficult to fully understand any third party impacts."*

2.2.5 Following the Application submission, further work has been carried out to revise and expand the assessment of flood risk for the proposed Sizewell link road in order to address the comments and satisfy the Environment Agency and other key stakeholders that appropriate consideration of flood risk has been included in the design process of each of the crossings. Details and outcomes of the additional assessment are discussed in the following sections.

3 UPDATE TO UNDERSTANDING OF BASELINE FLOOD RISK

3.1 Overview of additional assessment

3.1.1 In addition to general comments received relating to all of the assessed crossings, as summarised in **Section 2** of this document, the Environment Agency also provided comments specific to the individual sites described further in this section.

3.1.2 This section outlines the additional assessment and general updates to the hydrology and hydraulic models for all of the proposed crossings of the proposed development. Where applicable, further changes to the model schematisations, specific to the relevant crossing, were made. These are presented in the following sub-sections together with the updated modelling results and a discussion on flood risk at each crossing location.

a) Hydrological review

3.1.3 The assessment undertaken to inform the **Sizewell Link Road Flood Risk Assessment** [APP-136] used the ReFH2 method for peak flow estimation in line with the latest best practice and the Environment Agency's guidance. Details on the hydrological assessment are provided in **Appendix A: Sizewell Link Road Modelling Report** [APP-137] of the **Flood Risk Assessment**.

3.1.4 In their response to the Application, the Environment Agency raised one comment relating to the fluvial hydrology regarding the absence of the FEH Statistical Method analysis in the original hydrological assessment, stating:

> *"FEH statistical approach not considered. […] Estimates from the statistical approach should also be presented."*

3.1.5 In response to this comment, the current modelling exercise has undertaken a review of peak flows using the FEH Statistical Method, which is based on utilising observed flow data from a dataset of active gauging stations located throughout the UK river network.

3.1.6 Following review of the dataset, no suitable donor stations were available for the catchments delineated for each crossing, and therefore the QMED estimates have been derived using catchment descriptors as opposed to utilising observed data transferred across from a suitable donor gauge(s).

3.1.7 The **Sizewell Link Road Modelling Report Addendum** (**Appendix C** of this document) provides further details on the hydrological review undertaken and the limitations in relation to data availability.

Table 3.1 presents a comparison of peak flows for the 1 in 100-year event derived with the ReFH2 and the FEH statistical methods.

Table 3.1: Comparison of 1 in 100-year peak flow estimates

Crossing	ReFH2 peak flow (m^3/s) for the 1 in 100-year event	FEH Statistical Method peak flow (m^3/s) for the 1 in 100-year event
1	3.68	1.99
3	0.90	0.60
5	0.60	0.43
6	0.68	0.52
7	0.42	0.29

3.1.8 **Table 3.1** shows that the peak flows derived using the FEH statistical method are lower than those obtained using the ReFH2 method. On that basis, and in line with Environment Agency guidance (Ref. 3), further assessment for the Sizewell link road was carried out with the peak flows and hydrographs derived with the ReFH2 method to ensure the adoption of a conservative approach.

3.1.9 Further details on the peak flow estimation and comparison of the ReFH2 method with the FEH Statistical Method are provided in the **Sizewell Link Road Modelling Report Addendum** (**Appendix C** of this document).

b) Hydraulic model updates

3.1.10 The hydraulic models developed for the **Sizewell Link Road Flood Risk Assessment** [APP-136] and presented in **Appendix A: Sizewell Link Road Modelling Report** [APP-137] were built with limited information regarding the topography and existing structures, such as culverts on the field crossings. Following submission of the Application, additional topographical surveys were undertaken to inform the hydraulic modelling and the design of the crossings.

3.1.11 The additional survey captured several extended cross-sections, both upstream and downstream of each of the proposed crossing locations along the respective watercourses. Information on any structures (culverts, bridges, etc.) located within the survey extent was also captured.

3.1.12 The hydraulic models were updated with the information obtained from the additional survey, replacing cross-section information previously obtained from LiDAR data and adding the existing structures, where applicable.

3.1.13 The additional modelling assessment followed the general approach adopted for the Application, i.e. a 1D model with extended cross-sections, which is considered appropriate for the size of the watercourses and overall model extents and potential floodplain sizes.

3.1.14 The above updates were incorporated in the hydraulic models for both the baseline and post-development scenarios. Updates specific to the relevant crossings are discussed in the following sub-sections for the baseline scenario and in the respective sub-sections of **Section 4** of this document for the post-development scenario.

3.1.15 The updated models for all considered crossings were simulated for a series of return period events (1 in 5-year, 20-year, 100-year and 1,000-year) and two climate change scenarios, i.e. 35% (higher central) and 65% (upper end) to assess flood risk throughout the lifetime of the development.

3.1.16 Further details on the general updates to the hydraulic models are provided in the **Sizewell Link Road Modelling Report Addendum** (**Appendix C** of this document).

3.2 Crossings 1 and 2

3.2.1 The unnamed ordinary watercourse at crossing 2 is a tributary of the Middleton Watercourse (Main River) that is intersected by the Sizewell link road at crossing 1. Following the Application, the hydraulic models for crossings 1 and 2 were extended further downstream beyond the point of confluence of the watercourses and were therefore combined into one hydraulic model.

3.2.2 The additional survey showed that there are two existing field crossings over the Middleton Watercourse that were not previously identified. These have been incorporated into the updated model with culvert sizing informed by the survey and information collected during a site visit.

3.2.3 **Figure 1** (attached to this document) presents the Flood Zone Map for crossings 1 and 2 derived from the updated modelling results. The flood extent for the 1 in 100-year event was used to represent Flood Zone 3 and the 1 in 1,000-year event for Flood Zone 2. Areas outside of Flood Zone 2 or 3 are classed as being located within Flood Zone 1 (lowest flood risk).

3.2.4 The derived mapping shows that the Flood Zone 3 extent is limited to flooding of Fordley Road (**Figure 1**), as the Middleton Watercourse, a tributary of the Minsmere Old River, runs across the site adjacent to Fordley Road. Within the red line boundary there is an approximately 70m long section of the site located within Flood Zone 2, on the left floodplain within the most downstream part of the site, and another small area, approximately 30m long, at the upstream end, also on the left floodplain. Flood Zone 2 continues outside of the site boundary up to the Fordley Road junction with the B1122 on both sides of the floodplain.

3.2.5 Upstream of the proposed crossing 1, just outside the site boundary, there are up to four residential and non-residential properties with low flood risk (Flood Zone 1) but Fordley Road itself is located within the Flood Zone 3 extent. There are no other residential or commercial properties within the Flood Zone 2 or 3 extents.

3.2.6 **Figure 1** also shows that flood risk at the proposed crossing 2 (Garden House Farm watercourse), along the ordinary watercourse, is low and the area is mostly located within Flood Zone 1 (with a very small area of Flood Zone 2 and 3 within the site boundary) and the flooding is contained within the watercourse channel all through the site boundary and along the watercourse up to the confluence with the Middleton Watercourse at the Fordley Road junction with the B1122.

3.2.7 Further details on the hydraulic model build and results for crossings 1 and 2 used to derive the Flood Zone Maps are provided in the **Sizewell Link Road Modelling Report Addendum** (**Appendix C** of this document).

3.3 Crossing 3

3.3.1 The additional survey provided a better understanding of the watercourse (ordinary watercourse) crossing at Hawthorn Road. The watercourse has a ford which leads from the upstream of Wash Lane, over Hawthorn Road, and into the field ditch along the edge of Hawthorn Road, as illustrated in **Plate 3.1**. The ford was represented in the hydraulic model as a series of spill units and a 'bridge' unit was used to represent the structural element which conveys water into the ditch.

Plate 3.1: Hawthorn Road ford (photograph taken on 24.07.2020)

3.3.2 **Figure 2** presents the Flood Zone Map for crossing 3 derived from the updated modelling results. This shows that there are only localised areas within Flood Zone 3 or Flood Zone 2. There is one area around the corner of Hawthorn Road downstream of Hawthorn Cottages (**Plate 3.1**), and the right floodplain where an approximately 70m long section of the site is located within Flood Zone 3 or Flood Zone 2. Another, approximately 50m long area on the right floodplain at the downstream end of the site is also located within Flood Zone 3 or Flood Zone 2.

3.3.3 Hawthorn Cottages are at low risk flooding (Flood Zone 1 in **Figure 2**), as are the properties on the left and right floodplains just upstream of the junction between Hawthorn Road and the B112. There are no other residential or commercial properties located with Flood Zone 2 or Flood Zone 3.

3.3.4 As illustrated in **Figure 2**, the updated modelling results show that only a very limited area within the site boundary at crossing 3 would be at risk of flooding from fluvial sources, and no properties are at medium to high risk. Therefore, the overall flood risk to the site is considered to be low.

3.3.5 Further details on the model build and results for crossing 3 are provided in the **Sizewell Link Road Modelling Report Addendum** (**Appendix C** of this document).

3.4 Crossings 4 and 5

3.4.1 Crossings 4 and 5 are located on the Theberton Hall watercourse and the Pretty Road watercourse respectively (both ordinary watercourses), with crossing 4 being downstream and crossing 5 upstream (**Figure 4** of the **Sizewell Link Road Flood Risk Assessment** [APP-138].

3.4.2 In the previous study (**Sizewell Link Road Flood Risk Assessment** [APP-136], the hydraulic model for crossing 5 did not extend downstream to the location of crossing 4 as the proposed design did not require any changes to the existing watercourse or the culvert at this location and it was therefore assumed that modelling was not necessary.

3.4.3 In this study, the model was updated with the surveyed cross-sections and also extended further downstream to allow investigation of flood levels around the location of crossing 4 and crossing 5. In addition, three existing structures, which were not previously included, were incorporated, i.e. the culvert underneath the B1122 and two small field crossings further upstream.

3.4.4 **Figure 3** presents the Flood Zone Map for crossings 4 and 5 derived from the updated modelling. This shows that there are only two very localised areas within Flood Zone 2 or Flood Zone 3 along this ordinary watercourse (within the extent of the model).

3.4.5 There is an approximately 50m long section of the site located within Flood Zone 3 and a 70m long section within Flood Zone 2. This is limited to the area around existing culverts on a field crossing, at the location of the proposed crossing 5. There is another small area within the Flood Zone 2 or Flood Zone 3 extent on the left floodplain downstream of the B1122 (area outside the site boundary).

3.4.6 There are no residential or commercial properties located within Flood Zone 3 or Flood Zone 2. Therefore, based on the updated modelling results, the risk of fluvial flooding in the vicinity of the proposed crossings 4 and 5 is considered to be low.

3.4.7 Further details on the hydraulic model build and results for crossings 4 and 5 are provided in the **Sizewell Link Road Modelling Report Addendum** (**Appendix C** of this document).

3.5 Crossing 6

3.5.1 The hydraulic model for crossing 6 for the baseline scenario was updated with the additional surveyed cross-sections and extended downstream to the last surveyed cross-section. There were no existing structures or field crossings identified along the watercourse within the extent of the model.

3.5.2 In **Figure 4** of the **Sizewell Link Road Flood Risk Assessment** [APP-138], there is an ordinary watercourse (located outside of the site boundary) that joins the Main River (Theberton Watercourse) just upstream of the site boundary. This watercourse was not included in the recently undertaken topographical survey as it was found to be a small field ditch perched above the Main River and it appeared dry at the time of the survey. It was therefore not included in the updated hydraulic model. However, the hydrological assessment carried out for the Application (**Appendix A: Sizewell Link Road Modelling Report** [APP-137]) accounted for all flows within the catchment delineated around the main river and the ordinary watercourse (**Figure 4** of the **Sizewell Link Road Flood Risk Assessment** APP-138]), and therefore the inflow boundary of the model also includes any potential runoff from the small field ditch.

3.5.3 **Figure 4** presents the Flood Zone Map for crossing 6, derived from the updated modelling results, showing that along the watercourse (within the extent of the model) there is one area on the left floodplain located within either Flood Zone 2 or Flood Zone 3. This comprises an approximately 30m long section of the site located within Flood Zone 3 and an approximately 130m long section within Flood Zone 2.

3.5.4 There are no residential or commercial properties located within Flood Zones 3 or 2 along the watercourse or within the site boundaries.

3.5.5 Considering the limited extent of areas within either Flood Zones 2 or 3 and the lack of properties at flood risk, the risk of flooding from fluvial sources within the site boundary in the vicinity of the proposed crossing 6 is considered to be low.

3.5.6 Further details on the model build and results for crossing 6 are provided in the **Sizewell Link Road Modelling Report Addendum** (**Appendix C** of this document).

3.6 Crossing 7

3.6.1 At the time of the assessment undertaken to inform the Application, there was insufficient information available on the existing watercourse (Fishpond Grove ordinary watercourse) at the location of crossing 7 to build a hydraulic model or develop details of the proposed design. Therefore, this crossing in the **Sizewell Link Road Flood Risk Assessment** [APP-136] was only assessed based on the outline concept of the design.

3.6.2 The Environment Agency, in their response to the Application, states:

> *"No flood risk assessment of proposed crossing at SW7. FRA does not show the road will be safe for its lifetime without increasing flood risk elsewhere" […].*

3.6.3 As discussed in **section 3.1b)**, an additional topographical survey was undertaken following the Application submission, which included cross-sections of the existing ordinary watercourse within the site boundary at crossing 7 and details of the culvert underneath the B1122 and another culvert at a field crossing upstream of the site boundary.

3.6.4 Based on the additional information, a hydraulic model for crossing 7 has been developed to inform the updated flood risk assessment, including both baseline and post-development scenarios.

3.6.5 The surface water flood map (**Figure 3** of the **Sizewell Link Road Flood Risk Assessment** [APP-138]) shows that during an extreme flood event, water currently ponds in a topographically low-lying area to the left of the channel before then flowing over the B1122. This was confirmed during a site visit following a heavy rainfall event.

3.6.6 This flow path and the floodplain were incorporated into the hydraulic model using the survey information, where available and supplemented with the Environment Agency LiDAR data, for areas primarily within the floodplain.

3.6.7 The modelling results obtained for crossing 7 were used to derive a Flood Zone Map, illustrated in **Figure 5**, which shows that the flood extent is limited to the low spot within the left floodplain just upstream of the B1122 and a small area at the existing culvert which is upstream of the proposed Sizewell link road (i.e. outside of the site boundary). An approximately 70m wide section of the site, located within the left floodplain, is in either Flood Zone 3 or Flood Zone 2.

3.6.8 There are no residential or commercial properties located within either Flood Zones 3 or Flood Zone 2 within the site boundaries. There is one

property currently shown as within Flood Zone 2 (just upstream of the existing field crossing), however it is located approximately 150m upstream of the site boundary.

3.6.9 Considering the limited extent of the area within Flood Zones 2 or 3 and the lack of properties at flood risk within the site boundary, the risk of flooding from fluvial sources in the vicinity of the proposed crossing 7 is considered to be low.

3.6.10 Further details on the development of the model and obtained results for crossing 7 are provided in the **Sizewell Link Road Modelling Report Addendum** (**Appendix C** of this document).

3.7 Sequential Test and Exception Test

3.7.1 In the **Sizewell Link Road Flood Risk Assessment** [APP-136] it was concluded that the proposed Sizewell link road development is classified as 'essential infrastructure' and that, following review of the Environment Agency Flood Zone Map, it passes the Sequential and Exception Tests. However, it was acknowledged that the proposed highway will cross two Main Rivers with undefined flood extents and that the existing hydraulic models do not cover the proposed site.

3.7.2 In its response to the Application, the Environment Agency raised two comments in relation to the Sequential and Exception Tests:

> *"FRA concludes the proposed development takes the sequential approach based on existing flood zones which do not map the flood risk from the watercourses in question".*

> *"FRA states that the Exception test has been passed because modelling and an FRA have been produced. Production of an FRA and or modelling will not in itself result in passing the Exception Test. The FRA must evidence why the Exception test can be passed […]."*

3.7.3 To address the above comments and following the additional assessment, the approach to assess compliance with the Sequential Test and the Exception Test has been reviewed.

3.7.4 As discussed in the previous sections, Flood Zone Maps derived with the updated modelling results show that the Sizewell link road is primarily located in Flood Zone 1. Where the Sizewell link road is required to cross

watercourses, this necessitates the need for it to be located in, or cross over, Flood Zones 2 or 3.

3.7.5 In terms of the application of the Exception Test, this would only be relevant where the Sizewell link road passes through Flood Zone 3. However, the nature of the proposed development is such that any potential risk is mitigated within the design.

3.7.6 SZC Co. included the risk of flooding to inform the site selection and concept design of the Sizewell link road and to mitigate the risk of flooding, as discussed in **Chapter 3** of **Volume 6** of the **Environmental Statement** [APP-450]. The following has been considered:

- The route of the proposed Sizewell link road has been selected so that the fewest number of watercourse crossings would be required, and wider floodplain areas avoided, considering other engineering and site restrictions;
- The proposed road levels have been set above the flood levels (including climate change allowance) to mitigate flood risk to the development itself; and
- The proposed watercourse crossings have been sized, based on the model assessment, such that they mitigate the potential impact of flooding elsewhere.

3.7.7 The Sizewell link road would bypass a number of villages, which are located along the existing B1122, and would facilitate the movement of heavy goods vehicle traffic to safely and efficiently access Sizewell in relation to the proposed Sizewell C Project thereby significantly reducing through-traffic on the existing B1122. This would provide sustainability benefits to the community by addressing policy SP10 from the Suffolk Coastal Local Plan (Ref. 4).

3.7.8 Based on the above, it is concluded that the design of the route has followed, wherever possible, a sequential approach in terms of flood risk by primarily locating the proposed route in Flood Zone 1 and minimising the number of watercourse crossings, thereby reducing the level of interaction with areas at increased flood risk. The proposed development is therefore considered appropriate in line with the flood risk vulnerability and flood zone compatibility table (**Table 2.3** of the **Sizewell Link Road Flood Risk Assessment** [APP-136]).

3.7.9 Furthermore, site-specific hydraulic models have been developed for each of the crossings to support the design of the proposed development and

inform the **Sizewell Link Road Flood Risk Assessment** [APP-136]) and this **Sizewell Link Road FRA Addendum**, to minimise the impact of the proposed development on flood risk elsewhere and demonstrate that the development itself will be safe.

3.7.10 The updated modelling results show very limited, localised and negligible flood impacts on adjacent areas, none of which affects either residential or non-residential property, as detailed in **Section 4** of this assessment. Any impact would be very localised and limited to agricultural land.

3.7.11 Therefore, it has been demonstrated, as a result of the updated modelling exercise and the mitigation measures included within the design, that the proposed development passes the Sequential Test and that the design includes embedded measures to ensure that all parts of the Exception Test can be met.

4 UNDERSTANDING OF FLOOD RISK POST-DEVELOPMENT

4.1 Overview of additional assessment

4.1.1 The **Sizewell Link Road Flood Risk Assessment** [APP-136] stated that the majority of the site is at 'very low' risk of flooding from surface water, however areas associated with watercourses are at 'high' risk of flooding. Results from the hydraulic modelling for most of the crossings showed negligible change in flood levels with negligible impacts within the channel. For crossings 1 and 3, the results showed a slight increase in the modelled water levels, localised to the immediate upstream section of the diversion channel (although this did not result in any out of bank flow) and a short section between Hawthorn Road and the Sizewell link road culverts respectively. The overall conclusion was that the impact on flood risk would be very localised and negligible with no effect on any properties in the vicinity of the development.

4.1.2 It was acknowledged that the hydraulic modelling carried out for the Application was relatively high-level, and that some assumptions had to be made due to limited information on existing conditions and the relatively early stage of the design process.

4.1.3 In their response to the Application (Relevant Representation collated in **Appendix A** of this document, the Environment Agency raised the following comments:

" There are missing elements from the hydraulic model which mean the evidence to support the FRA is lacking in the detail we would expect. It appears as though some aspects of the FRA are based on outline design rather than final designs and some aspects have not been properly considered at all.[…] Flood risk in the baseline and 'with crossing' scenarios has not been mapped so it's very difficult to properly understand third party impacts, particularly where there are out of bank flows such as at SW1 and SW3."

"The final design of many aspects of the Sizewell Link Road has not yet been provided, which prevents an informed interpretation of the flood risk impacts that may be caused by this development."

4.1.4 Further comments were also raised by the Environment Agency following their review of the **Sizewell Link Road Flood Risk Assessment** [APP-136] and associated modelling report (**Appendix A: Sizewell Link Road Modelling Report** [APP-137]):

"The final design for the crossings are unclear."

"Report and proposed crossing layouts imply basic portal culverts have been used at all the crossings which is not correct. There has been little evidence that the knowledge of flood risk has informed and evidenced the design of the culverts and associated flood relief structures and mammal ledges."

4.1.5 Following the Application submission, SZC Co. has continued to develop the detail of the proposed Sizewell link road development, including additional engineering design, flood risk and environmental assessment. As a result, there are a number of changes proposed (**Chapter 6** of the **ES Addendum** [AS-185]), including:

- Changes to the Order Limits (site boundary) for works on the Sizewell link road;
- Updates to the proposed crossings design;
- Changes to the drainage design; and

- Changes as a result of additional survey information.

4.1.6 Through discussions with Suffolk County Council (SCC), SZC Co. has established that additional land may be necessary to accommodate small changes to the design or restrictions during construction. This includes extensions to the site boundary to allow the removal of vegetation, space to accommodate the tie in of the realigned farm access track with the west arm of the Middleton Moor Link Roundabout and to facilitate the removal of hedgerows to accommodate the potential realignment of Hawthorn Road. This is to ensure continued vehicular access to Hawthorn Cottages and for the construction of culverts. Further details on the proposed changes are provided in the Updated Description of Development (**Volume 3** of **Chapter 6** of the **Environmental Statement (ES) Addendum** [AS-248]).

4.1.7 The current proposed concept design of using a portal culvert for the watercourse crossings has not changed from that presented in the Application, i.e. it assumes a 3-sided portal culvert, approximately 5.5m wide with up to 1.2m headroom and no changes to the natural channel. Following further development of the design, changes were made to the details for some of the crossings. These are discussed in the following sections for each of the crossings in turn.

4.1.8 Ground investigation has been undertaken to determine local infiltration rates and validate the drainage design strategy in the Application. Infiltration rates were found to be very low, such that the removal of all highway surface water runoff by infiltration alone is not possible. Following receipt of the ground investigation results and discussions with SCC, the approach to drainage has changed to hold water in attenuation basins and manage the release of the water to local watercourses. Further details on the proposed changes to the surface water drainage are discussed in **Section 5c** of this document .

4.1.9 At the time of this assessment, details of the modified drainage design strategy were being developed. The exact number of attenuation basins or the location of the outfalls connecting to the existing watercourses were not yet concluded, however the design assumes no more than two outfalls (one on each side of the watercourse) with a maximum discharge rate of 5l/s (0.005 m^3/s) and piped connections between the attenuation basins.

4.1.10 For the purpose of the updated hydraulic modelling, to adopt a more conservative approach, it was assumed that the flow would be discharged upstream of each of the crossings. This approach was taken on the assumption that all flow would have to be conveyed by the proposed culverts and therefore represents a worst-case scenario. Also, a maximum

potential discharge rate of 0.01m^3/s (two outfalls with 0.005 m^3/s) was adopted for all the models.

4.1.11 The additional topographical survey and site visits provided further detail of the existing conditions at the locations of the proposed crossings, such as cross-sections of existing watercourses and dimensions of existing culverts and the number of field crossings. This additional information was used to further inform the design and update the hydraulic modelling and consequently the assessment of flood risk. Details of the specific updates to the design and modelling are provided in the following sections for each of the crossings in turn.

4.1.12 The updated hydraulic models for all crossings were simulated for a series of return period events (1 in 5-year, 20-year, 100-year and 1,000-year) and two climate change scenarios, i.e. 35% (higher central) and 65% (upper end) to assess flood risk throughout the lifetime of the development.

4.1.13 As in the **Sizewell Link Road Flood Risk Assessment** [APP-136], the 1 in 100-year return period with 65% climate change allowance was considered as the basis of design event for the assessment of risk to the development itself, whereas the 1 in 100-year return period with 35% climate change allowance was used to assess any potential off-site impacts on flood risk as a result of the proposed development.

4.1.14 With regard to the hydraulic modelling, the Environment Agency raised a concern in their response to the Application, that residual risk of blockage of the proposed watercourse crossings was not considered in the **Sizewell Link Road Flood Risk Assessment** [APP-136]. To address this comment, the risk of blockage has been assessed in the updated hydraulic modelling, together with further sensitivity testing, including changes in roughness and increases in fluvial flow. Results of the sensitivity testing for all of the crossings are presented in **Section 4.7** of this document.

4.2 Crossings 1 and 2

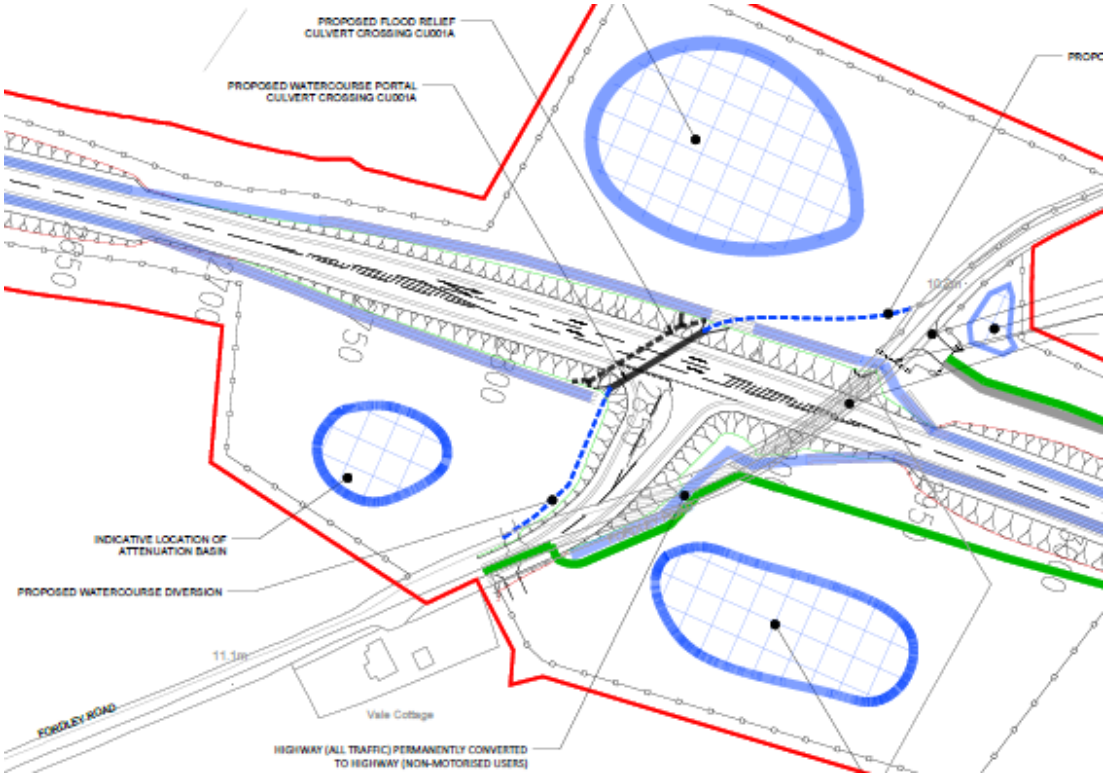
a) Updates to the proposed design and modelling

4.2.1 As discussed in **Section 3.2** of this document, the hydraulic models for crossings 1 and 2 were combined into a single model and updated with the surveyed cross-sections.

4.2.2 The concept of the proposed design at crossings 1 and 2 has not changed from that presented in the Application, **Appendix A: Sizewell Link Road Modelling Report** [APP-137]. At crossing 1 (Fordley Road), a diversion of the Main River (Middleton Watercourse) is proposed, as illustrated in **Plate**

4.1. This allows the length of the culverted section through the Sizewell link road to be minimised and also eliminates the requirement for another crossing at the connection between Fordley Road and the Sizewell link road.

Plate 4.1: Extract from drawing SZC-SZ0204-XX-000-DRW-100137 Rev02 showing Crossing 1 diversion



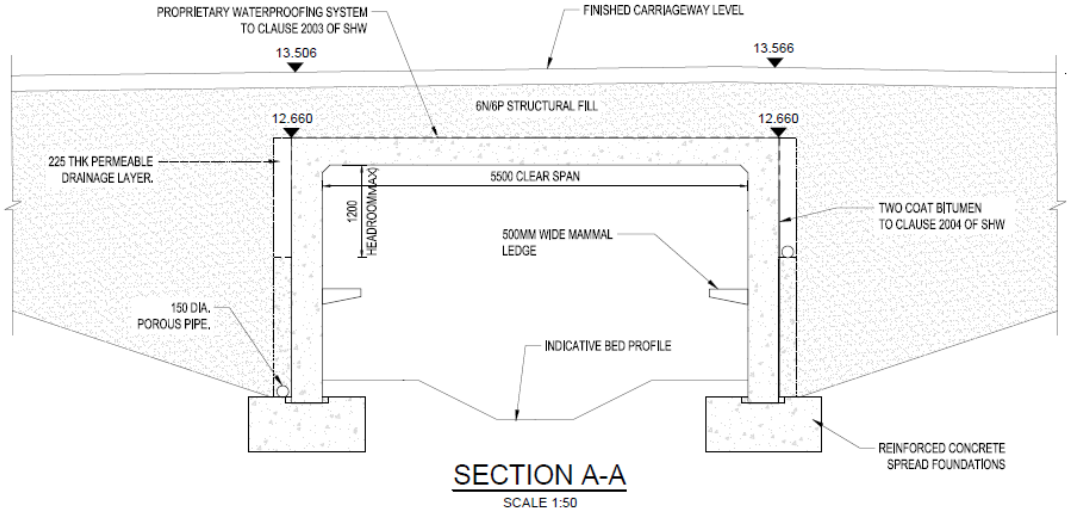
4.2.3 The additional survey identified two existing small field crossings upstream of the main Sizewell link road crossing, which were not accounted for in the design or modelling in the Application. The diversion of the river channel commences immediately after the uppermost of the field crossings.

4.2.4 The existing field crossing furthest upstream is a pipe with a 450mm diameter, approximately 6.5m long. As part of the proposed design, this pipe will be removed and replaced by an 8m long box culvert (4.2m wide and 1m high). The downstream field crossing will be fully removed as it becomes redundant due to the diversion of the watercourse and the space is required for the connection road between the Sizewell link road and the Fordley Road.

4.2.5 The new diverted channel has a 1m wide bed and a 1 in 3 side slope, resulting in a maximum top width of 10m as the diversion moves away from the existing channel and cuts into the existing ground.

4.2.6 SZC Co. propose a change to the design of the culvert at crossing 1, where in the Application, a T-shaped concrete cross-section through the culvert was proposed. The latest design assumes a portal culvert will be included within the diverted channel keeping the 1 in 3 bank slopes but fitting the culvert by cutting into the banks. The channel bed remains 1m wide and the banks will be at least 0.5m above the bed level. A cross-section through the proposed portal culvert crossing is shown in **Plate 4.2.**

Plate 4.2: Cross-section of portal culvert at crossing 1 (extract from drawing no. SZC-AD0310-WSP-SLRHDG-ZZ0000-DRW-HCD-300002)

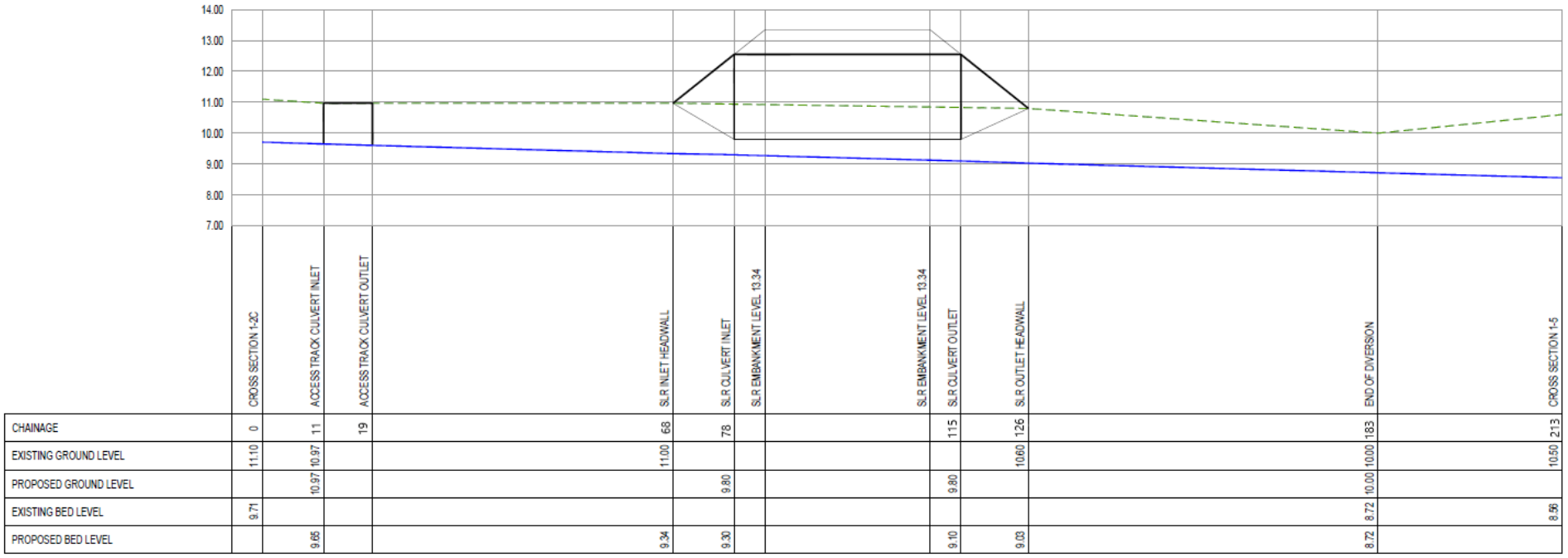


4.2.7 Mammal ledges would be provided on the sides of the crossing (**Plate 4.2**) and connected to the ground levels outside of the culvert to provide a continuous path.

4.2.8 Following initial results of the updated modelling, it was found that the flood relief culvert proposed in the Application is no longer required and therefore has been removed from the proposed design for crossing 1.

4.2.9 **Plate 4.3** illustrates a long-section of the proposed diverted channel, with the locations of the access track crossing and the portal culvert marked.

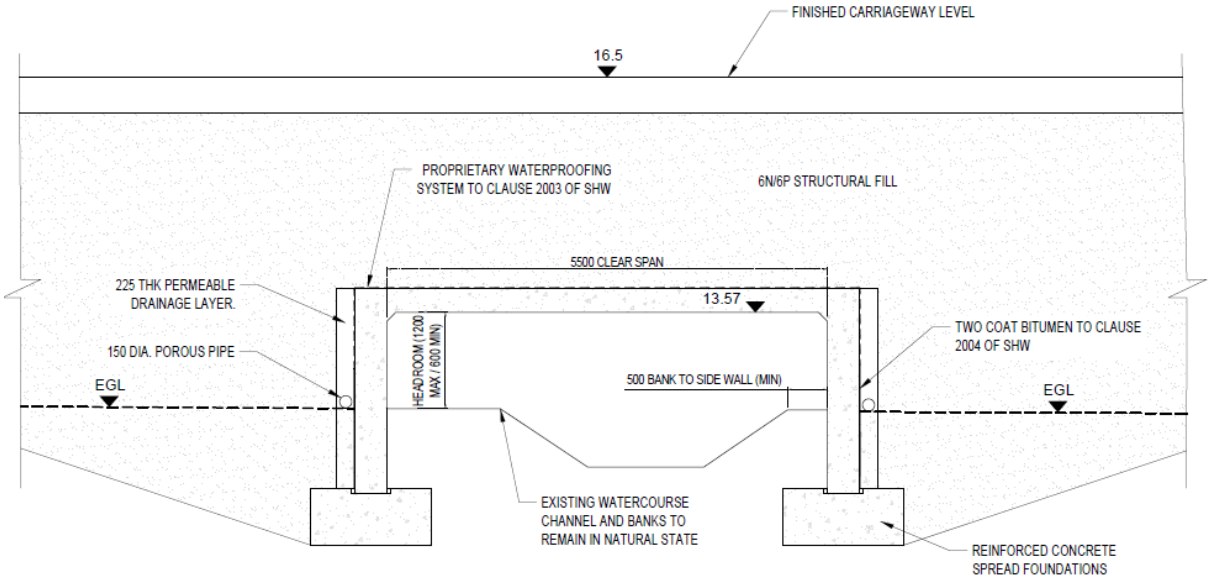
Plate 4.3. Long-section of the diverted channel (extract from drawing no. SZC-AD0310-WSP-SLRHDG-ZZ0000-DRW-HCD-300101)



4.2.10 There are no changes to the portal culvert concept for crossing 2 (Garden House Farm watercourse) with that presented in the Application. A cross-section through the portal culvert at crossing 2 is presented in **Plate 4.4**.

4.2.11 Further development of the design considered the detail of the placement of the culvert and its tie-in to the existing ground. The ordinary watercourse on which crossing 2 is located is relatively steep. The design principle assumes placement of the flat culvert based on the downstream ground levels and would necessitate some excavation of the banks at the upstream end of the culvert in order to maintain the required 600mm headroom for mammal passage.

Plate 4.4: Cross-section of portal culvert at crossing 2 (extract from drawing no. SZC-AD0310-WSP-SLRHDG-ZZ0000-DRW-HCD-300004)



4.2.12 As discussed in **section 4.1**, a combined flow of 0.01m^3/s from the drainage attenuation basins was included in the model with the outfall connection upstream of the proposed Sizewell link road crossing. This was added for both crossing 1 and crossing 2.

4.2.13 Further details on the updates to the hydraulic model are provided in the **Sizewell Link Road Modelling Report Addendum** (**APPENDIX C:**

b) Results

4.2.14 Results for crossing 1 and crossing 2 were assessed separately. **Table 4.1** presents peak flood levels at the key locations of crossing 1 (selected model

nodes illustrated in **Plate 4.5**) for the baseline, post-development (with scheme) scenarios and the difference between them. A positive difference indicates an increase in flood levels in the with scheme scenario.

Plate 4.5: Location of the key model nodes on crossings 1 and 2

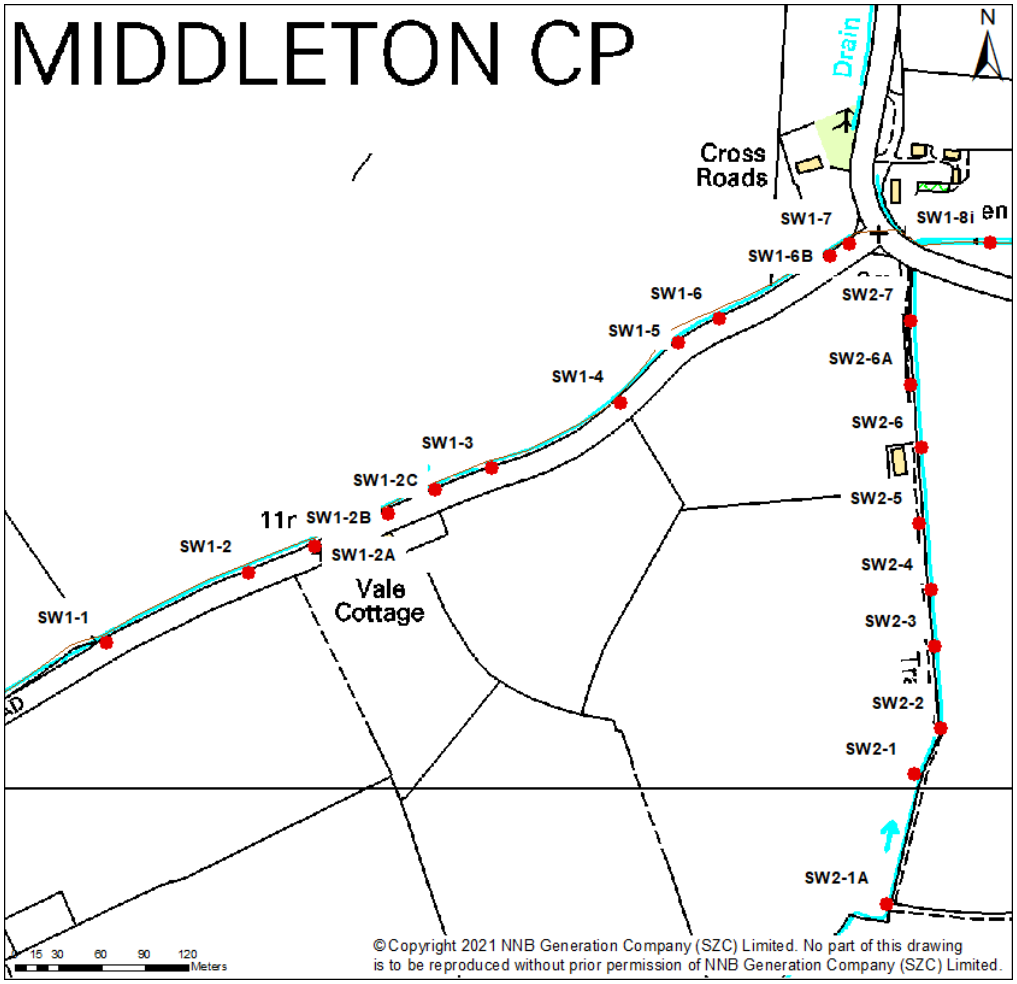


Table 4.1: Modelled peak flood levels for crossing 1

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m)
Next to residential house upstream (SW1-2B)	5 + 35%CC	11.20	10.86	-0.34
	5 + 65%CC	11.25	10.94	-0.31
	20 + 35%CC	11.28	10.99	-0.29
	20 + 65%CC	11.33	11.07	-0.26

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m)
	100 + 35%CC	11.40	11.16	-0.24
	100 + 65%CC	11.45	11.23	-0.22
	1,000 + 35%CC	11.56	11.42	-0.14
	1,000 + 65%CC	11.62	11.51	-0.11
Upstream of the Sizewell link road diversion and culvert (SW1-2C)	5 + 35%CC	11.19	10.50	-0.72
	5 + 65%CC	11.23	10.57	-0.69
	20 + 35%CC	11.26	10.63	-0.63
	20 + 65%CC	11.30	10.71	-0.59
	100 + 35%CC	11.37	10.88	-0.49
	100 + 65%CC	11.41	10.94	-0.47
	1,000 + 35%CC	11.50	11.15	-0.35
	1,000 + 65%CC	11.56	11.30	-0.26
Downstream of the Sizewell link road diversion and culvert (SW1-5)	5 + 35%CC	9.52	9.52	0.00
	5 + 65%CC	9.60	9.61	0.01
	20 + 35%CC	9.67	9.67	0.00
	20 + 65%CC	9.79	9.80	0.01
	100 + 35%CC	9.94	9.94	0.00
	100 + 65%CC	10.01	10.01	0.00
	1,000 + 35%CC	10.16	10.16	0.00
	1,000 + 65%CC	10.23	10.23	0.00

4.2.15 The road level of the Sizewell link road at crossing 1 is 13.50mAOD. Based on the results presented in **Table 4.1**, the development itself would not therefore be at risk of flooding under any of the considered extreme events and climate change scenarios, as the maximum flood level for the 1 in 1,000-year event with 65% climate change allowance is 11.30mAOD for the with scheme scenario and 11.56mAOD for the baseline scenario, providing up to 2m of freeboard.

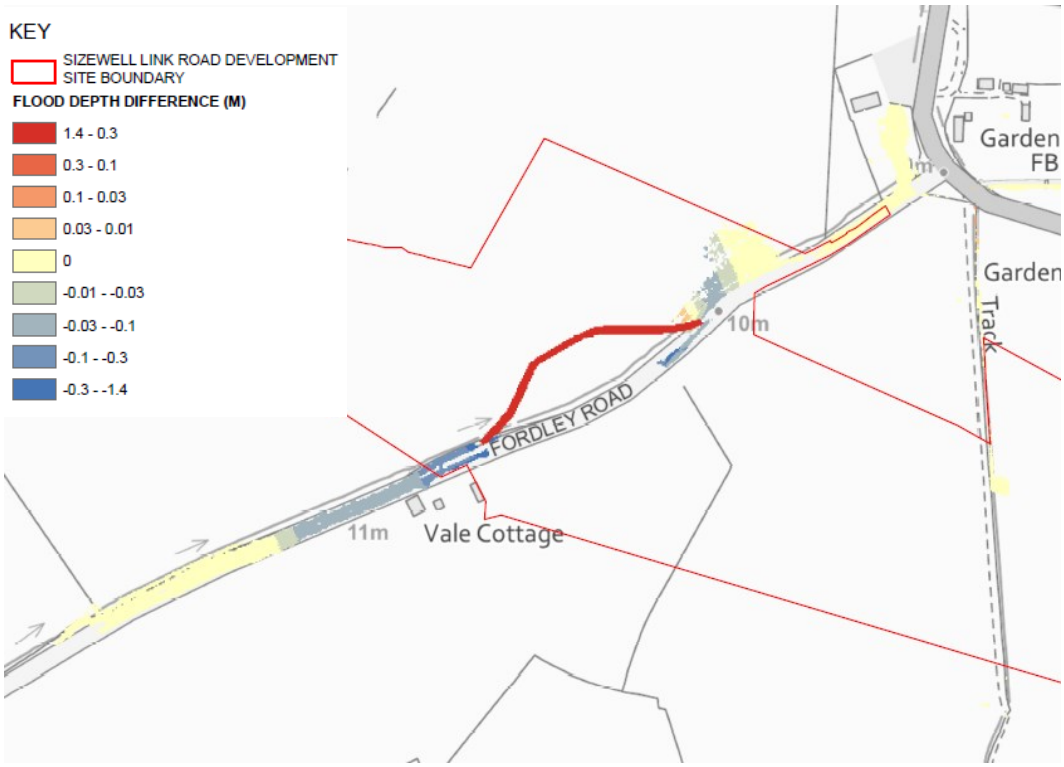
4.2.16 The flood extent is limited to the area on the left floodplain downstream of the crossing within the site boundary, and the area just upstream of the junction between Fordley Road and the B1122, with flood depth up to 0.1m and up to 0.6m, respectively (as illustrated in **Plate 4.6**). There is also some

flooding of Fordley Road itself upstream of the proposed diversion, in the vicinity of Vale Cottage, that is consistent with the baseline scenario.

Plate 4.6: Maximum flood depth in the with scheme scenario for crossings 1 and 2 – 1 in 100-year event with 65% climate change (extract from Figure B1.9 in APPENDIX C:)

4.2.17 As presented in **Table 4.1**, the peak flood levels upstream of the crossing and the diversion channel are lower as a result of the scheme. This is due to the increased conveyance of the diverted channel. Immediately downstream of the diversion, flood levels are slightly increased by up to 0.01m for some of the assessed scenarios, however the difference is very localised (up to 20m) with no change in flood levels further downstream (**Plate 4.7**).

Plate 4.7: Difference in maximum flood depth for crossings 1 and 2 – 1 in 100-year event with 35% climate change (extract from Figure C1.8 in APPENDIX C:)



4.2.18 **Table 4.2** presents peak flood levels at the key locations of crossing 2 (selected model nodes illustrated in **Plate 4.5**) for the baseline, post-development (with scheme) scenarios and the difference between them. A positive difference indicates an increase in flood levels in the with scheme scenario.

Table 4.2: Modelled peak water levels for crossing 2

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m)
Upstream of the Sizewell link road (SW2-4)	5 + 35%CC	12.53	12.54	0.01
	5 + 65%CC	12.55	12.55	0.00
	20 + 35%CC	12.57	12.57	0.00
	20 + 65%CC	12.60	12.60	0.00
	100 + 35%CC	12.64	12.64	0.00

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m)
	100 + 65%CC	12.67	12.67	0.00
	1,000 + 35%CC	12.74	12.74	0.00
	1,000 + 65%CC	12.78	12.78	0.00
Downstream of the Sizewell link road (SW2-5)	5 + 35%CC	11.54	11.54	0.00
	5 + 65%CC	11.56	11.57	0.01
	20 + 35%CC	11.58	11.59	0.01
	20 + 65%CC	11.60	11.61	0.01
	100 + 35%CC	11.64	11.65	0.01
	100 + 65%CC	11.68	11.68	0.00
	1,000 + 35%CC	11.75	11.76	0.01
	1,000 + 65%CC	11.79	11.79	0.00

4.2.19 The road level of the Sizewell link road is set at 16.5mAOD at the location of crossing 2. Considering that the maximum flood level for the 1 in 1,000-year event with 65% climate change allowance is 12.78mAOD, the development would not be at risk of fluvial flooding under any of the considered extreme events and climate change scenarios.

4.2.20 **Plate 4.6** shows that there is very limited out of bank flooding along the watercourse at crossing 2, with a maximum flood depth of 0.2m for the 1 in 100-year event with 65% climate change, and the majority of the flood water is contained within the channel.

4.2.21 **Table 4.2** shows that the difference in maximum flood levels between the baseline and post-development for crossing 2 is a maximum of 0.01m across all assessed scenarios. This is also the case for the flood levels within the floodplain, where **Plate 4.7** shows the difference is less than 0.01m.

4.2.22 Further discussion on the modelling results for crossings 1 and 2 is provided in **section 4.2a** of the **Sizewell Link Road Modelling Report Addendum** (**APPENDIX C:**

c) Conclusions

4.2.23 The updated hydraulic model shows that, once constructed, the proposed Sizewell link road at crossings 1 and 2 would not be at risk of flooding under

any of the assessed scenarios (up to the 1 in 1,000-year event with 65% climate change allowance) throughout the development lifetime.

4.2.24 For the Main River at crossing 1 there is some flooding on the left floodplain upstream of the B1122 and along Fordley Road, however the impact of the proposed scheme is only localised and not significant, with a maximum increase in flood levels of 0.01m downstream of the diversion and decrease in levels upstream.

4.2.25 Flooding along the ordinary watercourse at crossing 2 is very localised with most flood water contained within the channel. The impact of the proposed scheme is minimal; up to 0.01m within the channel and less than 0.01m on the floodplain across all assessed scenarios (up to 1 in 1,000-year event with 65% climate change allowance).

4.2.26 There are no residential or commercial properties at risk of flooding in the vicinity of the proposed crossings 1 and 2.

4.2.27 Based on the above it is concluded that flood risk to the proposed Sizewell link road at crossings 1 and 2 is low and the impact of the proposed development to off-site receptors is not significant.

4.3 Crossing 3

a) Updates to the proposed design and modelling

4.3.1 There is no change in the proposed concept of a portal culvert (**Plate 4.8**) for crossing 3 as presented in the Application, however it is proposed to slightly modify the alignment of Hawthorn Road and its junction with the Sizewell link road (to ease access to the property). This will eliminate the need to cross the watercourse at the connection road that links the Sizewell link road and Hawthorn Road on the right bank of the watercourse.

4.3.2 No amendments are proposed to the existing ford which carries the water from Wash Lane, over Hawthorn Road, and into the field drain. Also, there would be no amendment to the road levels of Hawthorn Road itself. **Plate 4.9** illustrates the updated alignment of crossing 3.

4.3.3 As discussed in **Section 4.1** of this document, a combined discharge of 0.01m^3/s from the highway attenuation basins has been added to the design of crossing 3 and modelled with the outfall connection upstream of the proposed culvert crossing, adopting a worst case scenario where all flow would pass through the proposed culvert.

Plate 4.8: Cross-section of portal culvert at crossing 3 (extract from drawing no. SZC-AD0310-WSP-SLRHDG-ZZ0000-DRW-HCD-300006)

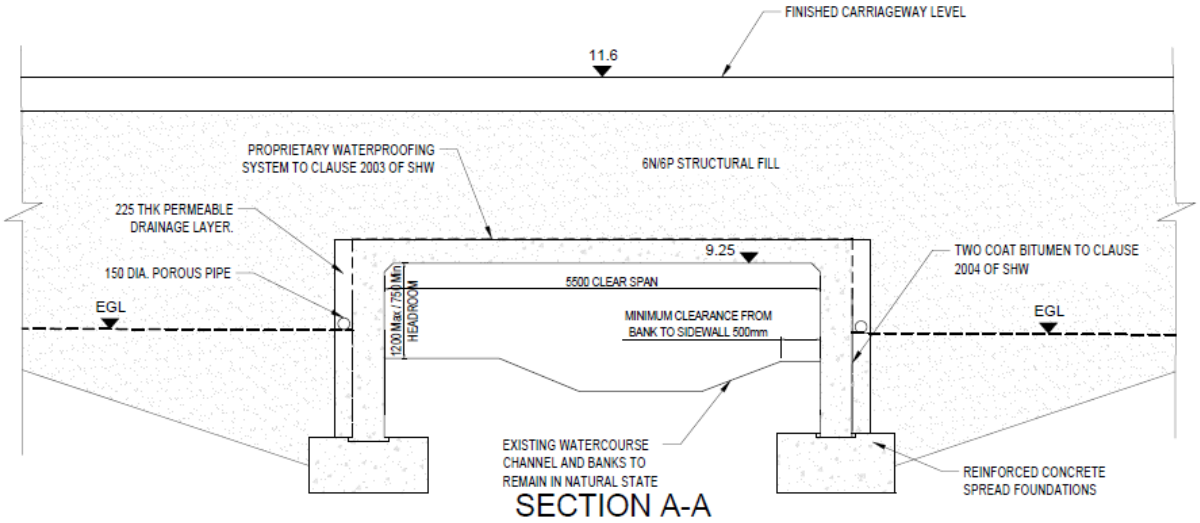
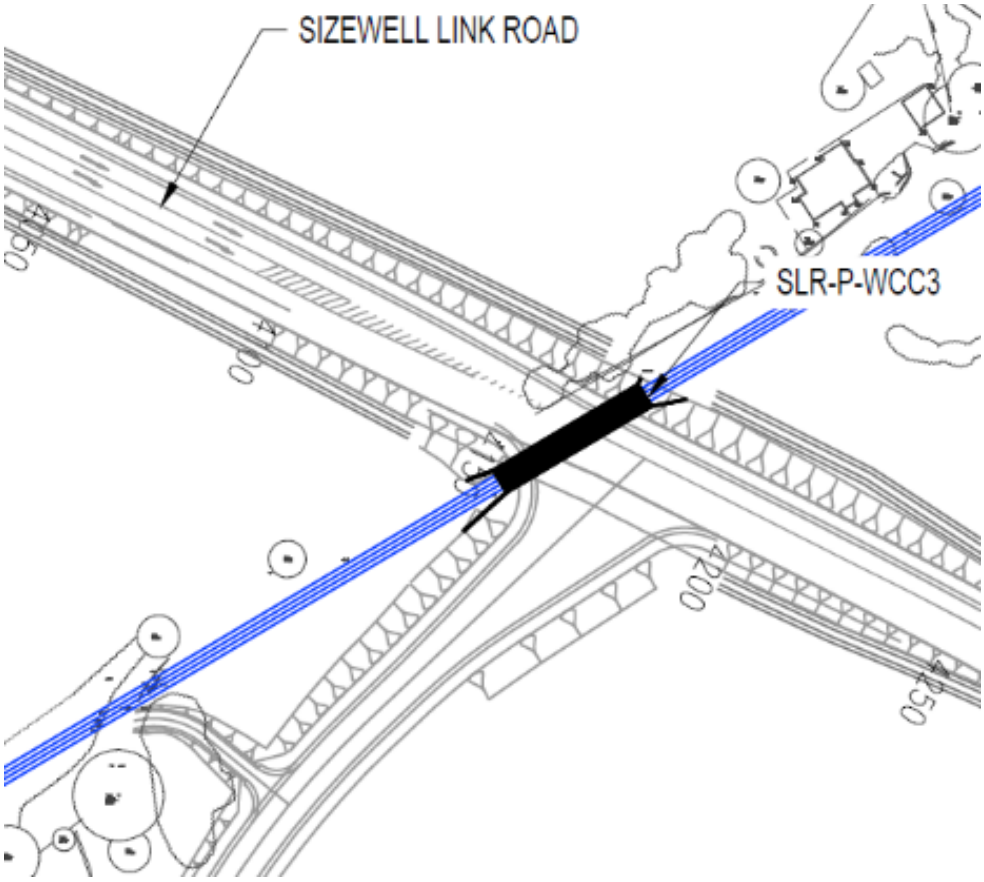


Plate 4.9: Plan view of crossing 3 (extract from drawing no. SZC-AD0310-WSP-SLRHDG-ZZ0000-DRW-HCD-300006)



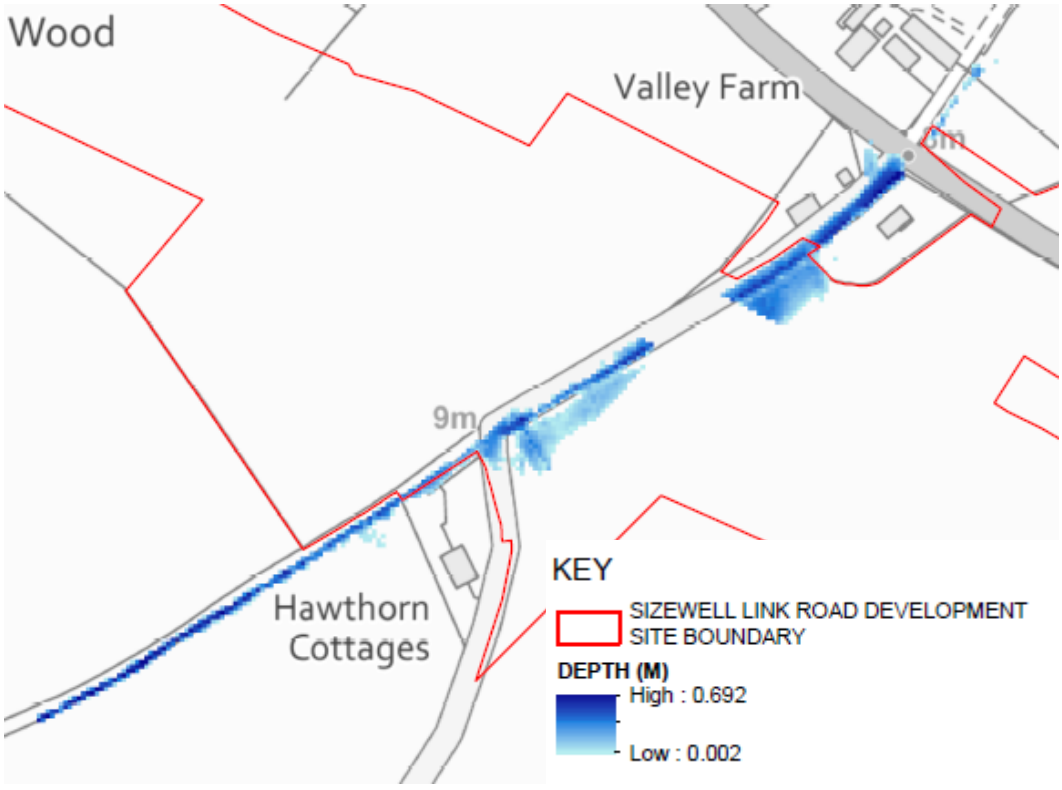
4.3.4 Following initial results of the updated modelling, it was found that the flood relief culvert proposed in the Application is no longer required and therefore has been removed from the proposed design for crossing 3.

4.3.5 Further details on the updates to the hydraulic model are provided in the **Sizewell Link Road Modelling Report Addendum** (**APPENDIX C:**

b) Results

4.3.6 **Plate 4.10**, illustrating the flood depth for the 1 in 100-year event with 65% climate change allowance, shows that there is some out of bank flooding along the right floodplain of the ordinary watercourse, which is consistent with the baseline scenario and the flood extents remain relatively small and localised. Out-of-bank flood depth is up to 0.5m in the area around the corner of Hawthorn Road, downstream of Hawthorn Cottages, up to 0.2m upstream of the crossing and up to 0.36m downstream of the crossing.

Plate 4.10: Maximum flood depth in the with scheme scenario for crossing 3 – 1 in 100-year event with 65% climate change (extract from Figure B3.9 in APPENDIX C:)



4.3.7 Results of the peak water levels at the key locations (selected model nodes as illustrated in **Plate 4.11**) for crossing 3, for the baseline and with scheme scenarios and the difference between them, are presented below in **Table 4.3**.

4.3.8 The proposed road level of the Sizewell link road at the location of crossing 3 is set at 11.60mAOD, whereas the flood level for the 1 in 1,000-year event with 65% climate change allowance presented in **Table 4.3** upstream of the crossing is 8.78mAOD with a maximum level of 9.69mAOD, providing up to 2.5m of freeboard. Therefore, the updated model results show that the proposed development itself would not be at risk of flooding under any of the considered extreme events and climate change scenarios throughout its lifetime up to 1 in 1,000-year event with 65% climate change allowance.

Plate 4.11: Location of the key model nodes on crossing 3

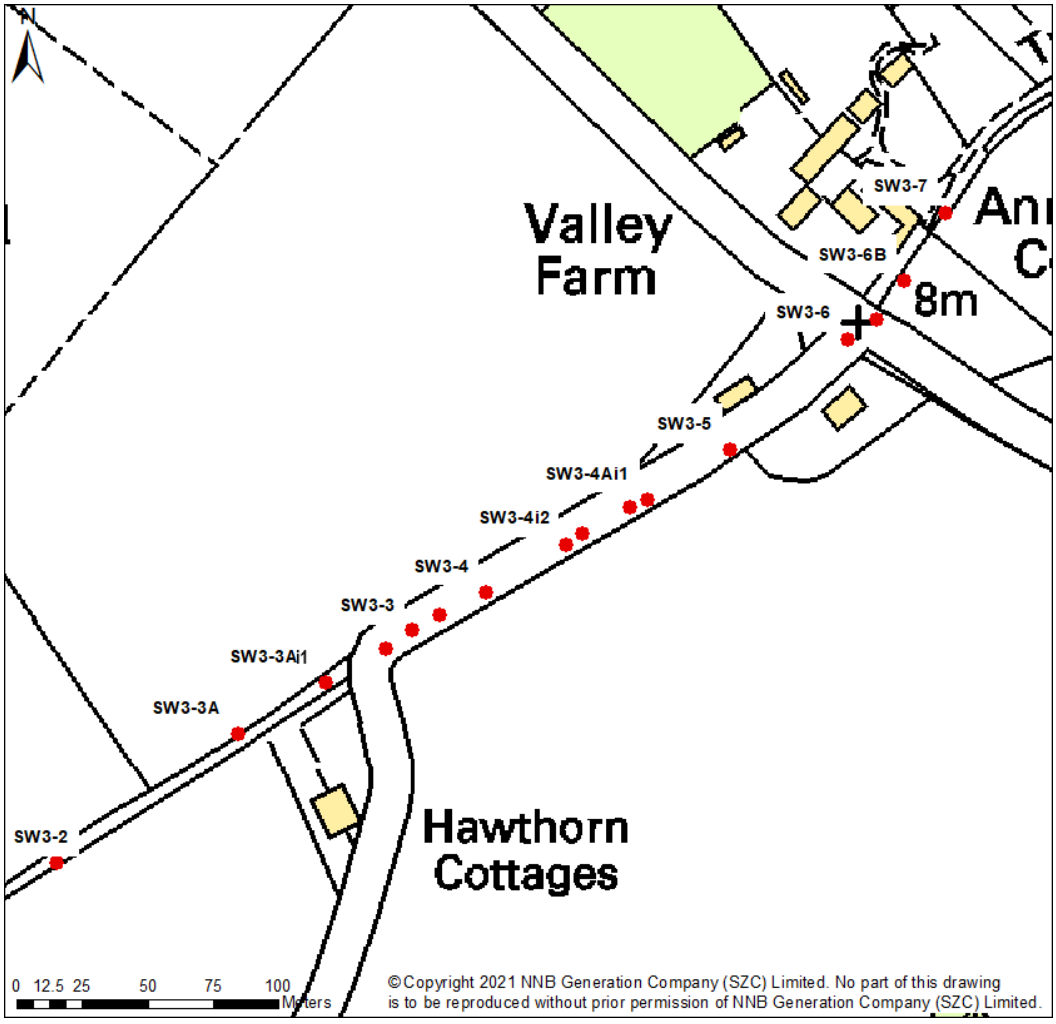


Table 4.3: Modelled peak water levels for crossing 3

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m)
Next to residential house upstream of the ford (SW3-3A2)	5 + 35%CC	9.40	9.40	0.00
	5 + 65%CC	9.42	9.42	0.00
	20 + 35%CC	9.43	9.43	0.00
	20 + 65%CC	9.46	9.46	0.00
	100 + 35%CC	9.49	9.49	0.00
	100 + 65%CC	9.52	9.52	0.00
	1,000 + 35%CC	9.59	9.59	0.00
	1,000 + 65%CC	9.62	9.62	0.00
Upstream of the Sizewell link road culvert (SW3-4i2)	5 + 35%CC	8.14	8.22	0.08
	5 + 65%CC	8.17	8.27	0.10
	20 + 35%CC	8.20	8.32	0.12
	20 + 65%CC	8.24	8.38	0.14
	100 + 35%CC	8.30	8.52	0.22
	100 + 65%CC	8.34	8.57	0.23
	1,000 + 35%CC	8.43	8.72	0.29
	1,000 + 65%CC	8.49	8.78	0.29
Downstream of the Sizewell link road culvert (SW3-4Ai1)	5 + 35%CC	7.95	7.92	-0.03
	5 + 65%CC	7.98	7.96	-0.02
	20 + 35%CC	8.01	7.99	-0.02
	20 + 65%CC	8.04	8.03	-0.01
	100 + 35%CC	8.09	8.07	-0.02
	100 + 65%CC	8.12	8.11	-0.01
	1,000 + 35%CC	8.20	8.18	-0.02
	1,000 + 65%CC	8.24	8.22	-0.02

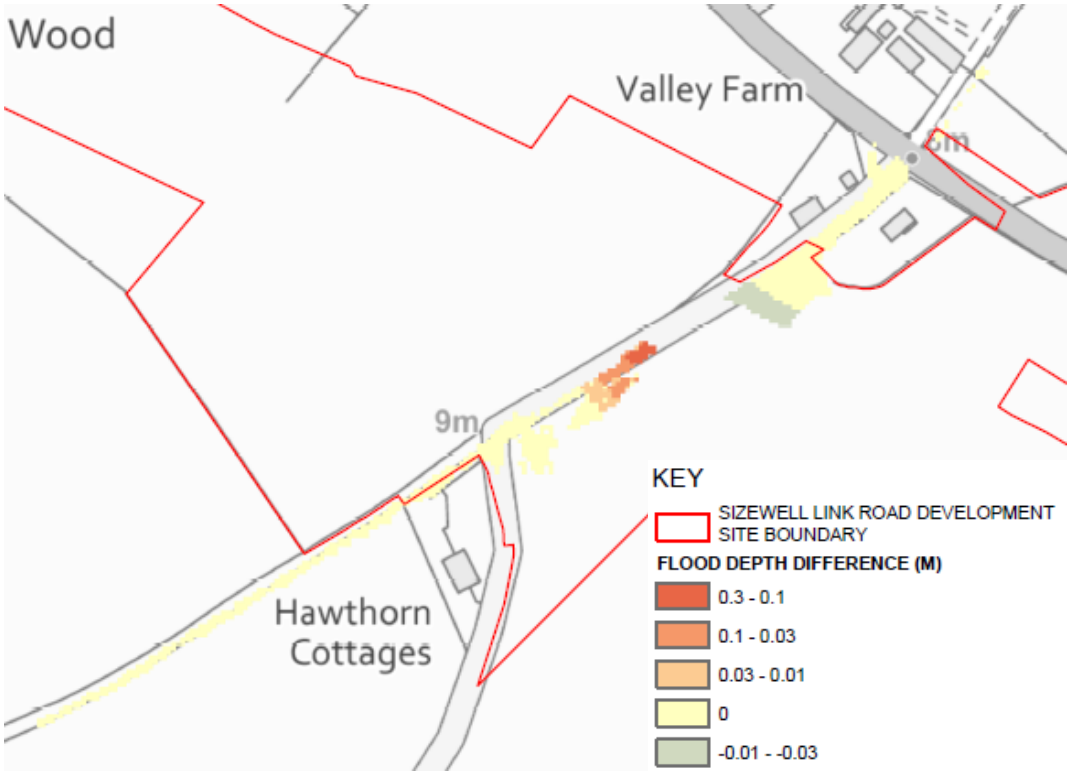
4.3.9 **Table 4.3** shows that the water levels immediately upstream of the proposed crossing have increased up to 0.3m when compared to the baseline scenario. However, the impact on the flood level is mostly limited to the strip of land between the existing Hawthorn Road and the connection road to the Sizewell link road and does not propagate upstream where the residential property closest to the proposed development is located. This

property is situated at around 9.8mAOD and so remains above flood levels for all modelled scenarios.

4.3.10 This is illustrated in **Plate 4.12** showing the difference in maximum flood depth between the with scheme and baseline scenarios for crossing 3 for the 1 in 100-year event with 35% climate change allowance.

4.3.11 As such, it was not considered necessary to incorporate a flood relief box culvert alongside the portal culvert as included in the Application, where it was assumed that inclusion of the box culvert would be necessary to replicate the flow path which appears along Hawthorn Road itself. However, the updated design (and slight realignment of Hawthorn Road) has shown that this is no longer required.

Plate 4.12: Difference in maximum flood depth for crossing 3 – 1 in 100-year event with 35% climate change (extract from Figure C3.8 in APPENDIX C:)



4.3.12 **Table 4.3** also shows that the proposed development does not have an adverse impact on flood levels downstream of the crossing.

4.3.13 There are no other residential or commercial properties at risk of flooding in the vicinity of the proposed crossing 3.

4.3.14 Further discussion on the modelling results for crossing 3, including additional figures, is provided in **section 4.2b** of the **Sizewell Link Road Modelling Report Addendum** (**APPENDIX C:**

c) Conclusions

4.3.15 The updated hydraulic model shows that, once constructed, the proposed Sizewell link road at crossing 3 would not be at risk of flooding under any of the assessed scenarios (up to 1 in 1,000-year event with 65% climate change allowance) throughout the development lifetime.

4.3.16 There is some flooding on the right floodplain along the watercourse at the proposed crossing 3. The scheme results in some increase in peak flood levels upstream of the crossing (up to 0.21m for the 100-year event with 35% climate change) however, the impact is localised and only within the site boundary. There is no impact on flooding further upstream (in the vicinity of the Hawthorn Cottages) or downstream of the crossing.

4.3.17 Therefore, it is concluded that flood risk to the proposed Sizewell link road at crossing 3 is low and the impact of the proposed development on off-site receptors is not significant.

4.4 Crossings 4 and 5

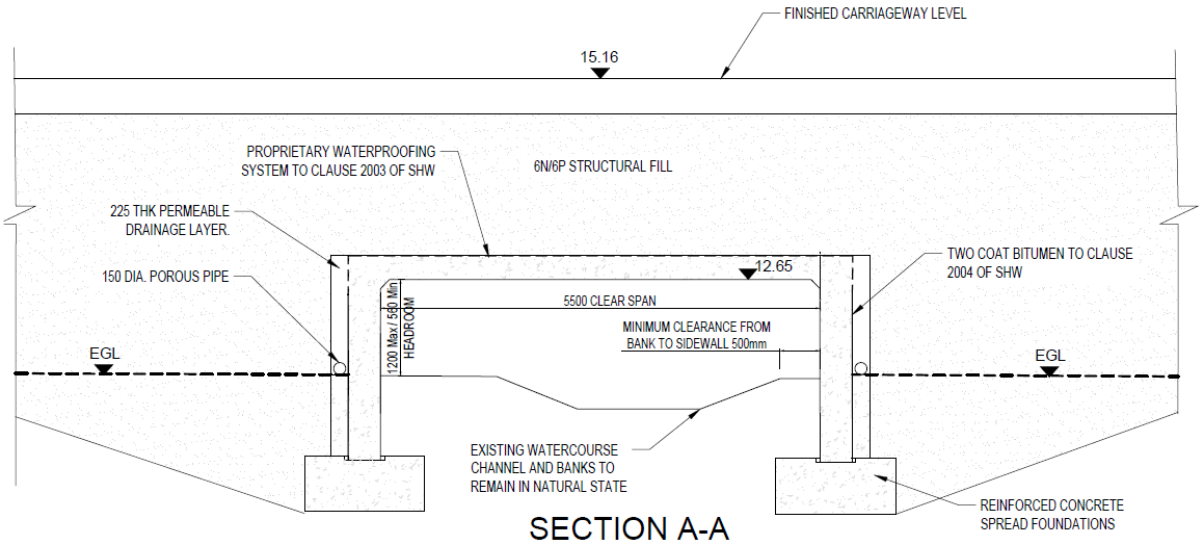
a) Updates to the proposed design and modelling

4.4.1 Crossings 4 and 5 are located on the Theberton Hall watercourse and Pretty Road Watercourse respectively (both ordinary watercourses). As discussed in **section 3.4**, crossing 4 was not explicitly modelled as part of the study for the **Sizewell Link Road Flood Risk Assessment** [APP-136], however the updated hydraulic model has been extended following the additional topographic survey. Therefore, flood levels at the location of crossing 4 were also assessed.

4.4.2 The proposed design for the B1122 / B1125 junction with the Sizewell link road has been reviewed and it remains the case that the required road modifications will not extend to the existing culvert (at crossing 4) and thus the structure and the road levels will remain unchanged. Similarly, there is no intention to undertake any other highway modification works at this location.

4.4.3 There are no substantial changes proposed to the design of crossing 5 portal culvert presented in the Application. It will consist of a single standard portal culvert, as discussed in **Section 4.1** (**Plate 4.13**).

Plate 4.13: Cross-section of portal culvert at crossing 5 (extract from drawing no. SZC-AD0310-WSP-SLRHDG-ZZ0000-DRW-HCD-300007)



4.4.4 The topographical information at the time of the assessment undertaken for the Application did not account for an existing field drain crossing (a single 375mm pipe) at the proposed Sizewell link road location. This has now been considered in the design and incorporated into the updated model.

4.4.5 The proposed updated design assumes that the pipe will be removed with a natural channel implemented between the upstream and downstream end of the Sizewell link road crossing, slightly increasing the in-channel capacity at this location.

4.4.6 As for all the other crossings, a combined discharge of 0.01m^3/s from the highway attenuation basins has been added to the model for crossing 5 with the outfall connection upstream of the proposed culvert crossing.

4.4.7 Further details on the updates to the hydraulic model for crossings 4 and 5 are provided in the **Sizewell Link Road Modelling Report Addendum** (**APPENDIX C:**

b) Results

4.4.8 Modelled peak flood levels at key locations for crossing 4 and crossing 5 are presented in **Table 4.4** for all assessed scenarios, with selected model nodes illustrated in **Plate 4.14**.

Plate 4.14: Location of the key model nodes on crossings 4 and 5

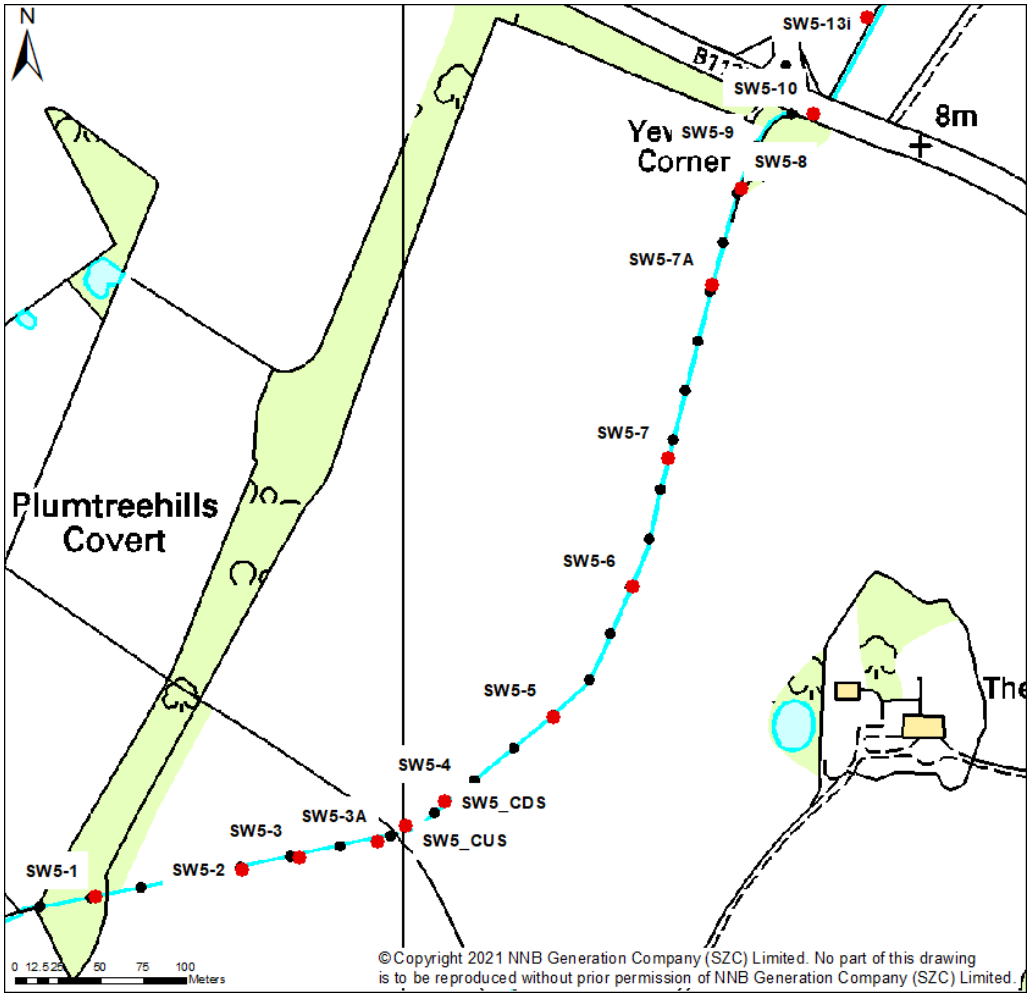


Table 4.4: Modelled peak water levels for crossing 4 and 5

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m))
	5 + 35%CC	12.28	11.09	-1.19
	5 + 65%CC	12.30	11.11	-1.19

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m))
Upstream of the Sizewell link road (SW5-3A)	20 + 35%CC	12.31	11.14	-1.17
	20 + 65%CC	12.33	11.17	-1.16
	100 + 35%CC	12.35	11.24	-1.11
	100 + 65%CC	12.37	11.28	-1.08
	1000 + 35%CC	12.40	11.40	-1.00
	1000 + 65%CC	12.42	11.48	-0.94
Downstream of the Sizewell link road (SW5-4)	5 + 35%CC	10.35	10.34	-0.01
	5 + 65%CC	10.39	10.38	-0.01
	20 + 35%CC	10.43	10.41	-0.02
	20 + 65%CC	10.47	10.46	-0.01
	100 + 35%CC	10.55	10.54	-0.01
	100 + 65%CC	10.61	10.60	-0.01
	1000 + 35%CC	10.75	10.74	-0.01
	1000 + 65%CC	10.82	10.81	-0.01
Upstream of crossing 4 (SW5-10)	5 + 35%CC	6.10	6.09	-0.01
	5 + 65%CC	6.12	6.12	0.00
	20 + 35%CC	6.14	6.14	0.00
	20 + 65%CC	6.18	6.18	0.00
	100 + 35%CC	6.26	6.26	0.00
	100 + 65%CC	6.31	6.31	0.00
	1000 + 35%CC	6.46	6.46	0.00
	1000 + 65%CC	6.56	6.56	0.00

4.4.9 Results in **Table 4.4** at the model node upstream of crossing 4 confirm that there is no change in flood levels when compared to the baseline scenario at this location and therefore there is no impact on off-site receptors in the area. Furthermore, the peak flood levels for all scenarios are within the channel (i.e. no out of bank flooding), as illustrated in **Figure 6** (location of the model shown in **Plate 4.14**). Therefore, the connection road itself at crossing 4 would not be at risk of flooding under any of the considered scenarios.

4.4.10 The level of the Sizewell link road at crossing 5 is set at 15.16mAOD. As such the proposed development would not be at fluvial flood risk under any of the considered scenarios, as the flood level (1,000-year +65% climate change) is 11.48mAOD during the with scheme scenario and a maximum of 12.42mAOD in the baseline scenario (**Table 4.4)**, providing more than 2.5m of freeboard.

4.4.11 **Figure 7**, illustrating the flood depth for the 1 in 100-year event with 65% climate change allowance for crossings 4 and 5, shows that flooding is very localised and primarily limited to a small area downstream of B1122 with the flood depth up to 0.3m.

4.4.12 The decrease in peak flood levels shown in **Table 4.4**, primarily upstream of the proposed crossing 5, is a result of the removal of the existing, relatively small, culverts at field crossings and replacing them with a larger portal culvert, and thereby easing the existing constriction.

4.4.13 Downstream of the proposed crossing, the decrease in peak water level is less but consistent for all considered scenarios. This indicates that the portal culvert introduces some afflux, however the flood levels are slightly lower than in the baseline scenario and therefore there is no adverse impact from the proposed development of flood risk to off-site receptors.

4.4.14 **Figure 8** illustrates that the peak flood levels within the proposed portal culvert for all considered scenarios are within the channel, and therefore dry mammal passage would be provided during extreme flood events.

4.4.15 Further discussion on the modelling results for crossings 4 and 5 is provided in **section 4.2c** of the **Sizewell Link Road Modelling Report Addendum** (**Appendix C** of this document).

c) Conclusions

4.4.16 The updated and extended hydraulic model shows that, once constructed, the proposed Sizewell link road at crossings 4 and 5 would not be at risk of flooding under any of the assessed scenarios (up to 1 in 1,000-year event with 65% climate change allowance) throughout the development lifetime.

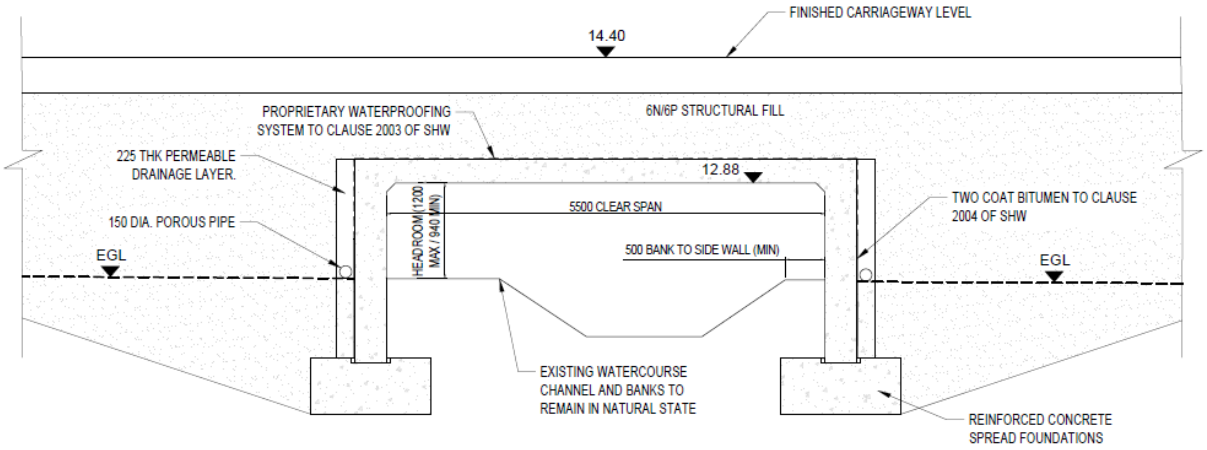
4.4.17 The scheme does not increase flooding for off-site receptors. There is some reduction in flood levels as a result of increased conveyance in the portal culvert when compared to the existing small field crossing. Therefore, it is concluded that flood risk to the proposed Sizewell link road at crossings 4 and 5 is low with no adverse impact from the proposed development on off-site receptors.

4.5 Crossing 6

a) Updates to the proposed design and modelling

4.5.1 No changes are proposed to the portal culvert concept for the crossing 6 (Theberton watercourse). As in the Application, a standard portal culvert would be implemented at this crossing with the dimensions presented in **Plate 4.15**.

Plate 4.15: Cross-section of portal culvert at crossing 6 (extract from drawing no. SZC-AD0310-WSP-SLRHDG-ZZ0000-DRW-HCD-300008)



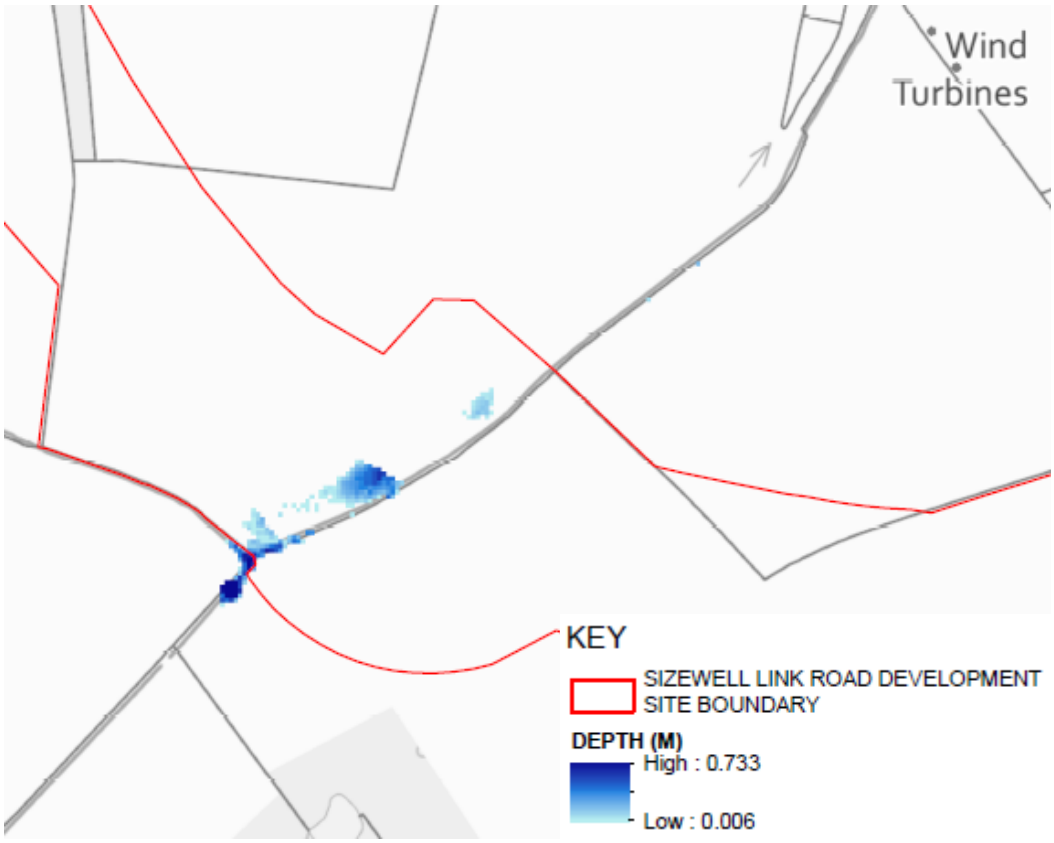
4.5.2 No existing nearby structures were identified as requiring removal following additional investigation of the proposed crossing location. There are no other changes proposed to the design of the crossing itself.

4.5.3 As for other crossings, a combined discharge of 0.01m^3/s from the highway attenuation basins has been added to the design of crossing 6, with the outfall connection upstream of the proposed culvert crossing.

b) Results

4.5.4 **Plate 4.16**, illustrating flood depth for the 1 in 100-year event with 65% climate change allowance for crossing 6, shows that there is some out of bank flooding along the left floodplain of the Theberton Watercourse and upstream of the site boundary, which is consistent with the baseline scenario, although the flood extents are relatively small and localised. The maximum flood depth immediately upstream of the crossing is up to 0.35m and further upstream (outside of site boundary) up to 0.74m.

Plate 4.16: Maximum flood depth in the with scheme scenario for crossing 6 – 1 in 100-year event with 65% climate change (extract from Figure B6.2 in APPENDIX C:)



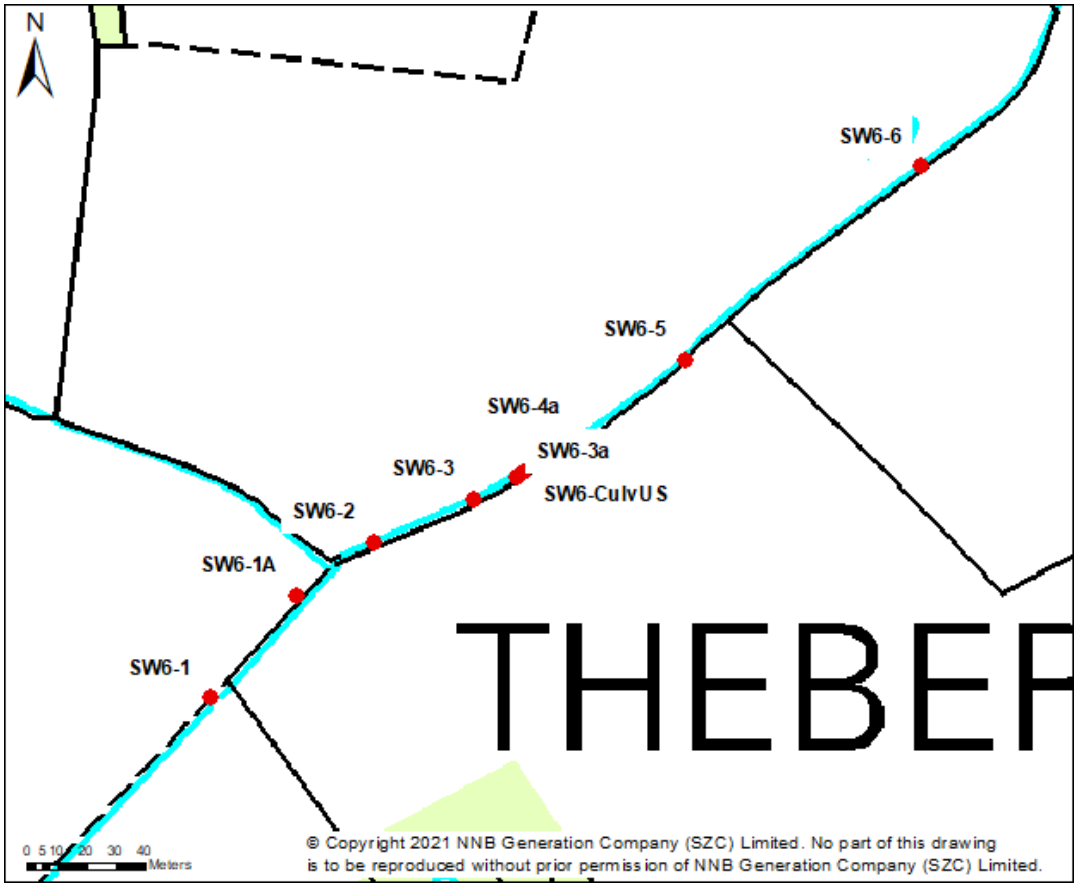
4.5.5 Results of the peak water levels at the key locations (selected model nodes as illustrated in **Plate 4.17**) for crossing 6, for the baseline and with scheme scenarios and the difference between them, are presented in **Table 4.5**.

Table 4.5: Modelled peak water levels for crossing 6

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m)
Upstream of the Sizewell link road (SW6-3)	5 + 35%CC	11.77	11.78	0.01
	5 + 65%CC	11.80	11.81	0.01
	20 + 35%CC	11.84	11.84	0.00
	20 + 65%CC	11.87	11.88	0.01
	100 + 35%CC	11.95	11.96	0.01

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m)
	100 + 65%CC	11.99	12.01	0.02
	1000 + 35%CC	12.06	12.09	0.03
	1000 + 65%CC	12.10	12.15	0.05
Downstream of the Sizewell link road (SW6-5)	5 + 35%CC	10.86	10.86	0.00
	5 + 65%CC	10.89	10.90	0.01
	20 + 35%CC	10.92	10.92	0.00
	20 + 65%CC	10.96	10.96	0.00
	100 + 35%CC	11.03	11.04	0.01
	100 + 65%CC	11.09	11.09	0.00
	1000 + 35%CC	11.22	11.22	0.00
	1000 + 65%CC	11.28	11.28	0.00

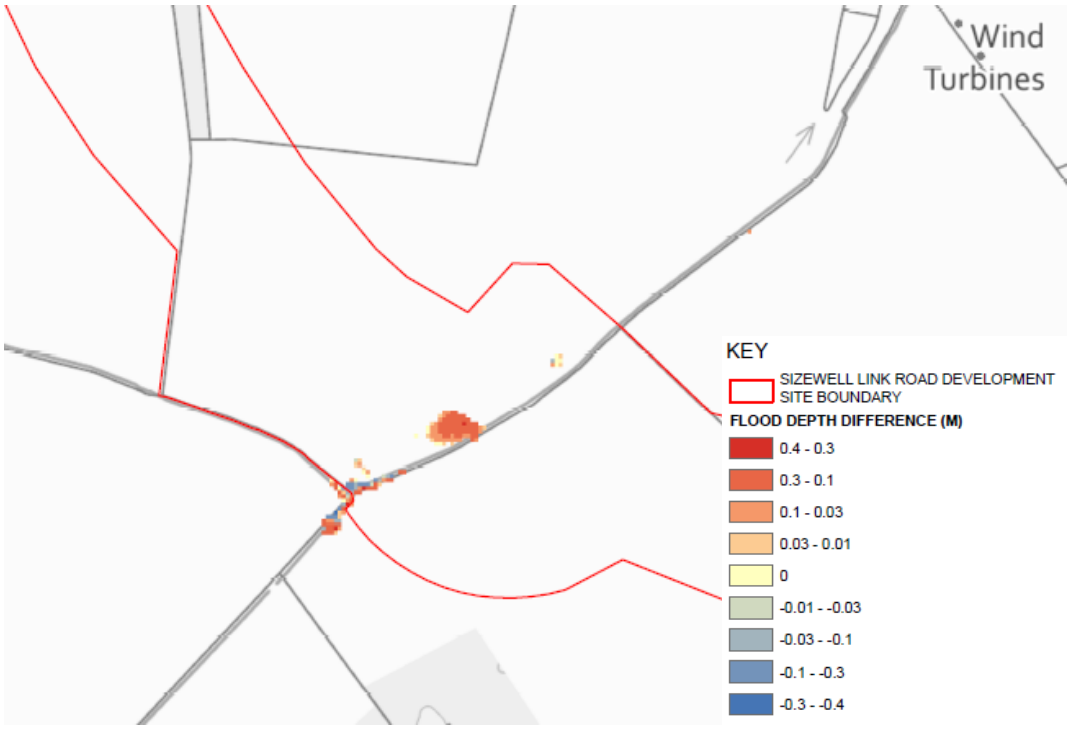
Plate 4.17: Location of the key model nodes on crossing 6



4.5.6 **Table 4.5** shows that the post-development maximum flood level for the 1,000-year event with 65% climate change allowance is 12.15mAOD, whereas the Sizewell link road level at the crossing 6 is approximately 14.40mAOD. Therefore, the proposed development is well above the fluvial flood levels for all scenarios throughout the development lifetime, with greater than 2m freeboard.

4.5.7 As illustrated in **Plate 4.18**, there is a slight increase in the flood levels immediately upstream of crossing 6 post-development (also shown in **Table 4.5**) and also further upstream (outside of the site boundary). However, only agricultural land would be impacted as there are no properties located within the flood extent.

Plate 4.18: Difference in maximum flood depth for crossing 6 – 1 in 100-year event with 35% climate change (extract from Figure C6.1 in APPENDIX C:)



4.5.8 Further discussion on the modelling results for crossing 6 is provided in **section 4.2d** of the **Sizewell Link Road Modelling Report Addendum** (**APPENDIX C:**

c) Conclusions

4.5.9 Results of the updated hydraulic model for crossing 6 show that, once constructed, the proposed Sizewell link road at this location would not be at risk of flooding under any of the assessed scenarios (i.e. up to 1 in 1,000-year event with 65% climate change allowance) throughout the whole development lifetime.

4.5.10 There are no properties at risk of flooding in the vicinity of the proposed crossing 6. The scheme does slightly increase flood levels upstream of the crossing location, however the impact is very localised and limited (mostly between 0.01m and 0.1m in a very small area up to 0.3m wide).

4.5.11 Since there are no properties affected and the flooding is limited, it is concluded that the proposed Sizewell link road at crossing 6 would not have adverse impacts on flood risk to off-site receptors.

4.6 Crossing 7

a) Updates to the proposed design and modelling

4.6.1 The concept design for crossing 7 (Fishpond Grove watercourse crossing) was least developed at the time of the Application due to the limited topographical information and uncertainty around the connectivity of the watercourse under the existing B1122. Hence, this crossing was not modelled in the previous study.

4.6.2 As discussed in **Section 3.6** of this document, following additional topographic survey crossing 7 has been considered in the hydraulic modelling and the flood risk assessment. Similarly, the proposed design has been developed further and reflected in the modelling.

4.6.3 The design assumes an extension of the existing pipe under the B1122 to ensure that current flow regimes are maintained. The existing culvert would be extended by approximately 36m with no change to its diameter.

4.6.4 In order to control water levels at the culvert inlet and avoid surcharging, it is proposed to lower, by 150mm, approximately 10m of the left bank upstream of the culvert to allow excess water storage within the floodplain.

4.6.5 In addition, the surface water flood map (**Figure 3** of the **Sizewell Link Road Flood Risk Assessment** [APP-138]) shows that during an extreme flood event, water currently ponds in a topographically low-lying area to the left of the channel before then flowing over the B1122. This was confirmed during a site visit following a heavy rainfall event.

4.6.6 In order to ensure that this flow path is maintained, a box culvert (2.4m wide by 1m high) is provided on the floodplain through the Sizewell link road. The general layout and flow routes are shown in **Plate 4.19** and cross-section of the flood relief culvert in **Plate 4.20**.

4.6.7 The design also assumes a highway attenuation basin that would discharge up to 0.01m^3/s to the watercourse via a controlled connection upstream of the proposed crossing. The attenuation basin would be located outside of the flood extent to ensure that sufficient flood storage volume can continue to be provided and to avoid the mixing of surface water with flood storage.

Plate 4.19: Plan view of the proposed dual culvert system and overland flow route at crossing 7 (extract from drawing no. SZC-AD0310-WSP-SLRHDG-ZZ0000-DRW-HCD-300003)

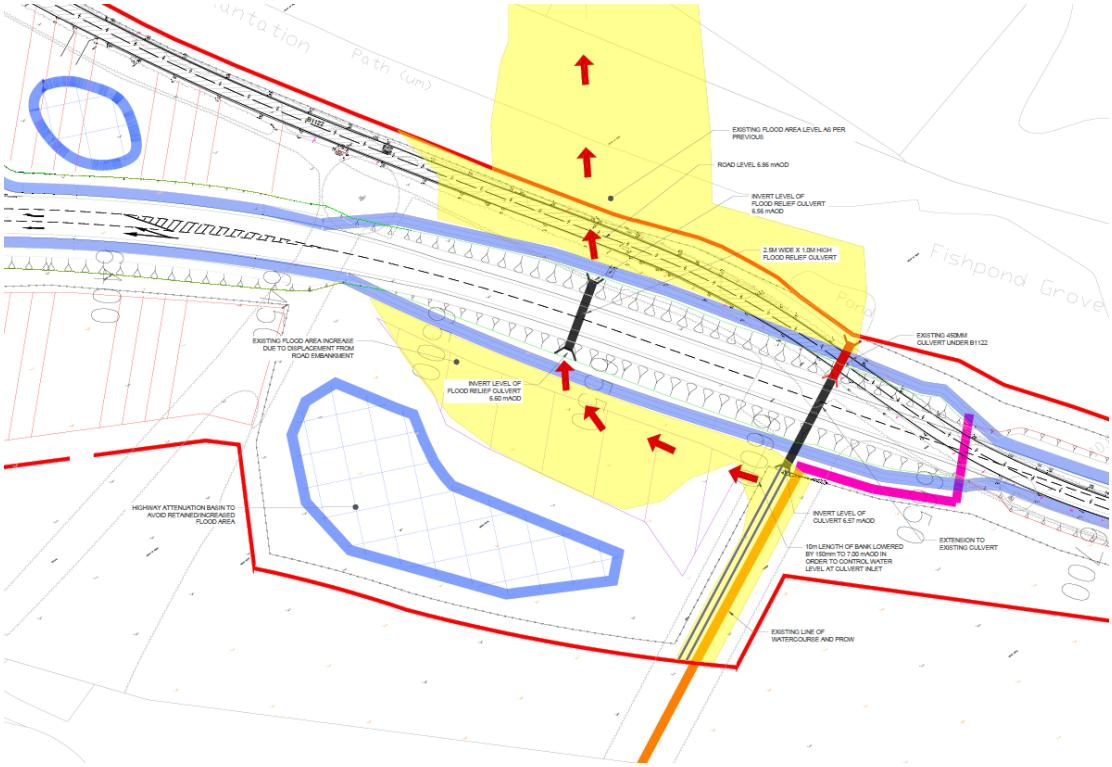
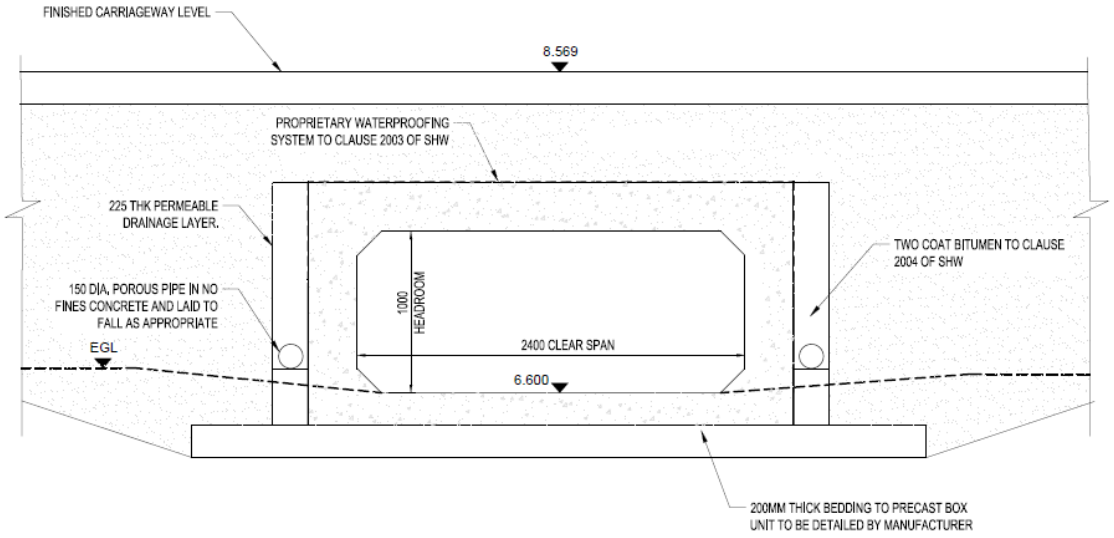


Plate 4.20: Cross-section of the proposed flood relief culvert at crossing 7 (extract from drawing no. SZC-AD0310-WSP-SLRHDG-ZZ0000-DRW-HCD-300004)



b) Results

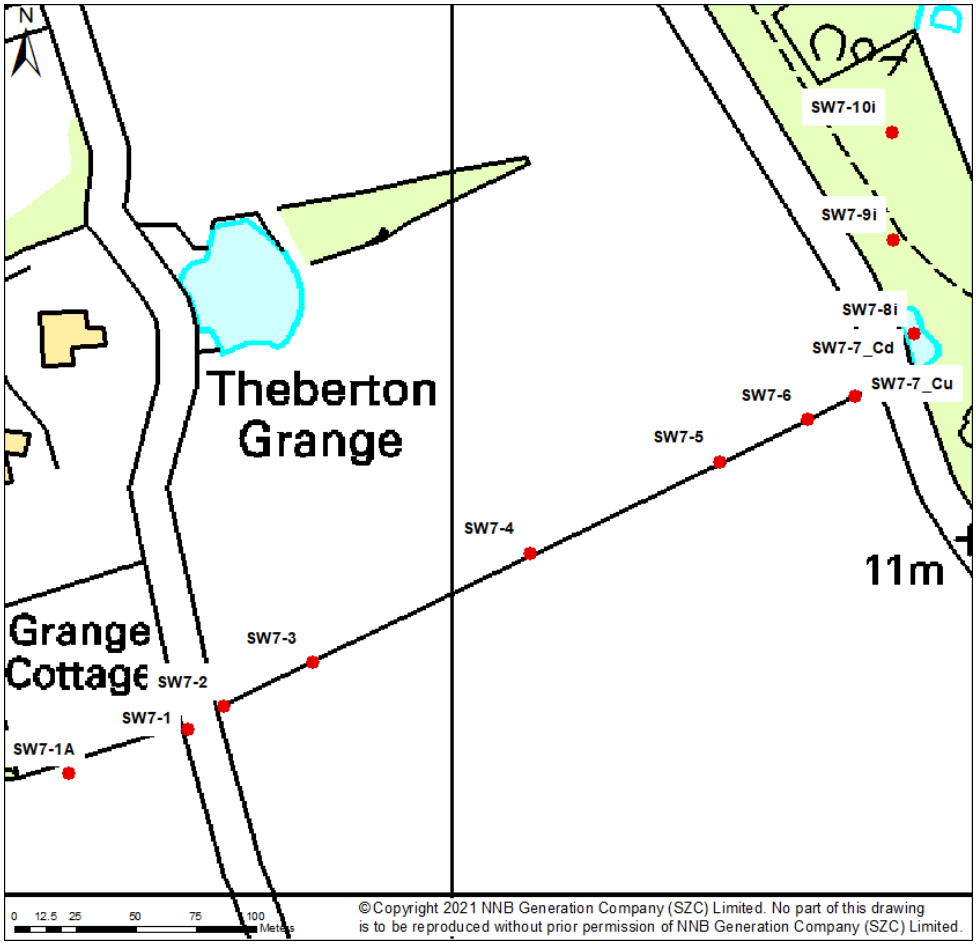
4.6.8 Results of peak water levels for crossing 7 at the key locations (selected model nodes as illustrated in **Plate 4.21**) are presented below in **Table 4.6** for all considered return period event and climate change scenarios.

Table 4.6: Modelled peak water levels for crossing 7

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m)
Next to residential house upstream of the ford (SW7-1)	5 + 35%CC	9.65	9.65	0.00
	5 + 65%CC	9.71	9.71	0.00
	20 + 35%CC	9.76	9.76	0.00
	20 + 65%CC	9.84	9.84	0.00
	100 + 35%CC	10.27	10.27	0.00
	100 + 65%CC	10.30	10.30	0.00
	1000 + 35%CC	10.34	10.34	0.00
	1000 + 65%CC	10.36	10.36	0.00
Within the floodplain upstream of the Sizewell link road (SW7-6_ResOut)	5 + 35%CC	6.76	6.78	0.02
	5 + 65%CC	6.77	6.79	0.02
	20 + 35%CC	6.77	6.81	0.04
	20 + 65%CC	6.78	6.81	0.03
	100 + 35%CC	6.79	6.84	0.05
	100 + 65%CC	6.79	6.86	0.07
	1000 + 35%CC	6.81	6.95	0.14
	1000 + 65%CC	6.82	7.00	0.18
Upstream of the Sizewell link road culvert (SW7-6)	5 + 35%CC	7.12	7.04	-0.08
	5 + 65%CC	7.15	7.05	-0.10
	20 + 35%CC	7.16	7.08	-0.08
	20 + 65%CC	7.18	7.04	-0.14
	100 + 35%CC	7.20	7.10	-0.09
	100 + 65%CC	7.24	7.13	-0.08
	1000 + 35%CC	7.26	7.19	-0.07
	1000 + 65%CC	7.28	7.23	-0.05
	5 + 35%CC	6.33	6.35	0.02

Node	Return period (years)	Baseline level (mAOD)	With scheme level (mAOD)	Difference in peak flood level (m)
Downstream of the Sizewell link road culvert (SW7-9i)	5 + 65%CC	6.38	6.39	0.01
	20 + 35%CC	6.42	6.43	0.01
	20 + 65%CC	6.48	6.49	0.01
	100 + 35%CC	6.56	6.57	0.01
	100 + 65%CC	6.63	6.64	0.01
	1000 + 35%CC	6.81	6.81	0.00
	1000 + 65%CC	6.89	6.90	0.01

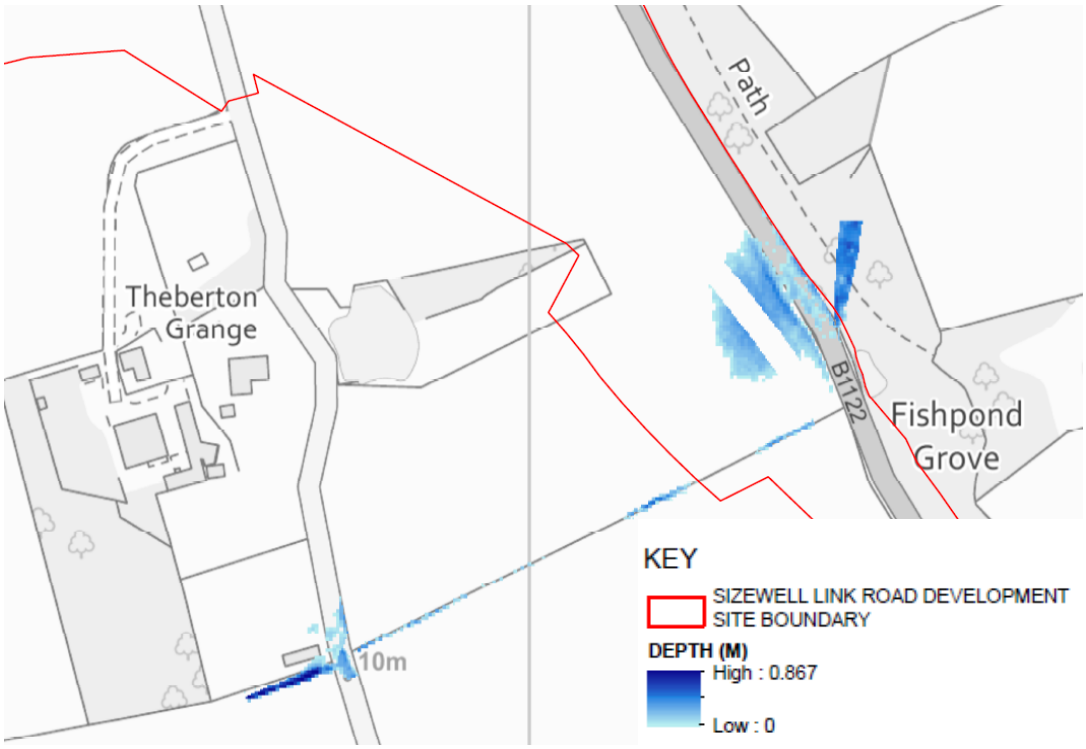
Plate 4.21: Location of the key model nodes on crossing 7



4.6.9 The level of the Sizewell link road at crossing 7 itself is situated at 7.95mAOD (tie-in to the B1122). **Table 4.6** shows that the maximum flood level for the 1,000-year event with 65% climate change is 7.23mAOD. As such the proposed development would not be at fluvial flood risk, having greater than 0.5m freeboard above the maximum flood levels for all considered scenarios throughout the development lifetime.

4.6.10 **Plate 4.22**, illustrating maximum flood depth for the 1 in 100-year event with 65% climate change allowance, shows flooding immediately upstream and downstream of the Sizewell link road, with the low-lying spot on the left floodplain upstream of the B1122, as well some flooding over the B1122. This is consistent with the baseline scenario and shows that the proposed flood relief culvert through the embankment functions as designed ensuring the existing flow path is retained. The maximum flood depth is 0.3m upstream of the embankment and 0.4m in the area between the embankment and the B1122 road.

Plate 4.22: Maximum flood depth in the with scheme scenario for crossing 7 – 1 in 100-year event with 65% climate change (extract from Figure B7.9 in APPENDIX C:)

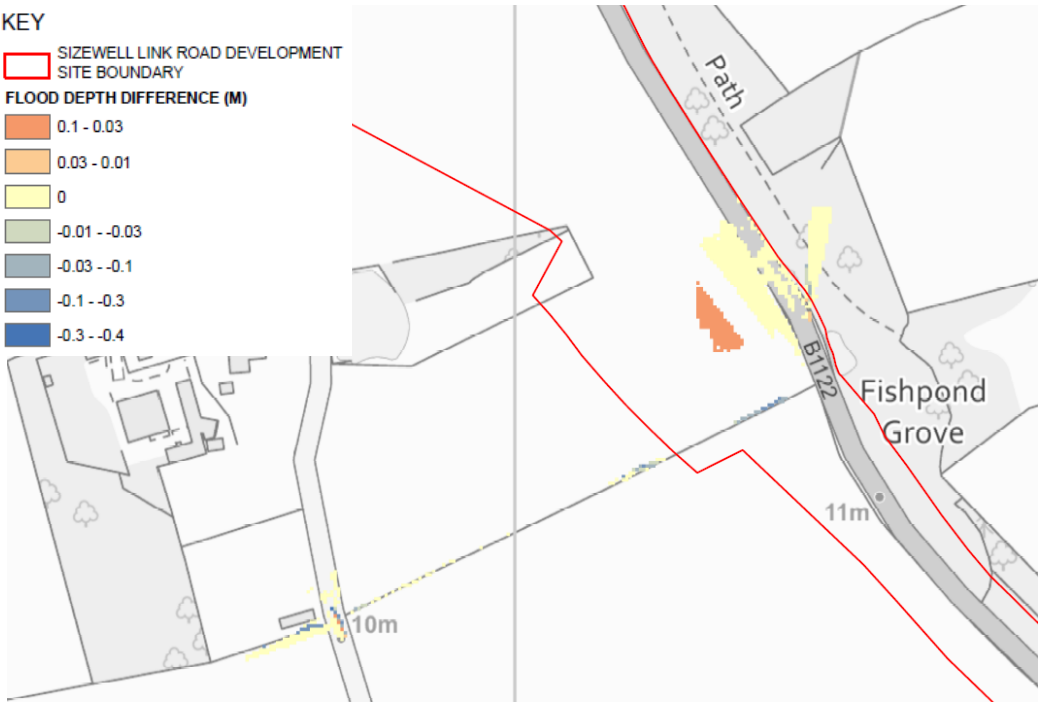


4.6.11 As presented in **Table 4.6**, there is some decrease in flood levels within the channel in the post-development scenario. This is a result of the added

berm on the left bank (lowered bank levels) which is allowing water to spill out earlier than in the baseline scenario. This in return, causes a small increase in flood level within the floodplain upstream of the Sizewell link road, however flooding remains within the red line boundary and does not impact either the road or the road drainage attenuation basin.

4.6.12 The difference in flood depth between the baseline and post-development scenarios for the 1 in 100-year with 35% climate change allowance is presented in **Plate 4.23**, showing that the maximum increase, immediately upstream of the Sizewell link road embankment, within the floodplain is up to 0.1m with no significant change in flood depth elsewhere.

Plate 4.23: Difference in maximum flood depth for crossing 7 – 1 in 100-year event with 35% climate change (extract from Figure C7.8 in APPENDIX C:)



4.6.13 There is no impact on flood depth near the residential property upstream of the proposed development. The property is situated approximately 300m upstream of the proposed development at around 10.3mAOD, as observed from LiDAR. Based on the modelling results (**Table 4.6**), it is likely that, in the baseline scenario, the property may be flooded in the 1 in 100-year + 65% climate change event. However, there is no increase in flood risk at this property due to the proposed development.

4.6.14 Further details on the modelling and results for crossing 7 are provided in **section 4.2e** of the **Sizewell Link Road Modelling Report Addendum** (**APPENDIX C:**

c) Conclusions

4.6.15 Results of the hydraulic model developed for crossing 7 show that, once constructed, the proposed Sizewell link road at this location would not be at risk of flooding under any of the assessed scenarios (i.e. up to 1 in 1,000-year event with 65% climate change allowance) throughout the whole development lifetime.

4.6.16 The proposed design maintains the existing flow path from the left low-lying floodplain over the B1122 road by incorporating a flood relief culvert through the Sizewell link road embankment.

4.6.17 The scheme has a very localised and limited impact on flood depth immediately upstream of the Sizewell link road embankment (increase up to 0.1m) however, this is only within the low-lying floodplain with the site boundary. Change in flood depth elsewhere is less than 0.01m and therefore is considered not to be significant.

4.6.18 There is no change in flood risk to the property upstream of the proposed development and there are no other residential or commercial properties located in the vicinity of the crossing.

4.6.19 Based on the above, it is concluded that the proposed Sizewell link road at crossing 7 would not be at risk of flooding throughout the development lifetime and the proposed development does not impact the flood risk to off-site receptors.

4.7 Sensitivity testing

4.7.1 As discussed in **Section 4.1** of this document, a series of sensitivity tests were undertaken to determine the model response to a change in some of the key parameters, such as inflow, roughness or blockage of key structures. The sensitivity tests were simulated for the key return periods, i.e. the 1 in 100-year +35% climate change and the 1 in 100-year +65% climate change scenarios. These return periods relate to the review of flood risk to both on-site and off-site risks.

4.7.2 All the sensitivity testing was carried out for the with scheme model schematisation only to determine the potential change in flood risk both to the proposed Sizewell link road itself and to how these changes may affect flood risk off-site with the development in place.

4.7.3 Results for each of the sensitivity test were analysed with a focus on comparison of the peak flood levels at the nearest comparison point upstream of the relevant Sizewell link road crossing location. These are presented in the following sub-sections.

a) Increase in flow

4.7.4 The results of the sensitivity test with 20% increase in fluvial flow are presented in **Table 4.7** below for the model nodes upstream of the Sizewell link road at each relevant crossing. The sensitivity test was run for the with scheme model schematisation only, hence the difference is comparing the sensitivity test to the with scheme (no increase in flow) results. A positive difference indicates that the sensitivity test has a higher flood level.

Table 4.7: Peak flood levels upstream of the Sizewell link road crossing for sensitivity test with 20% increase in flow

Return period	Crossing number	Baseline level (mAOD)	With scheme level (mAOD)	Sensitivity test level (mAOD)	Difference in peak level (m)
100-year +35% climate change	1	11.37	10.88	10.93	0.05
	2	12.64	12.64	12.67	0.03
	3	8.30	8.52	8.57	0.05
	5	12.35	11.24	11.28	0.04
	6	11.95	11.96	12.01	0.05
	7	7.20	7.10	7.12	0.02
100-year +65% climate change	1	11.41	10.94	11.02	0.08
	2	12.67	12.67	12.70	0.03
	3	8.34	8.57	8.64	0.07
	5	12.37	11.28	11.33	0.05
	6	11.99	12.01	12.05	0.04
	7	7.22	7.13	7.15	0.02

4.7.5 **Table 4.7** shows that the increase in flow results in an increase in flood levels, as to be expected, with the greatest difference up to 0.08m at crossing 1.

4.7.6 The increased levels however, do not affect the properties upstream of crossing 1, crossing 3 or crossing 7 (i.e. the crossings where properties are

present), as was also indicated with the results for higher return period events discussed in **section 4.2b)**, **section 4.3b)** and **section 4.6b)** respectively, where peak flows for the 1 in 1,000-year event with 65% climate change allowance are higher than the peak for 20% increase in flow for the 100-year event with 65% climate change.

b) Change in roughness

4.7.7 To assess the sensitivity of the hydraulic models to changes in roughness e.g. due to seasonal vegetation growth, the models were simulated with an increase of 20% and a decrease of 20% in roughness values.

4.7.8 The results are presented in **Table 4.8** and **Table 4.9** for the increase and decrease in roughness, respectively, with the differences comparing the sensitivity test to the normal (no change in roughness) with scheme model. The results are presented for the model nodes immediately upstream of the Sizewell link road at each relevant crossing.

Table 4.8: Peak flood levels upstream of the Sizewell link road crossing for sensitivity test with 20% increase in roughness

Return period	Crossing number	Baseline level (mAOD)	With scheme level (mAOD)	Sensitivity test level (mAOD)	Difference in peak level (m)
100-year +35% climate change	1	11.37	10.88	10.89	0.01
	2	12.64	12.64	12.67	0.03
	3	8.30	8.52	8.57	0.05
	5	12.35	11.24	11.28	0.04
	6	11.95	11.96	11.99	0.03
	7	7.20	7.10	7.10	0.00
100-year +65% climate change	1	11.41	10.94	10.98	0.04
	2	12.67	12.67	12.71	0.04
	3	8.34	8.57	8.63	0.06
	5	12.37	11.28	11.33	0.05
	6	11.99	12.01	12.03	0.02
	7	7.23	7.13	7.12	-0.01

4.7.9 **Table 4.8** shows that there is an increase in peak flood levels with increased roughness. However, this is not significant enough to change

flood risk to the proposed development at any of the crossing locations. As discussed in the previous sections, the proposed Sizewell link road levels are well above any of the maximum flood levels.

4.7.10 Similarly, the impact of the proposed development on flood risk to off-site receptors is very limited and does not affect any properties. Therefore, the slight increase in flood levels as a result of the increase in roughness would not significantly impact flood risk in the area.

Table 4.9: Peak flood levels upstream of the Sizewell link road crossing for sensitivity test with 20% decrease in roughness

Return period	Crossing number	Baseline level (mAOD)	With scheme level (mAOD)	Sensitivity test level (mAOD)	Difference in peak level (m)
100-year +35% climate change	1	11.37	10.88	10.81	-0.06
	2	12.64	12.64	12.61	-0.03
	3	8.30	8.52	8.45	-0.07
	5	12.35	11.24	11.19	-0.05
	6	11.95	11.96	11.94	-0.02
	7	7.20	7.10	7.11	0.01
100-year +65% climate change	1	11.41	10.94	10.93	-0.01
	2	12.67	12.67	12.64	-0.03
	3	8.34	8.57	8.52	-0.05
	5	12.37	11.28	11.24	-0.04
	6	11.99	12.01	11.99	-0.02
	7	7.22	7.13	7.13	0.00

4.7.11 **Table 4.9** shows that the peak flood levels are slightly lower in the sensitivity test with the decreased roughness for most of the crossings, except crossing 7 where there is a minimal increase in flood levels. A review of the model results confirms that the proposed development would not have a significant impact on flood risk in the area and would not result in additional flooding to property upstream or downstream.

c) Risk of blockage

4.7.12 To assess the flood risk both to the proposed development itself and the potential impacts to off-site receptors in the event of blockage of the proposed portal culverts, additional hydraulic model runs were undertaken.

4.7.13 Considering the dimensions of the proposed portal culverts, it is highly unlikely that a 100% blockage would occur. Therefore, two other blockage ratios were assessed i.e. 33% and 67%, in line with the available guidance from the Environment Agency (Ref. 5).

4.7.14 The results of the two sensitivity tests for all crossings are presented in **Table 4.10** and **Table 4.11** below with the differences comparing the sensitivity test to the with scheme model without blockage. These results are presented for the selected model nodes immediately upstream of the Sizewell link road at each relevant crossing.

Table 4.10: Peak flood levels upstream of the Sizewell link road crossing for sensitivity test with 33% blockage

Return period	Crossing number	Baseline level (mAOD)	With scheme level (mAOD)	Sensitivity test level (mAOD)	Difference in peak level (m)
100-year +35% climate change	1	11.37	10.88	10.89	0.01
	2	12.64	12.64	12.65	0.01
	3	8.30	8.52	8.61	0.09
	5	12.35	11.24	11.27	0.03
	6	11.95	11.96	12.00	0.04
	7	7.20	7.10	7.11	0.01
100-year +65% climate change	1	11.41	10.94	10.95	0.01
	2	12.67	12.67	12.69	0.02
	3	8.34	8.57	8.67	0.10
	5	12.37	11.28	11.32	0.04
	6	11.99	12.01	12.05	0.04
	7	7.22	7.13	7.14	0.01

Table 4.11: Peak flood levels upstream of the Sizewell link road crossing for sensitivity test with 67% blockage

Return period	Crossing number	Baseline level (mAOD)	With scheme level (mAOD)	Sensitivity test level (mAOD)	Difference in peak level (m)
100-year +35% climate change	1	11.37	10.88	11.00	0.12
	2	12.64	12.64	12.72	0.08
	3	8.30	8.52	8.75	0.23
	5	12.35	11.24	11.27	0.03
	6	11.95	11.96	12.11	0.15
	7	7.20	7.10	7.12	0.02
100-year +65% climate change	1	11.41	10.94	11.35	0.41
	2	12.67	12.67	12.78	0.11
	3	8.34	8.57	8.82	0.25
	5	12.37	11.28	11.32	0.04
	6	11.99	12.01	12.20	0.19
	7	7.22	7.13	7.18	0.05

4.7.15 **Table 4.10** and **Table 4.11** show that the blockage of the portal culverts would increase flood levels upstream of the crossings, with a greater increase for the higher blockage ratio.

4.7.16 However, as discussed in previous sections, the proposed Sizewell link road levels are well above any of the maximum flood levels. That remains the case in the blockage scenarios, showing that the proposed Sizewell link road itself would not be at flood risk under such a scenario.

4.7.17 Similarly, the impact of the proposed development to flood risk on off-site receptors is very limited and does not affect any properties. This is also illustrated in **Figure 9**, **Figure 10** and **Figure 11** for crossings 1, 3 and 7 respectively, where there are properties located upstream of the proposed crossings. Whilst there is a property upstream of crossing 7 showing potential flood risk impact at the very edge of the building, this is no worse than the baseline condition without scheme. Therefore, the increase in flood levels in the event of a blockage would not significantly impact flood risk in the area.

4.7.18 Further details on the sensitivity testing modelling and results for all of the crossings are provided in **section 4.3** of the **Sizewell Link Road Modelling Report Addendum** (**APPENDIX C:**

5 ADDITIONAL CLARIFICATIONS

a) Construction phase

5.1.1 In their response to the Application, the Environment Agency raised a comment with regard to the construction phase stating:

> *"No information is provided on the construction phase, methodology or construction compounds required."*

5.1.2 The proposed Sizewell link road crosses a number of existing ditches and watercourses that will require the installation of permanent culverts to facilitate the existing flow under the proposed Sizewell link road. A pre-cast portal culvert is proposed for each crossing, whereby the existing riverbank is untouched during the installation as the pre-cast portal culvert is placed on a strip foundation excavated in a trench to the side of each bank. Where the portal culverts are proposed there is no requirement to undertake any construction work within the watercourse.

5.1.3 In the **Sizewell Link Road Flood Risk Assessment** [APP-136], access routes via a number of existing roads during construction and operation were listed, i.e. from west to east; A12 roundabout north of The Red House Farm, B1122 / Middleton Moor link, Fordley Road south, Trust Farm Junction, B1122 at Title Road north, Hawthorn Road south, B1122 / B1125 Link, Pretty Road south, Moat Road, B1122 / Theberton Link, B1122 link at south of site.

5.1.4 Where access is required over the river crossing prior to the installation of the permanent culvert the Sizewell link road the contractor will install temporary bailey bridges over the proposed crossing. These temporary bailey bridges will facilitate ongoing construction works and will provide access over the existing river crossing during construction. They would be set on bank seats to ensure the underside of the bridge remains above the 1 in 100-year flood level.

5.1.5 In the event of significant flooding, construction works will be suspended. Given the depth of water predicted by the hydraulic modelling (**section 3** and **section 4**) and associated flood hazard, workers would not be at risk if flooding occurs before the workforce evacuates the construction site.

5.1.6 The Middleton Watercourse (crossing 1) is to be diverted in order to accommodate the proposed Fordley Road traffic junction with the Sizewell link road. The proposed new culvert will be constructed clear of the existing watercourse and its floodplain. Once the culvert installation is complete, the Middleton Watercourse will be diverted, working from the downstream end towards the upstream end so that water flow is maintained in the existing channel until the upstream tie in is in place. The redundant section of the existing Middleton Watercourse will then be infilled to surrounding ground levels.

5.1.7 In the case of the Fishpond Grove ordinary watercourse (crossing 7), an existing 450mm pipe culvert, which passes under the existing B1122 road, is to be extended to a point upstream of the Sizewell link road embankment. Given that the Fishpond Grove watercourse is normally dry, no issues in management of baseflow are foreseen. The watercourse will be temporarily blocked off upstream and any build-up of water would be pumped over to the existing channel to prevent any impacts upstream.

5.1.8 During construction, SZC Co. will implement methods to minimise impacts from surface water. The surface water runoff from the construction works and compounds will be managed through:

- Early installation of the permanent and temporary balancing ponds, where possible runoff from the site will be captured by the site drainage and diverted to the balancing ponds to settle;
- Only stripping topsoil as work progresses, to minimise silt laden surface water runoff;
- Using strategic silt fencing to slow water across the scheme;
- Installation of silt fencing at watercourse crossings, such as flumes and culverts, to mitigate silt entering the watercourse; and
- Where deemed applicable by the environmental team, installing silt fencing as part of the compound setup to minimise the risk of silt runoff from compound sites.

5.1.9 In addition, in the early construction phase, the pre-earthworks drainage will be one of the first activities undertaken on site following site clearance activities, adopting the following concepts:

- Utilise the permanent drainage solution as part of the pre-earthwork's requirements;

- Maintain existing drainage networks for as long as possible thereby ensuring works only takes place when required and for the shortest possible duration at watercourses;
- Construction of permanent balancing ponds (attenuation basins) to facilitate on-site storage of surface water during construction;
- Develop a surface water catchment drawing of the existing ground topography and surface water flow patterns that will be used to strategically install cut off V-Drains to divert clean water away from the main earthworks activities and reduce surface water treatment measures; and
- Implement best practice surface water mitigation where required.

5.1.10 All materials and plant used in the construction and installation will be stored outside of the watercourse flood extent as defined in **Section 3** of this report. The trench excavations would be bunded if required.

5.1.11 Measures will be put in place to reduce the risk of pollution to the relevant watercourses due to construction activities. The contractor will need to ensure they are controlling the risk of pollution, protecting the aquatic environment from the ingress of material such as soil, silt, oil, chemicals or concrete wash waters. This includes the existing watercourses, as well as the newly created drainage features that include ditches, swales and attenuation basins.

5.1.12 It is proposed to establish five site compounds for the construction of the Sizewell link road. The compounds will comprise a canteen, office space, drying rooms, toilets, plant and materials store and staff car parking. The first site compound will be located at the west of the development, adjacent to the existing A12 road, the second compound will be located on both sides of the East Suffolk Line where it would be crossed by the proposed Sizewell link road, the third site compound will be located to the west side of the proposed Middleton Moor link, the fourth site compound will be located west of the Sizewell link road adjacent to Pretty Road and the fifth site compound will be to located at the eastern end of the Sizewell link road site. All the site compounds will be located outside of the flood extent (in Flood Zone 1).

5.1.13 As discussed in the **Sizewell Link Road Flood Risk Assessment** [APP-136], prior to commencing construction, a Flood Risk Activity Permit (FRAP) (for Main Rivers) or Land Drainage Consent (for Ordinary Watercourses) will be required for any activity within a floodplain, within 8m of a non-tidal watercourse or flood defence, and for permanent structures over a Main

River or an Ordinary Watercourse. An application will need to be made to the Environment Agency or the Lead Local Flood Authority, as appropriate, and this will be submitted in accordance with the relevant permitting regulations.

5.1.14 As part of the FRAP application, it will be necessary to prepare and provide a detailed Construction Method Statement setting out the construction methodology, duration of works and the proposed programme. This should include plans to avoid periods of high flows (typically winter) and where areas of storage for materials or plant are required in relation to the channel and the wider floodplain.

5.1.15 Consideration of flood risk during the construction phase is also included in the Flood Risk Emergency Plan (**Appendix D** of this document), the rationale behind which is summarised briefly in the following **Section 5b)**.

b) Flood Risk Emergency Plan

5.1.16 A Flood Risk Emergency Plan (FREP) describes the evacuation procedure and need for safe refuge in response to a flood event. A FREP for the Sizewell link road was not developed at the time of the previous assessment (**Sizewell Link Road Flood Risk Assessment** [APP-136]), and was therefore not submitted as part of the Application.

5.1.17 In their response to the Application, the Environment Agency raised one comment with regard to the Flood Risk Emergency Plan stating:

> *"Evidence should be provided to demonstrate that an adequate FREP shall be in place throughout construction and operation phases."*

5.1.18 Following the Application submission, a FREP has been developed to detail the procedures that will be required during construction of the Sizewell link road (**Appendix D** of this document), in accordance with the guidance provided by the Association of Directors of Environment, Economy, Planning & Transport (ADEPT) and the Environment Agency (Ref. 6).

5.1.19 Guidance for a FREP indicates that it can either form part of a Flood Risk Assessment or be a standalone document. Whilst the FREP for the Sizewell link road has been included in **Appendix D** of this **Sizewell Link Road FRA Addendum**, it has been written such that it can be read as a standalone document, to aid in future updates, as necessary.

5.1.20 Within a FREP it is necessary to consider the timing of the proposed works, whether there are tools available for forecasting potential extreme rainfall

events and flooding, identification of evacuation areas, refuges and shelters options, where needed, and the roles required to ensure that the FREP is implemented during an event. A FREP is also required to consider the response needed following a flooding event.

5.1.21 Once constructed, the Sizewell link road will be elevated, above the adjacent floodplain, such that the maximum flood levels would be significantly below the level of the road (as illustrated with results presented in **Section 4** of this document. Therefore, the FREP for the Sizewell link road focuses on the risk to people during the construction phase of the road and associated watercourse crossings.

5.1.22 In addition, once the road is completed and the temporary construction works are removed there will be no requirement for the longer-term use of the wider floodplain. Therefore, there is no requirement for the FREP to consider emergency response / evacuation or the need for safe refuge once the Sizewell link road is operational.

c) Surface water drainage design

5.1.23 In the Application, **Volume 6**, **Chapter 2** of the **ES** [APP-446], the surface water drainage provision was described as following:

> *"Sustainable drainage system (SuDS) would be implemented to attenuate surface water run-off, minimise sediment generation and provide water treatment. It is envisaged that surface water run-off would be contained within the site, with drainage to ground via infiltration using infiltration basins and swales, wherever feasible."*

5.1.24 In their response to the Application, the Environment Agency raised concerns with regard to the proposed surface water drainage stating:

> *"The aim is to infiltrate surface water rather than drain it to watercourses. Infiltration testing has not been undertaken. […] information regarding the proposed 11 infiltration basins, and the watercourse relief basins is insufficient to demonstrate that flood risk will be adequately addressed."*

5.1.25 Subsequent to the Application, a ground investigation survey has been undertaken. This included obtaining infiltration rates at various locations along the length of the proposed road. The results demonstrate that the proposed removal of highway runoff by infiltration to ground, as intended,

is not achievable. As a result, it was necessary to modify the proposed drainage design strategy.

5.1.26 In the area (section of the road) from the A12 Roundabout to the East Suffolk Railway line it is proposed to retain the swales but provide more and larger basins. The basins have been changed from infiltration basins to attenuation basins. Their purpose is to receive highway runoff collected by the roundabout underground drains and swales. They store the water over a longer period time until it is gradually removed by natural processes, including take up by vegetation, evaporation and limited infiltration. The basins are required to hold the runoff resulting from a 1 in 100-year return period rainfall event with 40% climate change allowance plus additional storage equivalent to the runoff from a 1 in 10 year rainfall event as a minimum, to accommodate rainfall events which may occur following the 1 in 100 year event before the basin is empty.

5.1.27 This arrangement has been discussed with Suffolk County Council (SCC) in their dual role as Highway Authority and Lead Local Flood Authority. SCC have indicated that this arrangement could be considered acceptable provided sufficient storage volume can be achieved but they may wish to see additional back up drainage measures.

5.1.28 Consideration is therefore being given to such back up measures. The possibility of providing a drainage outfall to one of two local watercourses is being investigated but may be impractical. However, at this stage the red line boundary has been amended to provide routes from the road to these watercourses, should this option be pursued. The proposed changes to the site boundary are described in **Volume 1**, **Chapter 6** of the **ES Addendum** [AS-185].

5.1.29 The possibility of providing a surface water pumping station next to the roundabout attenuation basin SLR-AB-02 is also being considered as set out in **Volume 3**, **Chapter 6** of the **ES Addendum** [AS-248]. This pumping station would remove highway runoff from the basin and pump it along the line of the road and over the railway bridge to the next area / section where the runoff would discharge into a swale and ultimately to the Middleton watercourse.

5.1.30 For the remaining sections of the development located between the East Suffolk railway and the B1122 road east of Theberton, it is proposed to remove highway runoff by discharge to one of six local watercourses.

5.1.31 The swales will be retained and collect the highway runoff and convey the flow to the watercourse. They will be supplemented by additional attenuation basins which will provide temporary storage and help to reduce

the peak flow rate on the approach to the watercourses. The swales on the upstream side of the road will terminate short of the watercourse and pass under the road in a pipe to discharge into a final attenuation basin. Swales on the downstream side of the road will also discharge to the final attenuation basin.

5.1.32 The attenuation basin will have an outfall connection allowing discharge to the watercourse. The flow rate will be attenuated to a value in accordance with the SCC stated requirements. This will ensure that there is no unacceptable increase in flood risk from the watercourse. There will be one final attenuation basin located on either side of the watercourse at each of the road crossings. These basins replace the six flood relief basins previously proposed in the Application.

5.1.33 Swales and attenuation basins will also be provided to effectively drain the extended B1125 and realigned B1122.

5.1.34 This modification to the drainage strategy results in a need for additional attenuation basins. The precise number and size of the basins will be determined during the detailed design of the highway drainage network. Similarly, the exact location, footprint and depth of these basins is to be confirmed at the detailed design stage. Current indicative locations for the attenuation basins are shown in **Plate 5.1** – **Plate 5.6** for the respective watercourse crossings. The red line boundary has been amended to provide the required space for the additional attenuation basins.

5.1.35 Further details of the revised drainage design strategy are provided in the Technical Note '*Sizewell Link Road - DCO Design Validation – Drainage*' (provided in **Volume 3, Appendix 6.2.B** of the **ES Addendum** [AS-248] which has been prepared to support the **Outline Drainage Strategy** presented in **Volume 2, Appendix 2A** of the **ES** [APP-181] submitted in the Application.

Plate 5.1: Indicative location of the attenuation basins at crossings 1 and 2 (Extract from drawing no. SZC-SZ0204-XX-000-DRW-100137 Rev 02)

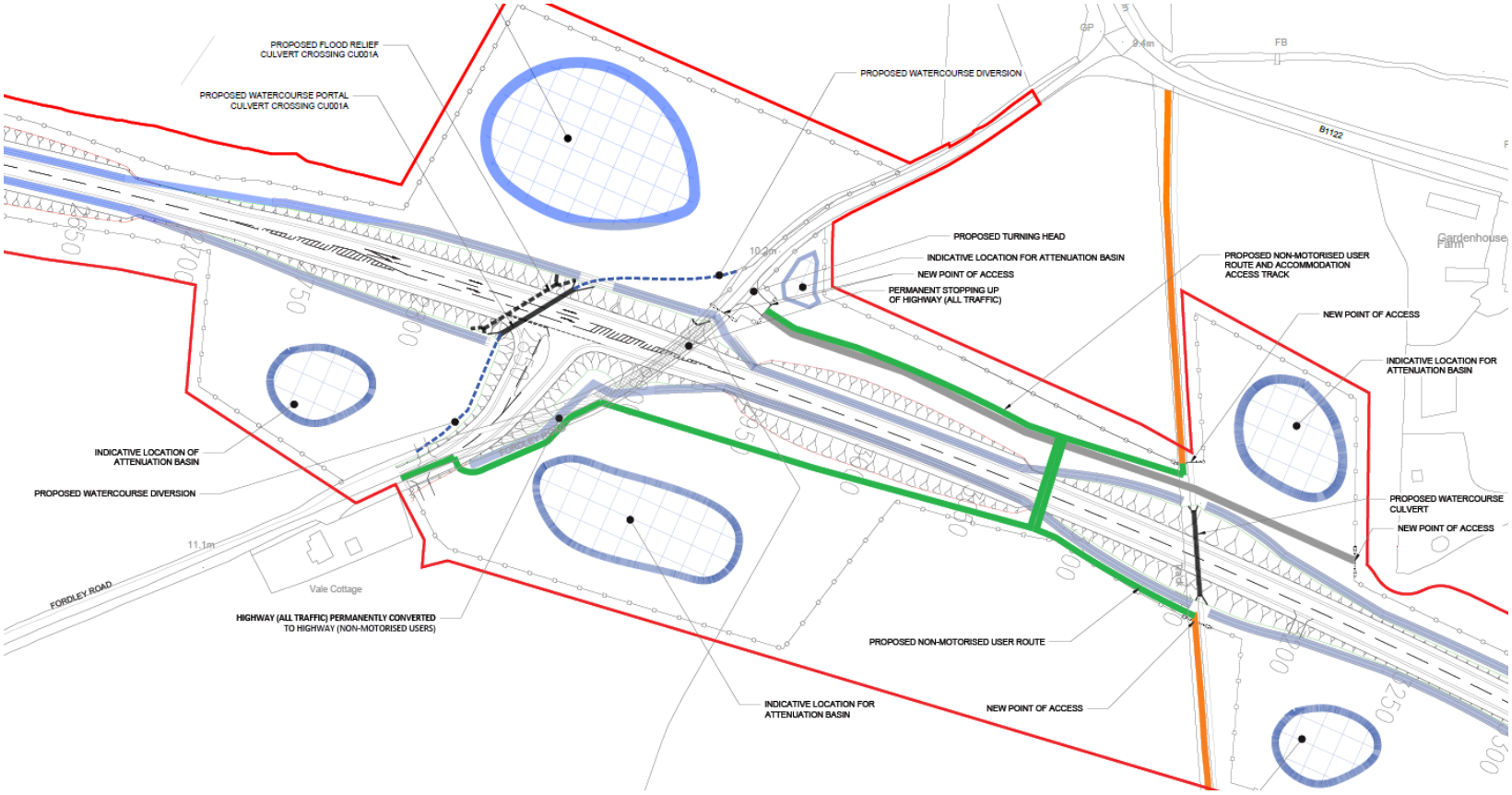


Plate 5.2: Indicative location of the attenuation basins at crossing 3 (Extract from drawing no. SZC-SZ0204-XX-000-DRW-100140 Rev 02)

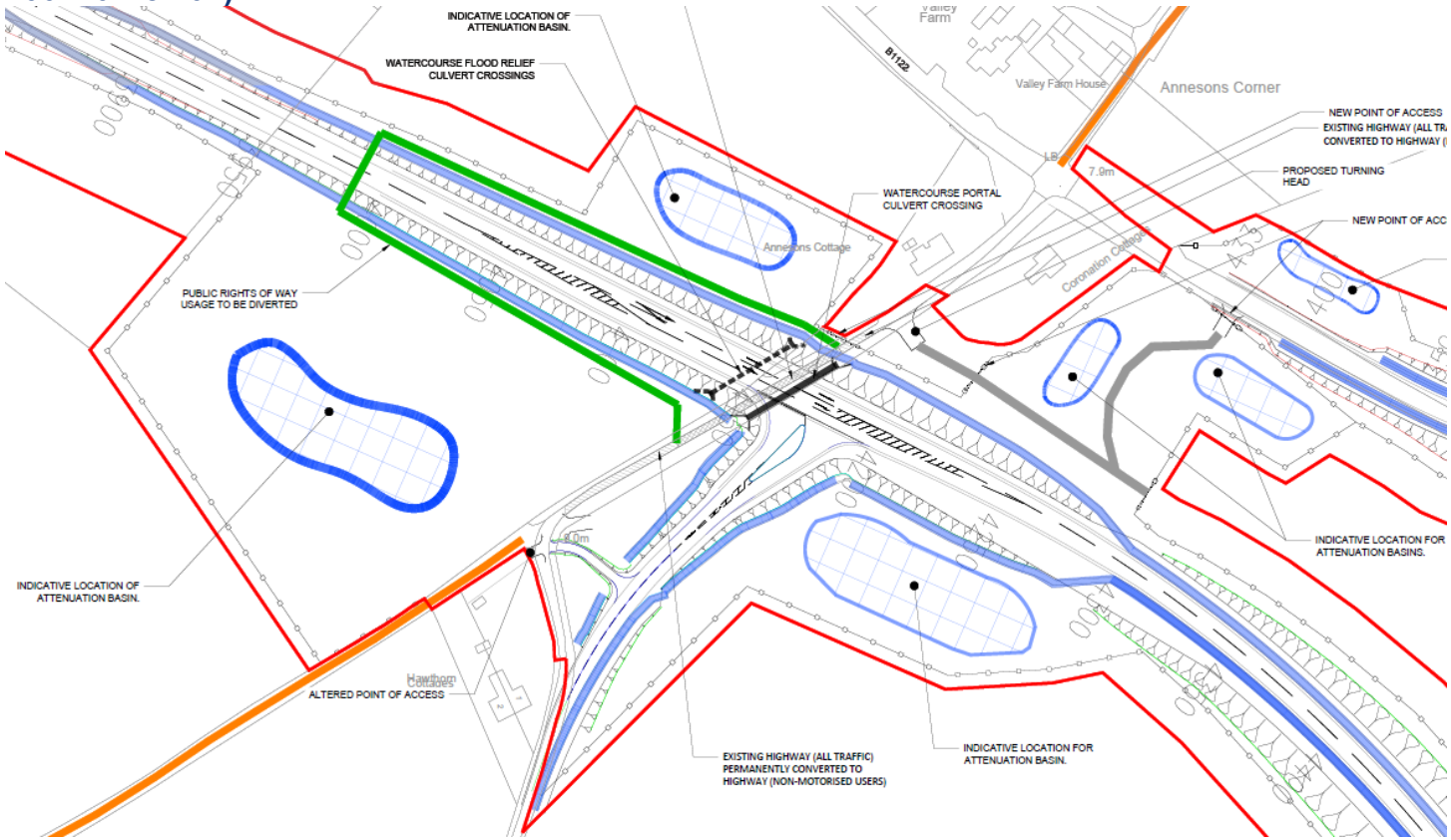


Plate 5.3: Indicative location of the attenuation basins at crossing 4 (Extract from drawing no. SZC-SZ0204-XX-000-DRW-100066 Rev 02)

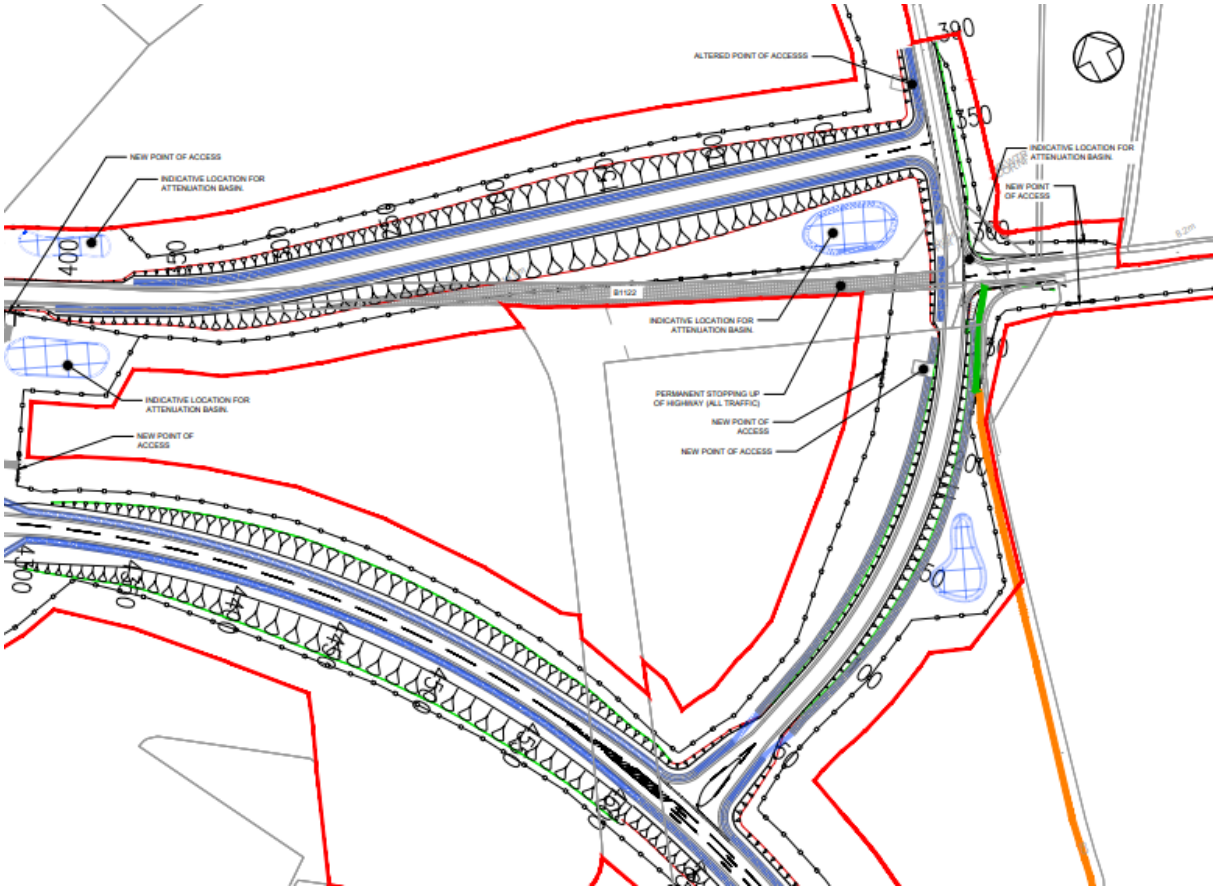


Plate 5.4: Indicative location of the attenuation basins at crossing 5 (Extract from drawing no. SZC-SZ0204-XX-000-DRW-100059 Rev 02 Sheet 4)

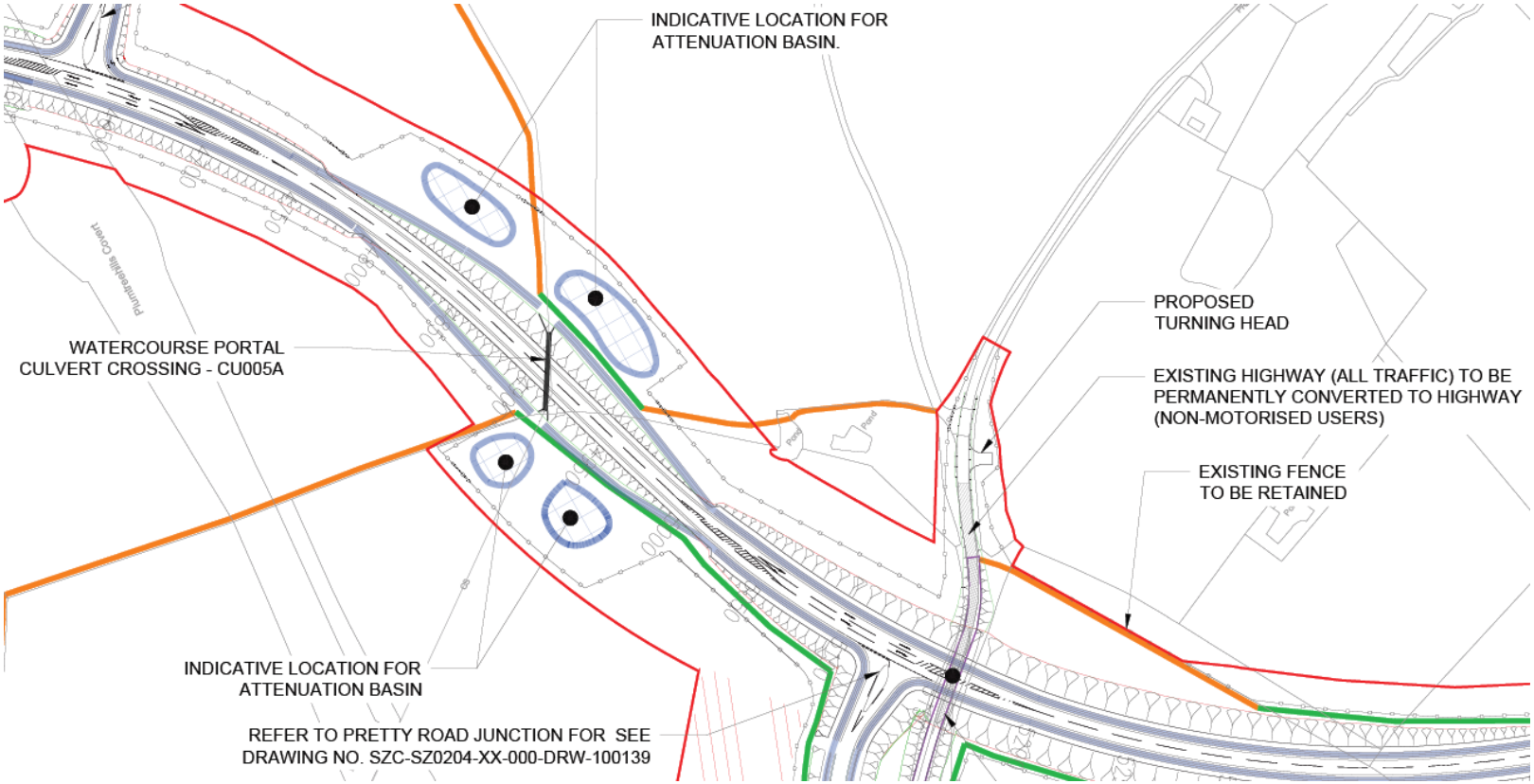


Plate 5.5: Indicative location of the attenuation basins at crossing 6 (Extract from drawing no. SZC-SZ0204-XX-000-DRW-100059 Rev 02 Sheet 4)

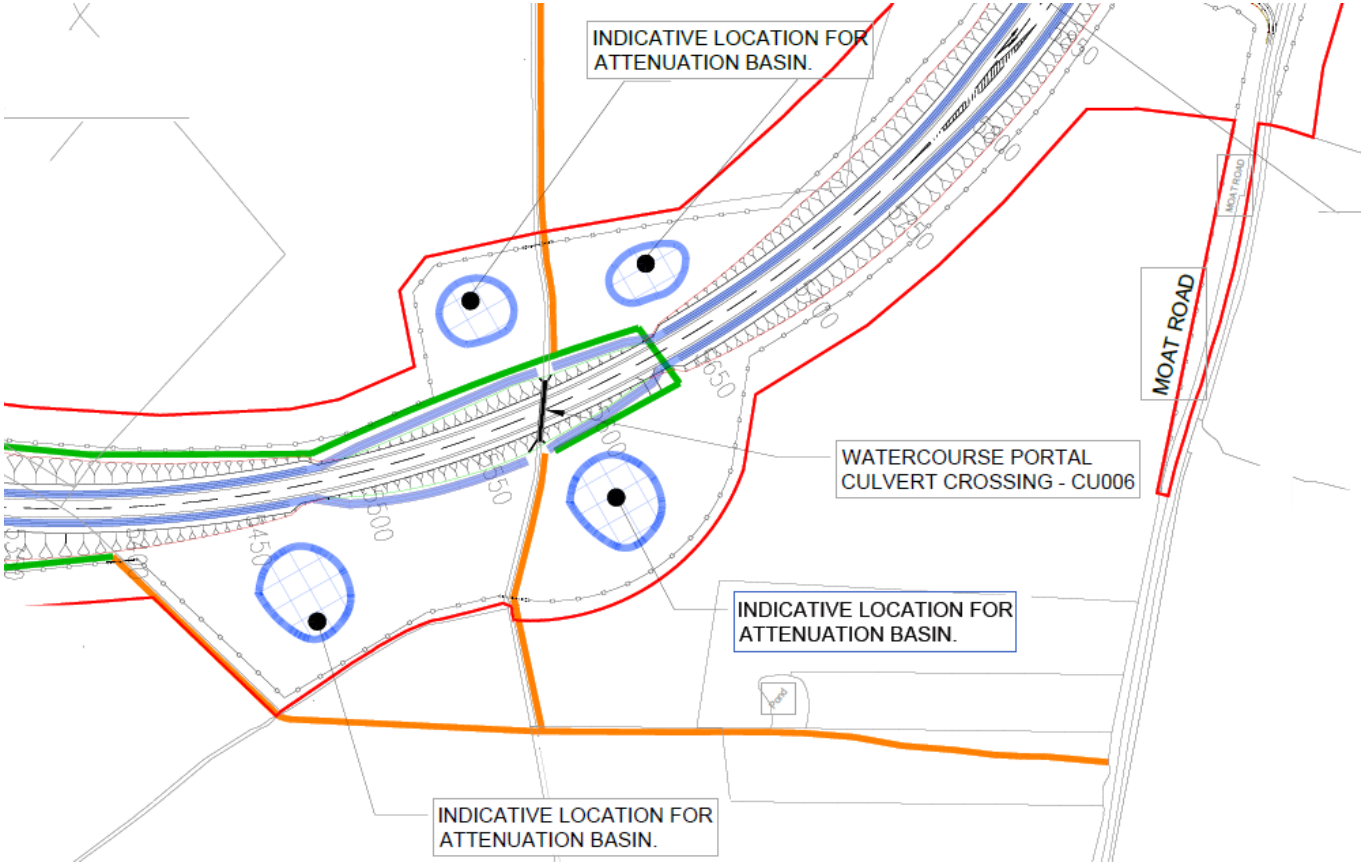
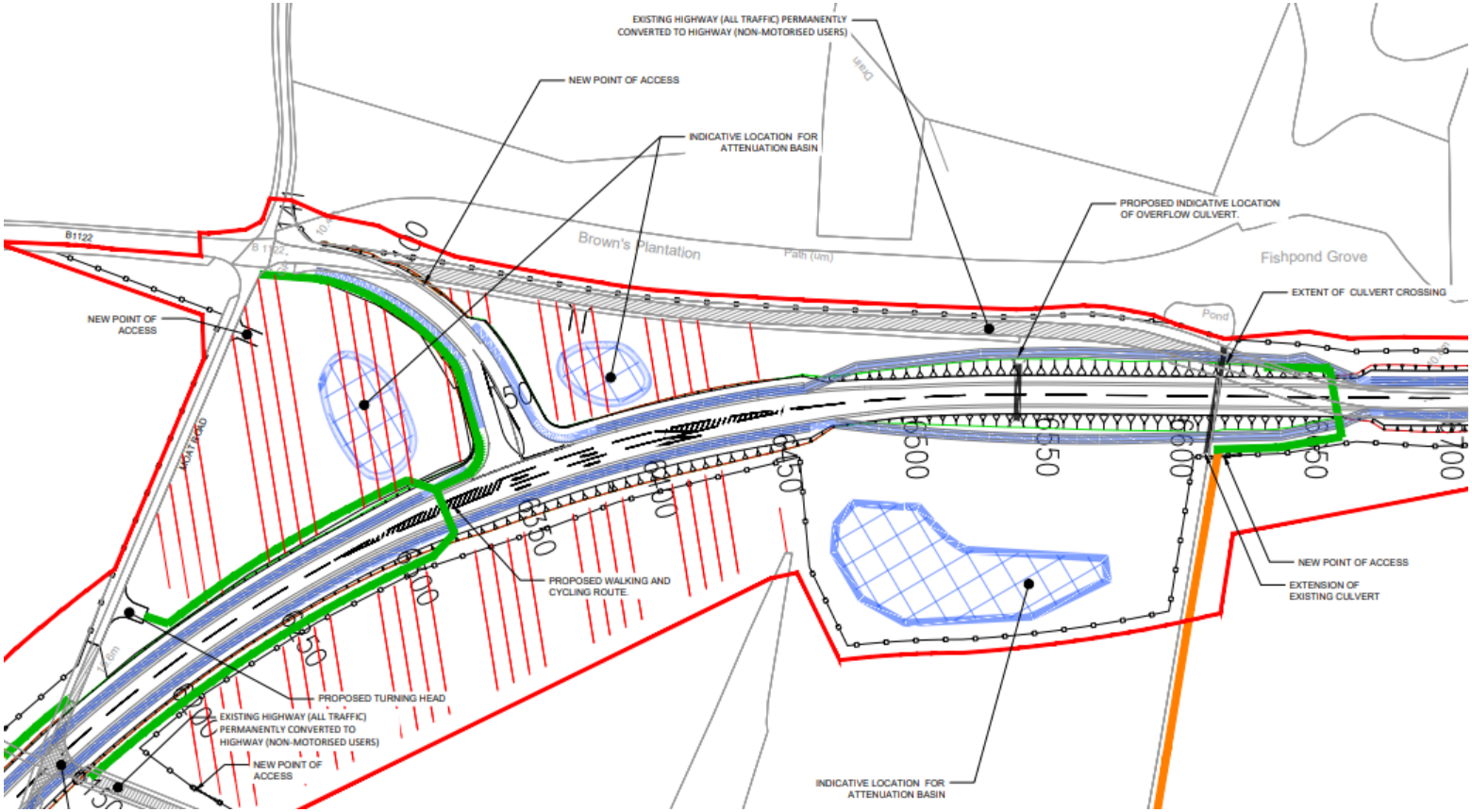


Plate 5.6: Indicative location of the attenuation basins at crossing 7 (Extract from drawing no. SZC-SZ0204-XX-000-DRW-100067 Rev 02)



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APPENDIX A: EXTRACT OF THE ENVIRONMENT AGENCY RELEVANT REPRESENTATION RELATED TO FLOOD RISK

A.1. Introduction

A.1.1. The following responses are those relevant to the Sizewell link road and its associated flood risk and have been taken directly from the Environment Agency's Relevant Representation on Sizewell C Development Consent Order, document AE/2020/125515/01(September 2020).

A.2. Relevant Responses

A.2.1. The following is the response provided by the Environment Agency within the main body of the Relevant Representation document:

> *" There are missing elements from the hydraulic model which mean the evidence to support the FRA is lacking in the detail we would expect. It appears as though some aspects of the FRA are based on outline design rather than final designs and some aspects have not been properly considered at all. In particular crossing SW7 has not been represented in the model and therefore third party flood risk impacts cannot be properly understood. There are also some discrepancies between what is reported in the modelling report and what is represented in the hydraulic model. These should be corrected. Flood risk in the baseline and 'with crossing' scenarios has not been mapped so it's very difficult to properly understand third party impacts, particularly where there are out of bank flows such as at SW1 and SW3.*
>
> *The final design of many aspects of the Sizewell Link Road has not yet been provided, which prevents an informed interpretation of the flood risk impacts that may be caused by this development. The Sizewell Link Road crosses water bodies at 7 locations, all of which have the potential to cause flood risk and ecological impacts. The crossings at SW7 and SW4 in particular have not been assessed due to "a lack of information collected", which is not an adequate justification. The current and post-*

development flood risk at these locations is therefore unknown.

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

A.2.2. **Table A. 1** identifies the additional matters raised by the Environment Agency.

Table A. 1: Additional matters raised by the Environment Agency in the Relevant Representation

Document Title	Paragraph number	Issue	Comment	Environment Agency suggested solution
Sizewell Link Road Flood Risk Assessment	3.6.2	Existing and proposed road levels not provided for SW4. Although proposed not to change culvert, current and future flood risk is still unknown.	The SW4 crossing was not modelled as the existing culvert will remain in place. The existing baseline flood risk is unknown as the watercourse is not currently modelled. The FRA also states that road levels will remain close to existing but not the same. Any increase in road level could create a further barrier to flood water which must be assessed.	Confirm road levels. Modelling may be required to evidence baseline and post development flood risk. This must be determined in consultation with Suffolk County Council as the river is an ordinary watercourse and the existing baseline flood risk is unknown.
Sizewell Link Road Flood Risk Assessment & Model Report	3.6.3 of FRA & 2.1.9 of model report	No flood risk assessment of proposed crossing at SW7. FRA does not show the road will be safe for its lifetime without increasing flood risk elsewhere which is contrary to paragraph 5.7.3 &	Flood risk at SW7 has not been assessed due to lack of information collected. This is not adequate justification for not assessing flood risk and fails to comply with national planning policy. The flood map for surface water shows a clear flow path is present and the new SLR will create a barrier to this and therefore could increase flood risk elsewhere. It	Provide further investigation and assessment of flood risk at SW7. Explain why hydrological calculations have not been used to inform design i.e. crossing size. This must be agreed in discussion with Suffolk County Council as this is a

		5.7.16 of National Policy Statement EN1 and paragraph 160 of the National Planning Policy Framework.	is also possible that the road itself could be at risk of flooding. It has not be proven in principle that the design could work and be sized correctly. It is understood that some hydrology calculations were undertaken for this catchment but this has not be used in the FRA or model report.	surface water flow path/ordinary watercourse.
Sizewell Link Road Flood Risk Assessment	3.6.6 & 3.6.7	The final design for the crossings are unclear	The FRA states portal culvert have been used at the crossings. This is misleading as this has not been possible in all locations and contradicts the modelling report and model build (e.g. SW1 is now a T shaped concrete culvert). Flood relief culverts have been used at some crossings (it is unclear which) and they are not shown on the plans provided or no plans have been provided at all.	Provide final designs for all crossings SW1 to SW7 with arrangement plans and cross sections for each.

Sizewell Link Road Flood Risk Assessment	5.2.5	FRA states & concludes that the SLR site is in Flood Zone 1 which has not been proven in the FRA. Several of the watercourses that will be crossed by the SLR have been modelled, although Flood Zone mapping has not been provided.	There is a clear indication of flood risk near to crossings as this information has been provided with cross sections. However, a map showing the extents of Flood Zones 3a, 3b and 2, based upon the hydraulic model outputs has not been provided. The baseline hydraulic model should be incorporated into the known flood risk areas, in order to provide an up to date map showing the extents of flood zones 3a, 3b and 2. The flood levels on the development site should be determined and compared to a topographic site survey to determine the location, flood depths and extent of flooding across the site.	Update FRA and model report text to state correct flood zones. This should be evidenced by modelled flood extents and levels.
Sizewell Link Road Flood Risk Assessment	4.3.3, Table 4.1, 5.1.2	The level of road compared with maximum modelled flood extents demonstrates road surface is above	FRA states SLR design at Fordley Road will reduce risks of flooding as the road will be moved outside of the currently mapped Flood Zone 3 which is based on JFLOW modelling. The Flood Zone maps in this area are	Update FRA and model report text and ensure all crossing assessments are based on detailed modelling flood extents not JFLOW extents/flood zones.

		flood level. However, the FRA should assess whether the footprint of the SLR is at risk of flooding. This could indicate the site would be at risk of flooding during the construction phase.	formed of national generalised modelling, which was used in 2004 to create fluvial floodplain maps on a national scale, known as JFLOW. This modelling is not a detailed local assessment, it is used to give an indication of areas at risk from flooding. JFLOW outputs are not suitable for detailed decision making. In these circumstances an FRA will need to undertake a modelling exercise in order to derive flood levels and extents (flood zones), both with and without allowances for climate change in order to inform the design of the site. The SLR will still cross the watercourse. The claim that flood risk has been reduced must be evidenced.	Remove claim that new SLR route will reduce risk of flooding or qualify with detailed modelling.