



The Sizewell C Project

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2 MAIN DEVELOPMENT SITE

2.1 Introduction

2.1.1 This chapter of the ES Addendum provides an update to **Volume 2** of the **ES** (Doc Ref. 6.3) [APP-178 to APP-347]. The chapter presents the Additional Information prepared and the proposed changes to the proposed development at the main development site since the submission of the Application for development consent (May 2020).

2.1.2 The Additional Information of relevance to **Volume 2** of the **ES** (Doc Ref. 6.3) [APP-178 to APP-347] includes:

- additional information on design proposals at the main development site, including the materials management strategy, freight management strategy, water supply strategy, and clarifications to plans and text (refer to **section 2.2** of this chapter);
- additional socio-economic baseline information on crime incidents (refer to **section 2.4** of this chapter);
- updated traffic modelling and transport environmental assessment to account for refined strategic traffic modelling, a new micro-simulation of journey times, a ‘typical-day’ scenario during peak construction and sensitivity testing (described in further detail in **section 2.5** of this chapter);
- updates to noise and air quality modelling to account for refinements to the strategic traffic modelling (described in further detail in **sections 2.6** to **2.7** of this chapter);
- sensitivity testing for noise modelling (described in further detail in **section 2.6** of this chapter);
- updates to air quality assessment to correct errors, to model the latest emission factors published by Defra and additional sensitivity testing (described in further detail in **section 2.7** of this chapter);
- baseline survey reports and data for terrestrial ecology and ornithology assessments, including on habitats, invertebrates, natterjack toad, reptiles, great crested newt, birds, badger, water vole, otter, and fish (described in further detail in **section 2.9** of this chapter);
- updates to terrestrial ecology and ornithology protected species licenses, method statements and the fen meadow strategy (described in further detail in **section 2.9** of this chapter);

- update to the overarching written scheme of investigation for terrestrial historic environment (described in further detail **section 2.11** of this chapter);
- correction to soils and agriculture assessment (refer to **section 2.12** of this chapter);
- additional information on ground conditions (described in further detail in **section 2.13** of this chapter);
- updates to flood risk assessment and modelling, as reported in the **Main Development Site Flood Risk Assessment Addendum** (Doc Ref. 5.2(A)Ad), including a flood risk emergency plan (referenced in **section 2.14** of this chapter);
- updated water monitoring and response strategy for the main development site (referenced in **section 2.14** of this chapter);
- additional information on the coastal processes monitoring and management plan (described in further detail in **section 2.15** of this chapter); and
- additional and updated fish assessments to inform the marine ecology assessment (described in further detail in **section 2.17** of this chapter).

2.1.3 A description of the proposed changes to the proposed development at the main development site is provided within **section 2.2** of this chapter.

2.1.4 A review of all Additional Information and the proposed changes has been undertaken by EIA specialists across all technical assessments presented in **Volume 2** of the **ES** (Doc Ref. 6.3) [APP-193 to APP-347]. The subsequent sections of this chapter provide an update to these assessments, as relevant.

2.2 Update to the description of development

2.2.1 This section presents details on the Additional Information and the proposed changes made to the proposed development at the main development site, since the preparation of **Chapters 2 and 3** of **Volume 2** of the **ES** (Doc Ref. 6.3) [APP-180 to APP-186]. Updated versions of **Chapters 2 and 3** in tracked changes, to include these changes, are provided within **Volume 3, Appendices 2.2.A and 2.2.B** of this **ES Addendum**. These updates do not affect the description of operation and decommissioning presented within **Chapters 4 and 5** of the **ES** (Doc Ref. 6.3) [APP-187 to APP-189].

2.2.2 Additional Information is provided on the following aspects of the proposed development:

- materials management strategy update;
- freight management strategy;
- water supply strategy update; and
- clarifications to plans and text.

2.2.3 The proposed changes affecting the main development site are:

- Potential to increase in the frequency of freight train movements to facilitate bulk material imports by rail (**Change 1**).
- An enhancement of the permanent beach landing facility and construction of a new, temporary beach landing facility (**Change 2**).
- Greater flexibility as to where certain Sizewell B facilities are relocated to potentially avoid the need for car parking on Pillbox Field (**Change 3**).
- Change to certain parameter heights and activities on the main development site (**Change 4**).
- Change to the location of the water resource storage area and the addition of flood mitigation measures to lower flood risk (**Change 5**).
- Change to the Site of Special Scientific Interest (SSSI) crossing design to a single span bridge with embankments (**Change 6**).
- Revisions to tree/vegetation retention on the main development site (**Change 7**).
- Surface water removed early in the construction process to be discharged to the foreshore via a temporary outfall (**Change 8**).
- Change to the sea defence to make the scheme more efficient and resilient to climate change (**Change 9**).
- Extension of the Order Limits to provide for additional fen meadow habitat at Pakenham as mitigation for fen meadow loss (**Change 11**).
- Minor extensions and reductions of the Order Limits for works on the main development site and related sites (fen meadow mitigation sites and marsh harrier improvement sites) (**Change 13**).

- A new bridleway link between Aldhurst Farm and Kenton Hills (**Change 15**).

a) [Additional Information on the proposed development](#)

a) i) [Materials management strategy update](#)

2.2.4 The **Materials Management Strategy Update** at **Volume 3, Appendix 2.2.C** of this **ES Addendum** presents the outcome of SZC Co.'s more detailed analysis of its materials requirements for the construction of the Sizewell C Project. It explains how more detailed design development has enabled more accurate estimates to be produced of materials that need to be excavated on site and imported to the site than was available at the time of the Application.

2.2.5 The total volume of materials arisings currently assumed in the Application is approximately 5.4 million m³. Further detailed site investigations and modelling have led to the need to increase this assumption by approximately 1.4 million m³. This is mainly due to the need to excavate deeper than previously assumed on the main platform and is the key reason why SZC Co. has identified a requirement for an increased stockpiling area on the main development site, as set out later in this section.

2.2.6 SZC Co. has also continued to develop its detailed understanding of the volume of required material imports. The total weight of imports assumed in the Application is approximately 10.1 million tonnes and further analysis has led to the need to increase this assumption by approximately two million tonnes. This is mainly due to the need to import more backfill material to help refill the deeper excavation, although further studies on the re-use of excavated crag material have significantly reduced the increase in imported backfill that would otherwise have been necessary. This is because SZC Co. is now able to assume that some of the crag can be re-used for higher specification structural backfill when blended with imported fill aggregate and treated with binders. Further details are set out in the **Materials Management Strategy Update** at **Volume 3, Appendix 2.2.C** of this **ES Addendum**.

a) ii) [Freight Management Strategy](#)

2.2.7 The **Freight Management Strategy** (Doc Ref. 8.18) explains the approach being taken by SZC Co. to ensure resilience and flexibility in its strategy for the movement of construction materials to the Sizewell C Project site.

2.2.8 Following stakeholder engagement, the Application is proposed to be revised in line with national policy which prefers the use of rail and sea for

the movement of materials where that is cost effective, by creating the opportunity for the additional movement of freight by rail (**Change 1**, refer to **section 2.2b**) for a further description) and through the enhancement of the permanent beach landing facility and addition of a temporary beach landing facility (**Change 2**, refer to **section 2.2b**) for a further description). Furthermore, the freight management strategy has been reviewed to take into account the updated material quantity estimates, as summarised in **section 2.2a)i**) above.

2.2.9 The **Freight Management Strategy** recognises that there are choices to be made but proposes a preferred strategy which is capable of optimising rail and sea transport and minimising the use of Heavy Goods Vehicles (HGVs). That preferred strategy would produce an outcome in which the proportion of construction materials moved by HGVs would reduce from the figure of 61% assumed in the Application to 40%.

2.2.10 With the preferred strategy, early years HGV movements would be unaffected (as the rail route extension would not be in place and the beach landing facilities would not have been constructed). For the peak construction period, however, typical day HGV movements would be reduced from 325 HGVs (650 movements) to 250 HGVs (500 movements), whilst peak HGV activity would reduce from 500 per day (1,000 movements) to 350 per day (700 movements).

a) iii) Water Supply Strategy Update

2.2.11 As set out in the **Water Supply Strategy Update** at **Volume 3, Appendix 2.2.D** of this **ES Addendum**, construction of the Sizewell C Project continues to entail many activities that would require water supply, both potable and non-potable. SZC Co. has continued to develop its water supply strategy by engaging with stakeholders including the Environment Agency, Essex & Suffolk Water and Anglian Water.

2.2.12 The principal supply for the Sizewell C Project is unchanged from the original **Site Water Supply Strategy** (Doc Ref. 8.4) [APP-601] and is assumed to come from mains water transferred via a new pipeline transfer connection from the Northern/Central Water Resource Zone. This scheme would be provided by Essex and Suffolk Water and does not form part of the Application. A cumulative assessment of the Sizewell C Project with the proposed scheme is however provided within **Chapter 10** of this **ES Addendum**.

2.2.13 For the reasons set out in the appendix noted above, SZC Co. has also retained the following water supply options for further consideration:

- new water resource options:

- Sizewell B effluent reuse;
- licence trading with local abstractors;
- water resource storage area;
- on-site non-potable water management options:
 - use of dewatering water;
 - rainwater harvesting;
 - re-using concrete wash water;
 - recycling tunnel boring machine water;
 - greywater reuse;
 - effluent reuse (Sizewell C construction site and Sizewell B);
 - use of water efficient fixtures and fittings;
 - use of other water efficient practices on site.

2.2.14 The retained water supply options have been reviewed to determine if they have the potential to give rise to any additional significant adverse effects, and it has been concluded that the options would not give rise to any new, or different environmental impacts and associated activities would be managed through existing permitting, consenting or licensing arrangements, or through mitigation and management measures currently proposed, such as the **Outline Drainage Strategy** presented in **Volume 2, Appendix 2A** of the **ES** (Doc Ref. 6.3) [\[APP-181\]](#) as described below.

a) iii) a) Sizewell B effluent reuse

2.2.15 The Sizewell B foul water treatment plant provides a potentially viable option to supply treated water to the construction site for reuse, rather than discharge to sea under an existing discharge permit. This would result in less water being discharged to sea, and would not give rise to any new or materially different environmental effects.

a) iii) b) Licence trading with local abstractors

2.2.16 Licence trading with local abstractors also forms part of the potential water supply strategy. SZC Co. would broker a licence trade between local abstractors and Essex & Suffolk Water to enable Essex & Suffolk Water to increase volumes they can abstract from existing groundwater sources. Alternatively, SZC Co. may take on a licence from nearby abstractors via a trade directly, where practicable. The abstractions would be within current abstraction licence limits, where there is spare resource within

previously abstracted levels. Therefore, there would be no new, or additional volumes extracted than that already permitted, and therefore no new or materially different environmental effects.

a) iii) c) **Water resource storage area**

2.2.17 The Application identifies that a temporary non-potable water storage area would be constructed for use in the construction process to the north of the main development site. As described below, further design work has identified that the water storage area can now be temporarily located adjacent to Water Management Zone 5 providing a storage area of approximately 16,000m³ (**Change 5**).

2.2.18 Assessment of the potential environment impacts of the water resource storage area as proposed in the Application are detailed in **Volume 2** of the **ES** (Doc Ref. 6.3) [APP-178 to APP-347] and the proposed changes are assessed in this chapter of the **ES Addendum**.

a) iii) d) **On-site non-potable water management options**

2.2.19 There are a range of retained on-site non-potable water management options. These include re-using water on site, treating as necessary, or minimising water usage. These are not anticipated to give rise to any new or materially different environmental effects, and associated operations will be managed through existing proposed control measures including the **Code of Construction Practice (CoCP)** (Doc Ref. 8.11(A)) and the **Outline Drainage Strategy** presented in **Volume 2, Appendix 2A** of the **ES** (Doc Ref. 6.3) [APP-181].

a) iv) **Clarifications to plans and text**

a) iv) a) **Access and Rights of Way Plans**

2.2.20 In the Procedural Decision letter dated 23 October 2020 [PD-005], the Examining Authority requested clarification on annotations included on Works Plans [APP-011 and APP-012] and Access and Rights of Way Plans [APP-013] for new and altered means of access. These annotations provide an additional layer of information on the relevant Works and Rights of Way Plans as per Article 19(1)(a) of the draft DCO, which relates directly to the annotations on the Rights of Way Plans. The inclusion of these annotations seeks to enable SZC Co. to clearly identify proposed access points for each development site

2.2.21 In response to the comments provided within the Procedural Decision, revised Access and Rights of Way Plans were submitted to the Planning Inspectorate on 24 November 2020 with updates having been made to the following plans:

- Main Development Site and Rail Rights of Way Plans – Sheet 2 of 27;
- Two Village Bypass Rights of Way Plan – Sheet 17 of 27;
- Two Village Bypass Rights of Way Plans – Sheet 18 of 27;
- Sizewell Link Road Rights of Way Plans – Sheets 20 of 27;
- Sizewell Link Road Rights of Way Plans – Sheet 21 of 27; and
- Sizewell Link Road Rights of Way Plans – Sheet 22 of 27.

2.2.22 A summary of the changes made to the Rights of Way Plans has been provided in the revision schedule within the November submission (Doc Ref 2.4(A)). The only change made to the Main Development Site Rights of Way Plans was an addition of a missing road name on the basemap.

2.2.23 Updated Rights of Way Plans are also included within Doc Ref. 2.4(B) to account for the proposed changes.

a) iv) b) **Construction parameter plan**

2.2.24 The construction parameter plan identifies typical maximum parameter heights by zone for fixed plant, structures and buildings, as shown at **Volume 2, Figure 2.2.2** of this **ES Addendum**. The plan also identifies exceptional maximum parameter heights by zone for time-limited activities, such as the installation of a large crane for specific tasks.

2.2.25 The environmental assessment also continues to assume that short-term construction activities may take place across the main development site as a whole for the specific purposes of realising the construction methodology. Such activity would typically comprise minor works using mobile plant up to approximately five metres above ground level. A clarification note has been added to the construction parameter plan accordingly, as shown at **Volume 2, Figure 2.2.2** of this **ES Addendum**.

2.2.26 Since the submission of the Application, there has also been further contractor involvement which has identified further detail on the approximate routes of access and haul roads. This Additional Information has been added to the construction parameter plan as shown in **Volume 2, Figure 2.2.2** of this **ES Addendum**. It does not affect the assessments except in the limited circumstances identified in **Change 7**.

a) iv) c) **Description of permanent development**

2.2.27 In the Procedural Decision letter dated 23 October 2020 [[PD-005](#)], the Examining Authority highlighted a discrepancy in the way that waste

buildings are described in **Chapter 2 of Volume 2** of the **ES** (Doc Ref. 6.3) [APP-180]. **Volume 3, Appendix 2.2.A** of this **ES Addendum** clarifies that there are one of each building rather than two. The clarification does not affect the assessments.

b) Proposed changes

b) i) Potential to increase the frequency of freight train movements to facilitate bulk material imports by rail (**Change 1**)

b) i) a) Proposed development in the Application

2.2.28 In the early years, rail operations would consist of up to two freight trains per day operating from the main East Suffolk Line along the upgraded Saxmundham to Leiston branch line to newly constructed sidings in the land east of Eastlands Industrial Estate (LEEIE). It is anticipated that the trains would arrive on the branch line at night and be held there overnight, proceeding to LEEIE after 7am in the morning. No trains would travel through Leiston at night. Once unloaded, the trains would leave LEEIE in the evening, be held again on the branch line and then return to the main East Suffolk Line at night. No change is proposed to these early years rail operations.

2.2.29 The rail extension route is expected to be constructed and operational within the first two years of the Sizewell C Project construction programme and would provide a direct rail route from the Saxmundham to Leiston branch line into the temporary construction area on the main development site. Once operational, trains would no longer need to be held on the branch line and could proceed directly to new rail sidings constructed within the temporary construction area.

2.2.30 The Application assumes up to three train deliveries (six movements) at the main development site after the early years, five days per week. Five of these rail movements (three inbound and two outbound) are assumed to happen at night (defined as between 23:00 and 07:00) and one during the day (i.e. after 07:00).

b) i) b) Description of the proposed change

2.2.31 SZC Co. has continued to engage in detailed discussions with Network Rail and with freight operating companies to investigate the full capacity for rail freight transport. This work is continuing but it has identified the following potential to increase the volume of material moved by rail:

- the potential to run four trains overnight, rather than three;
- the potential to run trains up to six days a week; and

- investigating whether a fifth daily train may be possible for a limited period at the peak of construction.

- 2.2.32 Further work is underway jointly with Network Rail to assess the ability of the mainline timetable and the capacity of the East Suffolk Line to accommodate additional train movements. It is possible that this work could conclude that the additional train capacity cannot be delivered.
- 2.2.33 However, for the purposes of assessment, a total of four train deliveries (eight train movements) per day is assumed for the majority of the construction phase. The main exceptions to this are during the early years (as set out above) whilst the rail extension route is under construction and towards the end of construction phase whilst the rail extension route is being decommissioned.
- 2.2.34 For a period of approximately two years during the construction phase when demand for bulk material imports is at its highest, a fifth train delivery (10 train movements in total) per day is assumed for the purposes of this assessment. The **Freight Management Strategy** (Doc Ref. 8.18) explains that securing a fifth daily train is unlikely but its potential cannot yet be ruled out.
- 2.2.35 As with the submitted Application, train movements are likely to operate predominantly at night, after 23:00. For the purposes of assessment, the reasonable worst-case scenario as relevant to each environmental topic has been assumed. These comprise variously:
- up to eight train movements take place overnight (for noise assessment purposes); or
 - all train movements take place overnight, except for up to three daytime movements per day (the purposes of the transport assessment).
- 2.2.36 For assessment purposes, it is also assumed that trains would run six days per week, including Sunday night / Monday morning.
- 2.2.37 Each train is assumed to include up to 20 wagons and be capable of carrying up to approximately 1,250 tonnes of construction material.

b) i) c) [Why is this change proposed?](#)

- 2.2.38 To deliver Sizewell C, significant amounts of construction material and equipment would need to be transported during the construction phase. In developing and designing the freight management strategy proposals, SZC Co. has sought opportunities to limit the impact of construction of Sizewell C on the local highway network wherever possible and to move materials by more sustainable modes (by rail and sea), where practical.

Further details on proposed changes to marine infrastructure are set out in **section 2.2b)ii)** of this chapter.

- 2.2.39 Through pre-application consultations and engagement with stakeholders and the public, SZC Co. has worked to find the most sustainable freight management strategy and consulted widely on options to minimise the impacts on local communities.
- 2.2.40 Since the submission of the Application, a number of stakeholders have urged that every effort should be made to maximise the use of rail and sea transport and, thereby, reduce HGV movements. At the same time SZC Co.'s project and contractor teams have continued to investigate ways to enhance the capacity for sustainable freight transport.
- 2.2.41 Additionally, detailed site investigation work has continued to finalise materials volumes, including the extent to which excavated material can be reused for infill or site landscaping. Further details on the updated Materials Management Strategy are set out in **section 2.2a)ii)** of this chapter.
- 2.2.42 As part of this work, contractors and transport logistics experts have been developing the procurement strategy for the Sizewell C Project's construction materials. That work has highlighted the ability to source aggregates and other materials from sources which are rail connected or which could potentially allow shipment by sea.
- 2.2.43 SZC Co. shares the objectives of stakeholders and the local community that goods should be moved sustainably, wherever possible, and that there are benefits in limiting HGV numbers to those necessary for goods which cannot be moved by rail or sea. SZC Co.'s contractors also strongly favour the use of rail and sea for appropriate materials because it can be highly efficient, reliable and cost-effective. Implementing these changes to the freight management strategy would enable approximately 60% of the construction materials (by weight) to be moved by rail or sea, compared with approximately 40% estimated in the Application.

b) ii) An enhancement of the permanent beach landing facility and construction of a new, temporary beach landing facility (**Change 2**)

b) ii) a) Proposed development in the Application

- 2.2.44 The Application includes a permanent beach landing facility (BLF), for use in both the construction and operational phases of the nuclear power station. It would be located on the coast directly in front of the Northern Mound at the northern end of the sea defences, with an associated private access road connecting it to the main platform, as shown at **Volume 2, Chapter 2, Figure 2.4** of the **Environmental Statement** (Doc Ref. 6.3)

[APP-183]. It would typically be used to import large deliveries, known as Abnormal Indivisible Loads (AILs), to Sizewell C by sea on barges.

- 2.2.45 The permanent BLF would be in place early in the construction phase to support construction of the power station by enabling delivery of some AILs by sea. Annual “campaign” periods (approximately 1 April to 31 October) are expected for the permanent BLF during the construction phase for a total of approximately four years. During each annual campaign period, for the purposes of the EIA, approximately 50 beach landings per campaign were assumed. As some AILs are smaller than others, it is assumed in the Application that each beach landing would contain an average of 1.5 AILs.
- 2.2.46 Offloaded AILs would access the site using a haul route into the main construction area, which would become integrated with the Northern Mound once complete.
- 2.2.47 Barges that serve the permanent BLF would be loaded with large deliveries at a transshipment port, towed to the BLF, moored in position and grounded as the tide drops. The AILs would then be transported to site along the BLF access road.
- 2.2.48 The permanent BLF would be used infrequently during the operational phase of the power station (i.e. post construction), approximately every 5-10 years for a few weeks at a time.
- 2.2.49 The seabed in front of the permanent BLF, where the barges land, would need to be surveyed and potentially re-profiled between each delivery during construction and operation of the power station. This is to ensure the next barge can land safely on a reasonably smooth surface.
- 2.2.50 A dredging volume of approximately 4,600m³ was assumed to facilitate access and barge grounding.
- 2.2.51 The permanent BLF would consist of a structure built across the beach and out into the sea, requiring a total of 20 piles. The permanent BLF would be lit when in use, as set out in the **Lighting Management Plan** (Doc Ref 6.3) [APP-182].
- 2.2.52 When not in use during the operational phase of the power station and during the winter months of construction, the permanent BLF deck would be dismantled and taken away for storage. Pier and cross beam supports would remain in place and form a permanent presence on the coast.
- 2.2.53 The Application also assumed temporary closures of the Suffolk Coast path during both construction and operation of the permanent BLF. Inland diversions for pedestrians are proposed as a result to minimise disruption.

b) ii) b) Description of the proposed change

2.2.54 Since submission of the Application, further design work has been carried out which has identified that there may be potential for more material to be brought to the site by sea than is currently provided for in the Application. As described in this section, this would be achieved by:

- enhancing the design of the permanent BLF; and
- providing a new temporary BLF.

b) ii) b) a) Enhancing the design of the permanent BLF

2.2.55 To increase the amount of AILs that could be delivered by sea during construction, it is necessary to make the seabed in front of the permanent BLF better able to receive more regular deliveries by barge without requiring additional maintenance works between barge landings. The current design limits the permanent BLF's capacity to receive more regular deliveries.

2.2.56 The proposed change would add a grounding platform (also known as grillage), which is assumed to be made of a combination of concrete, timber and steel, or similar. It would protrude above bed level by less than a metre and shallow foundations are assumed to be embedded into the sea bed. The sea bed would be graded to a roughly level surface before laying the platform, which is assumed to require localised dredging of less than a metre. Dredged material would not be removed from the sea and would be placed in close proximity to the BLF.

2.2.57 The sequence of installation is assumed to comprise:

- Prepare grounding area (approximately 100m x 30m) by trimming the seabed with an excavator.
- Place ground beams in trenches using a crane. Approximately 25 small bore piles would be required to control lateral shift of the grillage.
- Place platform or cross beams on top of ground beams using a crane and secure to ground beams.

2.2.58 On occasion, light injection dredging may be required if sand accumulates on the grillage when the BLF is in use. Excavated material would not be removed from the sea and would again be placed in close proximity to the platform.

2.2.59 The platform may require reinstallation following storm events or at the beginning of each summer period during construction use. The platform

would be removed at the end of its use period within the construction phase. A grounding pocket would be used for deliveries after the platform is removed, as per the originally submitted assessment.

- 2.2.60 A dredging volume of approximately 9,250m³ is assumed to facilitate access and barge grounding. This increased requirement is due to the assumption that the dredging area would extend deeper into the longshore bar than in the DCO submission.
- 2.2.61 The permanent BLF would be longer (approximately 100m in total length) to better align the barge deck with the platform, making deliveries safer and more efficient. It would require approximately 28 permanent piles in total. No pile driving would take place between May and August (inclusive).
- 2.2.62 . The approximate dimensions of the piles are as follows:
- 24 of these piles are expected to have a diameter of approximately one metre and would be spaced a minimum of approximately 9m apart.
 - Four fender piles and mooring dolphins are expected to have a diameter of approximately 2.5 metres.
- 2.2.63 The construction methodology (including piling method) would be the same as set out below for the temporary BLF. An exceptional construction parameter height has been added to construction parameter zone C16 allow for the temporary use of a crane as part of the construction process, as described for the temporary BLF below and shown at **Volume 2, Figure 2.2.2** of this **ES Addendum**.
- 2.2.64 The enhanced design would substantially increase the ability of the permanent BLF to receive AILs more regularly during the construction phase. Up to approximately 100 beach landings per annual campaign could be achieved and it is assumed that this rate of AIL delivery would occur for approximately four years using barges with a capacity of approximately 3,000 tonnes.
- 2.2.65 Each barge would continue to be guided by up to two tug boats and a single barge would continue to moor on the permanent BLF at any one time.
- 2.2.66 An indicative visualisation of the permanent BLF when not in use during the operational phase is shown at **Volume 2, Figure 2.2.3** of this **ES Addendum**.
- 2.2.67 The Suffolk Coast Path would be redirected up and down the shoreline as necessary to facilitate construction of the permanent BLF, except in rare circumstances where it is considered unsafe to do so. In such instances,

use of the temporary inland diversion would be necessary, as shown at **Volume 2, Figure 15I.4** of the **ES** (Doc Ref. 6.3) [APP-270]. The Suffolk Coast Path and beach would therefore now be assumed to remain open for substantially more of the construction period than in the submitted Application.

b) ii) b) b) Providing a new temporary BLF

- 2.2.68 To reduce the amount of construction material that would otherwise need to be delivered by land, a temporary BLF is proposed predominantly for the delivery of bulk construction materials, such as aggregate. Other types of material may also be imported through the temporary BLF, such as marine tunnel segments for marine works.
- 2.2.69 The temporary BLF would be in operation for approximately 8 years and would be located within construction parameter zone C20 (see **Volume 2, Figure 2.2.2** of the **ES Addendum**), which is located approximately 165m to the south of the permanent BLF.
- 2.2.70 The temporary BLF would be up to approximately 505m in length and up to approximately 12m in width for the main jetty. An enlarged unloading area would form a jetty head with dimensions of up to approximately 62m in width. A single berth (for a single vessel) is assumed at its seaward end. The structure would be a visually recessive colour as far as reasonably practicable. An indicative visualisation of the temporary BLF is shown at **Volume 2, Figure 2.2.4** of the **ES Addendum**.
- 2.2.71 A temporary conveyor would be installed along the length of the temporary BLF deck and would be the primary method of unloading material. The conveyor would follow the deck to the Hard Coastal Defence Feature (HCDF) where it would continue into the secure construction area. Except where necessary for loading, unloading or maintenance, the conveyor would be covered. The conveyor would pass over the Suffolk Coast Path on the deck of the temporary BLF. It is assumed that the conveyor system would continue into the construction site and follow a similar route to the haul roads. The underside of the temporary BLF deck would be at least 3.7m above the ground level of the Suffolk Coast Path.
- 2.2.72 The Suffolk Coast Path would be redirected up and down the shoreline as necessary to facilitate construction of the temporary BLF, except in rare circumstances where it is considered unsafe to do so. In such instances, use of the temporary inland diversion would be necessary, as shown at **Volume 2, Chapter 15, Figure 15I.4** of the **ES** (Doc Ref. 6.3) [APP-271]. An indicative visualisation of the temporary BLF on the beach is shown at **Volume 2, Figure 2.2.5** of the **ES Addendum**.

- 2.2.73 Other main infrastructure on the temporary BLF deck is assumed to include: an access road, for use by large vehicles; a private access footpath, lighting, hoppers; and railings or similar (to also provide some low-level screening of vehicle movements).
- 2.2.74 Standard navigation lights would be required on mooring dolphins and on nearby navigation markers and buoys. Task and ambient lighting would be required along the temporary BLF and would be installed, operated and maintained in general accordance with the controls and limits set out in **section 1.3** of the **Lighting Management Plan** (Doc Ref. 6.3) [[APP-182](#)].
- 2.2.75 A self-propelled vessel typically delivering up to approximately 4,500 tonnes of cargo per delivery is assumed, making up to approximately 400 deliveries between April and October (inclusive) and up to approximately 200 additional deliveries for the remainder of the year, for each year of operation.
- 2.2.76 The temporary BLF would extend seaward of the outer longshore sand bar. As such, there would be no requirements for dredging and vessels could berth alongside with sufficient under keel clearance. The length of the vessel may be up to approximately 120m. The vessel is assumed to include an excavator at deck level to unload material.
- 2.2.77 The majority of vessel movements would typically travel to the site from the south, following a corridor between approximately two nautical miles and approximately six nautical miles offshore, except where it is necessary to deviate on safety grounds. It is assumed for the purposes of assessment that all vessels travelling to/from the south would navigate the full corridor between the site and the Thames Estuary. All vessels are assumed to approach the temporary BLF from the north of the Sizewell Bank, to avoid the area of relatively shallow water on the approach from the south.
- 2.2.78 Approximately 114 piles would be required to construct the temporary BLF, of which approximately 12 would be located above Mean High Water Springs. They would each be up to approximately 1.2m in diameter, with the exception of two berthing dolphins and two mooring dolphins (each approximately 2.5m in diameter). Six raking piles are assumed at the seaward end of the unloading platform. Cross braces would be required between some of the piles for stability.
- 2.2.79 Spacing between piles would be no less than 10m on the BLF pier and no less than 12m on the unloading platform, with the exception of where the dolphins, raking piles and pier adjoin the unloading platform.

- 2.2.80 It is assumed that the piles would be driven by hammering with the following mitigation measures in place:
- Marine mammal observation – a visual inspection for local marine mammals prior to commencement of piling.
 - Use of a noise reduction system on the hammer (e.g. hydrohammer).
 - Slow start procedure.
 - No pile driving between May and August (inclusive).
- 2.2.81 Two piles would typically be driven every three days (for each BLF) to an embedment depth of approximately 20m, with hammering typically lasting approximately one hour per pile. Piling is assumed to occur simultaneously.
- 2.2.82 With the exception of the mooring dolphins, which would be installed using a jack-up barge, the temporary BLF would be predominantly constructed without placing construction vehicles into the sea. A crane, cantilever frame and piling equipment (including generators) are assumed to be located on the temporary BLF during construction. The temporary BLF would be constructed sequentially from the shore. A crane would not be used as part of normal operations.
- 2.2.83 The duration of the construction period for the temporary BLF is expected to be up to approximately nine months. The installation and commissioning of the conveyor system is assumed to take approximately a further eight months. It is assumed that the temporary BLF would be constructed at the same time as the permanent BLF.
- 2.2.84 The temporary BLF would predominantly be dismantled without placing construction vehicles into the sea, including use of a crane on the BLF. Piles would typically be removed by pulling using a vibrohammer. Piles that cannot be removed using this method would require the use of a jack-up barge and would be cut off below sea bed level and removed.
- 2.2.85 The operational constraints of the weather and the tide normally limit the marine campaign to a 7-month period annually between April and October. Based on these 29 weeks of operation each year, with two vessels of 4,500 tonnes offloading over each high tide there is a theoretical capacity of 1,827,000 tonnes. Allowing for efficiency, adverse weather, tidal conditions and breakdowns, the current assessment is that 70% utilisation is the upper limit that could be achieved, which would allow around 1,275,000 tonnes per year to be imported.

- 2.2.86 The potential for use in the remainder of the year is proposed but principally for resilience in the freight management strategy. There are logistical difficulties in being able to reliably deliver infrequently when weather conditions allow and no extra capacity from potential movements out of the summer campaign period has been assumed or relied on, although the potential effects of operating the temporary BLF throughout the year have been assessed.
- b) ii) c) Why is this change proposed?
- 2.2.87 Details on the justification for the additional marine infrastructure are provided in the **Freight Management Strategy** (Doc Ref. 8.18) summarised above.
- 2.2.88 Alternative options to the proposed temporary BLF are explained in the **Consultation Report Addendum** (Doc Ref. 5.1Ad) and can be summarised as:
- Option 1: a 120m long, single berth BLF capable of accommodating up to 70 barge deliveries per year;
 - Option 2: a 150m long, single berth BLF capable of accommodating up to 100 barge deliveries per year;
 - Option 3: a 270m long, double berth BLF capable of accommodating up to 400 barge deliveries per year and making part-use of self-elevating platforms; and
 - Option 4: a 400m long, single berth BLF capable of accommodating up to 460 barge deliveries per year and making part-use of self-elevating platforms.
- 2.2.89 Options 1 and 2 have been discounted due to the overall capacity being relatively low and due to difficulties grounding barges close to the shore under certain tidal conditions. This option could only therefore make a relatively small contribution to the movement of materials and the reduction of HGV movements, whilst having similar environmental impacts on the beach and marine environment as the proposed BLF.
- 2.2.90 Option 3 provides greater capacity to import material but less than the proposed temporary BLF but this option would have required more dredging than the proposed temporary BLF and was considered likely to cause greater adverse effects on the marine environment.
- 2.2.91 Option 4 has been taken forward as the basis for this submission and the detailed design has continued to evolve. The main differences between the proposed temporary BLF and Option 4 is the move away from Self-

Elevating Platforms (SEPs) in favour of a piled solution and the increase in length:

- A longer BLF is proposed as it allows larger vessels to berth, which can import more material than a smaller barge for the same number of deliveries.
- The primary concern of SEPs is their performance and stability during adverse weather conditions. The SEPs may be at risk from storm conditions. It is also likely that SEPs would need to be removed during the winter period and then reinstalled the following year. It would be necessary to undertake those works in good weather, meaning demobilisation and remobilisation would be within the summer campaign period, which would have significantly reduced the temporary BLF's capacity to import material.

b) iii) Greater flexibility as to where certain Sizewell B facilities are relocated to potentially avoid the need for car parking on Pillbox Field (**Change 3**).

b) iii) a) Proposed development in the Application

2.2.92 The boundary of the main development site for the Sizewell C power station includes an area of land to the north of the existing Sizewell B nuclear power station which currently comprises a number of facilities associated with Sizewell B station. As part of early works for the construction of Sizewell C, these facilities would be removed and replacement facilities provided. These works are referred to as the 'Sizewell B relocated facilities project'.

2.2.93 A hybrid planning application for the Sizewell B relocated facilities project was submitted to East Suffolk Council (ESC) in April 2019 by EDF Energy Nuclear Generation Limited who operate the Sizewell B power station (application ref. DC/19/1637/FUL). Permission was granted by ESC on 13 November 2019, allowing for the relocation of existing Sizewell B facilities to start prior to the determination of the Application for the Sizewell C Project, thereby enabling an overall earlier delivery of the Sizewell C nuclear power station. Nevertheless, as these are such critical elements to facilitate the construction of Sizewell C, the proposals for the above facilities were also included in this Application. **Volume 2, Figure 2.2.6** of the **ES Addendum** identifies the proposed layout submitted as part of the Application. The parameter locations for certain Sizewell B relocated facilities are shown as parameter zones 1H and 1I at **Volume 2, Chapter 2, Figure 2.6** of the **ES** (Doc Ref. 6.3) [[APP-183](#)].

b) iii) b) Description of the proposed change

2.2.94 As part of SZC Co.'s commitment to continue to engage with stakeholders and explore the possibility for re-using previously developed land within the existing Sizewell power station complex, an area of land within the Sizewell A complex has become potentially available for use by the Sizewell B relocated facilities project, subject to the completion of a land agreement. In addition, following further design development, the layout of the relocated facilities has been revised to facilitate easier and more efficient construction. As a result, two options have been identified for the delivery of the Sizewell B relocated facilities project.

b) iii) b) a) Option 1: Sizewell B relocated facilities proposals, including Sizewell A land

2.2.95 With the provision of the additional area of Sizewell A land, the following changes are proposed to the site configuration of the Sizewell B relocated facilities project (also illustrated in **Volume 2, Figure 2.2.7** and **Figure 2.2.8** of the **ES Addendum**):

- **Removal of the replacement Sizewell B outage car park from Pillbox Field.** If the Sizewell B outage car park were relocated from Pillbox Field to the existing Sizewell B west car park, there would also be no need for the demolition of Rosery Cottages garage or the connection for pedestrians between Pillbox Field and the Coronation Wood development area. Therefore, only mitigation planting would be proposed in Pillbox Field.
- **Relocation of the administration building.** Originally proposed with welfare facilities within the Sizewell B power station perimeter, this building would be moved to the Coronation Wood development area to facilitate easier construction. The welfare facilities, along with replacement storage and refurbished canteen, would still be located within the Sizewell B station perimeter.
- **Design of the training centre.** The width of the building would be increased and the height reduced from three storeys to two storeys to reduce the visual impact of the building.
- Optimisation of the Coronation Wood development area, as identified on Volume 2, Figure 2.2.9 of the ES Addendum:
 - the laydown area would be moved to the Sizewell A land;
 - changes would be made to the arrangement/ location of replacement operational car parking; and

- the visitor centre would be relocated to the southern part of the Coronation Wood development area.
- **Redesign of the landscaping scheme on Pillbox Field.** This would provide ecological enhancement and mitigation planting for trees lost from Coronation Wood. The redesigned landscaping scheme is illustrated on **Volume 2, Figure 2.2.10** of the **ES Addendum**.

2.2.96 A separate planning application was submitted to ESC under the Town and Country Planning Act 1990 in November 2020, reflecting this revised approach to relocating certain Sizewell B facilities. As per the previous scheme, SZC Co. propose that these proposals would also feature in this Application. **Volume 2, Figure 2.2.7** of the **ES Addendum** illustrates the proposals for this revised application.

b) iii) b) b) Option 2: Sizewell B relocated facilities proposals, excluding Sizewell A land

2.2.97 As the provision of the additional Sizewell A land is subject to the completion of a land agreement, the original proposal would remain part of the Application. However, SZC Co. has continued to review the scheme in this scenario and proposes the following amendments, as shown in **Volume 2, Figure 2.2.11** and **Figure 2.2.12** of the **ES Addendum**:

- **Relocation of the administration building:** Originally proposed with welfare facilities within the Sizewell B power station perimeter, this building would be moved to the Coronation Wood development area, to the north of the training building, to facilitate easier construction. The welfare facilities, along with replacement storage and refurbished canteen, would still be located within the Sizewell B station perimeter.
- **Design of the training centre:** The width of the building would be increased and height reduced from three storeys to two storeys to reduce the visual impact of the building.
- Optimisation of the Coronation Wood development area:
 - relocation of the visitor centre to the southern part of the Coronation Wood development area; and
 - utilisation of the remaining central area between the proposed buildings, within the Coronation Wood development area for the outage laydown.

2.2.98 Pillbox Field would continue to include the proposed outage car park in this option.

2.2.99 The overall construction duration for the Sizewell B relocated facilities project in this scenario would be the same as for the alternative Sizewell B relocated facilities proposals.

b) iii) c) Why is this change proposed?

2.2.100 The main reasons for the changes proposed are:

- **Removal of Sizewell B outage car park from Pillbox Field (Option 1 only):** Pillbox Field was the only appropriate area for the provision of the replacement Sizewell B outage car park in the Application. However, SZC Co. has continued to engage with the Nuclear Decommissioning Authority/ Magnox to identify alternative options for site configuration. The identification of the additional area of land from the Sizewell A complex would, therefore, allow for the proposed site layout to be reconfigured and built development from Pillbox Field to be removed, so that the field would be used only for the provision of replacement planting for Coronation Wood and ecological enhancements.
- **Relocation of the administration building (Options 1 and 2):** The administration building would be moved from the outline development zone within the Sizewell B station perimeter to the Coronation Wood development area to facilitate easier construction, given the restrictions on construction within the operational Sizewell B station site.
- **Modifications to the training centre building (Options 1 and 2):** Following further design development, it was concluded that by increasing the width of the building slightly and removing one storey, the building could accommodate the facilities required. Therefore, the height of the building could be reduced to minimise visual effects.
- **Other changes to the Coronation Wood development area layout (Options 1 and 2):** As a result of the relocation of the administration building and changes to the training centre building, the visitor centre would be moved to the south eastern corner of the Coronation Wood development area and the layout of replacement operational car parking would be reconfigured for Option 1 and proposed as outage laydown in Option 2.

2.2.101 Collectively, these changes would bring environmental improvements and operational benefits compared with the current proposal contained within the Application.

b) iv) Change to certain parameter heights and activities on the main development site (**Change 4**).

b) iv) a) Proposed development in the Application

2.2.102 As with any large-scale construction project, a range of buildings, structures, plant and associated facilities are temporarily required, and their exact heights and locations would vary throughout the construction process. To ensure the environmental effects of this wide range of activities can be assessed, the Application includes clear parameters to identify maximum working heights for different parts of the construction site.

2.2.103 These heights are separated into general maximum heights for typical working conditions and “exceptional” maximum heights for relatively short-term activities, such as the use of a particularly large crane to lift specific objects.

2.2.104 Construction parameter heights plans are contained within the Application at **Volume 2, Figure 3.1** of the **ES** (Doc Ref. 6.3) [\[APP-186\]](#).

2.2.105 Parameter heights for the permanent development are contained within the Application at **Volume 2, Figures 2.3-2.6** of the **ES** (Doc Ref. 6.3) [\[APP-183\]](#).

b) iv) b) Description of the proposed change

2.2.106 This section does not detail the proposed changes to parameter heights and activities that are already identified as part of other proposed changes in this chapter:

- new parameter zone for the temporary BLF (Change 2);
- minor revisions to the locations and dimensions for the SSSI crossing (Change 6), sea defence (Change 9) and certain Sizewell B relocated facilities parameter zones (Change 3); and
- approximate location of the temporary outfall (Change 8).

2.2.107 This section details the following other changes proposed to construction parameters for the main development site. All changes are shown at **Volume 2, Figure 2.2.2** of this **ES Addendum**.

b) iv) b) a) Introduction of construction phase stockpiling to an existing parameter zone

2.2.108 For the reasons set out in the **Materials Management Strategy Update** in **Volume 3, Appendix 2.2.C** of the **ES Addendum**, the quantity of

materials that need to be managed on-site has increased by approximately two million tonnes. To accommodate this additional material an additional stockpile area (parameter zone 5a) would be required up to approximately 15m above ground level (35mAOD). The Application already applies for construction activities up to this height in the location and this change therefore relates to an additional activity in that area, to also allow for stockpiling.

b) iv) b) b) **Creation of a new parameter zone for construction phase marine tunnelling and shafts**

2.2.109 As described earlier in this chapter, the proposed design of the temporary HCDF has changed and this would release approximately 50 metres of additional usable space that would allow marine tunnelling works to take place outside of the cut off wall within parameter zone C21, as shown at **Volume 2, Figure 2.2.2** of the **ES Addendum**.

2.2.110 The cut off wall is needed to allow dewatering to take place alongside excavation works within the main construction area without significant impacts on the surrounding groundwater table. Relocation of the marine tunnelling works means that other construction works within the cut off wall can commence before the marine tunnelling work is complete, thereby making construction more efficient and potentially faster.

b) iv) b) c) **Addition of a permanent bat barn**

2.2.111 To compensate for the potential for noise and/or lighting impacts on bats, the Bat Mitigation Strategy (Doc Ref 6.3) [\[APP-182\]](#) confirms that either a purpose-built 'bat barn' or modifications to existing buildings would be provided.

2.2.112 Following engagement with Natural England, SZC Co. proposes to proceed with a bat barn located in close proximity to Lower Abbey Farm. It would be located close to existing bat flight lines with a dark corridor from the adjacent habitat in accordance with the Lighting Management Plan (Doc Ref. 6.3) [\[APP-182\]](#).

2.2.113 The structure would have a footprint of approximately 25m². It would also be made out of wood or masonry brick, with a steep pitched roof and dark coloured tiles for ecological purposes.

2.2.114 A new parameter zone 1G would be created accordingly for a structure approximately 6m above ground level (up to 8m AOD), as shown at **Volume 2, Figure 2.2.1** of the **ES Addendum**.

b) iv) b) d) Provision of a mammal pass under Lover's Lane

2.2.115 SZC Co. has continued discussions with stakeholders relating to connectivity between Sizewell Marshes SSSI and Aldhurst Farm, which first began in approximately 2014 in relation to the Aldhurst Farm planning application (ref. DC/14/4224/FUL).

2.2.116 SZC Co. intend to improve connectivity between the two sites by providing a new mammal culvert located in close proximity to the existing culvert at Lover's Lane north of Leiston Recycling Centre. It would be designed with features to encourage use by mammals including otters and water voles. Otter fencing would also be installed to guide animals to the culvert.

2.2.117 The approximate location is shown in **Main Development Site Operational Parameter Plans** (Doc Ref 2.5(A)).

b) iv) b) e) Change to pylon parameter zones

2.2.118 SZC Co. has continued to explore opportunities to reduce the visual impact of overhead power lines on the main platform. Through detailed discussions with stakeholders and further assessment, SZC Co. now intends to reduce the height of the southernmost pylon from 79m AOD to 59mAOD. It is necessary to move parameter zone P3 approximately 30m further south compared to the current location proposed in the DCO application to facilitate this height reduction.

b) v) Change to the location of the water resource storage area and the addition of flood mitigation measures to lower flood risk (**Change 5**).

b) v) a) Proposed development in the Application

2.2.119 The Application identifies that a temporary non-potable water storage area would be constructed for use in the construction process. The water would be used for construction activities such as dust suppression on the stockpiles. The location is shown at **Volume 2, Figure 2.2.13** of the **ES Addendum**.

b) v) b) Description of the proposed change

2.2.120 Further design work has identified that the water storage area can now be temporarily located elsewhere on the construction site, adjacent to a proposed attenuation pond, also known as water management zone 5, and adjacent to the proposed borrow pits and stockpiles, as indicated on **Volume 2, Figure 2.2.13** of the **ES Addendum**.

2.2.121 SZC Co. proposes to allow the storage area's original proposed location to instead provide additional, permanent, fluvial flood mitigation. Wetland

habitat would also be created in this area, comprising open water channels and wet reedbeds to provide high quality foraging habitats for marsh harriers and other species during the construction of Sizewell C.

2.2.122 Once the construction of Sizewell C is complete and compensatory marsh harrier foraging habitats are no longer required, the open water and wet reedbed habitats could be transitioned to wet woodland habitats, either through natural successional processes or through planting. In the long term, if progressed, this would compensate for the loss of wet woodland from the Sizewell Marshes SSSI. The flood mitigation area would also be linked to the proposed permanent wetland habitat corridor immediately to the south to create a single integrated wetland feature, as illustrated in **Volume 2, Figure 2.2.14** of the **ES Addendum**.

2.2.123 These changes would provide approximately 100,000 cubic metres of additional flood mitigation volume and require excavation up to approximately -2mOD.

2.2.124 The flood mitigation area and wetland habitats would be constructed very early in the construction phase to ensure no ongoing construction disturbance to foraging marsh harriers during the following summer.

2.2.125 Construction activity would predominantly consist of earthmoving activities using excavators and earthmoving vehicles. Construction activity is assumed to also include a materials handling area west of the flood mitigation area during the construction period of this feature only (approximately 6 months).

b) v) c) [Why is this change proposed?](#)

2.2.126 The proposed change would introduce additional flood mitigation and wetland habitat areas.

2.2.127 The additional flood mitigation area would reduce the impact of fluvial flood storage loss caused by development on parts of the main platform area.

2.2.128 The new habitat areas would provide additional foraging habitats for marsh harriers in the short term. In the long term, they could also provide additional wet woodland to help compensate for the loss of wet woodland from the Sizewell Marshes SSSI.

2.2.129 Relocation of the water storage area creates operational efficiencies by storing the water closer to stockpiles, where it is needed for dust suppression, and closer to the haul road.

b) vi) Change to the Site of Special Scientific Interest (SSSI) crossing design to a single span bridge with embankments (**Change 6**)

b) vi) a) Proposed development in the Application

- 2.2.130 The main development site needs to be accessed from the north, from a new access road linking the site to the B1122. The Application includes a vehicular and pedestrian crossing over the Sizewell Marshes SSSI. It is located at the narrowest practicable location of the SSSI corridor to minimise environmental impacts, as shown on parameter zone 1E at **Volume 2, Chapter 2, Figure 2.4** of the **ES** (Doc Ref. 6.3) [[APP-183](#)].
- 2.2.131 The crossing comprises an embankment structure and culvert with the permanent access road positioned on top. The embankment would have an approximate width of 40m at road level and an overall width of 70m at its base. This would remain the same for both the construction and operational phases of the proposed development to minimise disturbance to the SSSI corridor. The side slopes of the embankment in the Application have a gradient of 1:2.
- 2.2.132 A culvert would be incorporated into the embankment running perpendicular to the causeway along the existing route of Leiston Drain. The culvert would be approximately 3.5m high and 8m wide. A ledge would be installed to enable passage by otters. The bank and channel of Leiston Drain would remain intact.
- 2.2.133 During the construction phase, roads would be placed at the top of the embankment, including a haul road for very large construction vehicles. The construction haul road would be removed and planted with trees at the end of the construction phase. The remaining access road would be positioned to the western edge of the embankment, away from the coastal edge. The carriageway would have an approximate width of 12m and require 3m high safety barriers on either side, as shown at **Volume 2, Figure 2.2.15** of the **ES Addendum**.
- 2.2.134 The Nuclear Site Licence, which is governed by the Office for Nuclear Regulation (ONR), requires flood risk to also be assessed against 1 in 10,000 and 1 in 100,000 year events. The **Main Development Site Flood Risk Assessment Addendum** (Doc Ref. 5.2 (A)Ad) states that by 2090 the maximum crest height of the SSSI crossing is likely to need to be increased to 10.5mAOD. Parameter Zone 1E allows for this maximum, which is shown at **Volume 2, Chapter 2, Figure 2.4** of the **ES** (Doc Ref. 6.3) [[APP-183](#)].

b) vi) b) Description of the proposed change

- 2.2.135 The design of the SSSI crossing is proposed to be changed, to comprise separate embankments at either end with an approximately 30m long single-span bridge connecting them. A sheet pile barrier wall would be driven into the ground either side of the Leiston Drain, with the total distance between the walls being approximately 24m. The bank and channel of Leiston Drain would be unaffected.
- 2.2.136 This new bridge design would retain substantially more space around the Leiston Drain. The revised design retains an approximate crest width of 40m at road level and an overall width of up to approximately 70m at its base. Splayed wing walls over the Leiston Drain would maximise daylight and reduce the amount of permanent SSSI land take of wet woodland habitat stated in the Application by approximately 0.08ha. The structure would be up to approximately 8m in height and approximately 45m in width at the underside of the bridge. Therefore, it is assumed the area underneath the centre of the crossing will be in deep shade.
- 2.2.137 An indicative visualisation of the proposed SSSI crossing is shown at **Volume 2, Figure 2.2.16** of the **ES Addendum**. The revised parameter zone 1E for the SSSI crossing is shown at **Volume 2, Figure 2.2.8** of the **ES Addendum**.
- 2.2.138 A ledge would continue to be installed under the bridge to facilitate passage by otters and artificial bat roosts would be included within or on the bridge abutments.
- 2.2.139 The gradient of the slope on the eastern (seaward) side would be reduced from a 1:2 gradient to approximately a 1:3 gradient. The landward slope, which is generally less visible in views, would become steeper to approximately a 1:1 gradient accordingly, meaning the overall width of the crossing would remain unchanged. Soft landscaping would be provided on both sides of the embankment, with more substantial planting on the seaward side.
- 2.2.140 The access road to the power station on the SSSI crossing has a fixed alignment and therefore the change in gradient of the embankments would result in the footprint of the SSSI crossing moving eastward slightly, as shown at parameter zone 1E of **Volume 2, Figure 2.2.2** of the **ES Addendum**. The alignment of Sandlings Walk would also need to move slightly further east accordingly.
- 2.2.141 The existing ground below the embankments is assumed to be improved with a grid of rigid inclusions formed of controlled modulus columns (CMCs) or similar and overlaid with a reinforced granular stone load transfer platform above.

- 2.2.142 Contamination of the groundwater within the SSSI during construction would be prevented by provision of an impermeable sheet pile wall surrounding the construction area and permanent works, which would be embedded into the Crag layer below the softer materials near the surface.
- 2.2.143 During construction, the SSSI crossing would continue to include segregated lanes for pedestrians, two-way light goods vehicles and two-way working for off-highway dump trucks.
- 2.2.144 Two “Bailey” style temporary crossings would still be installed in advance of the main crossing and within the SSSI crossing working area to provide an early route between the temporary construction area and the main construction area and to facilitate construction of the permanent bridge. They would be constructed on a temporary foundation to the south and to the north the foundation would be shared with the proposed permanent foundation.
- 2.2.145 At the end of the construction phase, the construction haul road would still be removed and planted with trees. The remaining access road would be positioned to the western edge of the embankment, away from the coastal edge. The carriageway would continue to have an approximate width of 12m and require approximately 3m high safety barriers on either side.
- 2.2.146 No change to the approach described above is proposed in relation to the taller adaptive design required to mitigate against future flood overtopping.
- b) vi) c) Why is this change proposed?
- 2.2.147 The change provides additional flood relief, which would reduce water levels during times of increased flood risk compared with the current design. This is the case both local to the SSSI crossing and further afield at Minsmere Nature Reserve and relevant parts of Eastbridge.
- 2.2.148 The change in embankment slopes allows taller and more substantial trees to establish on the seaward embankment of the SSSI crossing. This has the effect of better integrating the SSSI crossing into the landscape from coastal viewpoints.
- 2.2.149 The change in design from a culvert to a bridge would provide greater connectivity for species including water voles, otters and bats, thereby reducing the potential for fragmentation of populations.

b) vii) Revisions to tree retention on the main development site
(Change 7).

b) vii) a) Proposed development in the Application

2.2.150 The Application includes the **Site Clearance** and **Landscape Retention Plans** (Doc Ref 2.5) [APP-020], as well as **Volume 2, Chapter 3, Figures 3.9 and 3.10** of the **ES** (Doc Ref. 6.3) [APP-186] which illustrate the sections of hedgerow and woodland that are proposed to be retained and removed. The Landscape Retention Plan shows the sections of woodland and hedgerow that would be retained.

2.2.151 Within the temporary construction area, the majority of field boundary hedgerows, and a section of plantation woodland at Goose Hill would be removed. Arable farmland would be removed for the construction site.

2.2.152 The construction of the main platform would involve the removal of the existing vegetation.

2.2.153 LEEIE would be converted from arable farmland into a temporary construction site. The boundary hedgerows and vegetation would be retained.

2.2.154 There would also be some localised removal of trees and hedgerows associated with the proposed temporary rail infrastructure and realignment of Lover's Lane.

b) vii) b) Description of the proposed change

2.2.155 Since the submission of the Application, there has been further contractor involvement which has identified that a small amount of additional vegetation may need to be removed to support the construction activity on the main development site, as explained in more detail below.

2.2.156 SZC Co. has identified three locations where changes are proposed to be made to the **Landscape Retention** and **Site Clearance Plans** (Doc Ref. 2.5) [APP-020].

b) vii) b) a) Location 1 – Important Hedgerow IH10 & IH25

2.2.157 As can be seen from **Volume 2, Figure 2.2.17** of the **ES Addendum**, the hedgerows (IH10 and IH25) conflict with the width of the proposed access road. The gap which has been allowed for in the Landscape Retention Plan submitted with the Application, is proposed to be amended and located further north. The amended location of the gap is shown on **Volume 2, Figure 2.2.17** of the **ES Addendum** and is the same width as originally proposed. There is no additional net loss of trees in this location as a result of the proposed change.

b) vii) b) b) Location 2 - Important Hedgerow IH08

2.2.158 As can be seen from **Volume 2, Figure 2.2.18** of the **ES Addendum**, the hedgerow (IH08) conflicts with the access route between the two plaza car parks. The gap which has been allowed for in the Landscape Retention Plan submitted with the Application is proposed to be amended and located further north. The amended gap is shown on **Volume 2, Figure 2.2.18** of the **ES Addendum** and is the same width as originally proposed. There is no additional net loss of trees in this location as a result of the proposed change.

b) vii) b) c) Location 3 – Close to Rail Route Alignment

2.2.159 There is some vegetation shown as retained on the Landscape Retention Plan submitted with the Application, which is in very close proximity to the proposed alignment of the rail extension route. More detailed design development has shown that the vegetation conflicts with the embankment of the temporary construction area, extending close to the rail extension route, as shown on **Volume 2, Figure 2.2.19** of the **ES Addendum**. This is very likely to create an obstruction for the construction and operation of the rail extension route. As a result, it is now proposed to remove an additional three to four trees to create enough space for the construction works within this area, but also for the operation of the rail extension route when it is in place. The proposed amendment is shown in **Volume 2, Figure 2.2.19** of the **ES Addendum**.

b) vii) c) Why is this change proposed?

2.2.160 As detailed design has progressed, the enabling works contractor has been looking in closer detail at the **Landscape Retention Plan** (Doc Ref. 2.5) [[APP-020](#)]. The contractor has identified areas where there are conflicts between retained landscape and access required into various parts of the site to carry out necessary construction works. These clashes have been assessed with a particular focus on landscape constraints and ecology, in particular bat roosts. These changes are proposed in order to facilitate the construction works proposed.

b) viii) Surface water removed early in the construction process to be discharged to the foreshore via a temporary outfall (**Change 8**).

b) viii) a) Proposed development in the Application

2.2.161 Early in the construction phase, a Combined Drainage Outfall (CDO) is proposed to be constructed, which would be created using a directional drilling technique under the foreshore and seabed. Two individual tunnels would connect and terminate in a headwork structure approximately 300m offshore.

- 2.2.162 One of the functions of the CDO is to discharge treated surface water run-off from the site during the construction period. The CDO would discharge this treated water to the sea in compliance with the requirements of an environmental permit.

b) viii) b) Description of the proposed change

- 2.2.163 In the period before the CDO is constructed, surface water would be temporarily pumped from the construction site, over the temporary sea defences and into a chamber before discharging water through a gravity pipe towards the shoreline. The pipe size is assumed to be less than 50cm in diameter. A maximum total suspended solids content of 250mg/l is assumed.
- 2.2.164 The outfall would be designed to be pumped at a maximum permitted rate of 200 litres per second when required. It is assumed that the outfall would typically only be used infrequently when surface water is captured in the construction site which cannot be discharged through infiltration or to the surrounding watercourses (e.g. due to flooding or storm events). Surface water under normal conditions would be collected in balancing ponds, treated via water treatment systems and then either infiltrated to ground or discharged to the surrounding watercourses, in accordance with the **Outline Drainage Strategy** (Doc Ref. 6.3) [[APP-181](#)].
- 2.2.165 The temporary outfall would be laid under the Suffolk Coast Path to ensure no obstruction and would then terminate above the Mean High Water Spring tide level. The temporary outfall is assumed to be located south of both the permanent and temporary beach landing facilities in the approximate location shown at **Volume 2, Figure 2.2.2** of the **ES Addendum**.
- 2.2.166 The Suffolk Coast Path would remain open during construction and operation of the temporary outfall as far as it is reasonably practicable and safe to do so.
- 2.2.167 Once the CDO is constructed the temporary outfall would be removed.

b) viii) c) Why is this change proposed?

- 2.2.168 Residual risk was identified in the **Main Development Site Flood Risk Assessment** (Doc Ref. 5.2(A)) [[AS-018](#)], where at times of high surface water inundation, there may be a necessity to include additional attenuation storage within the main construction area as temporary measures.
- 2.2.169 The proposed change would mean that the surface water from the main platform area would be pumped to the coastal environment during the

early phases of construction, when surface water captured in the construction site cannot be discharged through infiltration or to the surrounding watercourses (e.g. due to flooding or storm events). This would therefore prevent the localised effects on groundwater and surface water that were predicted in the Application as a result of moving this water to the detention basins in the WMZs. The temporary outfall will allow continued drainage from the platform and divert discharge away from the Sizewell Marshes SSSI and pump surface water to the marine environment therefore mitigating potential flood risk and environmental impacts.

- 2.2.170 The new temporary outfall will allow more efficient drainage prior to construction of the CDO when compared with the approach set out in the Application. As such it is concluded that it would provide improved mitigation of the surface water flood risk within the main platform construction area during the early construction phase.

b) ix) Change to the sea defence to make the scheme more efficient and resilient to climate change (**Change 9**).

b) ix) a) Proposed development in the Application

- 2.2.171 The site currently benefits from protection by the Bent Hills, a man-made bund structure constructed as part of the landscaping scheme for Sizewell B. The Bent Hills extend from south to north along the top of the shore, merging to the north with an east-west feature known as the Northern Mound. For compliance with the requirements of the Nuclear Site Licence for seismic qualification, the existing Northern Mound would need to be demolished and excavated down to a suitable formation layer before being built back up for the purposes of the Sizewell C Project.

- 2.2.172 Furthermore, for the construction of Sizewell C, a new HCDF would be required. The HCDF would be approximately 40m east of the existing Bent Hills and would replace it, as shown on parameter zone 1C at **Volume 2, Chapter 2, Figure 2.4** of the **ES**. To protect Sizewell C once the power station is operational, the Northern Mound would form part of the HCDF, as shown on parameter zone 1D at **Volume 2, Chapter 2, Figure 2.4** of the **ES**.

- 2.2.173 The Application includes a temporary and a permanent HCDF. The permanent HCDF has an adaptive design as explained further in this section.

- 2.2.174 Prior to construction of the permanent HCDF, the Application assumes a temporary HCDF would be built up using rock armour, with no piling proposed. This would form the eastern part of the permanent HCDF. Site-

won fill material would be placed over the rock armour and planted to soften views from the Suffolk Coast Path.

- 2.2.175 Towards the end of the construction phase, the Application identifies that the permanent HCDF would then be constructed. At this point, the western part of the permanent HCDF would be completed, involving the raising of the permanent level to +10.2m AOD.
- 2.2.176 This would be followed by the implementation of a landscape scheme to soften the visual appearance through planting and varying the overall height up to approximately +12.2m AOD. The Suffolk Coast Path would form part of the seaward side of the defence.
- 2.2.177 The Soft Coastal Defence Feature (SCDF) would be located seaward of the HCDF with a crest level at 5.2m AOD. The SCDF increases the resilience of the frontage by ensuring an adequate supply of sediment, which is necessary given the importance of the beach for flood risk and avoiding erosion impacts to neighbouring beaches.
- 2.2.178 In addition to the above, the Application provides for an adapted permanent HCDF design, as the Nuclear Site Licence requires resilience to flood risk also against 1 in 10,000 event and consideration of extreme events such as the 1 in 100,000 year event. The maximum adaptive height of the HCDF in the Application is therefore 14.2mAOD, to account for these scenarios. The Application states that this height is likely to be needed by 2046.

b) ix) b) Description of the proposed change

- 2.2.179 There remain three stages to the HCDF:
- temporary HCDF, for use from early in the construction phase;
 - permanent HCDF, for use once a greater degree of protection is required; and,
 - adapted version of the permanent HCDF, for use should extreme sea level rise identify that this is necessary.
- 2.2.180 An indicative drawing showing the location of the proposed permanent HCDF compared with the version in the Application is shown in **Volume 2, Figure 2.2.20** of the **ES Addendum**.

b) ix) b) a) Temporary HCDF

- 2.2.181 The temporary HCDF during the construction phase would comprise a sheet pile wall with a crest height of +7.3m AOD around the eastern

perimeter of the main construction area, as illustrated in **Volume 2, Figure 2.2.21** of the **ES Addendum**. It would be constructed prior to removal of the existing defences. This height provides for a 1 in 10,000 year storm event at 2030, including a precautionary assumption for wave height. The sheet pile would be embedded into the underlying Crag layer, which is typically up to -9m OD. The sheet pile wall would tie in with the existing ground at the Northern Mound. At its southern extent, it is assumed that there would be a transition provided to the Sizewell B sea defence using imported rock and shingle at up to +10.5m AOD.

- 2.2.182 The temporary HCDF would be located on what would become the seaward slope of the permanent HCDF, as shown in **Volume 2, Figure 2.2.21** of the **ES Addendum**. The parameter location of the temporary HCDF is shown at **Volume 2, Figure 2.2.2** of the **ES Addendum**. It is assumed that the temporary HCDF would be located approximately 14m landward of the HCDF toe design included within the DCO Application.
- 2.2.183 The temporary defence would be breached to allow access to the permanent BLF; however, this would only happen after the reinforced core of the permanent defence has been constructed up to a minimum level of 9.1m AOD.

b) ix) b) b) Permanent HCDF

- 2.2.184 Under the proposed design, the crest height of the permanent sea defence (including the Northern Mound) would change from +10.2m AOD (excluding landscaping) to +12.6m AOD (excluding landscaping). This height provides for a 1 in 10,000 year storm event at 2140, including a precautionary assumption for wave height. Up to two metres of landscaping continues to be assumed on the seaward slope and the crest, which would be constructed to varying depths to create naturalistic undulations to a typical gradient of approximately 1 in 3 on the embankment. The total height of the permanent HCDF with landscaping is therefore up to +14.6m AOD.
- 2.2.185 The seaward toe of the sea defence would be buried to a depth of approximately +0mOD, which is lower than the design presented within the Application. A temporary cofferdam would be created to facilitate construction underwater. The toe of the permanent HCDF would be approximately 2m seaward of the HCDF included within the Application for most of its length. At the abutment with the enhanced permanent BLF the toe would be up to 10m seaward of the original design.
- 2.2.186 The north-east corner of the HCDF would be reshaped compared with the design contained within the DCO application, moving it further southward (20m) away from the site boundary to provide greater space for maintenance.

- 2.2.187 The permanent design would still include rock armour placed on the seaward side of the sea defence.
- 2.2.188 Fill material is assumed to be placed on the landward side and the core of the sea defence, with reinforcements, as necessary. Ground improvement works are assumed to be necessary using CMCs or similar where underlying peat is present.
- 2.2.189 Landscaping is assumed to comprise filling the interstices of the rock armour with shingle and sand followed by topsoil and planting, as appropriate. The coast path would form part of the seaward landscaping and would typically be placed at approximately +5mOD.
- 2.2.190 The crest level of the SCDF would be 6.4m AOD.
- 2.2.191 Unlike other construction materials, it is now assumed that the rock armour or similar would be offloaded from grounded barges directly onto the beach.
- 2.2.192 Indicative details of the permanent HCDF are shown on **Volume 2, Figure 2.2.22** and **Figure 2.2.23** of the **ES Addendum**. The parameter location of the permanent HCDF is shown at **Volume 2, Figure 2.2.8** of the **ES Addendum**. An illustrative view of the permanent HCDF is shown at **Volume 2, Figure 2.2.24** of the **ES Addendum**.
- b) ix) b) c) Permanent HCDF, adapted
- 2.2.193 The Nuclear Site Licence, which is governed by the Office for Nuclear Regulation (ONR), requires flood risk to also be assessed against 1 in 10,000 and 1 in 100,000 year events at 2140 for its own purposes. After 2140 the project is assumed to enter the decommissioning phase. The permanent HCDF design retains the ability to raise the sea defence further to mitigate this risk. As the proposed permanent HCDF is now taller than the height in the Application and described above, the expected date when the adaptive design may be needed is now after 2140, rather than 2046 as per the current assumption in the Application. This brings the substantial benefit of not needing to undertake future construction works on the sea defence partway through the power station's operational life and not needing to disturb the landscaping placed on it.
- 2.2.194 The maximum crest height of the adaptive sea defence would be +16.4m AOD and landscaping would increase this to up to +18m AOD. This adaptation is not likely to be required within the operational life of the station, if at all, as even under the UKCP18 95th percentile of the high emissions scenario (RCP8.5), it would not be required until after 2140. The seaward toe of the sea defence would be buried to a depth of approximately -1.5mOD, south of the permanent BLF. A temporary

cofferdam would be created to facilitate construction underwater. The toe of the Northern Mound and at the permanent BLF does not need to increase in depth in the adaptive scenario, but the remainder of the HCDF would be extended approximately 20m seaward of the HCDF design in the DCO application, to align with the easting of the BLF abutment.

2.2.195 As with the permanent HCDF, the subaerial beach and SCDF fronting the adapted HCDF would be maintained. As the majority of the adapted HCDF would be approximately 20m seaward of the design presented within the DCO application, the subaerial beach and the Soft Coastal Defence Feature would also move seaward by a similar distance.

2.2.196 The adaptive design would be constructed of further rock armour or similar placed on top of the seaward side of the sea defence. Additional fill material would be placed on the landward side and landscaped to create naturalistic undulations following the same approach as the permanent HCDF.

2.2.197 Indicative details of the adapted HCDF are shown on **Volume 2, Figure 2.2.25** of the **ES Addendum**. The parameter location of the adapted HCDF is shown at **Volume 2, Figure 2.2.8** of the **ES Addendum**.

b) ix) c) Why is this change proposed?

b) ix) c) a) Temporary HCDF

2.2.198 Coastal flood risk from wave overtopping during the construction phase in the DCO application was considered to be significant, with a tangible risk to people during the 1 in 200-year event. The proposed design of the temporary HCDF reduces wave overtopping during the construction phase and mitigates this risk.

2.2.199 The change in design of the temporary HCDF also allows the marine shafts and tunnelling works to take place outside of the cut off wall. This is because the sheet pile wall is a vertical rather than a sloped feature, creating approximately 50 metres of additional usable space between the cut off wall and the sea defence.

2.2.200 The cut off wall is needed to allow dewatering to take place alongside excavation works within the main construction area without significant impacts on the surrounding groundwater table. Relocation of the marine tunnelling works means that other construction works within the cut off wall can commence before the marine tunnelling work is complete, thereby making construction more efficient and potentially faster.

b) ix) c) b) Permanent HCDF

- 2.2.201 The permanent HCDF height contained within the Application (+10.2m AOD) provided for a 1 in 10,000 year storm event, with an allowance for wave height and sea level rise, but potentially requiring future raising by approximately 2046. The proposed increase extends the potential point in time until a future raising may be required, after 2140, and thus provides for a longer initial period of protection in relation to the 1 in 10,000 year storm. The proposed change continues to be assessed based on UKCP18 climate change allowances and embeds primary mitigation into the design of the sea defence by increasing its height.
- 2.2.202 Assumptions on ground improvement works to the permanent HCDF have been included to allow for the scenario where the sea defence is required to be seismically qualified. In that event, the ground improvement works would control potential settlement on peat and increase the stability of the slopes in a seismic event.
- 2.2.203 During the change consultation, SZC Co. identified a height of +14m AOD plus landscaping. Further modelling and refinement of the design has informed the reduced height of +12.6m AOD plus landscaping.

b) ix) c) c) Permanent HCDF, adapted

- 2.2.204 Over time the permanent HCDF adapted height contained within the Application (+14.2m AOD plus landscaping) would require increasing reliance on secondary mitigation to address the potential for wave overtopping. The residual flood risk would be managed on the main platform with site management protocols, warning system and weather forecasting. An appropriate response team would manage the clean-up operation and the removal of potential debris accumulated on the platform. The sea defence would be inspected after an event to ensure to the structure has not been damaged.
- 2.2.205 During the change consultation, SZC Co. identified an adaptive height of +15m AOD plus landscaping to embed primary mitigation into the design of the adapted sea defence. SZC Co. continues to engage with stakeholders, including ONR on the Nuclear Site Licence safety case and that work, combined with further modelling and refinement of the safety functional requirements to limit the potential for flooding on the platform by increasing safety margin throughout the operation and decommissioning phases of the project. This has informed the increased height of +16.4m AOD plus landscaping after 2140.

b) x) Extension of the Order Limits to provide for additional fen meadow habitat at Pakenham as mitigation for fen meadow loss (**Change 11**).

b) x) a) Proposed development in the Application

2.2.206 As detailed in the Application, fen meadow compensation areas are proposed to be created at Benhall and Halesworth to compensate for fen meadow permanently lost from Sizewell Marshes SSSI as a result of the proposed development.

b) x) b) Description of the proposed change

2.2.207 SZC Co. has identified an additional site at Pakenham (see **Volume 2, Figure 2.2.26** of the **ES Addendum**) in West Suffolk, which has the potential for creating fen meadow. The site proposed comprises approximately 32ha of land located to the west of Fen Road, south of Thieves Lane / Broadway, east of Thurston Road and to the north of the Street. The site currently comprises a mix of grassland, fen meadow, rush pasture and drier grassland and is adjacent to the designated Pakenham Meadows SSSI for which lowland wet grassland and fen meadow are the primary interest features. An environmental site context plan is included within **Volume 2, Figure 2.2.27** of the **ES Addendum**.

2.2.208 The site has been identified as being potentially suitable for the creation of fen meadow as it lies in a shallow basin bisected by the Pakenham Stream, and is in close proximity to other areas of fen meadow habitat. Within the site identified, a total of 4.9ha is considered the primary locus for the creation of new fen meadow habitat, and some of the wider areas on the site may also have the potential for the creation of new fen meadow habitat.

2.2.209 Works to create the fen meadow habitat at Pakenham would be similar to those described in **Volume 2, Chapter 3** of the **ES** (Doc Ref. 6.3) [[APP-184](#)] in relation to Benhall and Halesworth, commencing at the outset of construction on the main development site, and assumed to include:

- installation of water control structures, to maintain / manipulate water levels;
- removal of any existing field drains, to reverse historic patterns of drainage;
- limited and superficial excavation to reduce local ground levels, create low bunds and /or create minor surface watercourses to help distribute surface water;

- translocations of turfs from the fen meadow areas Sizewell Marshes SSSI, where subject to landtake; and
- limited planting of other locally sourced native species and use of appropriately sourced 'green hay' to accelerate colonisation by key fen meadow species.

2.2.210 Volume 2, Figure 2.2.26 of the **ES Addendum** also identifies a number of potential access points between existing roads and the site which would be required to enable access to the site by construction vehicles and workers.

b) x) c) Why is this change proposed?

2.2.211 The additional fen meadow habitat is proposed to provide a greater area of habitat than would be lost during construction. This would increase the likelihood of successfully creating habitat of the same quality and distinctiveness.

2.2.212 The Application considers that in the unlikely event of failure to deliver the fen meadow compensatory habitats at either the Benhall and Halesworth sites, funding of other fen meadow habitat creation projects would be implemented at alternative locations in Suffolk to ensure the effects on fen meadow habitats as a result of Sizewell C would be fully compensated.

2.2.213 Further advice from Natural England, however, recommends that given the rarity of fen meadow in the UK and the known difficulty of restoring species-rich fen / fen meadow habitat, that a larger extent of land is required in order to provide sufficient compensatory habitat. SZC Co. is proposing to include the site at Pakenham to further increase the probability of creating sufficient fen meadow habitat to compensate for the loss of fen meadow from the Sizewell Marshes SSSI.

2.2.214 Even with the inclusion of the site at Pakenham, SZC Co. would, in the unlikely event of failure to deliver a sufficient quantum of fen meadow compensatory habitat, provide funding for the creation of new fen meadow habitats and the improvement of existing fen meadow habitats at alternative locations in Suffolk.

b) xi) Minor extensions and reductions of the Order Limits for works on the main development site and related sites (fen meadow mitigation sites and marsh harrier improvement sites) (**Change 13**).

b) xi) a) Proposed development in the Application

2.2.215 The Order Limits for the main development site, as presented in the Application, comprise five components:

- **Main platform:** the area that would become the power station itself;
- **Sizewell B relocated facilities and National Grid land:** the area that certain Sizewell B facilities would be moved to in order to release Sizewell B land for the proposed development and the area required for the National Grid transmission network;
- **Offshore works area:** the area where offshore cooling water infrastructure and other marine works would be located;
- **Temporary Construction Area:** the area located primarily to the north and west of the proposed SSSI crossing, which would be used to support construction activity on the main platform, including the accommodation campus and the part of the rail route comprising a rail extension from the proposed B1122 (Abbey Road) level crossing and the terminal within the main development site; and
- **Land east of Eastlands Industrial Estate (LEEIE):** the area to the north of Sizewell Halt and King George's Avenue, which would be used to support construction on the main platform and temporary construction area.

2.2.216 In addition, there are a number of related sites included in the Application, including:

- Permanent off-site sports facilities at Leiston, which would be used during the construction stage as a shared outdoor sports facility for Alde Valley School, the local community and construction workers.
- Permanent fen meadow compensation sites to the south of Benhall and to the east of Halesworth.
- Temporary marsh harrier habitat improvement area to the west of Westleton.

b) xi) b) Description of the proposed change

2.2.217 There are a number of minor reductions and additions proposed to the Order Limits for the main development site and the off-site habitat creation sites. The proposed changes described in this section relate to:

- fen meadow compensation sites to the south of Benhall and to the east of Halesworth;
- marsh harrier habitat improvement area to the west of Westleton;
- temporary construction area; and

- Sizewell B relocated facilities and National Grid land.

2.2.218 It has been determined following engagement with landowners and review of the development proposals that a number of small parcels of land are not necessary for the construction and operation of Sizewell C. In addition, further development of the design of the proposals has identified a requirement to make minor extensions to the Order Limits. These areas are set out in **Table 2.1** and in **Volume 2, Figures 2.2.28 to 2.2.31** of the **ES Addendum**.

Table 2.1: Changes to the Order Limits for the main development site and associated off-site habitat creation sites

Volume 2 Figure	Location of the change	Reduction or addition	Why is the change proposed?
2.2.28	Land to the west of the main development site, adjacent to Bridleway 19, north of the rail extension route	Reduction	Minor reduction to the site boundary due to a mapping/boundary discrepancy.
2.2.28	Land west of the B1122 Abbey Road to the south of the rail extension route prior to the crossing of the road.	Reduction	Partial reduction to the site boundary to avoid access to adjoining property.
2.2.28	Lover's Lane to the east of the Aldhurst Farm Habitat Creation Scheme south of the pegasus crossing and north of the Valley road access.	Addition	Extension of the site boundary to allow for a temporary construction area to enable works to be undertaken to the highway and allow for the construction of the bridleway and cycle way diversions, whilst retaining the existing hedgerow in place and minimising disruption to the road.
2.2.28	Lover's Lane to the east of the Aldhurst Farm Habitat Creation Scheme opposite the Leiston Household Waste Recycling Centre	Addition	Minor extension of the site boundary to allow for a proposed right turn lane into the recycling centre.
2.2.28	North Western boundary of the Sizewell A site	Reduction	Partial reduction to the site boundary to exclude an area of land which is not required for the Sizewell C Project.

Volume 2 Figure	Location of the change	Reduction or addition	Why is the change proposed?
2.2.29	Land to the north-west of the fen meadow habitat creation site at Halesworth.	Reduction	Minor reduction to the site boundary due to a mapping/boundary discrepancy.
2.2.29	Access along Blyth Road and A144 at the fen meadow habitat creation site at Halesworth.	Addition	Increase to the site boundary to facilitate access to the site primarily within the highway boundary.
2.2.30	Access to the south from the A1094 in addition to an access off Aldecar Lane to the north west of the fen meadow habitat creation site at Benhall.	Addition	Increase to the site boundary to facilitate access to the site primarily within the highway boundary.
2.2.31	Access to the northern and southern boundary of the marsh harrier habitat improvement area in Westleton.	Addition	Increase to the site boundary to facilitate access to the site primarily within the highway boundary.

b) xii) A new bridleway link between Aldhurst Farm and Kenton Hills (Change 15).

b) xii) a) Proposed development in the Application

2.2.219 SZC Co. has committed to the re-provision of a number of permanent Rights of Way as part of the Application. These include (but are not limited to):

- A north-south combined bridleway, cycleway and footpath from Sizewell Gap and St George's Avenue to the northern end of bridleway 19 on Eastbridge Road (approximately 4.5km in length).
- A bridleway connection to the off-road route from Valley Road.
- A southern section of the public right of way diversion around the rail extension route immediately west of Abbey Road.

2.2.220 In addition, a new linear and public access area would be created at Aldhurst Farm forming part of the planning permission for the construction of the new wetlands (application reference DC/14/4224/FUL). This would include a definitive footpath and approximately 27ha of Open Access Land.

- 2.2.221 In summary, approximately 5km of new definitive Rights of Way (comprising 4.6km of new off-road bridleway and 0.4km of new public footpath) and 27ha of new Open Access Land would be provided in this area through the delivery of Sizewell C.
- 2.2.222 Full details of the Rights of Way proposals can be found in the Application at the following locations:
- Access and Rights of Way plans (Doc Ref. 2.4(B));
 - **Rights of Way and Access Strategy** (Doc Ref 6.3) [[APP-270](#)];
 - **Draft DCO**, Schedule 10 and 11 (Doc Ref. 3.1(A)); and
 - Draft DCO Addendum: Proposed Changes to the Draft DCO Schedules (Doc Ref. 3.1 Ad(A)).

b) xii) b) **Description of the proposed change**

- 2.2.223 A crossing point would be provided over Lover's Lane from the northern field of Aldhurst Farm into the arable field to the north. A new route would then pass through an existing field, parallel to the field boundary, towards Kenton Hills. It would then join the existing Bridleway 19 route, as shown in **Volume 2, Figure 2.2.32** of the **ES Addendum**.
- 2.2.224 The new permanent route and crossing point would be made available for pedestrians in the construction phase once the entrance to the main development site from the B1122 is in place and the number of HGVs using the early years access is reduced, approximately two years post commencement of construction works. The link would be designated as a bridleway once construction is complete.

b) xii) c) **Why is this change proposed?**

- 2.2.225 This route would provide substantially improved recreational connectivity in the surrounding area and enhance the north-south recreational routes within the Suffolk Coast and Heaths AONB.
- 2.2.226 Part of the mitigation package provided by the Application would be the provision of an off-road bridleway route between Sizewell Gap and Eastbridge Road during the construction and operation phases, running parallel to Lover's Lane, the B1122 and Eastbridge Road.
- 2.2.227 This additional connection would provide an alternative, slightly shorter, bridleway route separated from Lover's Lane, the B1122 and Eastbridge Road, with fewer road and no rail crossings, enhancing the recreational experience of users. It would also create a more direct west-east

connection between Aldhurst Farm (and Leiston to the south-west) and the permissive footpath network within and adjacent to Kenton Hills and to the coast, bringing further amenity benefits.

2.2.228 Engagement with local stakeholders has identified that they consider that there would be an unplanned desire line that people would seek to use across Lover's Lane between the proposed off-road bridleway within the Aldhurst habitat creation area and Bridleway 19 near Kenton Hills car park. This would be prevented by including a safe crossing point and therefore reducing risk in this area.

2.2.229 This addition to the network has been requested by stakeholders. SZC Co. had intended that it would be funded through a Section 106 contribution so that it might be provided by the Suffolk County Council. However, that would require the Council to take additional powers. Inclusion of the proposal in the DCO would ensure its delivery by SZC Co.

2.3 Conventional waste management and material resources

a) Introduction

2.3.1 This section provides an addendum to the conventional waste management and material resources assessment resulting from the Additional Information and the proposed changes, with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 8** of the **ES** (Doc Ref. 6.3) [[APP-193](#)]; and
- **Volume 2, Appendix 8A** of the **ES** (Doc Ref. 6.3) [[APP-194](#)].

2.3.2 The conventional waste and material resources assessment presented within **Volume 2, Chapter 8** of the **ES** (Doc Ref. 6.3) [[APP-193](#)] provided a project-wide assessment. Therefore, where appropriate, in addition to considering the Additional Information and proposed changes for the main development site, relevant information for associated developments has also been considered.

b) Relevant Additional Information

2.3.3 The following Additional Information is relevant to the assessment of conventional waste management and material resources reported within **Volume 2, Chapter 8** of the **ES** (Doc Ref. 6.3) [[APP-193](#)]:

- Materials Management Strategy Update (as described in **section 2.2** of this chapter and set out within **Volume 3, Appendix 2.2.C** of this **ES Addendum**).

c) Relevant changes

- 2.3.4 All of the proposed changes to the Sizewell C Project (**Changes 1 to 15**), as listed within **Chapter 1** of this **ES Addendum**, have been reviewed to determine the potential for new or different significant effects to occur with regards to the conventional waste and material resource assessment presented within **Volume 2, Chapter 8** of the **ES** (Doc Ref. 6.3) [APP-193]. A summary of this review, to identify proposed changes that could alter the assessment conclusions for conventional waste and material resources is provided below.

c) i) Main development site

- 2.3.5 **Volume 2, Appendix 8A** of the **ES** (Doc Ref. 6.3) [APP-194] estimated construction waste quantities for the main development site on the basis of the forecasted waste quantities for Hinkley Point C. Whilst the proposed changes at the main development site are likely to alter waste quantities generated, the estimate used from Hinkley Point C is considered to remain valid. This is because as a conservative measure, a 10% contingency (equivalent to 22,000 tonnes) was applied to the estimated construction waste quantities from Hinkley Point C. Any change to the waste quantities, as a result of the proposed changes at the main development site, is considered likely to occur within the estimated contingency allowance, due to the nature and scope of these works.
- 2.3.6 The proposed changes would not alter the excavated materials cut and fill balance project-wide, as described within the **Materials Management Strategy Update (Volume 3, Appendix 2.2.C of this ES Addendum)**. There is no change to the estimated demolition waste volumes for the Sizewell B relocated facilities project.
- 2.3.7 As a result, overall the proposed changes at the main development site would not alter the conclusions of the assessment presented within **Volume 2, Chapter 8** of the **ES** (Doc Ref. 6.3) [APP-193] and have been screened out from further assessment.

c) ii) Associated developments

- 2.3.8 **Volume 2, Appendix 8A** of the **ES** (Doc Ref. 6.3) [APP-194] estimated construction waste quantities for the park and ride sites on the basis of the parking spaces provided at each site. The proposed changes would not alter the number of parking spaces provided and, therefore, there is no change to the calculations for waste quantities.
- 2.3.9 **Volume 2, Appendix 8A** of the **ES** (Doc Ref. 6.3) [APP-194] estimated construction waste quantities for the rail and highway infrastructure on the basis of their respective site areas. The proposed changes would result in

an overall increase in the site areas for two village bypass (by 0.1ha) and Sizewell link road (8ha). There would be no change to the site areas for the Yoxford roundabout and other highway and rail infrastructure.

- 2.3.10 As a result, the proposed changes at two village bypass and Sizewell link road (**Change 12**) have been screened in for further assessment.

d) Updated assessment – Additional Information

- 2.3.11 **Table 2.2** sets out the updated material quantities required for construction at the main development site, as described within the **Materials Management Strategy Update (Volume 3, Appendix 2.2.C of this ES Addendum)**. **Table 2.3** provides a revised comparison of construction material resource use requirements with estimated resource availability in Suffolk and nationally.

- 2.3.12 Whilst the estimated resource requirement for concrete has slightly reduced, the overall effect associated with reducing the availability of this material in Suffolk would remain major adverse (**significant**) and minor adverse (**not significant**) nationally. The significant effect at a local scale would occur within the context of the overall concrete requirement for the Sizewell C Project and the availability of existing concrete batching plants within Suffolk. The reduction in the total quantity of in bitumen changes the effect for Suffolk from moderate adverse (**significant**) to minor adverse (**not significant**) (as the quantity is now less than 5% of the availability in Suffolk), with the effect nationally remaining negligible (**not significant**). The effect on steel availability in Suffolk and nationally remains major adverse (**significant**) and the effect on gravel availability remains minor adverse (**not significant**) in Suffolk and negligible (**not significant**) nationally.

Table 2.2: Indicative material quantities to be imported to the main development site

Type	Imported materials by weight (million tonnes (%))	
	Original assumption	Updated assumption
Concrete materials	5.1 (50%)	4.8 (40%)
Backfill	2.0 (20%)	3.3 (27%)
Steel	1.0 (10%)	1.0 (8%)
Bitumen	1.0 (10%)	1.0 (8%)
Other	1.0 (10%)	2.0 (17%)
Total	10.1 (100%)	12.1 (100%)

Table 2.3 Summary of construction material resource use compared with resource availability in Suffolk and nationally (revised)

	Concrete (tonnes)	Bitumen (tonnes)	Steel	Concrete (tonnes)
<i>As reported within Volume 2, Chapter 8 of the ES (Doc Ref. 6.3) [APP-193]</i>				
Availability (Suffolk)	604,000	22,904,000¹	--	22,420,000
Availability (UK)	120,960,000	182,760,000¹	7,300,000	126,400,000
Main development site	5,050,000	1,010,000	1,010,000	--
Northern park and ride	8,450	11,900	100	33,650
Southern park and ride	13,400	21,950	10	38,900
Two Village Bypass	2,700	30,000 ¹	350	35,000
Sizewell link road	1,200	70,000 ¹	600	80,000
Yoxford Roundabout and other highway improvements	--	8,800 ¹	20	10,9000
Freight Management Facility	24,600	550	150	19,200
Rail route extension	850	750	320	17,010
Saxmundham to Leiston branch line improvements	3,100	3,750	960	33,300
Total for development	5,104,300	1,157,700	1,012,510	267,960
% of available (Suffolk)	>100%	5.05	--	1.17
% of available (UK)	4.22	0.63	13.87	0.21
Revised assessment				
Main development site	4,840,000	968,000	968,000	-
Total for development	4,894,300	1,115,700	970,510	348,371
% of available (Suffolk)	>100%	4.87	-	1.55
% of available (UK)	4.05	0.61	13.29	0.28

1 (including asphalt) 2 (including sand)

e) Updated assessment – proposed design changes (**Change 12**)

- 2.3.13** The revised overall estimated construction waste quantity from associated developments, as a result of the proposed changes to the site areas of two village bypass and Sizewell link road, would be approximately 211,000 tonnes, using BRE Smartwaste's waste benchmark data. This represents an increase of approximately 7,000 tonnes compared to the volume reported within **Volume 2, Chapter 8** of the **ES** (Doc Ref. 6.3) [APP-193].
- 2.3.14** There would be no change to the estimated operational and removal and reinstatement waste quantities.
- 2.3.15** **Table 2.4** summarises the changes to the total estimated inert, non-hazardous and hazardous waste quantities and updates the assessment conclusions on waste management infrastructure as a result of this change. Overall, the effect on inert landfill capacity would change from negligible to minor adverse, however, it would remain **not significant**. There is no change to the assessment of effects due to non-hazardous and hazardous waste.

Table 2.4: Update to estimated construction waste quantities and assessment

Construction waste type	Total estimated waste quantity (tonnes) within Volume 2, Chapter 8 of the ES	Assessment conclusion within Volume 2, Chapter 8 of the ES	Revised total estimated waste quantity (tonnes)	Revised assessment
Inert Waste	297,000	Less than 1% of remaining inert landfill capacity within the study area, resulting in a negligible effect (not significant).	302,000	Greater than 1% but less than 5% of remaining inert landfill capacity within the study area, resulting in a minor adverse effect (not significant).
Non-Hazardous Waste	107,000	Greater than 1% but less than 5% of remaining non-hazardous waste landfill capacity within the study area, resulting in a minor adverse	109,000	Greater than 1% but less than 5% of remaining non-hazardous waste landfill capacity within the study area, resulting in a

Construction waste type	Total estimated waste quantity (tonnes) within Volume 2, Chapter 8 of the ES	Assessment conclusion within Volume 2, Chapter 8 of the ES	Revised total estimated waste quantity (tonnes)	Revised assessment
		effect (not significant).		minor adverse effect (not significant).
Hazardous Waste	11,800	Greater than 1% but less than 5% of remaining hazardous waste landfill capacity within the study area, resulting in a minor adverse effect (not significant).	12,200	Greater than 1% but less than 5% of remaining hazardous waste landfill capacity within the study area, resulting in a minor adverse effect (not significant).

2.4 Socio-economics

a) Introduction

2.4.1 This section provides an addendum to the socio-economics assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 9** of the **ES** (Doc Ref. 6.3) [[APP-195](#)]; and
- **Community Safety Management Plan** (Doc Ref. 8.16) [[APP-635](#)].

2.4.2 This assessment considers the relevant Additional Information, as summarised in sections below. The proposed changes do not alter the socio-economics assessment, and, therefore, have not been considered further within this section.

b) Relevant Additional Information

2.4.3 The socio-economic assessment (**Volume 2, Chapter 9** of the **ES** (Doc Ref. 6.3) [[APP-195](#)]) relied on a baseline of publicly available data on crime rates. It set out Home Office data for recorded offences at different spatial scales – Leiston Neighbourhood Policing Area, local authority districts and the county of Suffolk. It provided the total number of crimes in the 12 months to 30 December 2018 and then provided a rate per 1,000 population.

2.4.4 The impact assessment acknowledged that the temporary increase in population arising from the non-home based (NHB) workforce could lead

to an increase in some types of crime. The ES estimated a peak impact of a 0.8% increase in crime in the county and an average of 0.4% based on the crime rate per 1,000 people. At a local level, this amounted to a 19.5% increase in Leiston which was reported as a **significant**, moderate adverse effect prior to mitigation.

2.4.5 The assessment drew on evidence from the construction of Sizewell B and Hinkley Point C and concluded that mitigation was likely to be effective such that the effect would be negligible.

2.4.6 Since the ES was submitted, further data from Hinkley Point C has been published, this is set out below.

2.4.7 In addition, in its Relevant Representation, Suffolk Constabulary raised two issues in relation to the socio-economic assessment:

- that the focus on recorded crimes did not reflect the full demand on police resources; and
- that the impacts may need to be weighted by demographics rather than on a per capita basis.

2.4.8 SZC Co. has continued to engage on these issues and Suffolk Constabulary has shared data on the other resource demands that it thinks would be required. These include:

- incidents of crime and disorder on and off-site requiring police response and investigation;
- wider disruption of criminal activities including substance misuse, drug supply and prostitution;
- safeguarding requirements, mental health calls and missing persons investigations;
- civil contingencies (major accidents and disasters) and protests, including in terms of preparedness and response; and,
- community policing activities including non-crime investigations, crime deterrence and neighbourhood patrols (for both enforcement and community reassurance).

2.4.9 SZC Co. has also collated the data reported on the policing impacts arising from Hinkley Point C that are reported by Avon and Somerset Constabulary (ASC).

c) Updated assessment – Additional Information

c) i) Baseline

c) i) a) Data from Suffolk Constabulary

2.4.10 Suffolk Constabulary has provided data not previously in the public domain to supplement the socio-economic assessment. These are grouped under three broad areas where Suffolk Constabulary expects resources may be required to deal with additional policing demands:

- custody (arrest and custody suite demand);
- command and control (responding to 999 and 101 calls, and incident response and co-ordination); and
- local policing.

2.4.11 The ES includes data on crimes which is standardised by reporting crime per 1,000 population. The Suffolk Constabulary data is reported here on the same basis. Suffolk Constabulary estimates that the population in 2018 was 758,556.

2.4.12 The Suffolk Constabulary data on impacts on Custody are based on the number of arrests. The following table shows the arrest data per 1,000 residents, broken down by gender.

Table 2.5: Arrests Data

	Arrests	Arrests per 1,000 Population
Male	8,898	23.7
Female	1,817	4.7
Total	10,758	14.2

2.4.13 The data on impacts on Command and Control are based on the number of suspects.

Table 2.6: Suspects Data

	Suspects	Suspects per 1,000 Population
Male	27,856	74.3
Female	9,726	25.4
Total	37,582	49.5

- 2.4.14 Additionally, Suffolk Constabulary has provided data on the volume of calls to 101 and 999.

Table 2.7: Calls to Police

Call Type	Calls	Calls per 1,000 Population
101 Calls	132,847	175.1
999 Calls	110,448	145.6

- 2.4.15 For Local Policing, the data supplied by Suffolk Constabulary includes other demands on police time for non-crime investigations, mental health and missing persons calls.

Table 2.8: Incidents Requiring Police Resource, 2019

Incident Type	Incidents	Incidents per 1,000 Population
Criminal investigations	56,331	74.3
Non-crime investigations	17,895	23.6
Mental health calls	2,289	3.0
Missing person calls	3,587	4.7
TOTAL	80,102	105.6

- 2.4.16 The number of criminal investigations per 1,000 population is slightly higher at 74.3 than the crime data reported in the ES (71.5). The inclusion of non-crime incidents increases the overall rate of incidents to 105.6 per 1,000 residents.

c) i) b) **Data from Hinkley Point C**

- 2.4.17 Avon and Somerset Constabulary (ASC) provides a quarterly report as part of the Hinkley Point C Community Safety Management Plan. This provides data on two measures - incidents of reported crime and of non-crime directly linked to the Hinkley Point C project or workforce.
- 2.4.18 The following table summarises the data up to Q4 2021, together with the estimated size of the workforce (based on reporting to the HPC Socio-economic Advisory Group (SEAG) which is undertaken every six months) and the rate of crime per 1,000 workers as an annual average (note 2020 data on workforce is not yet available).

Table 2.9: Incidents of Reported Crime and Reported Non-Criminal Activity linked directly to the Hinkley Point C Project (Reported to SEAG)

Date	Reported Crime	Reported Non-Criminal Activity	Reported workforce
Q1 2017	7	8	871
Q2 2017	10	15	
Q3 2017	12	10	1,566
Q4 2017	18	12	
2017 TOTAL / AVERAGE	47	45	1,219
Q1 2018	34	7	2,870
Q2 2018	36	23	
Q3 2018	38	23	3,787
Q4 2018	47	24	
2018 TOTAL / AVERAGE	155	77	3,329
Q1 2019	31	32	4,313
Q2 2019	34	56	
Q3 2019	43	39	4,837
Q4 2019	52	47	
2019 TOTAL / AVERAGE	160	174	4,575

2.4.19 This suggests that the average annual rates of reported crime and reported non-criminal activity linked directly to the Hinkley Point C Project were:

- in 2017 – 39 (reported crime) and 37 (reported non-criminal activity) per 1,000 resident workers;
- in 2018 – 47 (reported crime) and 23 (reported non-criminal activity) per 1,000 resident workers; and
- in 2019 – 35 (reported crime) and 38 (reported non-criminal activity) per 1,000 resident workers.

2.4.20 The statistics for ASC show an overall crime rate of around 80 per 1,000 residents. The crime and incident rate for all Hinkley Point C workers is around half of that. The data covers all workers at Hinkley Point C, i.e. it includes home-based workers who were already resident in the area. Therefore, not all of these incidents are “additional” to the baseline and requiring project mitigation.

c) ii) Environmental Design and Mitigation

- 2.4.21 Mitigation measures proposed for Sizewell C mirror those in place for Hinkley Point C and are set out in greater detail in **Volume 2, Chapter 9** of the **ES** (Doc Ref. 6.3) [APP-195] and in the **Community Safety Management Plan** (Doc Ref. 8.16) [APP-635]. These include:
- The accommodation campus (which at Sizewell C will house a larger number of the non-home based workforce and be in one location on the main development site).
 - The Worker Code of Conduct.
 - Drug and alcohol testing.
 - Security vetting.
 - Sizewell C Project security team.
 - Section 106 funding for police resources.

c) iii) Assessment of effects

- 2.4.22 **Volume 2, Chapter 9** of the **ES** (Doc Ref. 6.3) [APP-195] (para 9.7.229) acknowledged that recorded crime was only one part of the impact on policing:
- “SZC Co. recognises through engagement with Suffolk Constabulary, that recorded crimes (the metric used in this assessment) are only one contributor towards police resourcing, and that information on response to non-reported incidents and dealing with crimes not categorised by the Home Office definitions can lead to greater demand for police resourcing.”
- 2.4.23 Suffolk Constabulary has provided data that shows crime makes up around 70% of all incidents.
- 2.4.24 The evidence from Hinkley Point C suggests that incidents of crime per 1,000 involving Hinkley Point C workers are significantly lower than the average for the ASC area (around 40 vs 80 per 1,000 residents). Non-crime incidents appear to be slightly lower than reported crimes, at 33 per 1,000 workers.
- 2.4.25 There are many reasons why overall crime and non-crime rates at Hinkley Point C are lower than average, despite the workforce being overwhelmingly male. These include a range of both mitigation measures

(as summarised above) and features of the workforce, which will also apply at Sizewell C.

2.4.26 There are also other factors that may mitigate against increases in crime, such as the fact that many NHB workers would spend time at their permanent homes away from Suffolk (e.g. at the weekend when some crimes are typically higher) and that they are employed (employed people are less likely to both commit and be victims of crime).

2.4.27 The overall conclusion of **Volume 2, Chapter 9** of the **ES** (Doc Ref. 6.3) [APP-195], therefore, remains valid. Sizewell C workers are not expected to lead to a disproportionate increase in crime or non-crime incidents requiring police resources and, after mitigation, the impacts are expected to be negligible (defined as an increase in crime rates per 1,000 population of up to 1%), which is considered **not significant**.

2.5 Transport

a) Introduction

2.5.1 This section provides an addendum to the transport environmental assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [[APP-198](#)]; and
- **Transport Assessment** (Doc Ref. 8.5(A)) [[AS-017](#)].

2.5.2 The transport environmental assessment presented within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] provided a project-wide assessment. Therefore, where appropriate, in addition to considering the Additional Information and proposed changes for the main development site, relevant information for associated developments is also considered.

2.5.3 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) Relevant Additional Information

2.5.4 The following Additional Information is relevant to the assessment of transport reported within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198]:

- updates to VISUM traffic modelling based on further engagement with key transport stakeholders to re-assess the transport effects arising from the construction and operation of the Sizewell C main development site. The updated VISUM flows are referred to within this assessed as

the 'Refined DCO' flows. Further detail of the changes that have been made to the VISUM model are set out in the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad);

- assessment of additional scenarios to those assessed within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198]. The ES submission included an assessment of the Early Years, peak construction and operational phases of the Sizewell C Project. For the peak construction phase, a worst case of the Sizewell C busiest day was assessed with 1,000 two-way HGV movements. This updated assessment also considers the typical day at peak construction with 650 two-way HGV movements to provide an understanding of the potential 'typical' environmental transport effects rather than only the worst-case effects. The difference between these scenarios is only with regards to HGV volumes and, therefore, primarily effects the links on the A12 and Sizewell link road during peak construction.
- a sensitivity test has been undertaken based on 100% of HGVs from the A12 south (and 0% from the north) to understand, if an alternative HGV distribution would result in any changes to the effects summarised in the **Transport Assessment** (Doc Ref. 8.5(A)) [AS-017] or the ES assessments, including the updated assessment of transport effects set out in this section.
- refined pedestrian delay calculations utilising the equation for determining pedestrian delay, as published in the Transport Research Laboratory paper (TRL SR356, Goldschmidt, 1976) (Ref. 1). The assessment of transport reported in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] was based on the graph included within TRL SR356, which is referred to in the Guidelines for the Environmental Assessment of Road Traffic published by the Institute of Environmental Assessment in 1993 (now Institute of Environmental Management and Assessment (IEMA)) (Ref. 2). The refined pedestrian delay calculations set out in this section are based on the equation rather than the graph included in TRL SR356 (Ref. 1).

c) Relevant changes

2.5.5

The following proposed changes are relevant to the assessment of transport reported within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198]:

- Potential to increase the frequency of freight train movements to facilitate bulk material imports by rail (**Change 1**).

- An enhancement of the permanent BLF and construction of a new, temporary BLF (**Change 2**).
- Greater flexibility as to where certain Sizewell B facilities are relocated to potentially avoid the need for car parking on Pillbox Field (**Change 3**).
- Proposed realignment of Hawthorn Road, which requires a footpath diversion and an additional walking and cycling route on the north side of Sizewell Link Road at Moat Road (**Change 12**).
- A new bridleway link between Aldhurst Farm and Kenton Hills (**Change 15**).

d) Updated assessment – Additional Information

2.5.6 Some of the strategic VISUM highway assignment model inputs and assumptions have been refined following further engagement with stakeholders such as Suffolk County Council, East Suffolk Council and Highways England. The strategic VISUM model has therefore been re-run for all of the modelling scenarios included in the **Transport Assessment** (Doc Ref. 8.5 (A)) [AS-017] and the updated traffic flows used to inform the updated assessment.

2.5.7 This section presents an updated assessment of the transport effects arising from the construction and operation of the main development site and the construction, operation and removal and reinstatement of the associated development sites. This assessment has been informed by Refined DCO flows presented in the **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad) and the updated pedestrian delay calculations.

2.5.8 The sensitivity test of 100% HGV via the A12 south are included within **section 2.5d)vi**).

d) i) Updated assessment – updated traffic link screening

2.5.9 As per the ES, IEMA guidance (Ref. 2) has been used to determine which links are to be screened in/screened out of the updated assessment based on the Refined DCO traffic flows. Within the IEMA guidance (Ref. 2), two broad rules are suggested that can be used as a screening process to define the scale and extent of the assessment:

- Rule 1: include highway links where traffic flows would increase by more than 30% (or the number of HGVs would increase by more than 30%).
- Rule 2: include any other specifically sensitive areas where traffic flows would increase by 10% or more.

- 2.5.10 In line with the ES, this updated assessment has also included an additional rule in the screening process ('Rule 3'):
- Rule 3: include highways links which SCC has determined to be of particular sensitivity.
- 2.5.11 **Volume 3, Appendix 2.5.A** of this **ES Addendum** summarises the updated traffic link screening based on the Refined DCO traffic flows.
- 2.5.12 As a result of the updated screening process, there are an additional four links screened in and two links screened out for 2023 Early Years compared to the original screening process. The additional screened in/out links in the 2023 Early Years are:
- Screened in Link 6: B1119 Saxmundham Road, Leiston;
 - Screened in Link 38b: A12 Woodbridge n/o B1079;
 - Screened in Link 87: A12 south of Eagle Way/Anson Rd junction;
 - Screened in Link 88: A12 south of Foxhall Road;
 - Screened out Link 19a: A1117 in Lowestoft; and
 - Screened out Link 82: B1438 Melton Hill.
- 2.5.13 There are an additional six links screened in and three screened out for the 2028 peak construction (busiest day) assessment compared to the original screening process. The additional screened in/out links in the 2028 peak construction (busiest day) assessment are:
- Screened in Link 12a: B1121, Saxmundham;
 - Screened in Link 19b: A12, Lowestoft;
 - Screened in Link 32a: A12, Woodbridge;
 - Screened in Link 77: Aldeburgh Rd, north of Aldringham;
 - Screened in Link 87: A12 south of Eagle Way/Anson Rd junction;
 - Screened in Link 88: A12 south of Foxhall Road;
 - Screened out Link 4b: Lover's Lane;
 - Screened out Link 7: B1069, Coldfair Green;
 - Screened out Link 51: B1078, Gibraltar.

2.5.14 The peak construction (typical day) was not previously assessed as part of the ES submission. The screening process has resulted in the same links being screened in/out as for the updated peak construction (busiest day) assessment except for the following links, which have been screened out of the assessment as a result of the lower HGV flows on the typical day compared to the busiest day:

- Screened out Link 17a: A12 north of B1125, Blythburgh;
- Screened out Link 17c: A12 south of B1125, Blythburgh;
- Screened out Link 32c: A12 south of A1152, Woodbridge;
- Screened out Link 34c: A12 south of Main Road, Martlesham;
- Screened out Link 38b: A12 Woodbridge, north of B1079;
- Screened out Link 53b: A12 north of A144;
- Screened out Link 84: A12 south of B1126;
- Screened out Link 86: A12 south of B1387;
- Screened out Link 87: A12 south of Eagle Way/Anson Rd junction;
- Screened out Link 88: A12 south of Foxhall Road.

2.5.15 There are no additional links screened in or out of the 2034 operational phase assessment compared to the original screening process.

d) ii) Updated assessment - Early Years assessment

2.5.16 The complete updated Early Years environmental transport assessment based on the Refined DCO flows is included in **Volume 3, Appendix 2.5.B** of this **ES Addendum** and summarised in the following section.

d) ii) a) Severance

2.5.17 The assessment of severance is based on percentage change in total daily traffic (24hr AAWT) and percentage change in total traffic in the hour of greatest change in traffic, referred to as the 'representative hour'. The representative hour for the assessment is 07:00-08:00.

2.5.18 **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] concluded that, based on the 24 hour AAWT flows, no road links would experience a moderate or major adverse effect on severance in the early years and the effect is considered to be **not significant**. The updated assessment

based on the Refined DCO flows shows that there are no changes in significance of the effects on severance in the Early Years based on the 24 hour AAWT flows.

2.5.19 There are an additional four links that have been screened into the Early Years assessment based on the Refined DCO flows, all of which would experience either a negligible (Links 38b, 87 and 88) or minor adverse (Links 6) effect on severance in the Early Years based on 24hr AAWT, which is **not significant**.

2.5.20 With regards to the assessment of the representative hour, **Table 2.10** below provides a comparison of the significant effects on severance reported in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] and the updated assessment based on the Refined DCO flows.

Table 2.10: Severance 2023 Early Years Representative Hour (07:00-08:00) Total Traffic

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
11	B1125 through Westleton	Moderate adverse	Major adverse	Change (remains not significant due to absolute volume of traffic)
13d	A1120	Moderate adverse	Moderate adverse	No change
17b	B1125	Major adverse	Major adverse	No change
90	A1120 Sibton	Moderate adverse	Moderate adverse	No change
6	B1119 Saxmundham Road	Screened out	Moderate adverse	Not significant (due to low absolute volume of traffic)
38b	A12 Woodbridge n/o B1079	Screened out	Negligible	Not significant
87	A12 south of Eagle Way	Screened out	Negligible	Not significant
88	A12 south of Foxhall Road	Screened out	Negligible	Not significant

- 2.5.21 The updated assessment for the representative hour shows that there are no changes in significance of the effects on severance in the Early Years for links 11, 13d, 17b when compared with the assessment within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198]. Link 11 (B1125) has increased in effect from moderate to major adverse but the absolute change in traffic between the ES assessment and the updated assessment is only 3 vehicles per hour. The same professional judgement is applied as in the ES assessment and it is therefore considered that the effect of the Early Years traffic on severance during the representative hour for links 11, 13d, 17b and 90 would be **not significant**.
- 2.5.22 There are an additional four links that have been screened into the Early Years assessment based on the Refined DCO flows and the updated assessment for the representative hour shows that 3 links (i.e. links 38b, 87 and 88) would experience a negligible effect on severance, which is **not significant**. Link 6 would experience a moderate adverse effect on severance in the Early Years in the representative hour of 07:00-08:00.
- 2.5.23 Link 6, B1119 Saxmundham Road in Leiston, has been classified as high sensitivity due to the presence of Leiston Children's Centre and Shining Stars Nursery. Based on the Refined DCO flows there is estimated to be a 31% increase in traffic flows, which is just over the 30% 'low' magnitude threshold. However, the absolute volume of traffic is very low, even with Sizewell C traffic, and only increases from 263 to 344 two-way vehicles per hour in the representative hour. Children would be unlikely to be arriving at the nursery or children's centre during the representative hour of 07:00-08:00 and, coupled with the very low absolute levels of traffic, it is considered that the effect on severance on link 6 would be **not significant**.
- d) ii) b) Pedestrian delay
- 2.5.24 As for the ES assessment, the research report TRL SR356 (Ref. 1) has been used to provide an approximation for determining pedestrian delay and a two-way flow of 1,400 vehicles per hour has been adopted as a lower threshold for assessment (equating to a mean 10 second delay for a link with no pedestrian facilities in the TRL report).
- 2.5.25 **Table 2.11** and **Table 2.12** below provide a comparison of the effects on pedestrian delay for links exceeding the 1,400 vehicles per hour assessment threshold reported in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] and the updated assessment based on the Refined DCO flows for both the 24 hour AAWT and representative hour total traffic flows.

Table 2.11: Pedestrian Delay 2023 Early Years 24hr AAWT Total Traffic

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
32c	A12 (S)	Negligible	Negligible	No change
33	A12 south of Woodbridge	Negligible	Negligible	No change
34a	A12 (N)	Negligible	Negligible	No change
34c	A12 (S)	Negligible	Negligible	No change
6	B1119 Saxmundham Road	Screened out	Screened out	Not significant
38b	A12 Woodbridge n/o B1079	Screened out	Negligible	Not significant
87	A12 south of Eagle Way	Screened out	Negligible	Not significant
88	A12 south of Foxhall Road	Screened out	Negligible	Not significant

Table 2.12: Pedestrian Delay 2023 Early Years Representative Hour (07:00-08:00) Total Traffic

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
22c	A12 (S) (Farnham)	Minor adverse	Minor adverse	No change
23	A12 Farnham Bend	Minor adverse	Minor adverse	No change
24	A12 Stratford St Andrew	Minor adverse	Minor adverse	No change
25	A12 Little Glemham	Minor adverse	Minor adverse	No change
26	A12 Marlesford	Minor adverse	Minor adverse	No change
27	A12, south of Wickham	Screened out	Minor adverse	Not significant
32a	A12 (N)	Negligible	Negligible	No change
32c	A12 (S)	Minor adverse	Minor adverse	No change
33	A12 south of Woodbridge	Negligible	Negligible	No change
34a	A12 (N)	Negligible	Negligible	No change
34c	A12 (S)	Minor adverse	Minor adverse	No change
6	B1119 Saxmundham Road	Screened out	Minor adverse	Not significant
38b	A12 Woodbridge n/o B1079	Screened out	Negligible	Not significant

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
87	A12 south of Eagle Way	Screened out	Negligible	Not significant
88	A12 south of Foxhall Road	Screened out	Negligible	Not significant

2.5.26 The ES assessment concluded that, based on the 24hr AAWT and representative hour flows, there would be a negligible or minor adverse effect on pedestrian delay for pedestrians to cross roads within the study area in the Early Years, which would be **not significant**. The updated assessment does not change the significance of effect on pedestrian delay in the Early Years. There is an additional link that exceeds the 1,400 threshold (link 27, A12 south of Wickham Market) for the representative hour. The updated assessment concludes that there would be a minor adverse effect on pedestrian delay on link 27, which would be **not significant**.

2.5.27 There are an additional four links that have been screened into the Early Years assessment based on the Refined DCO flows and the updated assessment. The updated assessment shows that the Early Years increase in traffic would have a negligible (links 38b, 87 and 88) or minor adverse (link 6) effect on pedestrian delay, which would be **not significant**.

2.5.28 In addition to assessing the effect of the additional Early Years traffic on pedestrians crossing roads within the study area, the ES assessment also assessed the effect of changes to the Public Rights of Way (PRoW) as a result of PRoW diversions. The ES assessment in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] concluded that there would be a negligible or short term minor adverse effect on pedestrian delay as a result of PRoW diversions during the construction of the two village bypass and Sizewell link road and PRoW diversions in the vicinity of the main development site during the Early Years, which would be **not significant**. There are no changes to the effects on pedestrian delay during the Early Years as a result of the updated assessment.

d) ii) c) **Amenity**

2.5.29 As with the ES assessment, the threshold against which to assess the effect upon amenity has been taken to be when traffic flow or Heavy Duty

Vehicle (HDV)¹ composition is halved or doubled. Below these levels the magnitude of impact is taken to be low.

- 2.5.30 The ES assessment concluded that none of the links would experience a significant effect on amenity during the Early Years, based on the increase in 24hr AAWT total traffic or the total traffic volumes in the representative hour (07:00-08:00). There are no changes to the effects on amenity based on the increase in total traffic (either 24hr AAWT or representative hour) in the Early Years as a result of the updated assessment. Of the four additional links that have been screened into the Early Years assessment, all have either a negligible (link 6) or minor adverse (links 38b, 87 and 88) effect on amenity, based on the total increase in traffic, which is **not significant**.
- 2.5.31 With regards to the assessment of amenity based on the increase in 24 hour HDVs and increase in HDVs in the representative hour, **Table 2.13** and **Table 2.14** below provide a comparison of the significant effects on amenity in the Early Years reported in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] and the updated assessment based on the Refined DCO flows.

Table 2.13: Amenity 2023 Early Years 24hr AAWT HDVs

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
1	Sizewell Gap	Moderate adverse	Moderate adverse	No change
4c	B1122 (N)	Major adverse	Major adverse	No change
10	B1122 through Theberton	Major adverse	Major adverse	No change
13b	B1122	Moderate adverse	Moderate adverse	No change
64	B1122 north of SZC access	Major adverse	Major adverse	No change
66	B1122 west of B1125	Major adverse	Major adverse	No change
74	B1122 (Middleton Moor)	Major adverse	Major adverse	No change
6	B1119 Saxmundham Road	Screened out	Minor adverse	Not significant
38b	A12 Woodbridge n/o B1079	Screened out	Negligible	Not significant
87	A12 south of Eagle Way	Screened out	Negligible	Not significant
88	A12 south of Foxhall Road	Screened out	Negligible	Not significant

¹ The term heavy duty vehicle (HDV) is used in this assessment as an extension of heavy good vehicles (HGVs) to include consideration of other heavy vehicles, for example buses and/or coaches.

Table 2.14: Amenity 2023 Early Years Representative Hour (07:00-08:00) HDVs

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
1	Sizewell Gap	Moderate adverse	Moderate adverse	No change
4c	B1122 (N)	Major adverse	Major adverse	No change
10	B1122 through Theberton	Major adverse	Major adverse	No change
13b	B1122	Moderate adverse	Moderate adverse	No change
64	B1122 north of SZC access	Major adverse	Major adverse	No change
66	B1122 west of B1125	Major adverse	Major adverse	No change
74	B1122 (Middleton Moor)	Major adverse	Major adverse	No change
6	B1119 Saxmundham Road	Screened out	Negligible	Not significant
38b	A12 Woodbridge n/o B1079	Screened out	Negligible	Not significant
87	A12 south of Eagle Way	Screened out	Negligible	Not significant
88	A12 south of Foxhall Road	Screened out	Negligible	Not significant

2.5.32

2.5.33 It can be seen from **Table 2.13** and **Table 2.14** that there are no changes to the effects on amenity in the Early Years for the 24 hour AAWT HDV and representative hour HDV scenarios as a result of the updated assessment.

2.5.34 The additional four links that have been screened into the Early Years assessment all have either a negligible (links 38b, 87 and 88) or minor adverse (link 6) effect on amenity, based on the increase in HDVs (24hr and representative hour) in the Early Years, which is **not significant**.

d) ii) d) Fear and Intimidation

2.5.35 The same thresholds have been used as in the ES assessment to provide an approximation of the likelihood of fear and intimidation. The thresholds define the degree of hazard to vulnerable road users by average traffic flow per hour over an 18 hour day and HDV flow over an 18 hour day.

2.5.36 The ES assessment concluded that no links would experience an increased significance of effect in fear and intimidation as a result of the change in total vehicle flows during the Early Years. There are no changes to the effects on fear and intimidation based on the increase in total traffic in the Early Years as a result of the updated assessment, which is **not significant**.

- 2.5.37 Of the four additional links that have been screened into the Early Years assessment, none would experience an increase in significance of effect in fear and intimidation as a result of the change in total vehicle flows during the Early Years based on the updated assessment.
- 2.5.38 With regards to the assessment of fear and intimidation based on the increase in HDVs, **Table 2.15** below provides a comparison of the significant effects on fear and intimidation reported in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] and the updated assessment based on the Refined DCO flows. The table provides a summary of the links which experience an increased magnitude of impact in fear and intimidation as a result of the increase in HDVs.

Table 2.15: Fear and Intimidation 2023 Early Years 18hr HDVs

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
13c	A12 (middle)	Negligible to Minor adverse	Negligible to Minor adverse	No change
27	A12 south of Wickham Market	Minor to Moderate adverse	Minor to Moderate adverse	No change
32a	A12 (N)	Negligible to Minor adverse	Negligible to Minor adverse	No change
32c	A12 (S)	Moderate to Major adverse	Moderate to Major adverse	No change
34a	A12 (N)	Negligible to Minor adverse	Negligible to Minor adverse	No change
34c	A12 (S)	Moderate to Major adverse	Moderate to Major adverse	No change
6	B1119 Saxmundham Road	Screened out	Minor adverse	Not significant
38b	A12 Woodbridge n/o B1079	Screened out	Minor adverse	Not significant
87	A12 south of Eagle Way	Screened out	Minor adverse	Not significant
88	A12 south of Foxhall Road	Screened out	Minor adverse	Not significant

- 2.5.39 The ES assessment concluded that there would be 6 links that would experience an increase in effect on fear and intimidation resulting from the increase in HDVs in the Early Years. There are no changes to the effects on fear and intimidation based on the increase in HDVs in the Early Years as a result of the updated assessment.

- 2.5.40 The four additional screened in links would experience a minor adverse effect in terms of fear and intimidation, as a result of the increase in HDVs on the links in the Early Years, which is **not significant**.

d) ii) e) Driver and passenger delay

- 2.5.41 The assessment of driver delay was considered within the **Transport Assessment** (Doc Ref. 8.5 (A)) [AS-017] and summarised within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

- 2.5.42 The ES assessment concluded that, based on the traffic modelling within the Transport Assessment, there is expected to be a minor adverse effect on driver delay and bus passenger delay during the Early Years, which would be **not significant**.

- 2.5.43 The changes in journey time in the Early Years of construction based on the Refined VISUM strategic model are not materially different to those summarised in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198]. The effects on driver and bus passenger delay are therefore unchanged from the previous assessment and would be **not significant**.

- 2.5.44 Since the Application submission, a VISSIM micro-simulation model has been developed of the A12 corridor between Seven hills (A12/A14 junction) and Woodbridge. The effects on journey time along the A12 corridor have been assessed by comparing the Early Years journey times to the equivalent Reference Case travel times. This demonstrates that average journey times are not predicted to increase during the Early Years by more than 18 seconds when travelling northbound on the A12 between the A14 and the A1152 and by no more than 12 seconds when travelling southbound. Over a 14km route, this would be imperceptible to drivers and the effect on this part of the A12 would be negligible, which is **not significant**.

- 2.5.45 With regards to impacts on rail passengers, the ES assessment concluded that the Early Years rail operation associated with the movement of construction material would not have any effect on rail passenger journey times, which would be **not significant**. There will be no change to the effect on rail passenger delay during the Early Years based on the updated assessment.

d) ii) f) Accident and road safety

- 2.5.46 The ES assessment concluded that there would be a negligible - minor adverse effect on road safety during the Early Years, which would be **not significant**.

- 2.5.47 An updated assessment of collisions and road safety is provided in the **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad) based on the Refined DCO flows. This includes a link-based analysis, which estimates that there would be an additional 14 collisions per annum across the entire study area based on the Early Years traffic flows, with less increase in collisions during the start of the Early Years when traffic levels are lower. Applying the historic severity split of collisions to the 14 additional collisions per year across the network at the peak of the peak construction would result in 12 slight collisions and 2 serious collisions.
- 2.5.48 This analysis does not take account of the embedded mitigation, which includes HGV driver rules, induction for HGV drivers at the freight management facility, monitoring of HGVs along the HGV routes and the worker code of conduct which includes driver rules for workers. The embedded mitigation will act to reduce the number of collisions from the assessment within the **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad).
- 2.5.49 There are no new or different significant effects to collisions and road safety as a result of the updated modelling data for the Early Years and the effect would be negligible – minor adverse, which is **not significant**.
- d) iii) Updated assessment - peak construction assessment (busiest day)
- 2.5.50 The complete updated peak construction (busiest day) assessment based on the Refined DCO flows is included in **Volume 3, Appendix 2.5.B** of the **ES Addendum** and summarised in the following section.
- d) iii) a) Severance
- 2.5.51 The ES assessment of the peak construction (busiest day) for the 24hr AAWT and representative hour concluded that there would be a number of links within the study area that would have a significant adverse or beneficial effect on severance.
- 2.5.52 **Table 2.16** and **Table 2.17** below provide a comparison of the significant effects on severance during the peak construction (busiest day) reported in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] and the updated assessment based on the Refined DCO flows.

Table 2.16: Severance 2028 peak construction (busiest day) 24 hour AAWT Total Traffic

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
4a	B1122 (S)	Moderate adverse	Moderate adverse	No change
4c	B1122 (N)	Minor adverse	Moderate adverse	Change Not significant due to primary mitigation
5	B1122 Abbey Road	Moderate adverse	Moderate adverse	No change
10	B1122, Theberton	Major beneficial	Major beneficial	No change
10a	Theberton part of SLR	Major adverse	Major adverse	No change
22c	A12 (S) (Farnham)	Major beneficial	Major beneficial	No change
23	A12 Farnham bend	Major beneficial	Major beneficial	No change
23a	Two village bypass	Major adverse	Major adverse	No change
24	A12 Stratford St Andrew	Major beneficial	Major beneficial	No change
34b	Main Road (E)	Major adverse	Minor adverse	Change Not significant during busiest day
57	SLR (east A12)	Major adverse	Major adverse	No change
63	SLR (west B1125)	Major adverse	Major adverse	No change
65	SLR Middleton Moor link	Major adverse	Major adverse	No change
66	B1122 west of B1125	Major beneficial	Major beneficial	No change
74	B1122 (Middleton Moor)	Major beneficial	Major beneficial	No change
12a	B1121, Saxmundham	Screened out	Minor adverse	Not significant
19b	A12, Lowestoft	Screened out	Minor adverse	Not significant
32a	A12, Woodbridge	Screened out	Negligible	Not significant
77	Aldeburgh Rd, Leiston	Screened out	Minor adverse	Not significant
87	A12 south of Eagle Way	Screened out	Negligible	Not significant
88	A12 south of Foxhall Rd	Screened out	Negligible	Not significant

Table 2.17: Severance 2028 peak construction (busiest day) representative hour (07:00-08:00) total traffic

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
4a	B1122 (S)	Major adverse	Major adverse	No change
4c	B1122 (N)	Moderate adverse	Moderate adverse	No change
5	B1122 Abbey Road	Major adverse	Major adverse	No change
10	B1122, Theberton	Moderate beneficial	Moderate beneficial	No change
10a	Theberton part of SLR	Major adverse	Major adverse	No change
22c	A12 (S) (Farnham)	Major beneficial	Major beneficial	No change
23	A12 Farnham bend	Major beneficial	Major beneficial	No change
23a	Two village bypass	Major adverse	Major adverse	No change
24	A12 Stratford St Andrew	Major beneficial	Major beneficial	No change
34b	Main Road (E)	Major adverse	Minor adverse	Change Not significant during busiest day
57	SLR (east A12)	Major adverse	Major adverse	No change
63	SLR (west B1125)	Major adverse	Major adverse	No change
65	SLR Middleton Moor link	Major adverse	Major adverse	No change
66	B1122 west of B1125	Major beneficial	Major beneficial	No change
74	B1122 (Middleton Moor)	Major beneficial	Major beneficial	No change
12a	B1121, Saxmundham	Screened out	Negligible	Not significant
19b	A12, Lowestoft	Screened out	Minor adverse	Not significant
32a	A12, Woodbridge	Screened out	Negligible	Not significant
77	Aldeburgh Rd, Leiston	Screened out	Minor adverse	Not significant
87	A12 south of Eagle Way	Screened out	Negligible	Not significant
88	A12 south of Foxhall Rd	Screened out	Negligible	Not significant

2.5.53 The updated assessment shows that, based on 24hr AAWT and representative hour flows, there are two changes in the effects categories on severance during peak construction when compared with the assessment within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198]. Link 4c (B1122 (N)) was previously assessed to have minor adverse effect, based on the 24hr AAWT flows, and is now assessed to be moderate adverse. However, as part of the primary mitigation a shared

footway/cycleway will be provided along this link with a Pegasus crossing. As such, it is considered that the effect on severance on link 4c would remain **not significant**. Link 34b (Main Road, Martlesham) was previously assessed to have a major adverse effect on severance, which would be **significant**. However, based on the updated assessment, link 34b would have a minor adverse effect on severance, which would be **not significant**. Since the Application was submitted the VISUM model has been refined in this area to better represent the routing of traffic. The updated assessment is therefore considered to provide a more likely assessment of effects on this link. The same professional judgement is applied to the links in **Table 2.16** and **Table 2.17** as for the ES assessment. The adverse effect on severance on links 4a, 23a, 63 considered to remain **significant** but the adverse effect on severance on links 4c, 5, 10a, 57, 65 during peak construction (busiest day) considered to remain **not significant** once professional judgement is applied.

- 2.5.54 There are an additional six links that have been screened into the peak construction (busiest day) assessment based on the Refined DCO flows, all of which would experience either a negligible (links 32a, 87 and 88) or minor adverse effect (links 12a, 19b, 77) on severance in peak construction based on the 24 hour AAWT flows, which is **not significant**.
- 2.5.55 The updated assessment for the representative hour summarised in **Table 2.17** shows that all of six screened in links except one would experience a negligible (links 12a, 32b, 87 and 88) or minor adverse effect (links 19b and 77) on severance, which would be **not significant**.

d) iii) b) Pedestrian delay

- 2.5.56 The ES assessment concluded that, for those links that exceed the 1,400 threshold in the 24 hr AAWT (average hourly flows) peak construction (busiest day) scenario, there were no links that would have a moderate or major effect on pedestrian delay and the effect would be **not significant**. The updated assessment, based on 24 hr AAWT (average hourly flows), does not change the significance of effect on pedestrian delay in the peak construction (busiest day).
- 2.5.57 There are an additional six links that have been screened into the peak construction (busiest day) assessment based on the Refined DCO flows. The updated assessment for the 24 hr AAWT (average hourly flows) shows that all of the additional screened in links would experience either a negligible (links 32a, 87 and 88) or minor adverse effect (links 12a, 19b and 77) on pedestrian delay in the peak construction (busiest day), which would be **not significant**.
- 2.5.58 **Table 2.18** below provides a comparison of the effects on pedestrian delay for links exceeding the 1,400 vehicles per hour assessment

threshold reported in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] and the updated assessment based on the Refined DCO flows for the representative hour total traffic flows.

Table 2.18: Pedestrian Delay 2028 peak construction (busiest day) representative hour (07:00-08:00) total traffic

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
22c	A12 (S) (Farnham)	Moderate beneficial	Moderate beneficial	No change
23	A12 Farnham bend	Moderate beneficial	Moderate beneficial	No change
23a	A12 two village bypass	Moderate adverse	Moderate adverse	No change
24	A12 Stratford St Andrew	Moderate beneficial	Moderate beneficial	No change
12a	B1121, Saxmundham	Screened out	Screened out	Not significant
19b	A12, Lowestoft	Screened out	Screened out	Not significant
32a	A12, Woodbridge	Screened out	Negligible	Not significant
77	Aldeburgh Rd, Leiston	Screened out	Screened out	Not significant
87	A12 south of Eagle Way	Screened out	Negligible	Not significant
88	A12 south of Foxhall Rd	Screened out	Negligible	Not significant

2.5.59 With regards to the assessment of pedestrian delay in the representative hour, the ES assessment concluded that there would be some significant beneficial and significant adverse effects. The ES assessment concluded that links 22c, 23 and 24 (A12 through Farnham and Stratford St Andrew) would experience a moderate beneficial effect on pedestrian delay at peak construction (busiest day) and that the two village bypass would experience a moderate adverse effect on pedestrian delay, which would be **significant**. The updated assessment does not change the significance of effect on pedestrian delay during the peak construction.

2.5.60 With regards to the additional six links that have been screened into the peak construction (busiest day) assessment, the updated assessment for the representative hour shows that all of the links would experience a negligible effect on pedestrian delay at peak construction, which would be **not significant**.

2.5.61 In addition to assessing the effect of the additional peak construction traffic (busiest day) on pedestrians crossing roads, the ES also assessed the effect of changes to the PRow as a result of PRow diversions. The ES assessment in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] concluded that there would be a minor adverse effect on pedestrian

delay as a result of PRow diversions during the operation of the two village bypass and Sizewell link road and PRow diversions in the vicinity of the main development site during construction, which would be **not significant**. There are no changes to the effects on pedestrian delay as a result of PRow diversions based on the updated assessment.

d) iii) c) **Amenity**

2.5.62 The ES assessment concluded that a number of the links would experience a **significant** effect on amenity, based on the increase in total traffic and/or HDVs either based on the 24hr AAWT flows and/or the representative hour flows.

2.5.63 **Table 2.19** below provides a comparison of the significant effects on amenity in the peak construction (busiest day) reported in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] and the updated assessment based on the Refined DCO flows.

Table 2.19: Amenity 2028 peak construction (busiest day)

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
4a	B1122 (S)	Minor - Major adverse	Minor - Major adverse	No change
4c	B1122 (N)	Negligible – Major adverse	Negligible – Major adverse	No change
5	B1122 Abbey Road	Minor - Moderate adverse	Minor - Moderate adverse	No change
7	B1069 Coldfair Green	Minor - Moderate adverse	Screened out	Change Screened out from assessment
10	B1122, Theberton	Minor - Major beneficial	Minor - Major beneficial	No change
10a	Theberton part of SLR	Major adverse	Major adverse	No change
13b	B1122	Negligible-Moderate adverse	Negligible-Moderate adverse	No change
21b	A12 (north of B1119)	Minor - Major adverse	Minor - Major adverse	No change
21c	A12 (middle)	Minor - Moderate adverse	Minor - Moderate adverse	No change
21e	A12 (south of B1119)	Minor - Moderate adverse	Minor - Moderate adverse	No change
22c	A12 (S) (Farnham)	Moderate - Major beneficial	Moderate - Major beneficial	No change

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
23	A12 Farnham bend	Moderate - Major beneficial	Moderate - Major beneficial	No change
23a	Two village bypass	Major adverse	Major adverse	No change
24	A12 Stratford St Andrew	Moderate - Major beneficial	Moderate - Major beneficial	No change
34b	Main Road (E)	Negligible - Major adverse	Negligible – Minor adverse	Change Not significant during busiest day
57	SLR (east of A12)	Major adverse	Major adverse	No change
63	SLR (west of B1125)	Major adverse	Major adverse	No change
64	B1122 north of SZC	Minor - Major adverse	Minor - Major adverse	No change
65	Middleton Moor Link	Major adverse	Major adverse	No change
66	B1122 west of B1125	Minor - Major beneficial	Minor - Major beneficial	No change
74	B1122 (Middleton Moor)	Minor - Major beneficial	Minor - Major beneficial	No change
76	B1069	Minor - Moderate adverse	Minor adverse	Change Not significant during busiest day
78	A12 (north of B1121)	Minor - Moderate adverse	Minor - Moderate adverse	No change
12a	B1121, Saxmundham	Screened out	Minor adverse	Not significant
19b	A12, Lowestoft	Screened out	Minor adverse	Not significant
32a	A12, Woodbridge	Screened out	Negligible	Not significant
77	Aldeburgh Rd, Leiston	Screened out	Minor – Major adverse	Significant
87	A12 south of Eagle Way	Screened out	Negligible	Not significant
88	A12 south of Foxhall Rd	Screened out	Negligible	Not significant

2.5.64 The updated assessment summarised in **Table 2.19** above has concluded that, there are only three changes to the significance of the effect on amenity for the peak construction (busiest day):

- Link 7 (B1069 Coldfair Green) was previously screened into the ES assessment but has been screened out of the updated assessment based on the Refined DCO flows and refinement of the Leiston direct bus routing as detailed in the **Transport Assessment Addendum** (Doc Ref 8.5(A)Ad).
- Link 34b (Main Road, Martlesham) has changed from **significant** to **not significant** effect on amenity during the peak construction as a result of the refinements to the strategic modelling. Further information on the refinements to the calibration of the VISUM model in the Martlesham and Woodbridge area is summarised in the **Transport Assessment Addendum** (Doc Ref 8.5(A)Ad).
- Link 76 (B1069, Leiston) as changed from **significant** to **not significant** as a result of the refinement to the Leiston direct bus.

2.5.65 With regards to the additional six links that have been screened into the peak construction (busiest day) assessment, five of the links would experience either a negligible (links 32a, 87 and 88) or minor adverse effect (links 12a and 19b) on amenity, which would be **not significant**. Link 77 (Aldeburgh Road) would experience a minor adverse effect on amenity based on the 24 hour AAWT total flows as well as the representative hour total vehicle flows and HDV flows. However, link 77 would experience a major adverse effect on amenity based on the increase in 24 hour HDVs in the Refined DCO flows. This is as a result of the refinement of the Leiston direct bus within the refined modelling to route in a loop via Aldeburgh Road, Aldringham Lane and B1069 and not route via Knodishall. The actual routing of all direct buses will be agreed via the Transport Review Group but assumptions have been made for assessment purposes within the modelling. Link 77 has a medium sensitivity due to the presence of a footpath and bridleway. The PRoW intercept the link rather than run alongside the link and therefore the amenity of the users of the PRoW would only have the amenity affected at the point the PRoW crosses the road. The absolute increase in HDVs over a 24 hour period is modelled to be 93 two-way HDVs on Link 77. It is not considered that this absolute increase in HDVs spread over a day would have a significant effect of the amenity of users of the PRoW network intercepting the link and that the effect on amenity would be **not significant**.

d) iii) d) Fear and intimidation

2.5.66 **Table 2.20** and **Table 2.21** below provide a comparison of the effects on fear and intimidation reported in Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198] and the updated assessment based on the Refined DCO flows as a result of the increase in total traffic and HDVs during peak construction (busiest day). The tables provide a summary of the links which experience an increased magnitude of impact in fear and intimidation as a result of the increase in total traffic and HDVs, respectively.

Table 2.20: Fear and Intimidation 2028 peak construction (busiest day) 18hr AAWT

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
23	A12 Farnham bend	Minor adverse to Minor beneficial	Minor adverse to Minor beneficial	No change
23a	Two village bypass	Negligible to Minor adverse	Negligible to Minor adverse	No change
24	A12 Stratford St Andrew	Minor adverse to Minor beneficial	Minor adverse to Minor beneficial	No change
57	SLR (east of A12)	Negligible to Minor adverse	Negligible to Minor adverse	No change
63	SLR west of B1125	Negligible to Minor adverse	Negligible to Minor adverse	No change
65	Middleton Moor Link	Negligible to Minor adverse	Negligible to Minor adverse	No change
66	B1122 west of B1125	Minor adverse to Minor beneficial	Minor adverse to Minor beneficial	No change
74	B1122 (Middleton Moor)	Minor adverse to Minor beneficial	Minor adverse to Minor beneficial	No change
12a	B1121, Saxmundham	Screened out	Minor adverse	Not significant
19b	A12, Lowestoft	Screened out	Moderate adverse	Not significant
32a	A12, Woodbridge	Screened out	Minor adverse	Not significant
77	Aldeburgh Rd, Leiston	Screened out	Minor adverse	Not significant
87	A12 south of Eagle Way	Screened out	Minor adverse	Not significant
88	A12 south of Foxhall Rd	Screened out	Minor adverse	Not significant

Table 2.21: Fear and Intimidation 2028 peak construction (busiest day) 18hr HDVs

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
10	B1122, Theberton	Minor adverse – Minor beneficial	Minor adverse –Minor beneficial	No change
10a	SLR, Theberton	Negligible – Minor adverse	Negligible –Minor adverse	No change
13a	A12 (N)	Negligible – Minor adverse	Negligible –Minor adverse	No change
21b	A12 (north of B1119)	Negligible – Minor adverse	Negligible –Minor adverse	No change
22c	A12 Farnham	Minor adverse – Minor beneficial	Minor adverse – Minor beneficial	No change
23	A12 Farnham bend	Negligible – Minor beneficial	Negligible –Minor beneficial	No change
23a	Two village bypass	Negligible – Minor adverse	Negligible –Minor adverse	No change
24	A12 Stratford St Andrew	Minor adverse – Minor beneficial	Minor adverse –Minor beneficial	No change
26	A12 Marlesford	Minor adverse	Minor adverse – Moderate adverse	Change Significant effect in busiest day
27	A12 south of Wickham	Minor adverse – Moderate adverse	Minor adverse – Moderate adverse	No change
32c	A12 (S)	Moderate adverse – Major adverse	Moderate adverse – Major adverse	No change
34a	A12 (N)	Negligible – Minor adverse	Negligible – Minor adverse	No change
34c	A12 (S)	Moderate adverse – Major adverse	Moderate adverse – Major adverse	No change
57	SLR (east of A12)	Negligible – Minor adverse	Negligible –Minor adverse	No change
63	SLR (west of B1125)	Negligible – Minor adverse	Negligible –Minor adverse	No change
65	Middleton Moor Link	Negligible – Minor adverse	Negligible –Minor adverse	No change
66	B1122 west of B1125	Minor adverse – Minor beneficial	Minor adverse –Minor beneficial	No change

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
74	B1122 (Middleton Moor)	Minor adverse – Minor beneficial	Minor adverse –Minor beneficial	No change
12a	B1121, Saxmundham	Screened out	Minor adverse	Not significant
19b	A12, Lowestoft	Screened out	Minor adverse	Not significant
32a	A12, Woodbridge	Screened out	Negligible - Minor adverse	Not significant
77	Aldeburgh Rd, Leiston	Screened out	Minor adverse	Not significant
87	A12 south of Eagle Way	Screened out	Minor adverse	Not significant
88	A12 south of Foxhall Rd	Screened out	Minor adverse	Not significant

2.5.67 There is one change to the effects on fear and intimidation based on the increase in total traffic or HDVs during the peak construction (busiest day) as a result of the updated assessment. Link 26 (A12 Marlesford) would have an increased effect on fear and intimidation to moderate adverse during the busiest day of peak construction, which is **significant**. Link 26 was just under the moderate adverse threshold in the ES assessment and is just over the threshold in the updated assessment as a result of the refined direct bus strategy. The refinement to the direct bus strategy reduces the number of cars travelling on the A12 to the southern park and ride but slightly increase the number of buses on the A12. On the typical day there would be a minor adverse effect on fear and intimidation, which is **not significant**, as summarised later in **section d)iv)d)**.

2.5.68 The six additional screened in links would experience a negligible or minor adverse effect in fear and intimidation as a result of the increase in HDVs on the links during the peak construction (busiest day), which is **not significant**.

d) iii) e) **Driver and passenger delay**

2.5.69 The assessment of driver delay was considered within the **Transport Assessment** (Doc Ref. 8.5 (A)) [AS-017] and summarised within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

- 2.5.70 The ES assessment concluded that, based on the traffic modelling within the **Transport Assessment** (Doc Ref. 8.5 (A)) [AS-017], there is expected to be a **minor adverse** effect on driver delay and bus passenger delay during the peak construction (busiest day), which would be **not significant**.
- 2.5.71 The changes in journey time in the peak construction (busiest day) based on the Refined VISUM strategic model are not materially different to those summarised in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198]. The effects on driver and bus passenger delay are therefore unchanged from the previous assessment and would be **not significant**.
- 2.5.72 Since the Application submission, a VISSIM micro-simulation model has been developed of the A12 corridor between Seven hills (A12/A14 junction) and Woodbridge (just north of A1152). This demonstrates that the journey time on the A12 northbound is predicted to increase by up to 62 seconds between 08:00-09:00 and for all other hours the increase would be less than 36 seconds. In the southbound direction, the model predicts a journey time increase of 0-28 seconds. Over a 14km route, the effect on journey time on this part of the A12 would be minor adverse, which is **not significant**.
- 2.5.73 With regards to impacts on rail passengers, the ES assessment concluded that the peak construction rail operation associated with the movement of construction material would not have any effect on rail passenger journey times, which would be **not significant**. There will be no changes to the effect on rail passenger delay during the peak construction (busiest day) based on the updated assessment.
- d) iii) f) **Accident and road safety**
- 2.5.74 The ES assessment concluded that there would be a negligible - minor adverse effect on road safety during the peak construction within areas of the study area that do not have significant highway improvements proposed, which would be **not significant**. Minor beneficial (**not significant**) effects on road safety were predicted where improvements to the highway network were being made, such as the two village bypass and Sizewell link road.
- 2.5.75 An updated assessment of collisions and road safety is provided in the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) based on the Refined DCO flows. This includes a link-based analysis, which estimates that the additional Sizewell C traffic is forecast to add 18 collisions to the local highway network based on the peak construction flows and there would be less collisions per year during the other years within the peak construction phase when traffic flows are lower. Applying the historic severity split of collisions to the 18 additional collisions across the network

would result in 15 slight collisions, 2-3 serious collisions and 0.25 fatal collisions during the peak construction and lower during the other years within the peak construction phase. The increase in collisions is an aggregated value across the whole network within the study area with the increase on any individual link being considerably lower.

2.5.76 As set out for the Early Years, this analysis does not take account of the embedded mitigation, which will act to reduce the number of collisions.

2.5.77 There are no new or different significant effects to collisions and road safety as a result of the updated modelling data for the peak construction to those set out in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

d) iv) Updated assessment - peak construction assessment (typical day)

2.5.78 The ES assessment within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] assessed a worst case of the busiest day at peak construction. This updated assessment has also assessed the effects of peak construction during a typical day. The difference between the typical and busiest day is the volume of Sizewell C HGVs. All other Sizewell C traffic volumes remain constant between the peak construction typical and busiest day scenarios and therefore any change in effect will be on the HGV routes via the A12 and Sizewell link road during peak construction.

d) iv) a) Severance

2.5.79 The updated assessment of peak construction (busiest day) for the 24hr AAWT and representative hour concluded that there would be a number of links within the study area that would have a significant adverse or beneficial effect on severance. The updated assessment of peak construction (typical day) has the same effects as for the updated assessment for the peak construction (busiest day).

2.5.80 There are an additional four links that have been screened into the peak construction (typical day) assessment based on the Refined DCO flows, all of which would experience either a negligible (link 32a) or minor adverse effect (links 12a, 19b, 77) on severance in peak construction (typical day) which is **not significant**.

d) iv) b) Pedestrian delay

2.5.81 The updated assessment of peak construction (busiest day) for the 24hr AAWT flows (average hourly) and representative hour concluded that no links would have a significant effect on pedestrian delay to cross roads within the study area. The updated assessment of peak construction (typical day) has the same effects as for the updated assessment for the

peak construction (busiest day) with all links experiencing either a negligible or minor adverse effect, which is **not significant**.

- 2.5.82 There are an additional four links that have been screened into the peak construction (typical day) assessment based on the Refined DCO flows, all of which would experience either a negligible (link 32a) or minor adverse effect (links 12a, 19b, 77) on pedestrian delay in peak construction (typical day) which is **not significant**.

d) iv) c) **Amenity**

- 2.5.83 The updated assessment of peak construction (busiest day) effects on amenity concluded that there would be no changes to the significance of effects in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198]. The updated assessment of peak construction (typical day) has the same effects as for the updated assessment for the peak construction (busiest day).

d) iv) d) **Fear and intimidation**

- 2.5.84 The updated assessment of peak construction (typical day) has the same effects for the updated assessment for the peak construction (busiest day) based on the total average hourly traffic flows.
- 2.5.85 However, there are some differences in the effects on fear and intimidation between the peak construction busiest and typical day based on the 18hr HDV flows. **Table 2.22** below provides a comparison of the effects on fear and intimidation for the updated assessment based on the Refined DCO flows as a result of the increase in total traffic and HDVs during peak construction (busiest day) and peak construction (typical day).

Table 2.22: Fear and Intimidation 2028 peak construction (typical day) 18hr HDVs

Link	Link Name	Effect		Change in effects/ significance
		Refined strategic traffic modelling (busiest day)	Refined strategic traffic modelling (typical day)	
10	B1122, Theberton	Minor adverse – to Minor beneficial	Minor adverse – to Minor beneficial	No change
10a	SLR, Theberton	Negligible – to Minor adverse	Negligible – to Minor adverse	No change
13a	A12 (N)	Negligible – to Minor adverse	Negligible – to Minor adverse	No change

Link	Link Name	Effect		Change in effects/ significance
		Refined strategic traffic modelling (busiest day)	Refined strategic traffic modelling (typical day)	
21b	A12 (north of B1119)	Negligible – to Minor adverse	Negligible – to Minor adverse	No change
22c	A12 Farnham	Minor adverse – Minor beneficial	Minor adverse – Minor beneficial	No change
23	A12 Farnham bend	Negligible – to Minor beneficial	Negligible – to Minor beneficial	No change
23a	Two village bypass	Negligible – to Minor adverse	Negligible – to Minor adverse	No change
24	A12 Stratford St Andrew	Minor adverse – to Minor beneficial	Minor adverse – to Minor beneficial	No change
26	A12 Marlesford	Minor adverse – Moderate adverse	Minor adverse	Change Not significant effect in typical day
27	A12 south of Wickham	Minor adverse – to Moderate adverse	Minor adverse	Change Not significant effect in typical day
32c	A12 (S)	Moderate adverse – to Major adverse	Screened out	Change Screened out of typical day assessment
34a	A12 (N)	Negligible – Minor adverse	Negligible	Change Reduced effect in typical day, remains not significant
34c	A12 (S)	Moderate adverse – Major adverse	Screened out	Change Screened out of typical day assessment
57	SLR (east of A12)	Negligible – to Minor adverse	Negligible – to Minor adverse	No change
63	SLR (west of B1125)	Negligible – to Minor adverse	Negligible – to Minor adverse	No change
65	Middleton Moor Link	Negligible – to Minor adverse	Negligible – to Minor adverse	No change
66	B1122 west of B1125	Minor adverse – to Minor beneficial	Minor adverse – to Minor beneficial	No change

Link	Link Name	Effect		Change in effects/ significance
		Refined strategic traffic modelling (busiest day)	Refined strategic traffic modelling (typical day)	
74	B1122 (Middleton Moor)	Minor adverse – to Minor beneficial	Minor adverse – to Minor beneficial	No change
12a	B1121, Saxmundham	Minor adverse	Minor adverse	No change
19b	A12, Lowestoft	Minor adverse	Minor adverse	No change
32a	A12, Woodbridge	Negligible to Minor adverse	Negligible	Change Reduced effect in typical day, remains not significant
77	Aldeburgh Rd, Leiston	Minor adverse	Minor adverse	No change
87	A12 south of Eagle Way	Minor adverse	Screened out	Change Screened out of typical day assessment
88	A12 south of Foxhall Rd	Minor adverse	Screened out	Change Screened out of typical day assessment

2.5.86 **Table 2.22** shows that there are some reduced effects on fear and intimidation as a result of the reduced HDVs in the typical day compared to the busiest day. All of the links that have a reduced effect are on the A12 at Martlesham, Woodbridge, south of Wickham Market and Marlesford. There would be **no significant** effects on fear and intimidation during the peak construction typical day.

d) iv) e) **Driver and passenger delay**

2.5.87 Chapter 8 of the **Transport Assessment Addendum** (Doc Ref 8.5(A)Ad) summarises the updated strategic modelling and effect on journey time on various routes within the study area. The assessment shows that there would be up to 4% increase in journey time on the journey time routes (i.e. Routes 1 to 10 and A2 – A4) during the typical day which is slightly less than the busiest day percentage increase in journey time (i.e. up to 5%). The exceptions to this are routes A1 (A12 from Seven Hills to Martlesham) and route A5 (A12 from Seven Hills to north of Woodbridge), which are shorter routes and therefore have higher percentage increase in journey time. The modelling predicts these routes would experience a 2-

9% increase in journey time during the typical day compared to a 2-13% increase during the busiest day depending on the peak hour and direction of travel along the corridor.

- 2.5.88 The ES assessment concluded that there is expected to be a minor adverse effect on driver delay and bus passenger delay during the peak construction busiest day and typical day, which would be **not significant**.
- 2.5.89 The journey time analysis from the VISSIM micro-simulation model of the A12 corridor demonstrates that the journey time increase on the A12 northbound, between Seven Hills and just north of A1152, is predicted to be 9-37 seconds depending on the hour and 0-28 seconds in the southbound direction depending on the hour. Over a 14km route, the effect on journey time on this part of the A12 would be negligible, which is **not significant**.

d) v) Updated assessment - operational phase

- 2.5.90 The complete updated operational phase assessment based on the Refined DCO flows is included in **Volume 3, Appendix 2.5.B** of this **ES Addendum** and summarised in the following section. It should be noted that for the operational scenario, the hour of greatest change in traffic (i.e. the representative hour) is expected to be 16:00-17:00. No additional links have been screened in/out of the updated assessment compared to the ES assessment included in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

d) v) a) Severance

- 2.5.91 **Table 2.23** and **Table 2.24** below provide a comparison of the significant effects on severance during the operational phase reported in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] and the updated assessment based on the Refined DCO flows.

Table 2.23: Severance 2034 operational phase 24 hour AAWT Total Traffic

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
10	B1122, Theberton	Major beneficial	Major beneficial	No change
10a	SLR, Theberton	Major adverse	Major adverse	No change
22c	A12 (S) (Farnham)	Major beneficial	Major beneficial	No change
23	A12 Farnham bend	Major beneficial	Major beneficial	No change
23a	A12 two village bypass	Major adverse	Major adverse	No change

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
24	A12 Stratford St Andrew	Major beneficial	Major beneficial	No change
34b	Main Road (E)	Moderate adverse	Screened out	Change Screened out
57	SLR (east A12)	Major adverse	Major adverse	No change
63	SLR west B1125	Major adverse	Major adverse	No change
65	Sizewell link road	Major adverse	Major adverse	No change
66	B1122 west of B1125	Major beneficial	Major beneficial	No change
74	B1122 (Middleton Moor)	Major beneficial	Major beneficial	No change

Table 2.24: Severance 2034 operational phase representative hour (16:00-17:00) total traffic

Link	Link Name	Effect		Change in effects/ significance
		Volume 2, Chapter 10 of the ES (Doc Ref. 6.3) [APP-198]	Refined strategic traffic modelling	
10	B1122, Theberton	Major beneficial	Major beneficial	No change
10a	SLR, Theberton	Major adverse	Major adverse	No change
22c	A12 (S) (Farnham)	Major beneficial	Major beneficial	No change
23	A12 Farnham bend	Major beneficial	Major beneficial	No change
23a	A12 two village bypass	Major adverse	Major adverse	No change
24	A12 Stratford St Andrew	Major beneficial	Major beneficial	No change
57	SLR (east A12)	Major adverse	Major adverse	No change
63	SLR west B1125	Major adverse	Major adverse	No change
65	Sizewell link road	Major adverse	Major adverse	No change
66	B1122 west of B1125	Major beneficial	Major beneficial	No change
74	B1122 (Middleton Moor)	Major beneficial	Major beneficial	No change

2.5.92 The updated assessment based on the Refined DCO flows has the same effects on severance as for the ES assessment. The only exception is link 34b (Main Road, Martlesham) which had a moderate adverse effect in the ES assessment, which was significant, but has been screened out of the updated assessment and therefore the effect on this link would be **not significant**. Further information on the refinements to the calibration of

the VISUM model in the Martlesham and Woodbridge area is summarised in the **Transport Assessment Addendum** (Doc Ref 8.5(A)Ad).

- 2.5.93 The same professional judgement applied to the updated assessment as in the ES assessment. It is therefore concluded that the severance effect on links 10a, 57 and 65 on the Sizewell link road would be **not significant** but that the severance effect on link 63 would be **significant**. The professional judgement applied to the other links does not alter the significance of the effect.

d) v) b) Pedestrian delay

- 2.5.94 The ES assessment in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] concluded that there were no links that exceeded the 1,400 threshold in the 24 hr AAWT (average hourly flows) scenario for the 2034 operational phase and the effect on pedestrian delay would be **not significant**. The updated assessment, based on 24 hr AAWT (average hourly flows) and representative hour, does not change the significance of effect on pedestrian delay in the operational phase.

- 2.5.95 In addition to assessing the effect of the additional operational phase traffic on pedestrians crossing roads, the ES assessment also assessed the effect of changes to the PRoW as a result of PRoW diversions. There are no changes to the effects on pedestrian delay as a result of PRoW diversions based on the updated assessment.

d) v) c) Amenity

- 2.5.96 There are no changes to the effect on amenity during the operational phase as a result of the updated assessment based on the Refined DCO flows. The same professional judgement is applied to the effects as in the original ES assessment.

d) v) d) Fear and intimidation

- 2.5.97 There are no changes to the effect on fear and intimidation during the operational phase as a result of the updated assessment based on the Refined DCO flows. The same professional judgement is applied to the effects as in the original ES assessment.

d) v) e) Driver and passenger delay

- 2.5.98 The assessment of driver delay was considered within the **Transport Assessment** (Doc Ref. 8.5 (A)) [AS-017] and summarised within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

2.5.99 The ES assessment concluded that, based on the traffic modelling within the **Transport Assessment** (Doc Ref. 8.5(A)) [AS-017], there is expected to be a negligible effect on driver delay and bus passenger delay during the peak construction (busiest day), which would be **not significant**. The updated assessment based on the Refined DCO flows does not change the conclusions of the ES assessment in terms of the effect of driver and passenger delay.

d) v) f) **Accident and road safety**

2.5.100 The ES assessment concluded that there would be a negligible effect on road safety during the operational phase, which would be **not significant**. Minor beneficial (**not significant**) effects on road safety were predicted where improvements to the highway network were being made, such as the two village bypass and Sizewell link road.

2.5.101 An updated assessment of collisions and road safety is provided in the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) based on the Refined DCO flows. This includes a link-based analysis, which estimates that there would be less than one additional collision per annum across the study area during the operational phase.

2.5.102 There are no new or different significant effects to collisions and road safety as a result of the updated modelling data for the operational phase to those set out in the ES assessment in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

d) vi) **Updated assessment – sensitivity test 100% HGVs from south**

2.5.103 As detailed in **Appendix 8E** of the **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad), a sensitivity test has been undertaken based on 100% of HGVs from the A12 south (and 0% from the north) to understand if an alternative HGV distribution would result in any changes to the effects summarised in the **Transport Assessment** (Doc Ref. 8.5(A)) [AS-017] or the ES assessments, including the updated assessment of transport effects set out in this section.

2.5.104 The only links that the sensitivity test affects are on the B1122 and A12 in the Early Years assessment and on the Sizewell link road and A12 in the peak construction assessment. Only those links that would experience an increase in HGVs when compared to the core assessment set out earlier in this chapter have been considered in this sensitivity test as those links that would have a reduction in HGVs (i.e. on the A12 north) have already been assessed with a worst case level of HGVs in the core updated assessment earlier in this chapter.

- 2.5.105 Therefore, the links that are included in the sensitivity test for the Early Years are:
- A12 south: 13c, 13e, 21b, 21c, 21e, 22a, 22c, 23, 24, 25, 26, 27, 32a, 32c, 33, 34a, 34c, 35, 36, 37, 38b, 58, 59, 78, 87, 88.
- 2.5.106 The links that are included in the sensitivity test for the peak construction are the same for the Early Years except for:
- Links not included are:
 - links 13c, 13e, 58 on the A12 between the Sizewell link road and B1122; and
 - links 22c, 23 and 24 which are the A12 through Farnham and Stratford St Andrew which will not carry any Sizewell C HGVs at peak construction as HGVs will route via the two village bypass.
 - Additional links included are:
 - Link 23a, which is the two village bypass; and
 - Link 57, which is the Sizewell link road between the A12 and the railway line.
- 2.5.107 The assessment of the above links that would experience an increase in HGVs as part of the sensitivity test is included in **Volume 3, Appendix 2.5.C** of this **ES Addendum**.
- d) vi) a) **Early Years**
- 2.5.108 The change in HDVs on the A12 as part of the 100% HGV A12 south sensitivity test does not change the effects on severance, pedestrian delay, amenity or fear and intimidation in the Early Years on the A12 south to that concluded in the updated core assessment summarised earlier in this chapter.
- 2.5.109 As set out in **Appendix 8E** of the **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad), the sensitivity test has been based on 100% HGV routing to/from A12 south but outside of the AM and PM peak hours of 08:00-09:00 and 17:00-18:00. The sensitivity test would reassign 90 two-way HGVs per day to the A12 south during the Early Years (i.e. 15% of 600 two-way HGVs per day), as well as the HGVs to/from the associated development construction sites. This level of additional HGVs on the A12 south spread over the course of a day outside of the network peak hours would not materially change the effects on driver delay or road safety in the Early Years on the A12 south when compared to that concluded in the updated core assessment summarised earlier in this chapter.

d) vi) b) Peak construction

2.5.110 The change in HDVs on the A12 as part of the 100% HGV A12 south sensitivity test does not change the effects on severance, pedestrian delay, amenity or fear and intimidation in the peak construction on the A12 south when compared to that concluded in the updated core assessment summarised earlier in this chapter.

2.5.111 As set out in **Appendix 8E** of the **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad), the sensitivity test has been based on 100% HGV routing to/from A12 south but outside of the AM and PM peak hours of 08:00-09:00 and 17:00-18:00. The sensitivity test would reassign 150 two-way HGVs per day to the A12 south during the Early Years (i.e. 15% of 600 two-way HGVs per day). This level of additional HGVs on the A12 south spread over the course of a day outside of the network peak hours would not materially change the effects on driver delay or road safety in the peak construction on the A12 south when compared to that concluded in the updated core assessment summarised earlier in this chapter.

e) Updated assessment – reduction in HGV movements (**Changes 1 and 2**)

2.5.112 This section considers the potential changes in the transport effects that are expected from the proposed **Changes 1 and 2**. The proposed changes would lead to a reduction in the number of HGVs on the road network during peak construction by up to 150 two-way HGV movements during the typical day and up to 300 two-way HGV movements during the busiest day that would occur as a result of the proposed changes to rail and marine capacity, as explained in the **Freight Management Strategy** (Doc Ref. 8.18).

2.5.113 The benefit of these changes is likely to be most noticeable on the HGV routes during peak construction (i.e. A12 and Sizewell link road). The assessment provides a comparison of the transport effects resulting from the Refined traffic flows with the reduced HGV flows resulting from the proposed changes in rail (**Change 1**) and marine capacity (**Change 2**).

e) i) Screening

2.5.114 **Volume 3, Appendix 2.5.D** of this **ES Addendum** summarises the traffic link screening based on the reduced HGV flows resulting from **Changes 1 and 2**.

2.5.115 The only additional links that have been screened out of the assessment, compared to the updated assessment for the Refined DCO flows are:

- Typical day assessment:

- Screened out Link 19b: A12 Lowestoft.
- Busiest day assessment:
 - Screened out Link 17a: A12 north of B1125, Blythburgh;
 - Screened out Link 17c: A12 south of B1125, Blythburgh;
 - Screened out Link 32c: A12 south of A1152, Woodbridge;
 - Screened out Link 34c: A12 south of Main Road, Martlesham;
 - Screened out Link 38b: A12 Woodbridge, north of B1079;
 - Screened out Link 53b: A12 north of A144;
 - Screened out Link 84: A12 south of B1126;
 - Screened out Link 86: A12 south of B1387;
 - Screened out Link 87: A12 south of Eagle Way;
 - Screened out Link 88: A12 south of Foxhall Road.

e) ii) Peak construction assessment – reduced HGV flows (Changes 1 and 2)

2.5.116 The environmental transport assessment for the peak construction (typical and busiest day) based on the reduced HGV flows resulting from **Changes 1** and **2** is included in **Volume 3, Appendix 2.5.E** of this **ES Addendum** and summarised in the following section.

e) ii) a) Severance

2.5.117 **Table 2.25** provides a comparison of the effects on severance during the peak construction (typical day) based on the Refined DCO flows and the reduced HGV flows resulting from **Changes 1** and **2**.

Table 2.25: Severance 2028 peak construction (typical day) 24 hour AAWT Total Traffic – Changes 1 and 2

Link	Link Name	Effect		Change in effects/ significance
		Refined strategic traffic modelling Typical day	Reduced HGVs (Changes 1 and 2) Typical day	
4a	B1122 (S)	Moderate adverse	Moderate adverse	No change
5	B1122 Abbey Road	Moderate adverse	Moderate adverse	No change
10	B1122, Theberton	Major beneficial	Major beneficial	No change
10a	Theberton part of SLR	Major adverse	Major adverse	No change

Link	Link Name	Effect		Change in effects/ significance
		Refined strategic traffic modelling Typical day	Reduced HGVs (Changes 1 and 2) Typical day	
22c	A12 (S) (Farnham)	Major beneficial	Major beneficial	No change
23	A12 Farnham bend	Major beneficial	Major beneficial	No change
23a	Two village bypass	Major adverse	Major adverse	No change
24	A12 Stratford St Andrew	Major beneficial	Major beneficial	No change
34b	Main Road (E)	Minor adverse	Minor adverse	No change
57	SLR (east A12)	Major adverse	Major adverse	No change
63	SLR (west B1125)	Major adverse	Major adverse	No change
65	SLR Middleton Moor link	Major adverse	Major adverse	No change
66	B1122 west of B1125	Major beneficial	Major beneficial	No change
74	B1122 (Middleton Moor)	Major beneficial	Major beneficial	No change
12a	B1121, Saxmundham	Minor adverse	Minor adverse	No change
19b	A12, Lowestoft	Minor adverse	Screened out	Change Screened out
32a	A12, Woodbridge	Negligible	Negligible	No change
77	Aldeburgh Rd, Leiston	Minor adverse	Minor adverse	No change

2.5.118 It can be seen from **Table 2.25** that the effects on the severance would be unchanged from the updated assessment (Refined DCO flows) except for link 19b, which would be screened out of the reduced HGV assessment.

2.5.119 There are no changes to the effects on severance during the peak construction (busiest day) when comparing the assessments based on the Refined DCO flows and the reduced HGV flows resulting from **Changes 1 and 2**.

e) ii) b) **Pedestrian delay**

2.5.120 There are no changes to the effects on pedestrian delay during the peak construction typical or busiest day when comparing the assessments based on the Refined DCO flows and the reduced HGV flows resulting from **Changes 1 and 2**.

e) ii) c) **Amenity**

2.5.121 There are no changes to the effects on amenity during the peak construction typical day and busiest day based on the 24 hour total traffic flows when comparing the assessments based on the Refined DCO flows

and the reduced HGV flows resulting from **Changes 1** and **2**. Therefore, no summary table is provided comparing the assessments.

2.5.122 **Table 2.26** provides a comparison of the effects on amenity during the peak construction (typical day) based on the 24 hour AAWT HDV flows for the Refined DCO flows and the reduced HGV flows resulting from **Changes 1** and **2**.

Table 2.26: Amenity 2028 peak construction (typical day) 24 hour HDV – Changes 1 and 2

Link	Link Name	Effect		Change in effects/ significance
		Refined strategic traffic modelling Typical day	Reduced HGVs (Changes 1 and 2) Typical day	
5	B1122 Abbey Road	Moderate adverse	Moderate adverse	No change
10	B1122, Theberton	Major beneficial	Major beneficial	No change
10a	SLR, Theberton	Major adverse	Major adverse	No change
13b	B1122	Moderate adverse	Minor adverse	Change, Reduced effect to no significant.
21b	A12 (north of B1119)	Major adverse	Moderate adverse	Change Reduced effect, remains significant
21c	A12 (middle)	Moderate adverse	Minor adverse	Change Reduced effect to not significant
21e	A12 (south of B1119)	Moderate adverse	Minor adverse	Change Reduced effect to not significant
22c	A12 (S) (Farnham)	Major beneficial	Major beneficial	No change
23	A12 Farnham bend	Major beneficial	Major beneficial	No change
23a	Two village bypass	Major adverse	Major adverse	No change
24	A12 Stratford St Andrew	Major beneficial	Major beneficial	No change
57	SLR (east of A12)	Major adverse	Major adverse	No change
63	SLR (west of B1125)	Major adverse	Major adverse	No change
64	B1122 north of SZC access	Major adverse	Major adverse	No change

Link	Link Name	Effect		Change in effects/ significance
		Refined strategic traffic modelling Typical day	Reduced HGVs (Changes 1 and 2) Typical day	
65	Middleton Moor Link	Major adverse	Major adverse	No change
66	B1122 west of B1125	Major beneficial	Major beneficial	No change
74	B1122 (Middleton Moor)	Major beneficial	Major beneficial	No change
78	A12 (north of B1121)	Moderate adverse	Minor adverse	Change Reduced effect to not significant
12a	B1121, Saxmundham	Minor adverse	Minor adverse	No change
19b	A12, Lowestoft	Minor adverse	Screened out	Change Screened out
32a	A12, Woodbridge	Negligible	Negligible	No change
77	Aldeburgh Rd, Leiston	Major adverse	Major adverse	No change

2.5.123 Table 2.26 shows that the reduced levels of HGVs would reduce the effect on amenity on links 13b, 21b, 21c, 21e and 78. Link 19b has been screened out and therefore would have a negligible effect on amenity.

2.5.124 Table 2.27 provides a comparison of the effects on amenity during the peak construction (busiest day) based on the 24 hour AAWT HDV flows for the Refined DCO flows and the reduced HGV flows resulting from **Changes 1 and 2**.

Table 2.27: Amenity 2028 peak construction (busiest day) – Changes 1 and 2

Link	Link Name	Effect		Change in effect/ significance
		Refined strategic traffic modelling Busiest day	Reduced HGVs (Changes 1 and 2) Busiest day	
5	B1122 Abbey Road	Moderate adverse	Moderate adverse	No change
10	B1122, Theberton	Major beneficial	Major beneficial	No change
10a	SLR, Theberton	Major adverse	Major adverse	No change
13b	B1122	Moderate adverse	Minor adverse	Change Reduced effect to not significant
21b	A12 (north of B1119)	Major adverse	Moderate adverse	Change

Link	Link Name	Effect		Change in effect/ significance
		Refined strategic traffic modelling Busiest day	Reduced HGVs (Changes 1 and 2) Busiest day	
				Reduced effect to not significant
21c	A12 (middle)	Moderate adverse	Minor adverse	Change Reduced effect to not significant
21e	A12 (south of B1119)	Moderate adverse	Minor adverse	Change Reduced effect to not significant
22c	A12 (S) (Farnham)	Major beneficial	Major beneficial	No change
23	A12 Farnham bend	Major beneficial	Major beneficial	No change
23a	Two village bypass	Major adverse	Major adverse	No change
24	A12 Stratford St Andrew	Major beneficial	Major beneficial	No change
57	SLR (east of A12)	Major adverse	Major adverse	No change
63	SLR (west of B1125)	Major adverse	Major adverse	No change
64	B1122 north of SZC access	Major adverse	Major adverse	No change
65	Middleton Moor Link	Major adverse	Major adverse	No change
66	B1122 west of B1125	Major beneficial	Major beneficial	No change
74	B1122 (Middleton Moor)	Major beneficial	Major beneficial	No change
78	A12 (north of B1121)	Moderate adverse	Minor adverse	Change Reduced effect to not significant
12a	B1121, Saxmundham	Minor adverse	Minor adverse	No change
19b	A12, Lowestoft	Minor adverse	Screened out	Change Screened out
32a	A12, Woodbridge	Negligible	Negligible	No change
77	Aldeburgh Rd, Leiston	Major adverse	Major adverse	No change
87	A12 south of Eagle Way	Negligible	Negligible	No change
88	A12 south of Foxhall Rd	Negligible	Negligible	No change

2.5.125 **Table 2.27** shows that the reduced levels of HGVs would reduce the effect on amenity on links 13b, 21b, 21c, 21e and 78. Link 19b has been

screened out and therefore would have a negligible effect (**not significant**) on amenity.

e) ii) d) Fear and Intimidation

2.5.126 The updated assessment based on the Refined DCO flows (18 hour total traffic flows) concluded that there were no significant adverse effects on fear and intimidation in the peak construction typical and busiest day. The assessment based on the reduced HGV flows resulting from **Changes 1 and 2** has the same conclusions.

2.5.127 The updated assessment based on the Refined DCO flows (18 hour HDVs) concluded that during the peak construction (busiest day) there would be the following increase in effect on fear and intimidation:

- link 26 (A12, Marlesford) – minor adverse to moderate adverse;
- link 32c (A12, Woodbridge) – moderate adverse to major adverse; and
- link 34c (A12, Martlesham) – moderate adverse to major adverse.

2.5.128 The same professional judgement is applied to link 32c and 34c, with the effect being judged as **not significant**. Both links 32c and 34c are screened out of the assessment based on the reduced HGV flows resulting from **Changes 1 and 2**.

2.5.129 Link 26 (A12, Marlesford) would have a moderate adverse effect on fear and intimidation during the busiest day of peak construction based on the Refined DCO flows (18 hour HDVs), which would be **significant**. However, during the typical day the effect would be minor adverse, which would be **not significant**. The effect on fear and intimidation would be minor adverse in the typical and busiest day based on the reduced HGV flows resulting from **Changes 1 and 2** (18 hour HDVs), which would be **not significant**.

e) ii) e) Driver and passenger delay

2.5.130 The VISSIM micro-simulation model of the A12 corridor has been used to assess the effect on journey time.

2.5.131 The analysis demonstrates that the journey time increase on the A12 northbound is predicted to be 9-37 seconds depending on the hour and 0-28 seconds in the southbound direction depending on the hour during peak construction (typical day) based on the Refined DCO flows (i.e. 650 two-way HGVs per day).

- 2.5.132 The journey time increase on the A12 northbound is predicted to be 6-32 seconds depending on the hour and 0-21 seconds in the southbound direction depending on the hour during peak construction (typical day) based on the reduced HGV flows resulting from **Changes 1 and 2** (i.e. 500 two-way HGV movements).
- 2.5.133 The analysis demonstrates that the journey time increase on the A12 northbound is predicted to increase by up to 62 seconds between 08:00-09:00 and for all other hours the increase would be less than 36 seconds. In the southbound direction the model predicts a journey time increase of 0-28 seconds during the peak construction (busiest day) based on the Refined DCO flows (i.e. 1,000 two-way HGVs per day).
- 2.5.134 The journey time increase on the A12 northbound is predicted to be 11-42 seconds depending on the hour and 0-29 seconds in the southbound direction depending on the hour during peak construction (busiest day) based on the reduced HGV flows resulting from **Changes 1 and 2** (i.e. 700 two-way HGV movements).
- 2.5.135 The effect on journey time would be reduced slightly as a result of **Changes 1 and 2** (i.e. reduction of 3-20 seconds in journey time on A12 northbound route and 0-10 seconds on the southbound route, depending on the hour) and the effect on driver delay would continue to be **not significant**.
- 2.5.136 With regards to impacts on rail passengers, the ES assessment considered the peak construction rail operation associated with the movement of construction material as consisting of three return freight trains per day once the rail extension route was operational. Freight trains associated with the peak construction were assumed to operate after the last passenger train in the evening and before the first passenger train the following morning, with the exception of one inbound train which would utilise an existing gap in the passenger timetable between 08:00-09:00. The freight rail movements during peak construction were therefore deemed to not have any effect on rail passenger journey times, which would be **not significant**.
- 2.5.137 **Change 1** would see the potential to run 4 trains over night, which would not have any effect on rail passenger journey times, which would be **not significant**.
- 2.5.138 Change 1 also seeks to investigate whether a fifth daily train may be possible for a limited period at the peak of construction. If this were possible and utilised then it would be likely to impact on the rail passenger timetable, which would have a short term minor adverse effect on rail passenger journey times during the day, which would be **not significant**.

e) ii) f) Accident and road safety

2.5.139 The assessment of accidents and road safety based on the Refined DCO flows concluded that there would be a minor adverse effect on road safety during peak construction, which would be **not significant**. The reduction in HGVs as a result of **Changes 1 and 2** would further reduce the likelihood and severity of collisions on the HGV routes (i.e. A12 and Sizewell link road) during peak construction. The effect on road safety would continue to be **not significant**.

f) Updated assessment – greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**)

2.5.140 The proposed change to the Sizewell B relocated facilities project would not alter the peak construction traffic flows or construction traffic routes considered in the Sizewell C Project's early years traffic modelling.

2.5.141 In the case of Option 1, where no outage car park on Pillbox Field is proposed, any effects associated with the use of the new Sizewell Gap/ Sandy Lane junction to Pillbox Field during construction and operation would be removed.

2.5.142 The effects of Option 2 would remain the same as presented within the **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

2.5.143 Overall, the proposed change would not alter the conclusions of the assessment presented within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

g) Update assessment – extensions and reductions of the Order Limits for works on the Sizewell link road, as well as minor changes to the public right of way proposals (**Change 12**)

2.5.144 Hawthorn Road is now proposed further east of the alignment shown in the Application. The revised alignment requires a diversion to Footpath E-396/020/0 in this location. The proposed PRow diversion would extend along the proposed route of the Sizewell link road, approximately 160m to the west, to cross the proposed route before heading east along the north side of the route to re-join Hawthorn Road. This change to the proposed PRow diversion would have a 60m increase in diversion compared to the Application, which would not materially increase pedestrian delay compared to that previously assessed within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

2.5.145 An additional walking and cycling route is now proposed on the north side of the proposed Sizewell link road. This provides users of the PRow with a more expedient way of joining the new walking and cycling route and

crossing the Sizewell link road from footpath E-515/007/0 (rather than users having to go to the B1122 junction to join the new walking and cycling route which is what was previously proposed in the Application). **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] concluded that there would be a minor adverse effect on pedestrian delay, which is **not significant**. The proposed change would not alter the effect on pedestrian delay presented within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

h) Updated assessment - new bridleway link between Aldhurst Farm and Kenton Hills (**Change 15**)

2.5.146 The change would introduce a new section of public right of way and road crossing. The link would be designated as a bridleway once the construction phase of the Sizewell C Project is complete.

2.5.147 The new link would provide benefits to the connectivity of the PRow network as well as improve safety for pedestrians and cyclists by providing an off-road route adjacent to the road.

2.5.148 However, overall, the proposed change would not alter the conclusions of the assessment presented within **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

2.6 Noise and vibration

a) Introduction

2.6.1 This section provides an addendum to the noise and vibration assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202];
- **Volume 2, Appendix 11G** of the **ES** (Doc Ref. 6.3) [APP-209]; and
- **Volume 1, Chapter 6, Appendix 6G** of the **ES** (Doc Ref 6.2) [APP-171].

2.6.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) Relevant Additional Information

2.6.3 Relevant Additional Information for the assessment of noise and vibration effects presented within **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202] include:

- refinements to the strategic traffic modelling (refer to the **Transport Assessment Addendum** (Doc Ref. 8.5Ad) for further information); and
- testing the sensitivity of the noise assessment outcome to the routing of 100% of HGVs from the south.

c) Relevant changes

- 2.6.4 Relevant proposed design changes for the assessment of noise and vibration effects presented within **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202] include:
- An enhancement of the permanent BLF and construction of a new, temporary BLF (**Change 2**).
 - Greater flexibility as to where certain Sizewell B facilities are relocated to potentially avoid the need for car parking on Pillbox Field (**Change 3**).
 - Change to certain parameter heights and activities on the main development site (**Change 4**).
 - Change to the location of the water resource storage area and the addition of flood mitigation measures to lower flood risk (**Change 5**).
 - Extension of the Order Limits to provide for additional fen meadow habitat at Pakenham as mitigation for fen meadow loss (**Change 11**).
- 2.6.5 Furthermore, a potential increase in rail movements during construction of Sizewell C (as a result of **Change 1**) and the additional temporary BLF (**Change 2**) would result in a reduction in construction traffic (HGV) movements, as described in **section 2.2** of this chapter. The updates to the road traffic noise modelling resulting from the reduction in HGV movements are presented within **Volume 3, Appendix 2.6.B** of this **ES Addendum**.
- 2.6.6 The proposed change to increase the number of rail movements (**Change 1**) is assessed within **Chapter 9** of this **ES Addendum**.
- 2.6.7 All other proposed changes described in **section 2.2** of this chapter would not affect the assessment of noise and vibration effects and, therefore, have not been considered further.

d) Updated assessment – revised road traffic noise calculations

- 2.6.8 This section considers the potential changes in the noise effects that are expected from changes to the refined strategic traffic model. The assessment of environmental impact of road traffic noise in **Volume 2**,

Chapter 11 of the **ES** (Doc Ref 6.3) [APP-202] was based on the change in road traffic noise level. The change could be beneficial or adverse, depending on whether the noise is expected to decrease or increase, and the magnitude of the change defines the magnitude of the effect.

2.6.9 **Volume 3, Appendices 2.6.A and 2.6.B** of this **ES Addendum** contain the calculated changes in the road traffic noise levels on existing roads since the preparation of the assessment set out in **Volume 2, Chapter 11** of the **ES** (Doc Ref 6.3) [APP-202], revised to take account of the refined strategic traffic modelling.

2.6.10 The effect categories remain as set out in **Volume 1, Chapter 6, Appendix 6G** of the **ES** (Doc Ref 6.2) [APP-171].

2.6.11 The locations and situations in which a change in assessment outcome is predicted are summarised in **Table 2.28** below. Where the change results in a reduction in level, these are marked in green. Where the change results in an increase in level, these are marked in orange. Where a change has occurred either to or from 'low flow', these are marked in blue.

2.6.12 There is one existing road where a change in significance of outcome would occur as a result of the changes to the strategic traffic modelling and that is that Kings Road in Leiston in both the 2028 typical and 2028 busiest scenarios. In this location, a moderate adverse effect (which is **significant**) was predicted in **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202]. As a result of the updates to modelling, a minor adverse effect (which is **not significant**) is predicted.

2.6.13 There are no other predicted significant changes to assessment outcomes resulting from the revisions to the strategic traffic modelling.

Table 2.28: Changes to road traffic noise assessment outcomes for existing roads resulting from refinements to the strategic traffic model

Period	Receptor		Magnitude of Change		Change in Significance
			As submitted in ES Volume 2, Chapter 11, Appendix 11G	Refined Strategic Traffic Modelling	
2023 Typical Day	21c	A12 (middle)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	21e	A12 (south of B1119)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	22c	A12 (S) (Farnham)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	24	A12 Stratford St Andrew (Low Road)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change

Period	Receptor		Magnitude of Change		Change in Significance
			As submitted in ES Volume 2, Chapter 11, Appendix 11G	Refined Strategic Traffic Modelling	
	58	A12 (north of SLR)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	78	A12 (north of B1121)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
2023 Typical Night	4a	B1122 (S)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	5	B1122 Abbey Road (existing level crossing)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	13c	A12 (middle)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	21c	A12 (middle)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	29	B1078 on slip to A12	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	34b	Main Road (E)	Low flow	Negligible (Not Significant)	N/A
	53c	A12 (south of A144)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	97	Cross street (east of B1069 Park Hill)	Minor Adverse (Not Significant)	Minor Beneficial (Not Significant)	N/A
2028 Typical Day	7	B1069 Coldfair Green	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	21b	A12 (north of B1119)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	21c	A12 (middle)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	21e	A12 (south of B1119)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	26	A12 Marlesford	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	29	B1078 onslip to A12	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	34b	Main Road (E)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	76	B1069 (north of Aldringham Lane)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	77	Aldeburgh Rd (north of Aldringham Lane)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	78	A12 (north of B1121)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	93	Kings Road	Moderate Adverse (Not Significant)	Minor Adverse (Not Significant)	Significant to Not Significant
	96	B1122 High Street, Leiston (south of Main Street)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change

Period	Receptor		Magnitude of Change		Change in Significance
			As submitted in ES Volume 2, Chapter 11, Appendix 11G	Refined Strategic Traffic Modelling	
	98	Main Street, Leiston	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	99	B1069 Haylings Road (south of Kings Road)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	100	B1069 Haylings Road (south of Cross Street)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	101	B1122 Aldeburgh Road (south of Kings Road)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
2028 Typical Night	13d	A1120	Negligible (Not Significant)	Minor Beneficial (Not Significant)	N/A
	19a	A1117 (N)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	21b	A12 (north of B1119)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	21e	A12 (south of B1119)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	22a	A12 (N)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	24	A12 Stratford St Andrew (Low Road)	Moderate Beneficial (Significant)	Low flow	N/A
	26	A12 Marlesford	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	28b	B1078 Wickham Market (east of B1438)	Minor Beneficial (Not Significant)	Negligible (Not Significant)	N/A
	34b	Main Road (E)	Low flow	Negligible (Not Significant)	N/A
	39c	A1094 (east of B1069)	Negligible (Not Significant)	Minor Beneficial (Not Significant)	N/A
	64	B1122 north of SZC access	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	73	B1078 south of B1116	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	81	B1078 at Campsea Ashe	Low flow	Negligible (Not Significant)	N/A
	98	Main Street, Leiston	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	102	B1122 High Street, Leiston (south of Cross Street)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	D2	B1122 btwn Theberton jcn with Sizewell link road, and main site access	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
2028 Busiest Day	7	B1069 Coldfair Green	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	29	B1078 onslip to A12	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change

Period	Receptor		Magnitude of Change		Change in Significance
			As submitted in ES Volume 2, Chapter 11, Appendix 11G	Refined Strategic Traffic Modelling	
	34b	Main Road (E)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	76	B1069 (north of Aldringham Lane)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	77	Aldeburgh Rd (north of Aldringham Lane)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	93	Kings Road	Moderate Adverse (Not Significant)	Minor Adverse (Not Significant)	Significant to Not Significant
	96	B1122 High Street, Leiston (south of Main Street)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	98	Main Street, Leiston	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	99	B1069 Haylings Road (south of Kings Road)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	100	B1069 Haylings Road (south of Cross Street)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	101	B1122 Aldeburgh Road (south of Kings Road)	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
2028 Busiest Night	13d	A1120	Negligible (Not Significant)	Minor Beneficial (Not Significant)	N/A
	19a	A1117 (N)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	21b	A12 (north of B1119)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	21d	B1119 (east of A12)	Negligible (Not Significant)	Minor Beneficial (Not Significant)	N/A
	21e	A12 (south of B1119)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	22a	A12 (N)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	24	A12 Stratford St Andrew (Low Road)	Moderate Beneficial (Significant)	Low flow	N/A
	26	A12 Marlesford	Negligible (Not Significant)	Minor Adverse (Not Significant)	No Change
	28b	B1078 Wickham Market (east of B1438)	Minor Beneficial (Not Significant)	Negligible (Not Significant)	N/A
	34b	Main Road (E)	Low flow	Negligible (Not Significant)	N/A
	39c	A1094 (east of B1069)	Negligible (Not Significant)	Minor Beneficial (Not Significant)	N/A
	73	B1078 south of B1116	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
	78	A12 (north of B1121)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change

Period	Receptor		Magnitude of Change		Change in Significance
			As submitted in ES Volume 2, Chapter 11, Appendix 11G	Refined Strategic Traffic Modelling	
	81	B1078 at Campsea Ashe	Low flow	Negligible (Not Significant)	N/A
	102	B1122 High Street, Leiston (south of Cross Street)	Minor Adverse (Not Significant)	Negligible (Not Significant)	No Change
2034 Typical Night	24	A12 Stratford St Andrew (Low Road)	Beneficial	Low flow	N/A
	34b	Main Road (E)	Low flow	Negligible (Not Significant)	N/A
	81	B1078 at Campsea Ashe	Low flow	Negligible (Not Significant)	N/A

e) Updated assessment – sensitivity testing for 100% HGVs from the south

- 2.6.14 As detailed in **Appendix 8E** of the **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad), a sensitivity test has been undertaken based on 100% of HGVs from the A12 south (and 0% from the north) to understand if an alternative HGV distribution would result in any changes to the effects summarised in the **Transport Assessment** (Doc Ref. 8.5(A)) [AS-017] or the ES assessments, including the updated assessment of traffic noise impacts set out in the chapter.
- 2.6.15 The sensitivity test involved the recalculation of the daytime changes in road traffic noise along the same road links assessed in this chapter and in **Volume 2, Chapter 11** of the **ES** (Doc Ref 6.3) [APP-202], using traffic data based on routing 100% of the HGVs from the south, with 0% from the north.
- 2.6.16 The results of the sensitivity test show that in 2023, and 2028 for the busiest days, the greatest increase in noise is predicted to be +0.2dB, generally on the A12 to the south or west of Saxmundham. The category of effect in all instances is predicted to remain the same after the 0.2dB increase is taken into account, and all will remain as minor adverse effects, which are **not significant**.
- 2.6.17 The sensitivity test suggests that some decreases in road traffic noise could result from routing 100% of the HGVs from the south, with decreases of up to 0.5dB, 0.7dB and 1.0dB predicted for 2023, 228 typical day and 2028 busiest day respectively.

- 2.6.18 The changes are predicted to occur on the two parts of the A12 north of Saxmundham and on one part of the B1122 close to Yoxford. Again, even taking account of the decreases in level, the effect categories are not predicted to change and all remain as minor adverse effects, which are **not significant**.
- 2.6.19 For the night-time, the sensitivity test traffic data suggest that only a small number of HGVs are affected, in the region of 2 to 3 in 2028 typical day and 3 to 4 in 2028 on the busiest day. These changes of HGVs will not affect the calculated noise levels, and no changes are expected as a result.
- f) Updated assessment– enhancement of the permanent BLF and construction of a new temporary BLF (**Change 2**)
- 2.6.20 The noise and vibration assessment has been reviewed to consider how the enhancement of the design of the permanent BLF for the delivery of AILs and the provision of a new temporary BLF for the delivery of bulk materials would change assessment outcomes presented within **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202] .
- 2.6.21 Noise levels close to the additional BLF would be increased a result of its construction and operation, and the mode of operation of the enhanced BLF would be altered. However, since, the closest human receptors would be over a kilometre away from the BLFs and there are many other construction noise and vibration sources which are closer to these receptors, the noise and vibration levels in these locations would not be materially affected by the proposed changes. The proposed change would not result in a change in noise or vibration effects at any of the human receptors as a consequence.
- 2.6.22 Noise level changes which have the potential to affect ecological receptors and amenity and recreation receptors are discussed in **sections 2.9** and **2.10** of this chapter respectively
- 2.6.23 There are no significant changes to predicted noise or vibration levels on human receptors resulting from the proposed change. As such, no changes to the assessment presented within **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202] are required.
- g) Updated assessment – greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**)
- 2.6.24 The noise and vibration assessment has been reviewed to consider how the change to the Sizewell B relocated facilities layout would change the assessment outcomes.

- 2.6.25 In the case of Option 1, where no outage car park on Pillbox Field is proposed, the construction noise and vibration effects on Rosery Cottages, Home Farm, Beach View Holiday Park and the Sizewell village would be reduced, as construction works would be located further away from these noise sensitive receptors. However, the residual effects at these receptors following the implementation of construction mitigation measures during these works were already identified as between negligible and minor adverse (**not significant**) in **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202].
- 2.6.26 The effects of Option 2 would not materially differ from those presented in the **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202]. In addition, there would be no material change to the operational noise assessment for either of the proposed options.
- 2.6.27 There are no significant changes to the predicted noise or vibration levels resulting from the proposed change. As such, no changes to the assessment presented within **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202] are required.
- h) Updated assessment – change to certain parameter heights and activities on the main development site (**Change 4**)
- 2.6.28 The noise and vibration assessment has been reviewed to consider how the change to certain parameter heights and activities on the main development site would change assessment outcomes.
- 2.6.29 Construction activities and plant used would remain as reported in **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202]. The height and footprint of the stockpile area would be increased as a result of these changes. However, the work would not be materially closer to human receptors and the additional height would not affect noise or vibration propagation by an amount which would result in a different assessment outcome at any receptors.
- 2.6.30 There are no significant changes to predicted noise or vibration levels resulting from the proposed change. As such, no changes to the assessment presented within **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202] are required.
- i) Updated assessment– change to the location of the water resource storage area and the addition of flood mitigation measures (**Change 5**)
- 2.6.31 The noise and vibration assessment has been reviewed to consider how the change to the location of the water resource storage area and the addition of the flood mitigation area would change assessment outcomes.

- 2.6.32 The plant and equipment used for the construction of the water resource storage area and the flood mitigation area would be the same as that reported in **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202]. In addition, the work activities would not be materially closer to any human receptors. As a result, there would therefore be no changes to the assessment outcomes.
- 2.6.33 There are no significant changes to predicted noise or vibration levels resulting from the proposed change. As such, no changes to the assessment presented within **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202] are required.
- j) Updated assessment – extension of the Order Limits to provide for additional fen meadow habitat at Pakenham (**Change 11**)
- j) i) Construction
- 2.6.34 The assessment of the proposed Pakenham fen meadow site follows the same methodology as that used for the fen meadow sites at Benhall and Halesworth. The creation of the new fen meadow areas is anticipated to require very little mobile or other plant and therefore there will be very few sources of noise during these works. A review has been carried out of the proposed fen meadow compensation areas and nearby residential receptors and a detailed sound level assessment is presented in **Volume 3, Appendix 2.6.C** of the **ES Addendum**.
- 2.6.35 The assessment has considered a worst-case scenario, where an excavator may have to undertake some earth moving at the site boundaries and therefore at the closest positions to nearby residential receptors. For a few days, there is the potential for noise levels from works to be medium in magnitude, which would have a moderate effect but the very short duration of those works is such that they would result in **no significant** effect from noise. As a result, there would be no new or different significant noise and vibration effects to those presented within **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202].
- j) ii) Operation
- 2.6.36 There are no new or different significant operational effects from noise and vibration as a result of the operation of the proposed Pakenham fen meadow site, in comparison with **Volume 2, Chapter 11** of the **ES** (Doc Ref. 6.3) [APP-202].

k) Updated assessment – reduction in HGV movements (**Changes 1 and 2**)

- 2.6.37 This section considers the potential changes in the noise effects that are expected from the proposed changes explained in the update of the Freight Management Strategy (Doc Ref 8.18). The proposed changes would lead to a reduction in the number of HGVs on the road network by up to 150 HGVs per day at the peak of construction. This equates to a reduction of up to 300 daily HGV movements that would occur as a result of the proposed changes to rail and marine capacity, as explained in the update to the Freight Management Strategy (Doc Ref 8.18).
- 2.6.38 The benefit of these changes is likely to be most noticeable on the roads that are anticipated to carry most of SZC Co.'s traffic. This section considers the changes in road traffic noise levels on existing roads around the site. The potential changes in road traffic noise on the two village bypass and the Sizewell link road are not considered in this section; these effects are considered in **Chapter 5** and **Chapter 6** of this **ES Addendum** respectively.
- 2.6.39 Where the magnitude of effect changes, i.e. where the changes in rail and marine capacity cause a change in the magnitude of effect compared to the revised assessment taking into account the refinements to the strategic traffic model, the cells are coloured; the cells are green for a beneficial change, and orange for an adverse change.
- 2.6.40 The effect categories remain as set out in **Volume 1, Chapter 6, Appendix 6G** of the **ES** (Doc Ref 6.2) [APP-171].
- 2.6.41 **Table 2.29** contains all of the locations where the magnitude of effect is predicted to change as a result of the proposed changes in rail and marine capacity.

Table 2.29: Changes to road traffic noise assessment outcomes for existing roads resulting from the reduction in HGV movements

Period	Receptor		Magnitude of effect		Change in Significance
			Resulting from the refined strategic traffic modelling	Resulting from the reduction in HGV movements	
2028 Typical Day	21c	A12 (middle)	Minor (Not Significant)	Negligible (Not Significant)	No Change
	21e	A12 (south of B1119)	Minor (Not Significant)	Negligible (Not Significant)	No Change
	26	A12 Marlesford	Minor (Not Significant)	Negligible (Not Significant)	No Change
	78	A12 (north of B1121)	Minor (Not Significant)	Negligible (Not Significant)	No Change

2.6.42 The proposed change in rail and marine capacity is not predicted to lead to any adverse effects relative to the previously-assessed outcomes. All of the changes in traffic noise are either beneficial, i.e. a smaller increase in traffic noise or a greater reduction in traffic noise, or there is expected to be no change.

2.6.43 While there are no predicted changes to the significance of effects as a result of the proposed change in rail and marine capacity, there are predicted to be reductions in traffic noise relative to those previously-assessed. Reductions in traffic noise of just under 1dB are predicted in the peak construction year of 2028, on the busiest day relative to those that resulted from the Additional Information.

2.7 Air Quality

a) Introduction

2.7.1 This section provides an addendum to the air quality assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [[APP-212](#)];
- **Volume 2, Appendix 12A** of the **ES** (Doc Ref. 6.3) [[APP-213](#)];
- **Volume 2, Appendix 12D** of the **ES** (Doc Ref. 6.3) [[APP-214](#)];
- **Volume 2, Appendix 12F** of the **ES** (Doc Ref. 6.3) [[APP-214](#)].

2.7.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) Relevant Additional Information

2.7.3 Additional Information is presented in this chapter on the following:

- updates to correct errors within **Volume 2, Chapter 12** and **Appendix 12A** of the **ES** (Doc Ref. 6.3) [[APP-212](#); [APP-213](#)];
- updated air quality modelling of transport emissions to take into account the following:
- refined traffic representative estimate of 24-hour Annual Average Daily Traffic (AADT) for 2018 and future baseline scenarios, 2023 early year, 2028 peak year and 2034 operational scenarios (refer to **Transport Assessment Addendum** for further information (Doc Ref. 8.5(A) Ad));

- Emissions Factors Toolkit (EFT) version 10.1 (Ref. 1);
- Defra's projected 2018-based Background Pollutant Concentration Maps (Ref. 4);
- NO_x to NO₂ conversion tool v8.1 (Ref. 5);
- additional sensitivity testing, comprising:
 - transport emissions sensitivity testing of 100% HGVs from the south; and
 - Stratford St Andrew Air Quality Management Area (AQMA) sensitivity testing (refer to **Volume 3, Appendix 2.7.A** of the **ES Addendum** for further information).

b) i) Updates to correct errors

2.7.4 **Figure 12.1** in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212] had incorrect labelling at receptor location LE42. A revised figure was submitted to the Examining Authority in November 2020 (Doc Ref. 6.3(A)) [AS-015]. For completeness, the revised figure with the correct labelling is also provided in **Volume 2, Figure 2.7.1** of the **ES Addendum**.

2.7.5 **Figures 12A.2 and 12A.3** in **Volume 2, Appendix 12A** of the **ES** (Doc Ref. 6.3) [APP-213] have also been updated with the same correction, and provided as **Volume 2, Figure 2.7.2 and 2.7.3** of this **ES Addendum**. The updates made to the figures are described within **Volume 3, Appendix 2.7.B** of the **ES Addendum**. The figure updates do not change any other part of the air quality assessment.

2.7.6 The NO₂, PM₁₀ and PM_{2.5} concentrations were reported incorrectly for the receptor SX6 in **Volume 2, Appendix 12B** of the **ES** (Doc Ref. 6.3) [APP-213], due to a typographical error. The values for SX6 that should have been reported in the ES are presented in **Volume 3, Appendix 2.7.C** of the **ES Addendum**.

2.7.7 The corrections do not change the assessment of effects on air quality, as reported within **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212] and have, therefore, not been considered further within this section.

b) ii) Updated modelling of transport emissions

2.7.8 The traffic data for the Sizewell C Project has been updated with the refinements to the strategic traffic modelling as detailed in the **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad). This has been used to assess the air quality impacts from transport emissions in the study area

of the main development site. Details on the changes to the traffic data are provided in the **Transport Assessment Addendum** (Doc Ref. 8.5Ad).

- 2.7.9 In August 2020, Defra published a new version of Background Concentration Maps (Ref. 4) using 2018 as the reference year to project future background concentrations. Along with these background maps, a new EFT (Ref. 1) and NO_x to NO₂ conversion tool (Ref. 5) were published, also using the new 2018-based background maps. As these tools represent a more accurate prediction of future air quality backgrounds, they have been utilised in this updated assessment.

b) iii) Sensitivity testing

- 2.7.10 Following feedback from stakeholders including East Suffolk Council and Suffolk County Council, a technical note was prepared that presents a sensitivity test of the methods used to estimate future year emissions from road transport at Stratford St Andrew AQMA, and addresses questions raised by stakeholders related to future emission rates from road vehicles. The sensitivity test method and the sensitivity test note are presented in **Volume 3, Appendix 2.7.A** of this **ES Addendum**.
- 2.7.11 In addition, as detailed in **Appendix 8E** of the **Transport Assessment Addendum** (Doc Ref. 8.5Ad), a sensitivity test has been undertaken based on 100% of HGVs travelling from the A12 south (and 0% from the north), in order to understand if an alternative HGV distribution would result in any changes to the effects summarised in the **Transport Assessment** (Doc Ref. 8.5(A)) [AS-017] or the ES assessments, including the air quality assessment of traffic impacts (**Volume 2, Chapter 12** (Doc Ref. 6.3) [APP-212]). The results of this sensitivity test are reported within this section.

c) Relevant changes

- 2.7.12 The following changes have been considered within the revised assessment for air quality at the main development site:
- enhancement of the permanent BLF and construction of a new temporary BLF (**Change 2**);
 - change to certain parameter heights and activities on the main development site (**Change 4**); and
 - extension of the Order Limits to provide for additional fen meadow habitat at Pakenham (**Change 11**).

- 2.7.13 The potential increase in rail movements during construction of Sizewell C (**Change 1**) and the additional temporary BLF (**Change 2**) would result in a reduction in construction traffic (heavy duty vehicles (HDV)²) movements and an increase in the number of freight trains and vessel movements by sea during construction, as described in **section 2.2** of this chapter. The air quality assessment of the associated transport emissions is set out in **Volume 3, Appendix 2.7.C** of the **ES Addendum**.
- 2.7.14 All other proposed changes described in **section 2.2** of this chapter would not alter the assessment of air quality effects and, therefore, have not been considered further.
- d) Updated assessment – revised air quality modelling of transport emissions
- d) i) Baseline
- 2.7.15 Following the submission of the ES, Defra have published new Background Concentration Maps (Ref. 4) using 2018 as the reference year to project future background concentrations, an update since the ES, which used 2017-based backgrounds. The new background maps change the existing and future baseline for air quality described in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212].
- 2.7.16 However, the Additional Information does not change the existing and future baseline dust deposition rate as described in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212].
- d) i) b) Current baseline
- 2.7.17 Defra projected background mapping (Ref. 4) indicates that the current air quality in the study area is well below the relevant air quality objectives. Background pollutant concentrations at human and ecological receptors within the study area range from 6.6 to 23.8µg/m³ for NO₂, 13.1 to 18.7µg/m³ for PM₁₀, and 8.7 to 11.5µg/m³ for PM_{2.5}. The backgrounds for the current baseline are broadly in line with the background values set out within **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212].
- 2.7.18 The modelled baseline pollutant concentrations have changed as a result of the refined strategic traffic model updates and the new Defra tools. The baseline concentrations are broadly in line with the current baseline set out in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212], with the exception of some receptors near Woodbridge which have a lower baseline due to the reduced flows in the refined strategic traffic model and

² The term heavy duty vehicle (HDV) is used in the air quality assessment as an extension of heavy good vehicles (HGVs) to include consideration of other heavy vehicles, for example buses and/or coaches.

lower Defra background concentration. Full details of the modelled baseline for each receptor are provided in **Volume 3, Appendix 2.7.C** of the **ES Addendum**.

d) i) c) Future baseline

- 2.7.19 For the year 2023, background pollutant concentrations at human and ecological receptors within the study area range from 5.6 to 20.2µg/m³ for NO₂, 12.0 to 17.6µg/m³ for PM₁₀, and 7.9 to 10.6µg/m³ for PM_{2.5}, according to the recently published Defra Background Concentration Maps (Ref. 4).
- 2.7.20 For the year 2028, background pollutant concentrations at human and ecological receptors within the study area range from 5.1 to 18.3µg/m³ for NO₂, 11.7 to 17.2µg/m³ for PM₁₀, and 7.6 to 10.3µg/m³ for PM_{2.5} (Ref. 4).
- 2.7.21 For the year 2034, background pollutant concentrations at human and ecological receptors within the study area range from 5.1 to 18.1µg/m³ for NO₂, 11.7 to 18.1µg/m³ for PM₁₀, and 7.6 to 10.3µg/m³ for PM_{2.5} (Ref. 4).
- 2.7.22 The backgrounds for the future baseline years are broadly in line with the background values set out within **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212].
- 2.7.23 The modelled future baseline pollutant concentrations have changed as a result of the refined strategic traffic model updates and the new Defra tools. The future baseline concentrations are broadly in line with the baselines set out in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212], with the exception of some receptors near Woodbridge which have a lower baseline due to the reduced flows in the refined strategic traffic modelling model and lower Defra background concentration. Full details of the modelled baseline for each receptor are provided in **Volume 3, Appendix 2.7.C** of the **ES Addendum**.

d) ii) Assessment of Effects

d) ii) a) Construction

d) ii) a) a) Construction dust

- 2.7.24 The Additional Information does not change the assessment of construction dust presented in **Volume 2, Appendix 12A** of the **ES** (Doc Ref. 6.3) [APP-213]. As such, the effect at human health and ecological receptors is **not significant** with mitigation in place, as outlined in the **Code of Construction Practice (CoCP)** (Doc Ref. 8.11(A)) and the dust management plan outlined within **Volume 2, Appendix 12A** of the **ES** (Doc Ref. 6.3) [APP-213].

d) ii) a) b) Non-mobile plant emissions

- 2.7.25 The Additional Information does not change the assessment of emissions from the combined heat and power plant presented in **Volume 2, Appendix 12F** of the **ES** (Doc Ref. 6.3) [APP-214]. As such, the effect at human health and ecological receptors is **not significant**.

d) ii) a) c) Transport emissions

- 2.7.26 The Additional Information has resulted in changes to modelled pollutant concentrations at receptors due to changes in traffic flow on the affected road network assessed in the transport emissions assessment, and an update to Defra assessment tools since the ES. Details of the traffic data are provided in the **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad) and the air quality transport emissions assessment is reported in **Volume 3, Appendix 2.7.C** of the **ES Addendum**.
- 2.7.27 There is no change to the effect of increased concentrations of NO₂ and particulate matter at all receptors in Sizewell village, Leiston and properties near the B1122 (Abbey Road) during the 2023 early year and the 2028 peak year typical or busiest day scenarios. Furthermore, there is no change to the effects from the increased number of rail movements. Therefore, the effect on air quality at these receptors remains negligible (**not significant**) for early year and peak year construction scenario.
- 2.7.28 As reported in the ES, the largest predicted impacts occur away from the main development site at receptors within the villages of Stratford St Andrew and Farnham (SX5, SX6, SX7 and SX17) which are predicted to experience a 'minor' or 'moderate' beneficial effect at a small number of properties due to a medium (SX5) to high (SX6, SX7 and SX15) magnitude reduction in annual mean NO₂ concentration in the 2028 typical and busiest day scenarios, when the two village bypass is in operation.
- 2.7.29 During the 2028 typical and busiest day scenarios, a small number of receptors adjacent to the two village bypass (WM1, SX8 and SX9) would now experience a minor adverse (**not significant**) effect from NO₂. These receptors were reported to have a negligible (**not significant**) effect in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212].
- 2.7.30 The effect at SX5 from NO₂ in the 2028 scenarios would be minor beneficial (**not significant**), where there was reported to be a moderate beneficial (**significant**) effect in the ES. The effect from PM₁₀ at SX7 and SX15 would be minor beneficial (**not significant**), where there was reported to be negligible (**not significant**) effects in the ES. For PM_{2.5}, the effect at SX7 and SX15 would be negligible (**not significant**) and minor

beneficial (**not significant**) respectively, compared to a moderate beneficial (**significant**) effect reported in the ES.

2.7.31 Overall, the impact of transport emissions in all modelled scenarios during construction would remain negligible (**not significant**) effect at most residential receptor locations, with only a limited number of receptors experiencing a minor adverse (**not significant**) effect, or a minor beneficial (**not significant**) or moderate beneficial (**significant**) effect. The air quality effects for the study area as a whole resulting from transport associated with the construction of the proposed development are predicted to remain **not significant** for all sensitive receptors within the study area, the same as the overall effect for construction reported in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212].

2.7.32 For statutory sites designated for nature conservation, including Minsmere-Walberswick Heaths and Marshes, Sandlings, and Sizewell Marshes, where impacts exceed the 1% critical load threshold, there is expected to be a smaller contribution for construction phase transport emissions, compared to the results presented in the ES, with the exception of Foxburrow Wood. This site is not subject to the same assessment criteria as statutory designated sites, due to its non-statutory designation as a County Wildlife site. Foxburrow Wood would also benefit from the wider proposed measures to minimise emissions from the Sizewell C Project, as described in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212]. Overall, there is no change to the conclusion to the assessment of air quality effects at this site being **not significant**, as presented in **Volume 5, Chapter 7** (Terrestrial Ecology and Ornithology) of the **ES** (Doc Ref. 6.6) [APP-425].

d) ii) b) Operation

d) ii) b) a) Non-mobile plant

2.7.33 The Additional Information does not change the assessment of operational emissions from the non-mobile plant presented in **Volume 2, Appendix 12F** of the **ES** (Doc Ref. 6.3) [APP-214]. As such, the effect at human health and ecological receptors remains **not significant**.

d) ii) b) b) Transport emissions

2.7.34 With the Additional Information, the impact of transport emissions during operation would remain as negligible (**not significant**) effect at most residential receptor locations, with only a limited number of receptors experiencing a minor beneficial (**not significant**) or moderate beneficial (**significant**) effect in the villages of Stratford St Andrew and Farnham. Receptor SX5 would experience a minor beneficial effect (**not significant**) from NO₂, a change from the moderate beneficial

(**significant**) effect reported in the **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212]. Receptors SX7 and SX15 would experience a minor beneficial (**not significant**) effect from PM₁₀, a change from the negligible (**not significant**) effect reported in the **ES**.

- 2.7.35 The air quality effects for the study area as a whole resulting from transport associated with the operation of the proposed development are predicted to remain **not significant** for all sensitive receptors within the study area, the same as the overall effect for operation reported in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212].
- 2.7.36 For sites designated for nature conservation that exceed the 1% critical load threshold, there is expected to be a smaller contribution for operational phase transport emissions compared to the results presented in the **ES**, with the exception of Foxburrow Wood. This site is not subject to the same assessment criteria as it is a County Wildlife site and not a national designation. Foxburrow Wood would also benefit from the wider proposed measures to minimise emissions from the Sizewell C Project, as described in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212]. Overall, there is no change to the conclusion to the assessment of air quality effects being **not significant**, as presented in **Volume 5, Chapter 7** (Terrestrial Ecology and Ornithology) of the **ES** (Doc Ref. 6.6) [APP-425].

e) Updated assessment - sensitivity testing

e) i) Stratford St Andrew AQMA

- 2.7.37 The sensitivity test analyses presented within **Volume 3, Appendix 2.7.A** of this **ES Addendum** show that the assumptions for the transport emissions assessment in the **ES** (and the subsequent **ES Addendum**) are reasonable.
- 2.7.38 The analyses demonstrate that by making minor changes to the assumptions underpinning the modelling, the **ES** approach provides an assessment that does not represent an extremely optimistic or pessimistic prediction of likely effects. Therefore, the approach to the transport emissions modelling used within the **ES** and this **ES Addendum** is considered to remain valid.

e) ii) 100% HGVs from the south

- 2.7.39 A sensitivity test was undertaken to determine the potential impact on air quality traffic emission at receptors in the study area. No receptors would experience a change in air quality effect to the that reported for individual receptors in **Volume 3, Appendix 2.7.C** of the **ES Addendum**, with the exception of receptor SX6 in Stratford St Andrew, which has the potential

to experience a minor adverse (**not significant**) effect from NO₂ in the 2023 early year construction scenario, compared to a negligible (**not significant**) effect reported for the main assessment (**Volume 3, Appendix 2.7.C** of the **ES Addendum**). This is due to an increase in HDVs travelling on the A12 through the Stratford St Andrew AQMA in the early years of construction. In the 2028 busiest day peak year scenario, receptors in Stratford St Andrew are not expected to experience any change to the air quality effect reported in **Volume 3, Appendix 2.7.C** of the **ES Addendum**, as all additional HGVs from the south would travel on the two village bypass.

- 2.7.40 There would be no change to the assessment conclusion of not significant effects for the study area as a whole, as presented in **Volume 3, Appendix 2.7.C** of the **ES Addendum** and under **section 2.7d)** above.

f) Updated assessment – enhancement of the permanent BLF construction of a new temporary BLF (**Change 2**)

- 2.7.41 The construction dust assessment has been reviewed to consider whether the proposed changes to the permanent BLF and the new temporary BLF would result in materially different effects to those presented within **Volume 2, Appendix 12A** of the **ES** (Doc Ref. 6.3) [APP-213].

- 2.7.42 The delivery and transfer of bulk materials to the temporary BLF and permanent BLF would be managed in accordance with the **CoCP** (Doc Ref. 8.11(A)) and dust management plan, and therefore no additional dust impacts are expected during construction. During operation of the temporary BLF and permanent BLF, materials would be transferred from vessels to the construction site on an enclosed conveyor, that would limit the dust emissions during transfer of material to site.

- 2.7.43 The review concluded that the proposed enhanced permanent BLF is not expected to materially alter conclusions presented in **Volume 2, Appendix 12A** of the **ES** (Doc Ref. 6.13) [APP-213]. Therefore, with the measures outlined in the **CoCP** (Doc Ref. 8.11 (A)) and the dust management plan, the residual effects of dust soiling and particulates and ecological effects would be **not significant**.

g) Updated assessment – change to certain parameter heights and activities on the main development site (**Change 4**)

- 2.7.44 The construction dust assessment has been reviewed to consider whether the proposed change for the additional stockpiling area would result in materially different effects to those presented within **Volume 2, Appendix 12A** of the **ES** (Doc Ref. 6.3) [APP-213]. As stockpile heights are not being increased and conservative mitigation measures are included in the

CoCP (Doc Ref. 8.11 (A)), no new or different effects have been identified.

h) Updated assessment – extension of the Order Limits for additional fen meadow habitat at Pakenham (**Change 11**)

2.7.45 The off-site development assessment has been reviewed to consider whether the proposed change for the new fen meadow site at Pakenham would result in materially different effects to those presented within **Volume 2, Appendix 12D** of the **ES** (Doc Ref. 6.3) [APP-214].

2.7.46 Works to establish the new fen meadow mitigation area are not considered to result in a significant effect on air quality at sensitive receptors. Earthworks and handling of materials would be managed in accordance with the **CoCP** materials used for the works (Doc Ref. 8.11 (A)), and are expected to give a negligible level of risk of dust impacts due to the small scale of earthworks. Traffic related to construction of the fen meadow mitigation site is not expected to meet criteria that determine that an assessment of traffic emissions is needed. There would be no emissions associated with the site once the habitat is created.

2.7.47 Therefore, no new or materially different significant effects reported in **Volume 2, Chapter 12** and **Appendix 12D** of the **ES** (Doc Ref. 6.3) [APP-212, APP-214] have been identified.

i) Updated assessment – potential increase in rail movements and vessel emissions and reduction in HGV movements (**Changes 1 and 2**)

2.7.48 This section presents the assessment of impacts associated with the potential increase in rail movements, an increase in vessel emissions and the reduction in HGVs.

i) i) Transport emissions

2.7.49 An assessment of transport emissions (from both road and rail transport) associated with the changes that relate to the freight management strategy is presented in **Volume 3, Appendix 2.7.C** to the **ES Addendum**. The transport emissions associated with the proposed changes would only have an air quality effect on receptors during the peak years of construction (2028).

2.7.50 Similar to the transport emissions from the peak year construction scenario described in **section 2.7d**) above, the impact of transport emissions would have a negligible (**not significant**) effect at most residential receptor locations, with only a limited number of receptors experiencing a minor adverse (**not significant**) effect, or a minor

beneficial (**not significant**) or moderate beneficial (**significant**) effect. A small number of receptors have a change to the magnitude of change descriptor due to reduced HDVs (imperceptible for some receptors near Leiston or the A12, where they would experience very low or low change) or increase in train movements (very low or low for some receptors near the rail route, where they would experience imperceptible change). There is no change to the effect descriptors for each receptor. The magnitude of change and the effect at each receptor is presented in **Volume 3, Annex 2.7.C** to the **ES Addendum**.

- 2.7.51 The air quality effects for the study area as a whole resulting from transport associated with the construction of the proposed development under the proposed freight management strategy are predicted to remain **not significant** for all sensitive receptors within the study area, the same as the overall effect for construction reported for in section above and reported in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212].
- i) ii) **Vessel emissions**
- 2.7.52 It was specified in **Volume 2, Chapter 12** of the **ES** (Doc Ref. 6.3) [APP-212] that no detailed assessment of vessel emissions was undertaken, since the anticipated nature of movements associated with the proposed permanent BLF was significantly below the Defra screening threshold of 5,000 large ship movements per year with relevant exposure within 250m of berths.
- 2.7.53 For the purposes of this assessment, with the proposed change to the BLFs, the vessel movements are represented as 700 deliveries (1,400 movements) in any year. This scenario represents a conservative basis for the consideration of the temporary and permanent BLF. These figures remain substantially below the screening threshold of 5,000 large ship movements per year. A simple model was produced to represent shipping emissions for the updated freight management strategy.
- 2.7.54 A self-propelled vessel of 5.5m draft and 4,500 dead weight metric tonnes (DWT) has been assumed for the temporary BLF, with deliveries to the permanent BLF being made by a barge with two accompanying small tug boats. The emissions to air from the temporary BLF would be considerably greater per delivery and are used for the basis of assessment for both temporary and permanent BLF. A search of cargo vessels meeting these criteria indicated that a main engine with power output in the range of 2,500 to 2,750 kW, with two auxiliary engines up to 150 kW each would be representative. Source properties for the main engine were used as provided in **Table 2.30** with consideration from technical documents for MAN, MAK and Wartsilla and Ferus Smit (Ref. 6 - 9). It was also noted that the emissions reported in these documents were

lower than those which are consistent with post-2000 engine standards, as specified in the Defra UK ship emissions inventory (Ref. 10). To represent a worst-case estimate, the higher emission rates in the Defra document were used as presented in **Table 2.31**.

- 2.7.55 It was assumed that there would be no shoreside power, auxiliary and main engines would be used a berth as specified in **Table 2.32** (Ref. 10), these loads informed the final volumetric flow rate modelled. General ADMS5 model conditions are provided in **Table 2.33**, main engine and auxiliary engine flues would be combined into a single stack.

Table 2.30: Model Source Properties

Parameter	Value	Notes
At Berth (point source)		
Stack release height	9 m	Ref. 9
Cross sectional diameter	600 mm	Ref. 6
Stack temperature	388°C	Ref. 6
Stack exit velocity (actual)	43.7 m/s	Calculated
Stack flow (actual)	12.4 m³/s	Calculated
Manoeuvring (line source)		
Height	9 m	Ref. 9
Width	600 mm	Ref. 6
Route length	1 km	Parrelel to shore, either side of pier

Table 2.31. Emission rates used in models

Source	NO _x (g/kWh)	SO ₂ (g/kWh)	VOC (g/kWh)	PM (g/kWh)
Main Engine	11.3	0.8	1.8	0.9
Auxiliary engine	11.5	0.9	0.4	0.3

Table 2.32: Engine operation parameters

	% load of MCR for Main Engines operation	% load of MCR for Auxiliary Engines operation
At berth	20	50
Manoeuvring	20	40

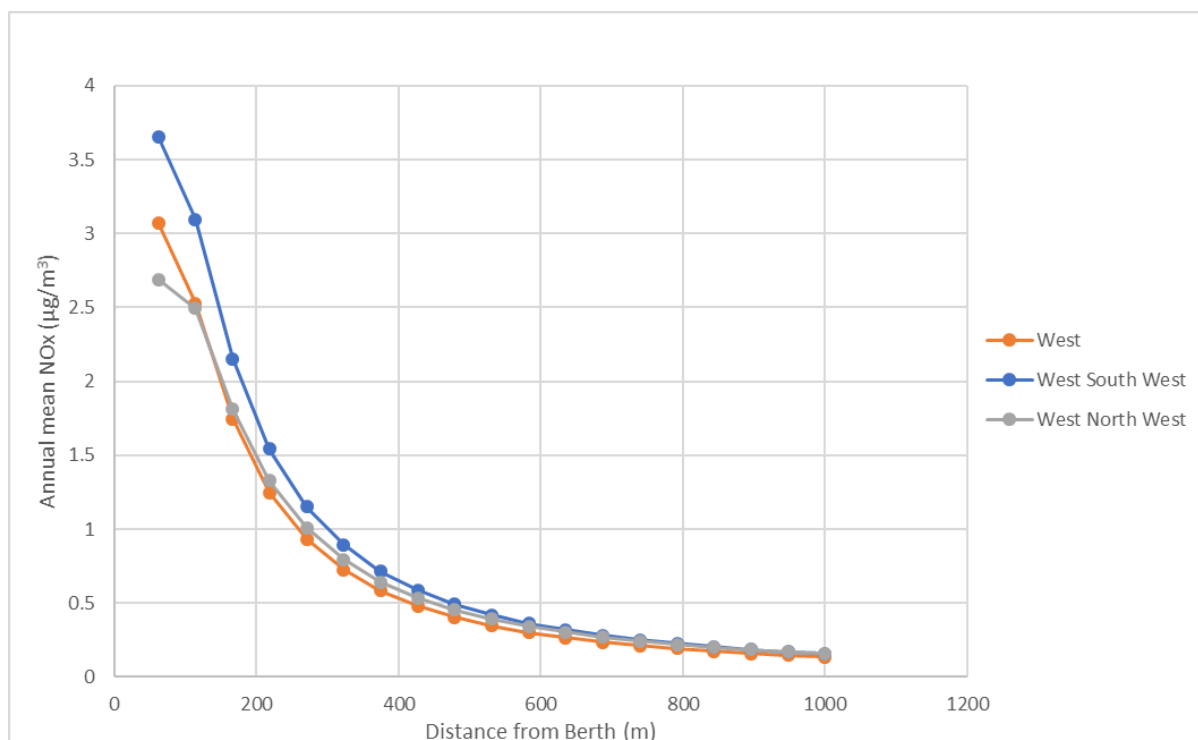
Table 2.33: General ADMS5 Model Conditions

Parameter	Input
Surface roughness at source	0.5
Surface roughness at meteorological site	0.5
Receptors	Polar grid r: 10-100, 20 points θ: 0-330, 12 points z: 0-0, 1 point
Meteorological data	Wattisham 2018
Terrain data	Flat
Emissions per vessel	Line (g/k/s) Point (g/s)

Parameter	Input		
	NO _x	1.05E-03	2.02E+00
	SO ₂	7.62E-05	1.45E-01
	VOC	1.40E-04	2.76E-01
	PM	7.18E-05	1.41E-01

2.7.56 Results from the modelling indicate that the concentrations of all pollutants are low. The pollutant of most concern to the Sizewell C Project as a whole is NO₂/NO_x. Results obtained from this shipping model task indicate that no considerable NO₂/NO_x emissions are contributed. **Plate 2.1** shows annual mean NO_x results, which were factored appropriately to reflect a worst-case schedule, assuming that number of movements specified above and 8 hours of berth per day, every day of the year. Only data for points due west, west south west and west north west of the point source are presented as this would be the direction towards land under the shipping strategy.

Plate 2.1: Annual Mean NO_x concentrations at different distances from berth

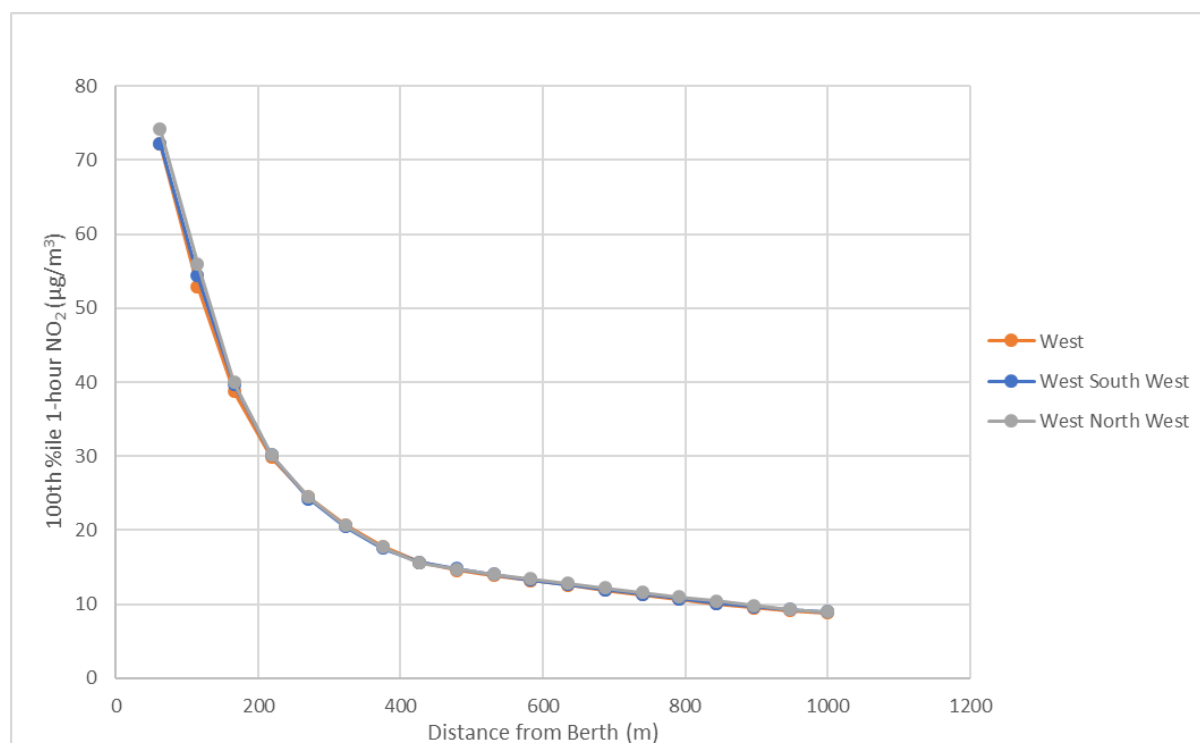


2.7.57 The data presented in **Plate 2.1** show that the highest impacts are predicted to occur at sea. At the high tide mark, NO_x concentrations are well below 1 µg/m³. The impacts at ecological receptors are therefore expected to be extremely small and even less considerable at human

receptors, where the nearest residential receptor is over 1km from the anticipated location of berth.

- 2.7.58 **Plate 2.2** shows 100th percentile 1-hour NO₂. Again, only data for points due west, west south west and west north west of the point source are presented as this would be the direction towards land under the shipping strategy.

Plate 2.2: 100th percentile 1-hour NO₂ concentrations at different distances from berth



- 2.7.59 The data presented in **Plate 2.2** indicates that predicted maximum 1-hour NO₂ concentrations are small. At the high tide mark, concentrations are predicted to be less than 10% of the NO₂ short-term air quality standard.
- 2.7.60 The magnitude of the predicted impacts is too small to be capable of causing a significant effect at any air quality sensitive receptor either singularly or in combination.
- 2.7.61 The outcome of the simple shipping models show that the screening threshold applied in the ES is upheld despite an increase in anticipated shipping movements and shipping emissions can confidently be removed from further consideration within the context of the air quality study.

2.8 Landscape and visual

a) Introduction

2.8.1 This section provides an addendum to the landscape and visual impact assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [[APP- 216](#)]; and
- **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [[APP- 218](#) and [APP -219](#)].

2.8.2 This assessment considers the relevant proposed changes at the main development site, as summarised in sections below. The Additional Information summarised in **section 2.2** of this chapter does not alter the landscape and visual assessment, and, therefore, has not been considered further within this section.

b) Relevant changes

2.8.3 The following design changes have been considered within the revised assessment for landscape and visual receptors at the main development site:

- enhancement of the permanent BLF (**Change 2**);
- construction of a new, temporary BLF (**Change 2**);
- greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**);
- change to certain parameter heights and activities on the main development site (**Change 4**);
- change to the location of the water resource storage area and the addition of flood mitigation measures (**Change 5**);
- change to the SSSI crossing design to a single span bridge with embankments (**Change 6**);
- revisions to tree retention on the main development site (**Change 7**);
- surface water removed early in the construction process to be discharged to the foreshore via a temporary outfall structure (**Change 8**);

- change to the sea defence to make the scheme more efficient and resilient to climate change (**Change 9**);
- extension of the Order Limits to provide additional fen meadow habitat at Pakenham (**Change 11**);
- minor extensions and reductions of the Order Limits for works on the main development site and related sites (fen meadow mitigation and marsh harrier improvement sites) (**Change 13**); and
- a new bridleway link between Aldhurst Farm and Kenton Hills (**Change 15**).

c) Updated material supplementary to assessment

2.8.4 Additional and updated information to that presented within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] has been prepared to inform the assessment of effects on landscape and visual receptors arising from relevant elements of the proposed changes at the main development site.

2.8.5 This includes Zone of Theoretical Visibility modelling to illustrate potential for visibility of the relevant proposed changes; updated narrative on the representative viewpoint photography to describe amendments to the judgements presented regarding the scale of visual effects arising; and updated construction phase photowires, where the relevant proposed changes are material considerations in informing the assessment of effects in this **ES Addendum**. The relevant figures included within **Volume 2** of this **ES Addendum** are as follows:

c) i) Zone of Theoretical Visibility Modelling

- Figure 2.8.1 - Zone of Theoretical Visibility model of enhanced permanent beach landing facility parameters (construction zone C16);
- Figure 2.8.2 - Zone of Theoretical Visibility model of temporary beach landing facility parameters (construction zone C20);
- Figure 2.8.3 - Zone of Theoretical Visibility model of marine shafts and tunnelling works parameters (construction zone C21); and
- Figure 2.8.4 - Zone of Theoretical Visibility of hard coastal defence parameters.

c) ii) Representative Viewpoints Photograph Panels

- Figure 2.8.5 – Representative Viewpoint 6: Photograph Panel (Suffolk Coast Path east of Goose Hill);
- Figure 2.8.6 – Representative Viewpoint 10: Photograph Panel (Suffolk Coast Path and Sandlings Walk east of Hill Wood);
- Figure 2.8.7 – Representative Viewpoint 14: Photograph Panel (Suffolk Coast Path at Minsmere Sluice);
- Figure 2.8.8 – Representative Viewpoint 15: Photograph Panel (Beach at Thorpe Ness);
- Figure 2.8.9 – Representative Viewpoint 16: RSPB Minsmere (Whin Hill);
- Figure 2.8.10 – Representative Viewpoint 17: Photograph Panel (National Trust Dunwich Coastguard Cottages car park);
- Figure 2.8.11 – Representative Viewpoint 23: Photograph Panel (Promenade, Southwold at junction with East Cliff road);
- Figure 2.8.12 – Representative Viewpoint 26: Photograph Panel (1800m directly east of Sizewell power stations); and
- Figure 2.8.13 – Representative Viewpoint 31: Photograph Panel (Shingle beach east of secondary sea defence bund).

c) iii) Night Time Representative Viewpoint Photograph Panels

- Figure 2.8.14 – Night Time Representative Viewpoint 6: (Suffolk Coast Path east of Goose Hill);
- Figure 2.8.15 – Night Time Representative Viewpoint 10: Photograph Panel (Suffolk Coast Path and Sandlings Walk east of Hill Wood);
- Figure 2.8.16 – Night Time Representative Viewpoint 14: Photograph Panel (Suffolk Coast Path at Minsmere Sluice);
- Figure 2.8.17 – Night Time Representative Viewpoint 17: Photograph Panel (National Trust Dunwich Coastguard Cottages car park); and
- Figure 2.8.18 – Night Time Representative Viewpoint 26: Photograph Panel (1800m directly east of Sizewell power stations).

c) iv) Construction Phase Parameters Based Photowires

- Figure 2.8.19 – Representative Viewpoints: Construction Phase Parameters Based Photowire – Viewpoint 8: Footpath north of Leiston Abbey;
- Figure 2.8.20 – Representative Viewpoints: Construction Phase Parameters Based Photowire – Viewpoint 14: Suffolk Coast Path at Minsmere Sluice;
- Figure 2.8.21 – Representative Viewpoints: Construction Phase Parameters Based Photowire – Viewpoint 16: RSPB Minsmere (Whin Hill);
- Figure 2.8.22 – Representative Viewpoints: Construction Phase Parameters Based Photowire – Viewpoint 17: National Trust Dunwich Coastguard Cottages car park;
- Figure 2.8.23 – Representative Viewpoints: Construction Phase Parameters Based Photowire – Viewpoint 28: Footpath south of Theberton; and
- Figure 2.8.24 – Representative Viewpoints: Construction Phase Parameters Based Photowire Key.

d) Updated assessment – enhancement of the permanent BLF (Change 2)

d) i) Baseline

- 2.8.6 Analysis of ZTV modelling (**Figure 2.8.1**) indicates that no new landscape or visual receptors will be affected by the proposed design change to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216].

d) ii) Environmental Design and Mitigation

- 2.8.7 No additional mitigation has been identified to that embedded in the changed design.

d) iii) Assessment of effects

d) iii) a) Construction

- 2.8.8 The proposed changes would introduce a new exceptional construction phase height parameter (+60m AD) to construction zone C16 and increase the length of the enhanced permanent BLF. The changes would

also introduce additional permanent infrastructure to the original design, including additional piles, elevated cross beams and a submerged grillage (a grounding platform, assumed to be made of a combination of concrete, timber and steel, and protruding above bed level by less than a metre).

- 2.8.9 The proposed changes to the design would increase the capacity of the enhanced permanent BLF to receive more deliveries. This would increase the number and frequency of barges/tugs visible in the offshore environment (both moored and moving) and vehicles using the access road.
- 2.8.10 The nature of some views from coastal locations would be changed (refer to Representative Viewpoint Photograph Panels (**Figures 2.8.5, 2.8.6, 2.8.7, 2.8.8, 2.8.9, 2.8.10, 2.8.11, 2.8.12 and 2.8.13**) and Construction Phase Photowire Visualisations (**Figures 2.8.20, 2.8.21, 2.8.22**)). This would be partly due to the addition of cross-beams and a greater number of piles associated with the BLF, although more notably when tall cranes and plant are operational within the exceptional height parameter in construction zone C16.
- 2.8.11 These changes would not change the level of significance of the effects arising during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP-216].
- 2.8.12 The enhanced permanent BLF would only occasionally operate at night during the construction phase, when sea conditions are suitable, although lighting may be required for safety reasons during the operation of the BLF. As such, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

d) iii) b) Operation

- 2.8.13 The proposed change to the enhanced permanent BLF would increase the number of piles and the length of the BLF and introduce elevated horizontal cross beams to the piles, which would alter the appearance of the BLF, when not in use during the operational phase. Furthermore, the proposed changes introduce a submerged grillage.
- 2.8.14 Whilst the design change increases the amount of physical infrastructure visible above water and submerged, the changes would not change the level of significance of the effects arising during the operational phase on visual receptor groups; visual receptors using key routes; visual receptors

at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in the LVIA **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216].

2.8.15 There would be no change to the level of significance of the night time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

e) Updated assessment – construction of a new, temporary BLF (Change 2)

e) i) Baseline

2.8.16 Analysis of ZTV modelling (**Figure 2.8.2**) indicates that no new landscape or visual receptors would be affected by the proposed design change to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216].

e) ii) Environmental Design and Mitigation

2.8.17 No additional mitigation has been identified to that embedded in the changed design.

e) iii) Assessment of effects

e) iii) a) Construction

2.8.18 The proposed change would introduce a new construction zone (C20) for the temporary BLF with a normal working height parameter of +25m AOD and exceptional working height parameter of +60m AOD that would increase the visibility of construction phase activity on the coast and in the immediate offshore environment from locations along the coast and offshore.

2.8.19 The proposed change would introduce a temporary BLF for a duration of approximately 8 years which is medium-term for the purpose of this assessment. The facility would be up to approximately 505m in length and located to the south of the permanent BLF. The temporary BLF would include mooring dolphins, an unloading area at the seaward end, pathway and vehicular access road running the full length of the facility and a conveyor that would pass over Sizewell beach and temporary sheet pile sea defence directly into the secure construction site. In addition to the views to the BLF structure itself, moving vehicles would be visible operating on the facility, although this would be infrequently, in particular from locations to the south. In views from the north the conveyor would largely screen views to vehicles. Other types of plant would be visible –

including cranes during the construction and dismantling of the facility, and excavators on vessels which would be used to transfer materials onto the conveyor system. Views would also encompass relatively large self-propelled vessels (up to approximately 120m in length) in the marine environment during year-round operational campaigns, which would be seen traversing offshore on their approach and departure from the temporary BLF and whilst moored at the facility to unload materials.

2.8.20 The temporary BLF would be able to operate at night and as such views would be possible to standard navigation lighting on mooring dolphins and on nearby navigation markers and buoys. Furthermore, task and ambient lighting would be required along the temporary BLF and vessels would be illuminated when moving and moored in the offshore environment.

2.8.21 A summary of the assessment of effects relating to the temporary BLF compared to the judgements within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] is presented in **Volume 3, Appendix 2.8.A** to the **ES Addendum**.

e) iii) a) b) Landscape/seascape character

e) iii) a) b) a) Coastal Dunes and Shingle Ridges Landscape Character Type (LCT)

2.8.22 Views along the coast and offshore are a characteristic feature of the Coastal Dunes and Shingle Ridge LCT and it is judged to have a high-medium susceptibility to the effects arising from major construction activity within the character type and adjacent landscape/seascape. The coastal landscape and immediate offshore area is within the Suffolk Coast and Heaths AONB and Suffolk Heritage Coast, and is of national value. The LCT is judged to be of high sensitivity.

2.8.23 Within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216], large and medium scale effects are identified along Sizewell beach between the area adjacent to the northern edge of Goose Hill and Sizewell Gap, with large scale effects across the whole of this part of the LCT when taller cranes are in use and when the permanent BLF and northern mound are under construction. These effects are assessed in the ES to be of high-medium magnitude, major (**significant**) and adverse.

2.8.24 The temporary BLF would increase the area across which large and large-medium scale effects occur on the character of the Coastal Dunes and Shingle Ridges LCT due to an increase in physical infrastructure on the coastline and in the immediate offshore environment, as well as from changes to views within the LCT. Changes would include views of the temporary BLF in addition to the other construction activity and relatively

frequent views to large vessels moving and moored offshore, which would be larger and more frequent than the vessels associated with the permanent BLF and assessed in the ES.

- 2.8.25 As illustrated on Representative Viewpoints 6, 10, 14, 15 and 31 (**Figures 2.8.5, 2.8.6, 2.8.7, 2.8.8 and 2.8.13**), large and large-medium scale effects would extend for a greater distance than assessed in the ES, stretching along the coastline adjacent to Minsmere to the edge of the area of higher ground at Dunwich Coastguard Cottages to the north and south to Thorpe Ness. Along this stretch of the LCT, built structures within the LCT and extending offshore are not currently a feature and the presence of large vessels and associated movement close to the shore is not characteristic. The scheme assessed in the ES would introduce construction activity adjacent to the LCT and extending into the LCT, but to a lesser extent and of a differing character to that proposed as part of the proposed change. These effects would reduce with distance from the site. Medium-term effects would affect an enlarged intermediate extent of the Coastal Dunes and Shingle Ridges LCT, increasing from the localised extent identified in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP-216] for the duration of the presence of the temporary BLF. The overall effects would remain of high-medium magnitude, major (**significant**) and adverse.
- 2.8.26 **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] records that areas of this LCT in close proximity to the existing Sizewell power stations, are influenced by artificial lighting at the existing power station complex. It also reports that areas adjacent to the main development site (predominantly Sizewell Beach) would experience effects that would be major-moderate (**significant**) and adverse at night due to construction lighting within the main development site and occasionally at the permanent BLF. The introduction of additional fixed and mobile lighting into a largely dark offshore environment, extending into the sea by over 500m and with a backdrop of open and unlit sea when viewed from the north, south and west, would result in large and large-medium scale effects at night in the area of the Coastal Dunes and Shingle Ridges LCT described above. The large scale effects would relate to a localised extent of the LCT rather than the limited extent identified in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216], with large-medium scale effects relating to an intermediate extent of the LCT. The overall effects would remain of major-moderate (**significant**) and adverse.
- 2.8.27 Beyond these extents, where the temporary BLF would either not be visible or distance would reduce its influence on landscape character in comparison to the construction effects of the rest of the main development site, the effects would remain as presented in **Volume 2, Chapter 13** of

the **ES** (Doc Ref. 6.3) [APP- 216] and in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3).

e) iii) a) b) b) **Nearshore Waters Seascape Character Type (SCT)**

- 2.8.28 Views towards and along the coast and offshore are a characteristic feature of the Nearshore Waters SCT and it is judged to have a high-medium susceptibility to the effects arising from major construction activity within the character type and adjacent to the coast. The immediate offshore area is within the Suffolk Heritage Coast and immediately adjacent to the Suffolk Coast and Heaths AONB and is of national value. The Nearshore Waters SCT is judged to be of high sensitivity.
- 2.8.29 **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] records that effects on the Nearshore Waters SCT would arise from views of construction activity within the main development site rather than from direct effects. Looking towards the shore from offshore locations, the views of construction activity onshore, would continue to influence seascape character, with the activity associated with the temporary BLF located in front of it. The temporary BLF would introduce areas across which large and large-medium scale effects on the character of the Nearshore Waters SCT would occur. The effects would occur due to an increase in physical infrastructure in the offshore environment and arising from changes to views due to the introduction of the temporary BLF against a backdrop of open sea from the north and south. There would also be relatively frequent views to large vessels moving and moored offshore, an increase in both scale and frequency from the movement of vessels associated with the permanent BLF and assessed in the **ES**.
- 2.8.30 As illustrated on Representative Viewpoints 26 (**Figure 2.8.12**) and similarly to the effects described above for the onshore Representative Viewpoints 14 and 15 (**Figures 2.8.7** and **2.8.8**), large to large-medium scale effects would extend offshore to approximately 2.5 km and along the coastline adjacent to Minsmere to the edge of the area of higher ground at Dunwich Coastguard Cottages to the north and south to Thorpe Ness, with the scale of effect diminishing with distance from the temporary BLF.
- 2.8.31 Large scale medium-term effects would affect a localised extent of the Nearshore Waters SCT and large-medium scale effects would affect an intermediate area of the SCT. The overall effects would increase to high-medium to medium magnitude, but as this increase would be medium-term rather than long term. The effects would remain major-moderate (**significant**) and adverse.
- 2.8.32 **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] records that areas of this SCT reports that artificial lighting at the main development

site would result in a greater degree of artificial lighting being visible in views towards the coastline within the Nearshore Waters SCT and that effects would be major-moderate (**significant**). The introduction of additional fixed and mobile lighting into a largely dark offshore environment, particularly when viewed from the north and south, would result in large to large-medium scale effects at night in the area of the Nearshore Waters SCT described above. The large scale effects would relate to a localised extent of the SCT rather than the limited extent identified in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216], with large-medium scale effects relating to an intermediate extent of the LCT. However, the overall effects would remain major-moderate (**significant**) and adverse due to the medium term duration of the effects of the temporary BLF and the continued effect of the construction lighting within the main development site during the same timescale.

- 2.8.33 Beyond these extents, the effects would remain as presented in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] and in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

e) iii) a) c) [Visual Receptors](#)

- 2.8.34 In some instances, and principally in the area up-to 2.5km along the coast and offshore, it is judged that the level of significance of effects on visual receptors with high to high-medium sensitivity would be increased from that presented within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] for the duration over which the temporary BLF would be constructed, operational and decommissioned.

e) iii) a) c) a) [Visual Receptor Group 8: Dunwich to Minsmere Coast](#)

- 2.8.35 **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] records that most of the narrow coastal stretch between Dunwich and Minsmere Sluice, containing the route of the Suffolk Coast Path, would have views of taller elements of the construction work, with the majority of lower elements of construction work screened by tree cover, excepting for a brief period adjacent to the power station platform before reinstatement of the northern mound. These effects are assessed to be of high–medium magnitude, major to major–moderate (**significant**) and adverse.

- 2.8.36 In the views south along the narrow stretch of the coast, the temporary BLF and its associated operation, would be seen in the context of construction activity extending inland across the right hand side of views and in the existing context of built development at Sizewell A and Sizewell B power stations, and the permanent BLF. Views offshore would alter to encompass the temporary BLF and vessels moving and moored in the marine environment. But in the context of a wider offshore seascape. With

reference to Representative Viewpoint 14 at Minsmere Sluice (**Figure 2.8.7**) and **Figure 2.8.20** which illustrates the construction phase parameters based photowire from the same location, the medium-term visual effects would be of large scale reducing to large-medium over distance and experienced over a wide extent of the visual receptor group. These effects would be of high to high-medium magnitude, and remain major to major-moderate (**significant**) and adverse overall, given the medium-term duration of the presence of the temporary BLF and the adjacent context and presence of the main development site construction activity.

- 2.8.37 At night, lighting at the existing Sizewell A and Sizewell B power stations interrupt the largely intrinsically dark environments in views along the coastal strip from within this visual receptor group with views offshore remaining intrinsically dark (refer to Representative Viewpoint 14 located on the Suffolk Coast Path at Minsmere Sluice (**Figure 2.8.16**)). **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] records that from within this visual receptor group the removal of the northern mound and sea defences would enable views of task lighting inside the main development site and illumination associated with the permanent BLF and access would also be visible. Views to the remainder of the construction site would generally be screened by intervening vegetation and landform. However, illumination to taller plant such as cranes and skyglow associated with lighting would be visible above the level of the trees extending predominantly across the inland part of the view. The temporary BLF would introduce further static and moving lighting to the coastal and offshore environment, extending lighting approximately 500m into the sea with a backdrop of undeveloped and unlit sea, but viewed in the context of the construction lighting associated with the main development site. Considering the high-medium sensitivity of receptors, the medium-term visual effects would be of large scale and experienced over a wide extent of the visual receptor group. These effects would be of high to high-medium magnitude, and remain major to major-moderate (**significant**) and adverse.

e) iii) a) c) b) **Visual Receptor Group 12: Minsmere to Sizewell Coast**

- 2.8.38 **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] records that users of the beach, as it passes the construction site and locations further to the north and south, would experience very close views of construction work within the power station platform, demolition and reinstatement of the Northern Mound and coastal defences and construction and operation of the permanent BLF and access road. Tall cranes around the main construction area would form locally dominant elements within the view. Access would be controlled at times, and the Suffolk Coast Path would move during different stages of construction of the sea defences, beach

landing facilities and main construction area. In addition to the construction effects already apparent, the temporary BLF would be visible during its construction and operation. Once operational the Suffolk Coast Path would run beneath the temporary BLF as it crosses the beach and extends out into the sea. On occasions the route may be entirely closed for short durations and walkers would be diverted inland. As indicated by Representative Viewpoint 6 on the Suffolk Coast Path east of Goose Hill, Representative Viewpoint 10 at Suffolk Coast Path and Sandlings Walk east of Hill Wood and Representative Viewpoint 31 at Shingle beach east of secondary sea defence bund (**Figure 2.8.5, Figure 2.8.6 and Figure 2.8.13**), the medium-term visual effects of the construction of the main development site with the addition of the temporary BLF would remain of large scale and experienced over a wide extent of the visual receptor group, seen in the context of the wider construction activity. These effects would be of high magnitude, major (**significant**) and adverse as recorded in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216], but the effects would not reduce as notably further south as recorded in the **ES** as the temporary BLF would remain a clearly visible element in the view.

2.8.39 At night, lighting at the existing Sizewell A and Sizewell B power stations interrupts the largely intrinsically dark environments in views along the coastal strip, with views offshore and when orientated away from the existing Sizewell A and Sizewell B power stations remaining intrinsically dark. Artificial light associated with the existing Sizewell A and Sizewell B power stations includes perimeter lights, and light reflected off existing structures and sky glow. The nature of existing views is illustrated by Representative Viewpoint 6 (Suffolk Coast Path east of Goose Hill) on **Figure 2.8.14** and Representative Viewpoint 10 (Suffolk Coast Path and Sandlings Walk east of Hill Wood) on **Figure 2.8.15**.

2.8.40 Whilst the illumination associated with the existing power stations is a notable feature of this stretch of the coastline, the sensitivity of receptors is judged in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] to be medium (community value and high susceptibility). **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] records that in views from the coast the removal of the northern mound and sea defences would enable views of lighting inside the main development site and illumination associated with the beach landing facility and access would also be visible. Illumination to taller plant such as cranes and skyglow associated with lighting would be visible predominantly extending across the inland part of views. Additional lighting associated with the temporary BLF would be viewed in the context of the construction phase lighting and would introduce further static and moving lighting to the coastal and offshore environment when it is operating. The medium-term visual effects would continue to be of large scale and experienced over a wide extent of the visual receptor group due to the continued influence of the lighting

associated with the construction of the main development site on this visual receptor group. These effects would remain of high magnitude, major-moderate (**significant**) and adverse as recorded in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216].

e) iii) a) c) c) Visual Receptor Group 20: Sizewell to Thorpeness Coast

2.8.41 The section of coast north of Thorpe Ness has views similar to those shown for Representative Viewpoint 15 located on the beach at Thorpe Ness (**Figure 2.8.8**). **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] records that the construction works for the main development site would be apparent in the view and partly screened by the existing power station structures and coastal landform. The main visible elements would include the onshore cranes and construction of taller onshore permanent structures and the permanent BLF. These effects were assessed to be of medium-low magnitude, moderate (**not significant**) and adverse in the ES. The temporary BLF would be visible in addition, along with the increase in size and frequency of moored and moving vessels in the marine environment, with the temporary BLF extending development further into the sea. During the medium-term when the temporary BLF would be under construction, in operation and subsequently, decommissioned, the effects would be large-medium scale closest to the site in the context of the main construction site, reducing to medium scale in the south of the visual receptor group. Effects would be of high-medium to medium magnitude, and range from major-moderate (**significant**) and adverse closest to the temporary BLF to remain moderate (**not significant**) and adverse further south.

2.8.42 At night, lighting at the existing Sizewell A and Sizewell B power stations interrupts the largely intrinsically dark environments in views along the coastal, with views offshore and when orientated away from the existing Sizewell A and Sizewell B power stations remaining intrinsically dark. Whilst viewed in the context of construction phase lighting, and in particular arising from works along the coastal frontage and illuminated cranes and skyglow, the temporary BLF would introduce further static and moving lighting to the coastal and offshore environment when it is operating, against the open and unlit sea. Considering the medium sensitivity of receptors, the medium-term visual effects would be of large to large-medium scale and experienced over a wide extent of the visual receptor group. These effects would be of high to high-medium magnitude, major-moderate to moderate (**significant**) and adverse.

e) iii) a) c) d) Visual Receptor Group 24: Offshore

2.8.43 Effects arising from views to construction activity along the beach and in particular during the demolition and reconstruction of the sea defences

and views to tall plant and emerging buildings and vessels using the permanent BLF and temporary BLF would be of large scale adjacent to the site and up-to approximately 2.5km offshore, extending the extent of large scale effects slightly further than the 2km distance recorded in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216]. This alteration in scale of effect is due to the introduction of the temporary BLF extending into the sea as well as the increase in size and frequency of movement of large vessels, as illustrated by Representative Viewpoint 26 located 1800m directly east of the Sizewell power stations (**Figure 2.8.12**). In views from the north and south, the temporary BLF would be viewed in the context of the main onshore construction activity, permanent BLF and its associated operation and against a backdrop of open sea and in an area where the number and size of vessels associated with the permanent BLF assessed in the ES would be smaller. Beyond approximately 2.5km, the effects would reduce to medium-small scale and then negligible beyond approximately 5km.

- 2.8.44 Within approximately 2.5km of the site (which remains a localised extent of the visual receptor group), medium-term effects on recreational users (high–medium sensitivity) would remain of high-medium magnitude, remain major to major-moderate (**significant**) and adverse.
- 2.8.45 Between 2.5–5km from the site (an intermediate extent), effects on recreational water users would remain of medium - low magnitude, remain moderate (**not significant**) and adverse reducing to minimal (**not significant**) beyond 5km as recorded in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216].
- 2.8.46 As illustrated by Representative Viewpoint 26, located 1800m directly east of Sizewell power station (**Figure 2.8.18**), at night the offshore environment is characteristically dark with few sources of artificial light. Some point source lights are visible -including marker buoys in proximity to the Sizewell B infall and outfall structures. In views to the shoreline, the existing Sizewell power stations are a notable source of artificial lighting, including point source perimeter lights, reflected light off structures and sky glow, seen above the level of the sea defences. Views along the shoreline include dark areas and areas of illumination at coastal settlements, such as Sizewell and Southwold. Views offshore are typically across dark open sea. Subject to weather conditions, lights on offshore wind turbines are visible to the south. **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] records that views of construction phase lighting would appear particularly prominent from the offshore zone. This would include works into the main development site (particularly following the removal of the sea defences and northern mound) and works occurring on the beach including the beach landing facility and access. Both fixed and task lighting would be visible. Illuminated cranes and

skyglow would be also be visible. The temporary BLF would be viewed in this context but would introduce further static and moving lighting to the coastal and offshore environment, particularly when viewed from the north and south against the backdrop of the unit sea. Considering the medium sensitivity of receptors and the context of the main construction site and permanent BLF construction and operation, the medium-term visual effects would remain as recorded in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] - large scale and experienced over a wide extent of the visual receptor group. These effects would remain of high magnitude, major-moderate (**significant**) and adverse.

e) iii) a) d) Key routes (recreational)

e) iii) a) d) a) Suffolk Coast Path

2.8.47 Users of the sections of the Suffolk Coast Path that follow the coastline approximately between Dunwich Coastguard Cottages and Dower House would experience views of the construction and operation of the temporary BLF and moored and moving vessels offshore. The temporary BLF would be seen in the context of construction work within the power station platform, demolition and reinstatement of the Northern Mound and coastal defences and construction and operation of the permanent BLF and access road. Access along the Suffolk Coast Path would be controlled at times, and the walking route would move during different stages of construction of the sea defences and beach landing facilities. Once operational the Suffolk Coast Path would run beneath the conveyor for the temporary BLF as it crosses the beach and extends out into the sea, and on rare occasions the route may be entirely closed for short durations and walkers would be diverted inland. As indicated by Representative Viewpoint 6 on the Suffolk Coast Path east of Goose Hill, Representative Viewpoint 10 at Suffolk Coast Path and Sandlings Walk east of Hill Wood, Representative Viewpoint 14 on the Suffolk Coast Path at Minsmere Sluice and Representative Viewpoint 31 at Shingle beach east of secondary sea defence bund (**Figure 2.8.5, Figure 2.8.6, Figure 2.8.7 and Figure 2.8.13**) and the construction phase photowire at Representative Viewpoint 14 (**Figure 2.8.20**), the medium-term visual effects would continue to decrease with distance from the main development site and remain in a range from large to medium scale as recorded in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] and experienced over an intermediate extent of the route. These effects would remain of high to medium magnitude, remain major to major-moderate (**significant**) and adverse.

2.8.48 At night lighting at the existing Sizewell A and Sizewell B power stations interrupts the largely intrinsically dark environments in views along the coastal strip, with views offshore and when orientated away from the

existing Sizewell A and Sizewell B power stations remaining intrinsically dark. However, along Sizewell beach approximately between Goose Hill and Sizewell, artificial light associated with the existing Sizewell A and Sizewell B power stations is visible, and includes perimeter lights, and light reflected off existing structures and sky glow. The nature of existing views at night is illustrated by Representative Viewpoint 6 (Suffolk Coast Path east of Goose Hill) on **Figure 2.8.14**, Representative Viewpoint 10 (Suffolk Coast Path and Sandlings Walk east of Hill Wood) on **Figure 2.8.15** and Representative Viewpoint 14 (Suffolk Coast Path at Minsmere Sluice) on **Figure 2.8.16**. Whilst the illumination associated with the existing power stations is a notable feature of this stretch of the coastline, the sensitivity of receptors is judged to be medium (community value and high susceptibility). As assessed for Visual Receptor Groups 8 and 12, in views from the coast, the removal of the northern mound and sea defences would enable views of lighting inside the main development site and illumination associated with the beach landing facility and access would also be visible. Illumination to taller plant such as cranes and skyglow associated with lighting would be visible extending predominantly across the inland part of views. The temporary BLF would introduce further static and moving lighting to the coastal and offshore environment when it is operating, in the context of the construction lighting associated with the rest of the main development site. Considering the medium sensitivity of receptors and the context of the main construction site and permanent BLF construction and operation, the medium-term visual effects would be of large scale and experienced over a wide extent of the visual receptor group. These effects would continue to remain as assessed for receptors within Visual Receptor Group 12, of high magnitude, major-moderate (**significant**) and adverse in close proximity to the main development site and reducing with distance.

e) iii) a) d) b) Sandlings Walk

2.8.49 During the construction phase, the Sandlings Walk follows the same alignment of the Suffolk Coast Path between Minsmere Sluice and Sizewell Gap.

2.8.50 The effects on receptors using this stretch of the Sandlings Walk would be the same as described above for the relevant section of the Suffolk Coast Path.

e) iii) a) e) Designated/defined landscapes and value

e) iii) a) e) a) Suffolk Coast and Heaths AONB

2.8.51 As noted above, the temporary BLF would not generally increase the significance of effects on landscape and seascape character and visual

receptors along the coastline within the Suffolk Coast and Heaths AONB and the immediate marine environment, given the context of the construction of the main development site. It would however have visual influence extending between Dunwich Coastguard Cottages in the north to Thorpe Ness in the south and offshore.

- 2.8.52 Within this area, the nature of effects on the natural beauty and special qualities indicators would broadly be as described in **Table 13.14** in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216], albeit the temporary BLF would be an additional temporary feature affecting the areas ‘scenic quality’ (in views along the coast and offshore); ‘relative wildness’; ‘relative tranquillity’; and ‘Natural Heritage Features’ along the coast.
- 2.8.53 Over the period of its construction and operation, the area of the Suffolk Coast and Heaths AONB that would experience large to large-medium scale effects would occur along the coast between approximately Dunwich Coastguard Cottages and Thorpe Ness and remain as recorded in the ES.
- 2.8.54 The key natural beauty indicators affected would continue to be, landscape quality, scenic quality, relative wildness, relative tranquillity and natural heritage features. The effects would continue to remain generally of high-medium to medium magnitude, remain major to major-moderate (**significant**) and adverse between approximately Dunwich Coastguard Cottages and Thorpe Ness, with the temporary BLF presenting a localised addition to the construction effects of the main development site in the coastal environment. Effects at greater distances along the coast from the proposed development and inland would remain as presented in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216].

e) iii) a) e) b) [Suffolk Heritage Coast](#)

- 2.8.55 The effects of the temporary BLF on the onshore elements of the Suffolk Heritage Coast would be the same as assessed for the Suffolk Coast and Heaths AONB described above.
- 2.8.56 Effects on the offshore elements would include some additional restrictions on fishing and water-based recreational activities due to the increased frequency of larger vessels associated with the temporary BLF. Effects on the seascape character and on visual receptors would generally remain as assessed in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] with a slight increase in the extent of the significant effects as set out for Visual Receptor Group 24 above.
- 2.8.57 The medium-term effects on the purposes of designation of the Heritage Coast would be large to large-medium scale in the localised area to north

and south of the main development site approximately between Dunwich Coastguard Cottages and Thorpe Ness and offshore to the edge of the area defined, reducing with distance from the Site and the temporary BLF. These effects would remain of high to high-medium magnitude, remain major to major-moderate (**significant**) and adverse as presented in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216].

e) iii) b) Operation

2.8.58 The temporary BLF would be dismantled following its operational period of approximately 8 years such that no visible elements would be visible above the level of the water. As such, there would be no change to the nature or significance of the effects arising during the operational phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast presented in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216].

2.8.59 In addition, there would be no change to the level of significance of the night time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

f) Updated assessment – greater extent as to where Sizewell B facilities are relocated (**Change 3**)

f) i) Baseline

2.8.60 No new landscape or visual receptors to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] would be affected as a result of the proposed change.

f) ii) Environmental Design and Mitigation

2.8.61 No additional mitigation has been identified to that embedded in the changed design.

f) iii) Assessment of effects

2.8.62 In the case of Option 1, the proposed change removes construction activity and permanent physical infrastructure and fixed lighting in Pillbox Field which would be visible from publicly accessible locations in close proximity and as such represents a notable benefit to local landscape character, visual receptors including users of local rights of way and the natural beauty and special qualities of the Suffolk Coast and Heaths AONB. The landscape and visual effects of the Sizewell B relocated facilities project would be reduced during both construction and operation

due to the proposed changes. However, this would not reduce the overall magnitude of effect on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216], as the effects arising from the construction and operation of the main power station would remain.

- 2.8.63 Whilst measures to mitigate effects, including the reduction in height of the training building would reduce visual effects, the effects of Option 2 would remain the same as presented within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

g) Updated assessment – change to certain parameter heights and activities on the main development site (**Change 4**)

g) i) Baseline

- 2.8.64 Analysis of ZTV modelling of the increased parameter heights for the enhanced permanent BLF (**Figure 2.8.1**), temporary BLF (**Figure 2.8.2**) and marine shafts and tunnelling parameters (**Figure 2.8.3**) indicates that no new landscape or visual receptors would be affected by the proposed design changes to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

g) ii) Environmental Design and Mitigation

- 2.8.65 No additional mitigation has been identified to that embedded in the changed design.

g) ii) a) Assessment of effects

g) ii) b) Construction

g) ii) b) a) Marine shafts and tunnelling parameter (construction zone C21)

- 2.8.66 The proposed change would introduce a new working construction zone (C21) with a normal height parameter of +40m and exceptional height parameter of +70m AOD to accommodate marine tunnelling works on the seaward side of the cut of wall and primarily relate to the use of cranes. This change has the potential to increase the visibility of construction phase activity on the coast and in the immediate offshore environment from locations along the coast and offshore, albeit this activity would be seen in the immediate context of construction activity within the main

development site which has a normal working height parameter of +160m AOD and exceptional working height parameter of +250m AOD.

2.8.67 With reference to **Figure 2.8.20** and **Figure 2.8.21**, it is judged that the proposed change would not change the level of significance of the effects arising during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

2.8.68 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

g) ii) b) b) Extension of stockpile zone (construction zone 5a)

2.8.69 The proposed change would introduce a new construction zone (5a) as an extension to the existing construction zone for the main stockpile (C5) into construction zone C3 which has a normal height of +35m AOD and exceptional height of +120m. The maximum height of the proposed parameter is +35m AOD.

2.8.70 With reference to **Figure 2.8.20**, **Figure 2.8.21** and **Figure 2.8.22** whilst the proposed change would marginally alter the nature of views from some locations, such as from elevated locations to the north, it is judged that the proposed change would not change the level of significance of the effects arising during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

2.8.71 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

g) ii) b) c) Addition of a permanent bat barn

2.8.72 Construction plant and activity would be present over a short duration and largely be screened from publicly accessible locations, albeit some glimpsed views may be possible from some locations to the north. This activity would not change the level of significance of the effects arising during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and

seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

- 2.8.73 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

g) ii) c) Operation

g) ii) c) a) Change to pylon parameter zones (parameter zones P3 and P5)

- 2.8.74 The proposed change would reduce the height of the southernmost pylon from 79m AOD to 59m AOD and the relevant parameter height would be reduced accordingly. Parameter zone P3 would also be moved 30m further to the south.

- 2.8.75 Whilst the proposed change would marginally reduce the visibility of the southernmost pylon from some locations, principally to the south and west of the proposed power station, it is judged that the proposed change would not change the level of significance of the effects arising during the operational phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

- 2.8.76 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

g) ii) c) b) Addition of a permanent bat barn

- 2.8.77 During the operational phase, the bat barn is unlikely to be clearly visible from publicly accessible locations. Any views would be glimpsed and in the context of existing buildings and structures at Lower Abbey Farm. Overall, the bat barn would not change the level of significance of the effects arising during the operational phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].
- 2.8.78 There would be no change to the level of significance of the night time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

g) ii) c) Provision of a mammal pass under Lover's Lane

- 2.8.79 The proposed mammal pass under Lover's Lane and associated features including otter fencing, is excluded from detailed assessment. It represents a minor element of new additional infrastructure that would be constructed over a very short duration and would not result in a notable change in any views or to landscape character once operational.

h) Updated assessment - change to the location of a water storage area and the addition of flood mitigation measures (**Change 5**)

h) i) Baseline

- 2.8.80 No new landscape or visual receptors, to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] would be affected by the proposed design change to the location of a water storage area and addition of flood mitigation measures.

h) ii) Environmental Design and Mitigation

- 2.8.81 No additional mitigation has been identified to that embedded in the changed design which incorporates new native tree and shrub planting to create wildlife habitats that are in keeping with local landscape character and long-term vision for the EDF Energy estate. The changed design also includes naturalistic reprofiling that would avoid damage to existing woodlands and other established vegetation and more recently planted areas.

h) iii) Assessment of effects

h) iii) a) Construction

- 2.8.82 There would be a marginal reduction to the landscape and visual impacts during the construction phase compared to original (temporary) water resource storage area. However, overall, the proposed change would not alter the level of significance of the effects arising during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP - 216].

- 2.8.83 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

h) iii) b) Operation

2.8.84 The flood mitigation area would be a permanent feature but would be in keeping with local landscape character and assimilate into its surrounding landscape context once new planting is established. Overall, the design would not change the level of significance of the effects arising during the operational phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in the **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

2.8.85 There would be no change to the level of significance of the night time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

i) Updated assessment – change to the SSSI crossing design (Change 6)

i) i) Baseline

2.8.86 No new landscape or visual receptors, to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216] will be affected by the proposed design change to the SSSI crossing.

i) ii) Environmental Design and Mitigation

2.8.87 No additional mitigation has been identified to that embedded in the changed design. The changed design incorporates sloping embankments. The seaward slopes would accommodate new planting to integrate the crossing with its surrounding landscape, and over time as planting becomes established, filter views to vehicles using the crossing from locations to the east.

i) iii) Assessment of effects

i) iii) a) Construction

2.8.88 The proposed changes to the design of the SSSI crossing would not change the level of significance of the effects arising during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP- 216].

- 2.8.89 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** (Doc Ref. 6.3) [APP- 218 and APP -219].
- i) iii) b) **Operation**
- 2.8.90 The proposed change to the design of the SSSI crossing would reduce the amount of permanent SSSI land take of wet woodland habitat stated in the Application by approximately 0.08ha, which would be of overall benefit to landscape fabric, landscape character and the Suffolk Coast and Heaths AONB compared to the previous design. The design change would alter the physical appearance of the SSSI crossing, notably in close views from the adjacent Suffolk Coast Path and permissive footpath, although planting would continue to be included offering both landscape and visual benefits. However, overall the changed design would not change the level of significance of the effects arising during the operational phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in the LVIA (**Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216]).
- 2.8.91 There would be no change to the level of significance of the night time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].
- j) **Updated assessment - revisions to tree retention in the main development site (Change 7)**
- j) i) **Baseline**
- 2.8.92 No new landscape or visual receptors, to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] would be affected by the proposed design change which revises the location and quantum of vegetation retained on the main development site.
- j) ii) **Environmental Design and Mitigation**
- 2.8.93 No additional mitigation has been identified to that embedded in the changed design.
- j) iii) **Assessment of effects**
- j) iii) a) **Construction**
- 2.8.94 Proposed changes would result in the loss of a small amount of additional vegetation to that proposed in the Application, with marginal impacts on

the fabric of the site. Overall, these changes would not change the level of significance of the effects arising during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

- 2.8.95 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

j) iii) b) Operation

- 2.8.96 Overall, there would be no change to the level of significance of the operational phase effects reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP - 216] arising from the minor additional vegetation removal proposed.

k) Updated assessment – temporary discharge outfall (**Change 8**)

k) i) Baseline

- 2.8.97 No new landscape or visual receptors, to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] would be affected by the proposed design change which introduces a temporary discharge outfall onto the foreshore of Sizewell beach.

k) ii) Environmental Design and Mitigation

- 2.8.98 No additional mitigation has been identified to that embedded in the changed design.

k) iii) Assessment of effects

k) iii) a) Construction

- 2.8.99 Construction plant and activity and would be visible from locations on Sizewell beach and offshore during relatively short duration associated with the installation and removal of the temporary outfall feature. Once operational the seaward end of the discharge would be visible on the beach, with the remainder buried beneath reinstated shingle (refer to Representative Viewpoint 31 on **Figure 2.8.13**). The landward end of the discharge pipe would be visible as it passes over the temporary sea defence (behind the construction site fence that runs parallel to the beach). When considering these changes, it is judged that this proposed change would not change the level of significance of the effects arising

during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

- 2.8.100 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

k) iii) b) Operation

- 2.8.101 The temporary discharge outfall would be removed and the beach fully reinstated following its use during the early construction phase. As such, there would be no change to the level of significance of the operational phase effects reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

l) Updated assessment – change to the sea defence (**Change 9**)

l) i) Baseline

- 2.8.102 With reference to **Figure 2.8.4**, no new landscape or visual receptors, to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP - 216] would be affected by the proposed design change to the sea defence.

l) ii) Environmental Design and Mitigation

- 2.8.103 No additional mitigation has been identified to that embedded in the changed design which includes vegetated seaward slopes, tree planting on the re-constructed Northern Mound and naturalistic undulations to integrate the sea defence with its surroundings and tie into the existing sea defences adjacent to Sizewell B.

l) iii) Assessment of effects

l) iii) a) Construction

- 2.8.104 With reference to **Figure 2.8.20**, whilst the proposed changes would alter the nature of views along the coastline, the proposed changes to the design of the sea defence would not change the level of significance of the effects arising during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk

Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

- 2.8.105 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

l) iii) b) Operation

- 2.8.106 The proposed change to the design of the sea defence would alter its physical appearance by changing its profile, seaward extents/interaction with Sizewell beach, and the increase in its height. The changed design would also change the location and alignment of the realigned Suffolk Coast Path. The increase in height would marginally reduce the visibility of proposed structures at Sizewell C within the main development site in views from the coast and, subject to design and seaward extent, may change the nature of views along the coastline, including potentially reducing the visibility of lower sections of Sizewell B from some locations on the beach to the north. Overall, it is judged that the changes would not change the level of significance of the effects arising during the operational phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

- 2.8.107 Whilst there would be a marginal increase in the screening of lighting within the main development site, as a result of the increased height of the sea defences, there would be no change to the level of significance of the night time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

l) iii) c) Adaptive design

- 2.8.108 Based upon the expected timescales for this design change, it is likely that the landscape and built context would differ from the present baseline, including as a result of decommissioning of Sizewell A and Sizewell B.
- 2.8.109 During the construction of the adaptive sea defence, there would be adverse landscape and visual effects, and adverse effects on the Suffolk Coast and Heaths AONB and Suffolk Heritage Coast due to the presence of construction plant and activity within the site and along the coastal area. The nature and significance of effects would vary over this time, dependent on the nature of construction activity being undertaken, and it is anticipated that the greatest effects would occur when plant is in operation or activities are in close proximity to receptors, such as users of

the coastal path and Sizewell beach. It is expected the effects would be similar to that noted during the construction of the existing sea defence.

- 2.8.110 During operation, the appearance of the adaptive sea defences would be of greater scale and footprint than the proposed sea defences and alter the nature of views and elements of the character of the local coastal area with adverse effects arising. There are substantial uncertainties with respect to the characteristics of the future baseline conditions so the exact nature and significance of effects cannot be accurately reported.

m) Updated assessment - extension of the Order Limits for additional fen meadow habitat at Pakenham (**Change 11**)

m) i) Baseline

- 2.8.111 The Pakenham fen meadow site is located almost entirely within the Valley Meadows and Fens LCT identified, mapped and described in the Suffolk Landscape Character Assessment (Ref. 11).

- 2.8.112 The site is located in relatively close proximity to residential dwellings off Fen Road and Thurston Road (Old Hall). A single footpath crosses the site (between Thurston Road and Fen Road at Old Hall and there are other footpaths in proximity.

- 2.8.113 The site is not located in an area designated nationally or locally for its landscape value.

m) ii) Environmental Design and Mitigation

- 2.8.114 No additional mitigation has been identified to that embedded in the proposed design which incorporates new native tree and shrub planting to create fen meadow habitat that is in keeping with local landscape character. The design also includes naturalistic reprofiling and establishment activities would avoid damage to existing established vegetation.

m) iii) Assessment of effects

m) iii) a) Construction

- 2.8.115 The proposals would result in minor changes to the character and fabric of the site by replacing improved and rushy pasture with new fen meadow habitat. Such changes would be in keeping with the character of the Valley Meadows and Fens LCT.

- 2.8.116 Views to establishment works would be localised and be limited to visual receptors at a relatively small number of adjacent residences, footpaths and local roads. During the construction phase, views would be to plant

and activity required to install water control structures; excavation works to reduce ground levels and create minor water courses; and planting.

- 2.8.117 None of the effects described above would result in significant adverse effects during construction (including at night).

m) iii) b) Operation

- 2.8.118 Once established the proposals would integrate into the immediate landscape context provided by the adjacent Pakenham Meadows SSSI. As a result, **no significant** adverse effects during operation (including at night) would occur.

- 2.8.119 Pakenham is identified as only one of two important fen meadow sites in this landscape in the Suffolk county landscape character assessment and as such, it is judged this the proposals would result in a marginal improvement to local landscape character, which would equate to a **not significant** beneficial effect.

n) Updated assessment - extension and reduction of the Order Limits for works on the main development site and related sites (**Change 13**)

n) i) Baseline

- 2.8.120 No new landscape or visual receptors would be affected by the proposed design change which introduces a number of minor reductions and additions to the Order Limits for the main development site and the off-site habitat creation sites to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] and **Volume 2, Appendix 13G** of the **ES** (Doc Ref. 6.3) [APP – 217].

n) ii) Environmental Design and Mitigation

- 2.8.121 No additional mitigation has been identified to that embedded in the changed design.

n) iii) Assessment of effects

n) iii) a) Construction

- 2.8.122 Proposed changes may result in the loss of a small amount of additional vegetation to that proposed in the Application, with marginal impacts on the fabric of the main development site or off-site habitat creation sites. Overall, these changes would not change the level of significance of the effects arising during the construction phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints;

landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] and **Volume 2, Appendix 13G** of the **ES** (Doc Ref. 6.3) [APP – 217].

- 2.8.123 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

n) iii) b) Operation

- 2.8.124 The proposed changes may marginally reduce the quantum of established vegetation retained through the construction period and into the operational phase. Overall, there would be no change to the level of significance of the operational phase effects reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP - 216] and **Volume 2 Appendix 13G** of the **ES** (Doc Ref. 6.3) [APP – 217].

o) Updated assessment - new bridleway link between Aldhurst Farm and Kenton Hills (**Change 15**)

o) i) Baseline

- 2.8.125 No new landscape or visual receptors, to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] would be affected by the proposed design change which introduces a new bridleway link and would necessitate the removal of some existing established hedgerows and replanting along similar alignments.

o) ii) Environmental Design and Mitigation

- 2.8.126 No additional mitigation has been identified to that embedded in the changed design.

o) iii) Assessment of effects

o) iii) a) Construction

- 2.8.127 The proposed change would occur approximately two years post commencement of construction works once the entrance to the main development site from the B1122 is in place and the number of HGVs using the early years access is reduced. The changes would introduce a new section of bridleway and road crossing and would be constructed over a relatively short duration of the overall construction phase. The introduction of the crossing would result in the loss of additional hedgerow vegetation to that proposed in the Application to ensure appropriate visibility of the crossing by motorists and safe operation by pedestrians

and horse riders. This would result in marginal impacts on the fabric of the site which would be mitigated by new replacement hedgerow planting. Overall, these changes would not change the level of significance of the effects arising during the operational phase on visual receptor groups; visual receptors using key routes; visual receptors at specific viewpoints; landscape and seascape character types; the natural beauty and special qualities of the Suffolk Coast and Heaths AONB; and Suffolk Heritage Coast reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

- 2.8.128 Furthermore, there would be no change to the level of significance of the night-time effects reported in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

o) iii) b) Operation

- 2.8.129 The link would be designated as a bridleway once construction is complete. There would be no change to the level of significance of the operation phase effects reported in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP - 216].

p) Updated assessment – combined effects

p) i) Baseline

- 2.8.130 Analysis indicates that the effects of changes and Additional Information at the main development site would not introduce new landscape or visual receptors to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216].

- 2.8.131 The only proposed change to result in the identification of new landscape or visual receptors to those considered within **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] is the additional fen meadow habitat site at Pakenham. The Pakenham site is situated several kilometres away from the main development site and there would be no landscape or visual receptors affected by the proposed changes at the main development site and at Pakenham in combination.

p) ii) Environmental Design and Mitigation

- 2.8.132 No additional environmental design and mitigation has been identified to address in combination effects.

p) iii) Assessment of effects

p) iii) a) Construction

- 2.8.133 Several of the proposed changes would occur during the construction phase and alter the nature of effects on landscape and seascape character, visual receptors and the Suffolk Coast and Heaths AONB and Suffolk Heritage Coast along the coastline. It is judged that these changes in combination would not exceed the effects described arising from the construction and operation of the temporary BLF. It is judged that the level of significance would not exceed those presented in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] and in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219], with the exception of effects on Visual Receptor Group 20: Sizewell to Thorpeness Coast where significant effects are identified during the day and night in the areas closest to the site, in the medium term only.

p) iii) b) Operation

- 2.8.134 Whilst several of the proposed changes would alter the nature of effects on landscape and seascape character, visual receptors and the Suffolk Coast and Heaths AONB and Suffolk Heritage Coast during the operational phase, it is judged that these in combination would not exceed those presented in **Volume 2, Chapter 13** of the **ES** (Doc Ref. 6.3) [APP – 216] and in **Volume 2, Appendix 13B** of the **ES** (Doc Ref. 6.3) [APP- 218 and APP -219].

2.9 Terrestrial ecology and ornithology

a) Introduction

- 2.9.1 This section provides an addendum to the terrestrial ecology and ornithology assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [[AS-033](#)].

- 2.9.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) Relevant Additional Information

- 2.9.3 Relevant Additional Information for the assessment of effects on terrestrial ecology and ornithology at the main development site includes the following new baseline survey reports submitted to the Examining Authority in November and December 2020:

- Phase 1 Habitat Survey Update 2020 Doc Ref. 6.13) [[AS-021](#)];
- National Vegetation Classification (NVC) Survey Report 2020 (Doc Ref. 6.13) [[AS-021](#)];
- Bat Tree Inspection Survey Report 2020 (Doc Ref. 6.13) [[AS-021](#)];
- Bat Backtracking Survey Report 2020 (Doc Ref. 6.13(A)) [[AS-037](#)];
- Bat Static Monitoring Survey Report 2020 (Doc Ref. 6.13(A)) [[AS-037](#)];
- Breeding Birds and Waterfowl Survey Report (Doc Ref. 6.13) [[AS-021](#)];
- Tern Survey Report 2020 (Doc Ref. 6.13) [[AS-022](#)];
- Marsh Harrier Survey Report 2020 (Doc Ref. 6.13(A)) [[AS-036](#)];
- Barn Owl and Nightjar Survey Report 2020 (Doc Ref. 6.13(A)) – [[AS-036](#)];
- Reptile Survey Report 2020 (Doc Ref. 6.13(A)) [[AS-036](#)];
- Great Crested Newt Survey Report 2020 (Doc Ref. 6.13) [[AS-021](#)];
- Natterjack Toad Survey Report (Doc Ref. 6.13) [[AS-021](#)];
- Fish Survey Report 2020 (Doc Ref. 6.13(A)) [[AS-036](#)]; and
- Invertebrate Survey Report 2020 (Doc Ref. 6.13(A)) [[AS-036](#)].

2.9.4 In addition, to the above survey reports, the following documents are submitted as appendices to this ES Addendum:

- Additional baseline survey reports (refer to **Volume 3, Appendix 2.9.A** of this **ES Addendum**), comprising
 - Badger Survey Report 2020;
 - Otter and Water Vole Survey Report 2020;
 - Wintering Bird Survey Report 2019-2020;
 - Additional Incidental Bird Sightings Report July to September 2020;
- Updated Bat Impact Assessment– **Volume 3, Appendix 2.9.B** of this **ES Addendum**;

- Protected species licence and method statement updates (**Volume 3, Appendix 2.9.C** of this **ES Addendum**), comprising:
 - Deptford Pink Draft Licence Update – Method Statement;
 - Natterjack Toad Draft Licence Update – Method Statement Part 1;
 - Natterjack Toad Draft Licence Update – Method Statement Part 2;
 - Water Vole Draft Licence Update – Method Statement;
 - Great Crested Newt - Updated Non-Licensable Method Statement; and
- Fen Meadow Strategy – **Volume 3, Appendix 2.9.D** of this **ES Addendum**.

2.9.5 Furthermore, a Freshwater Fish and Aquatic Invertebrates Mitigation Strategy is now provided within Appendix A of Part B of the **CoCP** (Doc Ref. 8.11(A)A).

2.9.6 A review of any updates required to the assessment presented within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] as a result of the additional ecology baseline survey reports is provided within **section 2.9d**) of this chapter.

2.9.7 The Additional Information on protected species licences and method statements and fen meadow strategy provide further detail on mitigation proposed for ecological receptors, however, do not change the assessment presented within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033]. These measures have been referenced, where appropriate, within this ES Addendum.

c) Relevant changes

2.9.8 As detailed in **section 2.2** of this chapter, a number of design changes have been proposed at the main development site. **Table 2.34** below presents the proposed design changes and considers their relevance to the assessment of effects on important ecological features (IEFs) for terrestrial ecology and ornithology, identified within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

Table 2.34: Relevance of proposed design changes to important ecological features at the main development site

Proposed Design Change	Relevant to Terrestrial Ecology & Ornithology IEFs & Assessment	Relevant IEFs
Potential to increase in the frequency of freight train movements to facilitate bulk material imports by rail (Change 1).	This design change is not anticipated to affect the identified IEFs to a differing level to that presented within Volume 2, Chapter 14 of the ES (Doc Ref. 6.3) [AS-033] and therefore, will not be considered further within this section. This is due to speed limits imposed and the limited increase in train movements.	N/A
An enhancement of the permanent beach landing facility and construction of a new, temporary beach landing facility (Change 2).	Given the nature of this change and potential for new or different impacts upon the identified IEFs, the beach landing facility design change is considered further in this section.	- Designated sites- Suffolk Shingle Beaches County Wildlife Site (CWS). - Plants and habitats (including Deptford Pink). - Terrestrial invertebrates. - Ornithology (kittiwake, tern species, red-throated diver).
Greater flexibility as to where certain Sizewell B facilities are relocated to potentially avoid the need for car parking on Pillbox Field (Change 3).	Given the nature of this change and the potential for changes to the impacts upon the identified IEFs, including reduced impacts, the removal of the outage car park from Pillbox Field is considered further within this section.	- Woodland planting. - Sandlings grassland creation. - Terrestrial invertebrates. - Birds. - Bats. - Reptiles.
Change to certain parameter heights and activities on the main development site (Change 4).	This design change is not anticipated to result in different impacts to the IEFs to those presented within Volume 2, Chapter 14 of the ES (Doc Ref. 6.3) [AS-033] and is therefore not considered further in this section.	N/A
Change to the location of the water resource storage area and the addition of flood mitigation measures to lower flood risk (Change 5).	Given the nature of this change and potential for different (reduced) impacts upon the identified IEFs, the water resource storage area change is considered further in this section.	- Sizewell Marshes SSSI and the provision of additional reedbed, open water and wet woodland habitats. - Marsh harrier foraging habitat.

Proposed Design Change	Relevant to Terrestrial Ecology & Ornithology IEFs & Assessment	Relevant IEFs
Change to the SSSI crossing design to a single span bridge with embankments (Change 6).	Given the nature of this change and potential for different (reduced) impacts upon the identified IEFs, the SSSI crossing design change is considered further in this section.	- Designated sites- Sizewell Marshes SSSI (which includes habitat communities and its invertebrate assemblage). - Terrestrial and aquatic invertebrates (including Norfolk hawk). - Terrestrial mammal (otter and water vole). - Bats.
Revisions to tree retention on the main development site (Change 7).	Whilst these are only relatively small-scale changes, the potential impacts upon the identified IEFs are considered as part of this section.	- Bat assemblage. - Habitats
Surface water removed early in the construction process to be discharged to the foreshore via a temporary outfall (Change 8).	This small-scale design change will provide wider environmental benefits but will take place within the area of the site boundary which has already been identified within the Application as being cleared to facilitate construction. The installation of the outfall will take place on this heavily modified foreshore. This design change is not anticipated to affect the identified IEFs to a differing level to that presented within Volume 2, Chapter 14 of the ES (Doc Ref. 6.3) [AS-033] and therefore, is not considered further within this section.	N/A
Change to the sea defence to make the scheme more efficient and resilient to climate change (Change 9).	Given the nature of the proposed changes which relate primarily to the height and underlying structures, the changes are not anticipated to affect any of the IEFs to a greater or lesser extent than already assessed. The proposals for the reinstatement of sand dunes and foreshore habitats over the sea defences at the end of their construction are unchanged. Therefore, this design change is not considered any further within this section.	N/A
Extension of the Order Limits to provide for additional fen meadow habitat at Pakenham as mitigation for fen meadow loss (Change 11).	Given the nature of this change and potential for different (reduced) impacts upon the identified IEFs, the additional fen meadow change is considered further in this section.	- Pakenham Meadows SSSI - Sizewell Marshes SSSI

Proposed Design Change	Relevant to Terrestrial Ecology & Ornithology IEFs & Assessment	Relevant IEFs
Minor extensions and reductions of the Order Limits for works on the main development site and related sites (fen meadow mitigation sites and marsh harrier improvement sites) (Change 13).	This design change is not anticipated to result in different impacts to the IEFs to those presented within Volume 2, Chapter 14 of the ES (Doc Ref. 6.3) [AS-033] and is therefore not considered further within this section.	N/A
A new bridleway link between Aldhurst Farm and Kenton Hills (Change 15).	This design change is not anticipated to result in different impacts to the IEFs to those presented within Volume 2, Chapter 14 of the ES (Doc Ref. 6.3) [AS-033] and is therefore not considered further within this section.	N/A

d) Updated assessment – Additional Information for ecological surveys

d) i) Summary of 2020 survey Information for each Important Ecological Feature (IEF)

2.9.9 Additional baseline ecology surveys have been undertaken following engagement with Natural England and other stakeholders to provide the most up-to-date data and to supplement the assessments presented within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033]. Whilst extensive and detailed survey works were carried out across the site during the period 2007-2019, further updated survey information was identified as being required to inform mitigation design, protected species licence applications, method statements as well as monitoring approaches.

2.9.10 **Table 2.35** provides a list of the IEFs identified at the main development site within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] and a brief summary of the survey results in 2020 (full survey results are presented in the baseline survey reports, refer to **section 2.9b**). Based on the 2020 targeted ecological and ornithological survey information, the IEFs identified within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] all remain relevant to the terrestrial ecology and ornithology assessment of the main development site. In summary, the Additional Information on ecological baseline conditions continued to identify the same habitat types, protected or invasive species, as those considered within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033], for the following IEFs:

- designated sites;
- plants and habitats;
- terrestrial and aquatic invertebrates;
- fish
- amphibians
- reptile assemblage; and
- birds.

2.9.11 For these IEFs, there is no change to the assessment presented within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033], as a result of the Additional Information. The additional survey information for bats and terrestrial mammals is considered in further detail in **sections 2.9d)ii) and 2.9d)iii)** below.

Table 2.35: Summary of 2020 additional ecology survey results for important ecological features at the main development site

Important Ecological Features (IEFs)	ES Assessment Criteria (level of importance)	2020 survey updates as relevant
Designated Sites:		
The Minsmere European Site (comprised Minsmere to Walberswick Heaths and Marshes SAC and Ramsar site).	International and National/High	- A review of the designated sites boundary and qualifying features undertaken in 2020 has not altered the baseline which remains unchanged from that presented in the ES. - Breeding bird, wintering bird, marsh harrier and terns surveys are relevant in this context as the areas surveyed including the Minsmere South Levels, offshore areas and bird species which are expected to move between the SAC / Ramsar site and the EDF Energy estate (see also below).
Alde, Ore and Butley Estuary SAC, SPA, Ramsar site and SSSI.	International and National/High	- A review of the designated sites boundary and qualifying features undertaken in 2020 has not altered the baseline which remains unchanged from the that presented in the ES. - Tern surveys are relevant in this context (see also ornithology below)
Orfordness to Shingle Street SAC and SSSI.	International and National/High	- A review of the designated sites boundary and qualifying features undertaken in 2020 has not altered the baseline which remains unchanged from that presented in the ES. - Tern surveys are relevant in this context (see also ornithology below)
SSSIs underpinning the Sandlings SPA (Blaxhall Heath, Sandlings Forest, Snape Warren, Tunstall Forest and Leiston to Aldeburgh SSSI)	National/High	A review of the designated sites boundary and qualifying features undertaken in 2020 has not altered the baseline which remains unchanged from that presented in the ES
Minsmere to Walberswick Heaths and Marshes SSSI.	National/High	As for the Minsmere European site, see above.
Sizewell Marshes SSSI.	National/High	A review of the designated sites boundary and qualifying features undertaken in 2020 has not altered the baseline which remains unchanged from that presented in the ES.

Important Ecological Features (IEFs)	ES Assessment Criteria (level of importance)	2020 survey updates as relevant
		A large number of the 2020 surveys are relevant to this IEF, including breeding bird, wintering bird and marsh harrier surveys, otter and water vole surveys (see also ornithology, otter and water vole below).
Sizewell Levels and Associated Areas CWS and Southern Minsmere Levels CWS.	County/Medium	- A review of the designated sites boundary and qualifying features undertaken in 2020 has not altered the baseline which remains unchanged from that presented in the ES. - A large number of the 2020 surveys are relevant to this IEF, including breeding bird, wintering bird and marsh harrier surveys, otter and water vole surveys and natterjack toad surveys (see also ornithology, natterjack toad, otter and water vole below).
Suffolk Shingle Beaches CWS.	National/High	A review of the designated sites boundary and qualifying features undertaken in 2020 has not altered the baseline which remains unchanged from that presented in the ES.
Plants & Habitats:		
Broadleaved and mixed woodland within the site boundary.	County/Medium	- Both extended Phase 1 and NVC surveys undertaken in 2020 are relevant in this context. - Habitats including woodlands are broadly unchanged from the baseline presented in the ES, although successional processes are leading to increased colonisation of wet woodlands with birches.
Acid grassland within the site boundary.	County/Medium	- Both extended Phase 1 and NVC surveys undertaken in 2020 are relevant in this context. - Existing acid grasslands broadly unchanged from the baseline presented in the ES, although new areas of acid grassland are becoming established across a number of former arable fields, out with the proposed order limits, including for example in the Studio Field complex, in accordance with habitat objectives for these areas.
Deptford Pink.	County/Medium	Deptford Pink was recorded in 2020 on the coastal defences. It was recorded flowering in June although it was not visible by August when the extended Phase 1 and NVC surveys were undertaken.

Important Ecological Features (IEFs)	ES Assessment Criteria (level of importance)	2020 survey updates as relevant
Terrestrial & Aquatic Invertebrates:		
Invertebrate habitat compartment 1	National/High	The 2020 invertebrate surveys are relevant to Compartments 1, 2, 3 and 4a.
Invertebrate habitat compartment 2	National/High	
Invertebrate habitat compartment 3	National/High	
Invertebrate habitat compartment 4/4a,	National/High	
Invertebrate habitat compartment 5	National/High	
Invertebrate habitat compartment 8	National/High	
Invertebrate habitat compartment 11	National/High	
Invertebrate habitat compartment 12	National/High	
Invertebrate habitat compartment 13	National/High	
Fish Assemblage:		
Fish	County/ Medium	- The 2020 Fish surveys are relevant to this IEF. - A total of eight species of fish were recorded within the Sizewell and Leiston drains, and adjacent waterbodies, in the north-east area of Sizewell Marshes SSSI (SSSI Triangle). - The presence of European eel was confirmed along with the presence of bullhead (a notable species).
Amphibians:		
Natterjack toad	National/ high	- The 2020 Natterjack toad survey is relevant to this IEF - An estimated population of 12 adults were recorded in breeding pond N1 which is consistent with previous monitoring results.
Reptile Assemblage:		

Important Ecological Features (IEFs)	ES Assessment Criteria (level of importance)	2020 survey updates as relevant
Slow-worm, common lizard, adder, grass snake	County/ Medium	- The 2020 reptile survey is relevant to this IEF - Adder, grass snake, common lizard and slow worm were recorded within the main development site and reptile receptor areas. Lower populations of reptiles in the locations were detected in areas which would be lost to land take from the construction of Sizewell C than have previously been recorded. Similar populations were recorded in the proposed receptor sites as has been recorded previously.
Ornithology:		
Bittern, avocet, redshank, shoveler, gadwall, teal, white-fronted geese, marsh harrier, hen harrier, nightjar, woodlark, red-throated diver, little tern, common tern, sandwich tern, lesser back-backed gull, bird assemblage associated with Minsmere to Walberswick Heaths and Marshes SSSI, Bird assemblage associated with Sandlings Forest SSSI and component SSSI of the Sandlings SPA (breeding/wintering), Bird assemblage associated with Alde Ore Estuary SSSI (breeding/wintering).	International/ High	- The 2020 breeding bird, marsh harrier, barn owl and nightjar and terns surveys and 2019-2020 wintering bird surveys are relevant in this context and brief summaries are provided below. - The main development site and adjacent habitats supported a diverse assemblage of bird species including 26 IEFs, 22 schedule 1 species, 20 red listed species, 39 amber listed species and 47 species of no conservation concern. Not all of these species were presumed to be breeding, however 15 IEFs and 13 birds of conservation concern were confirmed to be breeding within the survey areas. - The main development site and adjacent habitats continued to support foraging marsh harriers in 2020, with the Minsmere South Levels continuing to be a key foraging area for the species. Arable fields and Sizewell Marshes SSSI areas were also regularly used for hunting. Breeding marsh harriers were observed at Aldhurst Farm and RSPB Minsmere. - The main development site and adjacent habitats supported at least one pair of breeding barn owl in 2020, located within the northern barn at Lower Abbey. Sizewell Marshes SSSI and Minsmere South Levels comprise suitable foraging habitat. - Nightjar were not recorded within the main development site in 2020.
Bird assemblage associated with Sizewell Marshes SSSI.	National/ High	
Kittiwake.	Regional/ High	
Stone-curlew.	Regional/ High	
Barn owl.	Local/ Low	

Important Ecological Features (IEFs)	ES Assessment Criteria (level of importance)	2020 survey updates as relevant
Kingfisher.	County/ Medium	- Three species of tern (common tern, little tern and Sandwich tern) were recorded during the 2020 tern surveys with the highest concentration of tern observations within or adjacent to the RSPB Minsmere reserve. Breeding behaviour was observed on the scrapes within the RSPB Minsmere reserve (common and sandwich terns only) and the North Sea between Dunwich and Slaughden and the Sizewell outfall area continue to be important habitats for foraging terns. - Kittiwakes were recorded in April 2020, nesting on the offshore structures to the east of the Sizewell power station complex. At least 100 individuals were recorded with some carrying nesting material indicating breeding. - Kingfishers were recorded in May and June 2020 at Sizewell Belts only. - Hobby was recorded in 2020 with a peak count of two with observations mostly restricted to the northern half of the arable fields, Sizewell Belts, Minsmere South Levels and the edges of Goose Hill woodland. One pair of hobby was confirmed to be breeding on the east edge of Goose Hill woodland. Signs of a second pair with behaviour suggesting probable breeding within the northern part of the arable fields, near to Lower Abbey Farm. - Peregrines were observed in 2020 passing food on the southwest corner of the Sizewell A nuclear reactor building, which implied that peregrines were probably breeding on the building. - Black redstarts were recorded in 2020 singing at Sizewell A and B power with at least two breeding pairs thought likely to be present. - Cetti's warbler were recorded in 2020 with a peak count of potentially up to six territories. These were recorded in suitable habitats close to Goose Hill woodland, Leiston/Fiscal Policy and on the west and east of Minsmere South Levels and were all considered to be probable breeders. - The site supports 18 IEF wetland and waterfowl species as well as a range of other species of conservation concern. The Minsmere South Levels is considered to be the favourable and most important habitat for wetland and waterfowl species throughout the winter. The various areas of the Sizewell Marshes SSSI also support
Hobby	County/ Medium	
Peregrine falcon.	County/ Medium	
Black redstart.	County/ Medium	
Cetti's warbler.	County/ Medium	
Other birds of nature conservation importance.	County/ Medium	

Important Ecological Features (IEFs)	ES Assessment Criteria (level of importance)	2020 survey updates as relevant
		a range of waterfowl using the ditches and areas of open water. Waterfowl species recorded either within the site or adjacent habitat areas included barnacle goose, black-tailed godwit, brent goose, Canada goose, coot, curlew, gadwall, greylag goose, jack snipe, little grebe, little egret, mallard, moorhen, mute swan, pintail, redshank, shelduck, shoveler, snipe, teal, water rail, wigeon.
Bat Assemblage:		
Barbastelle	National/ High	- The three bat reports are all relevant to each of the bat IEFs: - Bat Tree Inspection Survey Report 2020 (Doc Ref. 6.13) [AS-021]; - Bat Backtracking Survey Report 2020 (Doc Ref. 6.13(A)) [AS-037]; - Bat Static Monitoring Survey Report 2020 (Doc Ref. 6.13(A)) [AS-037]. - A total of 322 trees were identified within the 2020 study area, which focussed on trees likely to be cleared and nearby areas, as having low, medium or high potential for roosting bats. One tree was identified as a confirmed roost. These trees contained an identified 626 potential roost features. The areas with the highest numbers of trees with potential to support bat roosting are within the Fiscal Policy woodland and the track along the northern edge of Kenton Hills. One confirmed roost was found within a woodland copse to the east of Old Abbey Farm likely to be of a pipistrelle species. - Fiscal Policy was found to be supporting a brown long-eared maternity roost within a bat box and several potential pipistrelle roosts. One likely pipistrelle roost was located in the vicinity of the mast to the south of Fiscal Policy woodland. These were located within the areas of the woodland which would be retained. - Several Natterer's maternity roosts, and pipistrelle roosts were found within bat boxes on trees which would be retained. - A commuting route for pipistrelle species and barbastelle was identified along the northern edge of Fiscal Policy along the access track. Foraging was also noted along the access track and within the neighbouring arable fields. Bats were
Natterer's	County/ Medium	
Leisler's bat and Nathusius' pipistrelle	Local (district)/ Low	
Noctule and serotine	Local (Zol)/ Low	
Daubenton's bat, brown long-eared bat, common pipistrelle and soprano pipistrelle.	Local (Zol)/ Low	

Important Ecological Features (IEFs)	ES Assessment Criteria (level of importance)	2020 survey updates as relevant
		observed commuting away from Fiscal Policy to the east. Subsequent surveys identified that a number of bats appeared to be commuting from within Kenton Hills, including from a number of bat boxes in this area, to and from Fiscal Policy (to be retained). - Barbastelle bats were recorded during both back-tracking and statics surveys. Barbastelle foraging and commuting was recorded within Goose Hill/ Fiscal Policy and along the forest tracks. A commuting through Goose Hill from the north to south along the forestry track was identified and was utilised by barbastelle. No confirmed roosts were found during the 2020 surveys in areas where trees are likely to be lost however a number of old mature English oak trees along the Kenton Hills track which appear to be suitable for roosts. - Surveys confirmed the continued presence of the bat assemblage within the proposed development site along with the continued presence of important foraging and commuting routes. The most important areas around the main development site for foraging bats are woodlands throughout the EDF Energy estate and the tree lined bridleway (Bridleway 19) from Lover's Lane running north to Lower Abbey Farm.
Terrestrial Mammals:		
Water vole	National/ High	- The 2020 water vole and otter surveys are relevant to this IEF. - Low populations of water voles were found throughout the Leiston and Sizewell drains in 2020 whilst a medium population was recorded within the Aldhurst Farm receptor area.
Badger	Local/ Low	- The 2020 badger survey is relevant to this IEF. - The number and distribution of badger setts across the EDF Energy estate was broadly similar to that recorded in previous years, with two main setts present. Two new outlier setts were located in 2020 and several existing setts were re-classified.
Otter	County/ Medium	The 2020 water vole and otter surveys are relevant to this IEF.

Important Ecological Features (IEFs)	ES Assessment Criteria (level of importance)	2020 survey updates as relevant
		Signs of otter were found throughout the Leiston and Sizewell drains in 2020 and across the wider SSSI ditch network. Five confirmed otter holts were found and one potential holt was found, with one of the confirmed holts present within the site boundary.

d) ii) Additional Information on bat assemblage

2.9.12 This section considers updates required to the assessment of effects on bats as a result of the Additional Information summarised in **Table 2.35**.

d) ii) a) Baseline

2.9.13 The additional survey information for bats collected in 2020 does not change the existing and future baseline for the bat assemblage as described in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033]. However, the surveys have provided additional evidence of barbastelle foraging within Goose Hill woodland and further clarified that the main commuting routes include the northern edge of the SSSI crossing, and through Kenton Hills.

d) ii) b) Environmental Design and Mitigation

2.9.14 In addition to the mitigation measures presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033], and given the survey findings of 2020, the following mitigation is proposed and would be set out within the relevant protected species licenses, as described within **Volume 3, Appendix 2.9.B** of this **ES Addendum**:

- An increase in the quantum of replacement bat boxes which would be totalled using Natural England guidance and informed further by the tree climbing surveys for existing bat roosts in trees to be carried out in early 2021.
- Subsequent to the submission of the ES an additional commuting route is proposed within the construction phase design. This is located through the centre of the construction phase site and would link Kenton Hills in the south with Ash Wood to the north. This new link would be provided by two tree lines, both running north-south, either side of two water management zones already proposed in this area but re-configured to enable this approach. Given the reprofiling of ground levels, the tree lines would be formed of newly planted semi-mature trees although it may be possible to retain an existing hedge to form the north half of the eastern tree line. Within this commuting route, there would be minimal lighting, as the area is to be utilised for water management and no night time maintenance is likely to be required.
- Temporary mitigation during the construction phase would include movable features such as trees in containers, bridge structures and fencing fitted with debris netting to maintain habitat connectivity and reduce temporary fragmentation effects.

d) ii) c) Assessment of Effects

- 2.9.15 **Volume 3, Appendix 2.9.B** of this **ES Addendum** provides a revised assessment of the effects in relation to bats for the construction and operational phase. The revised assessment was prepared to address:
- minor changes to the main development site development design, including additional mitigation measures;
 - post submission updates to the modelling of noise impacts;
 - post submission comments from stakeholders, including comments following a review of the bat assessment within **Volume 2, Chapter 14 of the ES**;
 - further surveys for bats on the main development site undertaken in 2020, including surveys of trees for bat roost potential, back-tracking surveys and the deployment of static detectors (see **Table 2.35** above);
 - further published studies on impacts of noise upon bats;
 - availability of long-term monitoring data to confirm the bat assessment on a comparable site (Hinkley Point C) to inform the likely success of proposed mitigation; and
 - an evolving mitigation approach through discussions with stakeholders including Natural England.
- 2.9.16 In summary, although there were new findings relating to bats, including modified assessments of usage of certain areas by certain species, the 2020 survey results do not change the valuation of bat species on the site.
- 2.9.17 The assessments for each for each of the bat IEFs (see **Table 2.35**) consider all of the additional information outlined above. Whilst some of the design changes and new mitigation measures are considered beneficial to bats, the species valuations, the assessment of impact magnitudes and the significance of the effects presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] remain unchanged.
- d) iii) Additional information on terrestrial mammals (water vole, badger, otter)
- 2.9.18 This section considers updates required to the assessment of effects on bats as a result of the Additional Information summarised in **Table 2.35**.

d) iii) a) Baseline

- 2.9.19 The additional survey information collected in 2020 does not change the existing and future baseline for terrestrial mammals as described in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] in relation to badger.
- 2.9.20 The water vole population density assessment surveys undertaken in 2020 identified areas where water voles are confirmed as present although at lower densities than previously estimated.
- 2.9.21 The 2020 surveys confirmed the presence of one otter holt located immediately to the north west of the existing Sizewell B station and within the site boundary. Further details are presented in the Otter and Water Vole Survey Report 2020 (refer to **Volume 3, Appendix 2.9.A** of this **ES Addendum**).

d) iii) b) Environmental Design and Mitigation

- 2.9.22 No further mitigation measures are proposed as a result of the additional survey information collected in 2020, above those stated in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] for badger.
- 2.9.23 **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] currently states that water vole mitigation would comprise a capture and relocation effort. Based on the 2020 survey findings and the low densities of water vole recorded in locations to be affected by the construction phase activity, displacement is now likely to be the proposed approach to be adopted. However, in the event of an increase in water vole numbers prior to construction, a trapping exercise would be carried out and the receptor site at Aldhurst Farm would remain available with sufficient carrying capacity to receive further animals, if required.
- 2.9.24 The 2020 survey findings recorded an increase in signs of otter including several holts, one of which would be directly impacted by the works. Further monitoring would be undertaken of this holt to determine its status including presence/ absence and the extent of use. The other otter holts identified would remain outside of the construction works areas and would not be directly impacted. Mitigation not previously identified may include the construction of an artificial otter holt in close proximity to the existing holt subject to agreement with Natural England under a protected species licence.

d) iii) c) Assessment of Effects

- 2.9.25 There are no new or different significant construction or operational effects in relation to terrestrial mammals to those considered within

Volume 2, Chapter 14 of the **ES** (Doc Ref. 6.3) [AS-033]. As such, no changes to the assessment conclusions presented within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] are required. However, some updates to the mitigation approaches would be implemented, as described above.

e) Updated assessment - enhancement of the permanent BLF and construction of a new, temporary BLF (**Change 2**)

e) i) Baseline

2.9.26 The baseline conditions associated with this design change remain the same as those presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

e) ii) Environmental Design and Mitigation

2.9.27 The environmental design and approach to mitigation as detailed in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] remains applicable to the enhanced permanent BLF and the new temporary BLF, specifically in relation to the Suffolk Shingle habitats present, the Deptford Pink, terrestrial invertebrates and the ornithological features present along the coastline.

e) iii) Assessment of effects

2.9.28 The IEFs presented in **Table 2.35** above, have been identified within this ES Addendum as potentially being affected by the enhanced permanent BLF and new temporary BLF. **Volume 2, Figure 2.2.5** of this **ES Addendum** provides an illustrative view of the BLF design.

e) iii) a) Construction

2.9.29 The construction impacts on the terrestrial environment associated with the proposed change would remain much the same as those identified within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033], as the changes remain inside the site boundary within areas that are identified for clearance during the construction phase. The proposed change does not alter the approach to reinstatement of the coastal habitats at the end of the construction phase or the translocation of the Deptford Pink, already identified.

2.9.30 In summary, the proposed change would not alter the effects and their significance on the following terrestrial and ornithological IEFs, as identified within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033]:

- Designated sites Suffolk shingle beaches CWS – moderate adverse (**significant**) (landtake) and negligible adverse (**not significant**) (air quality);
- Plants and habitats (including Deptford Pink)- moderate adverse (**significant**) (landtake);
- Terrestrial invertebrates-
 - Compartments 1, 2 and 4a – wet woodland invertebrate assemblage moderate adverse (**significant**) (habitat loss/ land take);
 - Compartments 1, 2, 3, 4/4a, 5, 13 and 15 – reedbed, ditch and dry sandy habitats invertebrate assemblage, minor adverse (**not significant**) (habitat loss / land take);
 - Compartments 1, 2, 3, 4/4a, 5, 8, 12 and 13 – invertebrate assemblage, minor adverse (**not significant**) (mortality of species);
 - Compartments 3, 11 and 12 – minor adverse (**not significant**) changes in habitat structure and composition;
 - Assessment Compartments 4/4a, 5, 6, 13, 14 and 15, major beneficial (**significant**) during the operational phase as change from intensively farmed arable habitat.

2.9.31 The construction impacts on the marine environment associated with **Change 2** would remain much the same as those identified within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033], although the additional piling required, additional vessel movements and the use of the new temporary BLF all have the potential to impact the following bird species:

- Sandwich tern;
- little tern;
- common tern;
- red-throated diver; and
- kittiwake.

2.9.32 The potential for adverse effects on integrity of European sites, for which the tern species and red-throated diver form important elements of the

designated interest, is considered in detail in the **Shadow HRA Addendum** (Doc Ref. 5.10Ad).

- 2.9.33 For little tern, potential effects are limited to those colony populations from within (or close to) the Minsmere-Walberswick SPA, which currently comprise a small proportion of the overall little tern population for which the Outer Thames Estuary SPA provides supporting habitat. Little tern is also a qualifying feature of the Minsmere-Walberswick SPA.
- 2.9.34 With regard to common tern, several colonies contribute to the Outer Thames Estuary SPA common tern population, with birds from the Orfordness and Minsmere breeding colonies (within the Alde-Ore Estuary SPA and Ramsar site and Minsmere-Walberswick SPA and Ramsar site, respectively) potentially susceptible to noise and visual disturbance effects.
- 2.9.35 Indirect effects due to the effects of underwater noise on the fish prey species of little tern and common tern would not result from the construction of the BLFs because these works would occur outside the breeding season for these species. Construction of the BLFs may coincide with the early parts of the breeding season for some other breeding seabirds (e.g. Sandwich tern) but this would be minimal, and at a stage when foraging ranges are likely to be considerably less constrained than during chick-rearing (e.g. Ref. 15, 16).
- 2.9.36 With respect to disturbance from vessel traffic, much of the foraging by little terns and common terns from the Minsmere and Orfordness colonies occurs in waters which already experience high levels of vessel movements and these terns species are considered to be relatively insensitive to sources of anthropogenic disturbance, such as vessel traffic, when foraging offshore (Ref. 12, 13).
- 2.9.37 Consequently, **Change 2** would not alter the conclusion of the ES that no significant adverse effects on tern populations are predicted as a consequence of noise and visual disturbance.
- 2.9.38 Red-throated divers are highly sensitive to noise and visual disturbance in their wintering areas. An assessment of the predicted increase in vessel deliveries to the BLFs would result in a small increase in the existing levels of vessel traffic within the SPA, whilst birds which are displaced would be subjected to a brief period of effect only. Indirect effects due to the effects of underwater noise on the fish prey species of red-throated diver would extend across a small part of the SPA only, and hence have, at most, a minor effect on wintering red-throated diver populations (**Shadow HRA Addendum** (Doc Ref. 5.10Ad). Consequently, it is considered that Change 2 would not alter the conclusion of the ES that

there would be no significant effect to the non-breeding red-throated population.

- 2.9.39 Kittiwakes nest on existing offshore structures at Sizewell C and are unlikely to be sensitive to the increases in disturbance associated with **Change 2** (Garthe & Huppopp 2004, Furness et al. 2013). Indirect effects due to the effects of underwater noise on the fish prey species of kittiwake are considered highly unlikely, given the large foraging range of this species (Woodward et al. 2009) and reliance on sandeels (which do not have a swimbladder and so are relatively insensitive to underwater noise). Kittiwakes nest on man-made structures in a number of highly disturbed urban locations on the East coast of Britain and no change to the significance of effects reported in the ES is predicted. Stakeholders have noted the potential for kittiwakes to nest on the new marine structures and further consideration will be given to the implications of any possible colonisation.

e) iii) b) Operation

- 2.9.40 The proposed temporary BLF would be removed at the end of the construction phase and would not be present in the operational phase of Sizewell C. There are no changes to the proposals for the operational use of the permanent BLF. There are therefore no new or different significant operational effects for terrestrial ecology and ornithology, as a result of the proposed change, in comparison with **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

f) Updated assessment – greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**)

f) i) Baseline

- 2.9.41 The proposed change does not alter the baseline conditions within the site area required for the Sizewell B relocated facilities works compared to the baseline reported in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].
- 2.9.42 It is noted that early works at the site of Sizewell B relocated facilities are progressing pursuant to a separate planning permission granted by East Suffolk Council under the Town and Country Planning Act 1990. Whilst this includes site clearance works and, therefore, the removal of existing ecological receptors in this location, this section considers the combined effects of all works associated with the Sizewell C Project at this site and so presents a worst-case assessment.

f) ii) Environmental Design and Mitigation

- 2.9.43 In the case of Option 1 of the proposed change, where Pillbox Field would not be used for the outage car park, this area would be subject to more extensive ecological mitigation and enhancement works, than was previously possible. The revised landscaping scheme for this option (refer to **Volume 2, Figure 2.2.10** of this **ES Addendum**) includes the creation areas of woodland planting to compensate for the loss of Coronation Wood, enhancement of Sandlings grasslands, provision of bat boxes and reptile hibernacula.
- 2.9.44 In the case of Option 2 of the proposed change, there would be no change to the environmental design and mitigation measures set out within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

f) iii) Assessment of effects

f) iii) a) Construction

- 2.9.45 In the case of Option 1 of the proposed change, given the removal of the outage car park from Pillbox Field, no construction activities would take place within this area. The area would be subject to enhancements, as noted above, such as the creation of Sandlings grassland, replacement woodland planting, provision of bat boxes and reptile hibernacula. The mitigation and enhancement works would result in beneficial effects for terrestrial invertebrates, bats, bird species and reptiles. However, these benefits are unlikely to alter the significance of effects reported within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].
- 2.9.46 In the case of Option 2 of the proposed change, the effects would remain as reported within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

f) iii) b) Operation

- 2.9.47 In the case of Option 1 of the proposed change, the enhanced habitats on Pillbox Field would provide benefits for local biodiversity in the long term. However, these benefits are unlikely to alter the significance of effects reported within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].
- 2.9.48 In the case of Option 2 of the proposed change, the effects would remain as reported within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

- g) Updated assessment - change to the location of the water resource storage area and the addition of flood mitigation measures (**Change 5**)

- g) i) Baseline

2.9.49 The baseline conditions associated with this design change remain the same as those presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033]. Four otter holts, of varying degrees of use, have been identified along boundary features of the flood mitigation area location, these are located on the site boundary.

- g) ii) Environmental Design and Mitigation

2.9.50 The environmental design and approach to mitigation as detailed in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] remains applicable to the proposed change. However, the proposed change would introduce a number of benefits for several of the IEFs.

2.9.51 The design changes for the provision of the flood mitigation area comprise the creation of reedbed and open water habitats. These additions to the scheme design would provide beneficial impacts and create an area of permanent habitat which would be safeguarded in the long-term as remaining within the ownership of the EDF Energy Estate. These changes would also result in the provision of optimal permanent foraging habitat for marsh harrier too which is important in the context of providing compensatory foraging for marsh harriers during the construction of Sizewell C (refer to the **Shadow HRA Addendum** (Doc Ref. 5.10 Ad) for further information). **Volume 2, Figure 2.2.14** presents the revised layout of the flood mitigation area.

- g) iii) Assessment of effects

- g) iii) a) Construction

- g) iii) a) a) Sizewell Marshes SSSI

2.9.52 The proposed design changes comprise the creation of additional reedbed and open water habitats. The provision of reedbed and open ditch habitats at Aldhurst Farm is already considered sufficient to compensate for the losses of these habitats which would arise from land take associated with the main development site. In this context, these additional wetlands are considered to provide beneficial impacts, as it would create an area of permanent habitat which would be safeguarded in the long-term as remaining within the ownership of the EDF Energy estate. Since the new open water and reedbeds do not serve to compensate further for the adverse impacts on the Sizewell Marshes

SSSI, it is still considered that the construction phase activities on the SSSI would constitute a minor adverse effect, which is considered to be **not significant** as presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

g) iii) a) b) Marsh Harrier

- 2.9.53 The improvement in the habitat quality available for foraging marsh harrier, provided by the new reedbed and open water would provide further certainty that sufficient foraging resource is available for marsh harriers during the construction of Sizewell C (refer to the **Shadow HRA Addendum** (Doc Ref. 5.10 Ad) for further information). It is still considered that impacts upon marsh harrier are overall likely to result in a minor adverse effect, which is deemed to be **not significant**. Therefore, the proposed change would not alter the results to the assessment as presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

g) iii) a) c) Terrestrial Mammals (specifically otter)

- 2.9.54 As noted within **section 2.9d)**, the 2020 survey findings confirmed the presence of three active otter holts grouped together in the corner of the field east of Sandpytle Plantation. One potential otter holt was recorded along the drain north of The Grove. These four holts are in the vicinity of the additional flood mitigation area at the northern extent of the site. In addition, an active otter holt was also recorded immediately to the west of the existing Sizewell power station complex, within Sizewell Marshes SSSI.
- 2.9.55 Whilst all of these features would remain, there is potential for some localised disturbance during construction of the wetland features. However, this would be managed through on-going monitoring and methods of working and set out in a detailed method statement (refer to **Volume 2, Appendix 14C10** of the **ES** (Doc Ref. 6.3) [APP-252]).
- 2.9.56 Overall, the effects to otter remain the same as outlined in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] and are considered to remain minor adverse, which is deemed to be **not significant**.

g) iii) b) Operation

- 2.9.57 Operational phase impacts would not differ to those presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033]. However, some localised beneficial impacts are likely to be sustained in the long-term given the additional permanent habitat creation measures being implemented.

h) Updated assessment - change to the SSSI crossing design (**Change 6**)

h) i) Baseline

2.9.58 The baseline conditions associated with this design change remain the same as those presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

h) ii) Environmental Design and Mitigation

2.9.59 The environmental design and approach to mitigation as detailed in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] remains applicable to the SSSI crossing. However, the change of design from a 70m culvert structure to a clear span bridge crossing does alter the mitigation embedded within design described within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033], specifically in relation to the IEFs identified in **Table 2.35**, including the Sizewell Marshes SSSI, plant and habitat communities, terrestrial and aquatic invertebrates (including Norfolk Hawker), terrestrial mammals (including otter and water vole), as well as bats.

2.9.60 The bridge design would result in a substantially larger cross-sectional area and void space under the bridge, compared to the culvert option which it replaces. The total distance between the wingwalls would be approximately 24m. The bank and channel of Leiston Drain would continue to remain intact.

2.9.61 The bridge design would reduce the potential for fragmentation effects around the Leiston Drain and would reduce the amount of permanent SSSI land take of wet woodland habitat by approximately 0.08ha. The bank and channel of Leiston Drain would still remain intact as with the culvert option. However, there would now be a greater offset adjacent to the channel provided through the construction of clear span bridge structure abutments rather than the culverted design option.

2.9.62 A ledge would be installed, as for the culvert option, to enable safe passage by otters during periods of 'out of bank' flood events and artificial bat roosts would be included within or on the bridge abutments. **Volume 2, Figure 2.2.16** of this **ES Addendum** provides an illustrative view of the SSSI crossing design layout.

h) iii) Assessment of effects

h) iii) a) Construction

2.9.63 Construction phase impacts associated with a bridge option would still result in some of the temporary impacts identified within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] and these are considered further below for each of the relevant IEFs.

h) iii) a) a) Sizewell Marshes SSSI

2.9.64 Direct land take, with the SSSI crossing provided as an embankment and culvert, was considered to be a minor adverse (**not significant**) effect in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033]. This effect was considered to be **not significant** given the compensatory habitat provided, the proposed compensatory habitats strategies and other mitigation provisions, as described within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

2.9.65 The proposed clear span bridge option would reduce the permanent land take of wet woodland habitat from the SSSI by approximately 0.08ha and reduce the potential for fragmentation compared to the culvert option. However, the reduced land take and fragmentation do not change the conclusions reached in the **ES** and the impacts to Sizewell Marshes SSSI are considered to remain as minor adverse (**not significant**). The revised calculations are provided in **Table 2.36** below.

Table 2.36: Revised Sizewell Marshes SSSI landtake calculations

Development Item	Habitat Feature	Extent of temporary land take from habitat type (ha) [ES, now Superseded]	Extent of permanent land take from habitat type (ha) [ES, now Superseded]	Extent of temporary land take from habitat type (ha)	Extent of permanent land take from habitat type (ha)	Reason for change
Sizewell Marshes SSSI Land Take <i>(to accommodate: -the main platform and SSSI crossing, -realignment of Sizewell Drain, -the restringing of pylons).</i>	Fen Meadow	0.90*	0.70	0.61	0.46	Differences in areas are caused by more accurate re-measuring of areas that included separating out the ditches and small woodland areas and putting those in their correct respective categories
	Wet woodland	1.13*	2.63	2.23	3.06	Differences due to additional wet woodland recreation, targeting more recreated woodland to be of SSSI quality and the removal of inclusion of an area of wet woodland in the Marsh Harrier Improvement Area (stated in the paragraph above Table 14.10 in the ES). Updated mapping showed that a larger area is now considered woodland instead of reedbed.
	Dry reedbed	0.00	3.55	0.00	2.06	A change in permanent habitat loss due to results of 2020 NVC survey of habitat areas.

Development Item	Habitat Feature	Extent of temporary land take from habitat type (ha) [ES, now Superseded]	Extent of permanent land take from habitat type (ha) [ES, now Superseded]	Extent of temporary land take from habitat type (ha)	Extent of permanent land take from habitat type (ha)	Reason for change
	Wet reedbed	0.67	0.00	0.00	0.87	Small change in the area due to results of 2020 NVC survey of habitat areas. Wet woodland recreation is now targeted in place of reedbed, meaning the loss is considered to be permanent rather than temporary.
	Tall ruderal	0.00	0.08	0.00	0.00	Tall ruderal habitat in the SSSI Triangle has been displaced by reeds due to succession.
	Ditches	0.20	0.07	0.18	0.07	Small change due to more accurate mapping in 2020 NVC survey.
Habitat Loss Totals		2.9ha	7.03ha	3.02	6.52	

h) iii) a) b) Terrestrial and Aquatic Invertebrates

- 2.9.66 The new clear span bridge structure would reduce the permanent land take of habitats and reduce the potential fragmentation that would impact upon the terrestrial and aquatic invertebrate communities, compared to the design included within the Application. The provision of the clear span bridge structure would result in a greater cross-sectional area for invertebrates to pass through. In addition, through the provision of the clear span bridge structure, substantially higher levels of natural lighting would be provided beneath the bridge deck which would considerably reduce the levels of shading. The increases in light levels beneath the bridge deck would also increase the extent to which aquatic invertebrates would pass through the channel, thereby reducing potential fragmentation effects further.
- 2.9.67 The construction phase activities would result in the construction of bridge abutments. However, these would be offset from the Leiston Drain to a greater extent than possible with the culvert structure and, therefore, further reduces potential impacts to the watercourse and its channel banks.
- 2.9.68 As with the culvert design included within the Application, sediment control measures would be implemented to protect the watercourse during the construction phase. However, compared to the culvert design, there would be reduced interface with the watercourse and its banks, thereby, further safeguarding water quality.
- 2.9.69 The impacts of direct land take resulting in habitat loss and fragmentation were identified within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] and were considered to be moderate adverse and **significant** for the wet woodland assemblage (based on consideration of habitat loss in compartments 1, 2 and 4a) and minor adverse / negligible and **not significant** for other compartments and assemblages. The proposed change would slightly reduce permanent land take of wet woodland and reduce the potential for fragmentation but the significance of the effects would be unchanged.

h) iii) a) c) Terrestrial Mammals (otter and water vole)

- 2.9.70 The provision of a clear span bridge structure (which would also include an otter ledge) rather than a culvert reduces the potential for and may eliminate fragmentation effects for both otters and water voles. **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] states that the proposed culverted SSSI crossing solution would result in direct landtake, fragmentation and incidental mortality of species would be minor adverse and **not significant**. However, the provision of the clear span bridge

crossing provided further confidence that effects would be are **minor adverse** in the worst case but are most likely to be **negligible** and would remain **not significant**. In addition, habitat loss for these species would be reduced.

h) iii) b) Operation

2.9.71 The long-term operational effects do not differ to those presented within **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033]. However, as described above, the provision of the clear span bridge structure is likely to reduce the potential for and may eliminate fragmentation effects. This is even more likely during the operational phase, with greatly reduced disturbance along the SSSI crossing, once habitats become re-established close to the bridge and once the plantings on the embankments become established. **No significant**, adverse effects are envisaged during the operational phase.

i) Updated assessment- revisions to tree retention on the main development site (**Change 7**)

i) i) Baseline

2.9.72 The baseline conditions associated with this design change remain the same as those presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033].

i) ii) Environmental Design and Mitigation

2.9.73 The environmental design and approach to mitigation as detailed in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] and as updated in **section 2.9d)ii)** above are applicable to the proposed change.

i) iii) Assessment of Effects

i) iii) a) Construction

2.9.74 **Volume 3, Appendix 2.9.B** of this **ES Addendum** provides the revised assessment in relation to bats for the construction phase following the undertaking of further targeted surveys in 2020.

2.9.75 The minor changes in respect of tree retention (**Change 7**) do not change the conclusions presented in **Volume 2, Chapter 14** of the **ES** for any of the bat IEFs. The minor changes are more than offset by additional commitments to reduce fragmentation including the new commuting link between Kenton Hills and Ash Wood and the use of trees in mobile containers to close overnight gaps created by haul routes.

- 2.9.76 The assessment of impact magnitudes and the significance of the construction effects presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] are unchanged.
- i) iii) b) [Operation](#)
- 2.9.77 **Volume 3, Appendix 2.9.B** of this **ES Addendum** provides the revised assessment in relation to bats for the operational phase following the undertaking of further targeted surveys in 2020.
- 2.9.78 Restoration proposals for the temporary construction area are defined in the **Outline Landscape and Ecological Management Plan (OLEMP)** (Doc Ref. 8.2) [APP-588] and are not affected by **Change 7**. The assessment of impact magnitudes and the significance of the operational effects presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] are unchanged.
- j) [Updated assessment –extension of the Order Limits to provide for additional fen meadow habitat at Pakenham \(**Change 11**\)](#)
- j) i) [Baseline](#)
- 2.9.79 SZC Co. has identified an additional fen meadow compensation site at Pakenham (refer to **Volume 2, Figure 2.2.26** of the **ES Addendum**) in West Suffolk, which has the potential for creating fen meadow, as described within **section 2.2** of this chapter.
- 2.9.80 The site proposed comprises approximately 32ha of land located to the west of Fen Road, south of Thieves Lane / Broadway, east of Thurston Road and to the north of the Street. The site currently comprises a mix of grassland, fen meadow, rush pasture and drier grassland and is adjacent to the designated Pakenham Meadows SSSI. The SSSI is designated for its unusually species rich, unimproved, poorly drained conditions which results in a mosaic habitat arrangement and lowland wet grassland and fen meadow are the primary interest features.
- j) ii) [Environmental Design and Mitigation](#)
- 2.9.81 The site at Pakenham has been identified as being potentially suitable for the creation of fen meadow as it lies in a shallow basin bisected by the Pakenham Stream, and is in close proximity to other areas of fen meadow habitat. The site can be distinguished as two parts, ‘north’ and ‘south’, that lie either side of a ‘tongue’ of slightly higher ground that divides the surface hydrology. Within the site identified, a total of 4.9ha is considered the primary locus for the creation of new fen meadow habitat, and some of the wider areas on the site may also have the potential for the creation of new fen meadow habitat.

- 2.9.82 The primary locus for fen-meadow creation in the north part of the site is along the western slope and around the north side of an existing area of fen meadow, which together comprise an approximate area of 3.2ha. If control is exerted over the central drain, then large areas of rush pasture and improved grassland also have the potential to act as fen meadow compensation.
- 2.9.83 The greatest potential for developing fen meadow on the south part of the site lies in controlling the internal ditches connected to the central drain, which would encompass an approximate area of 1.7ha. The potential also exists to detain water in the topsoil within the surrounding improved grassland. **Volume 2, Figure 2.2.26** of the **ES Addendum** presents the boundary of the fen meadow site at Pakenham. **Volume 2, Figure 2.2.27** of the **ES Addendum** shows the environmental context of the site.
- j) iii) [Assessment](#)
- j) iii) a) [Construction](#)
- j) iii) a) a) [Pakenham Meadows SSSI](#)
- 2.9.84 The Pakenham fen meadow compensation site is undesignated, is not identified as an IEF in its own right and so is screened out from further assessment. However, the Pakenham Meadows SSSI is located immediately adjacent to the site, to the east of the Pakenham Stream. The construction phase works would result in some localised disturbance to existing habitats and potentially water level changes within the fen meadow compensation site. It is possible that water control mechanisms and ground levels may be required on the compensation site and so some short-term construction activity could be required including earthworks and removal of field drains. This would result in some changes to the current habitat conditions on the compensation site but no impacts are anticipated on the SSSI to the east of the stream. All works would be carried out as detailed in the Fen Meadow Strategy (refer to **Volume 3, Appendix 2.9.D** of the **ES Addendum**).
- 2.9.85 The effects of the fen meadow creation proposals on the SSSI during construction are considered to be negligible and **not significant**.
- j) iii) a) b) [Sizewell Marshes SSSI](#)
- 2.9.86 Whilst the fen meadow site at Pakenham would provide additional compensatory habitat for the loss of fen meadow from the Sizewell Marshes SSSI, the overall construction impacts on the Sizewell Marshes SSSI are assessed to remain the same as presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033] and would remain as a minor adverse effect, which is considered to be **not significant**.

j) iii) b) Operation

j) iii) b) a) Pakenham Meadows SSSI

2.9.87 The habitat improvement works to be carried out at the adjacent Pakenham fen meadow compensation site would provide enhanced semi-natural habitat buffers to the SSSI and also provide greater connectivity between the SSSI and other habitats along the river corridor.

2.9.88 The effects of the fen meadow creation proposals on the Pakenham Fen SSSI during operation (once habitats are established) are considered to be minor beneficial and **not significant**.

j) iii) b) b) Sizewell Marshes SSSI

2.9.89 Operational phase impacts are not anticipated to differ to those presented in **Volume 2, Chapter 14** of the **ES** (Doc Ref. 6.3) [AS-033]. However, some beneficial impacts may be accrued in the long-term in respect of fen meadow habitats given the extent of the permanent habitat creation measures being implemented as compensatory habitats for the Sizewell Marshes SSSI. In the event of works at all three offsite fen meadow areas (at Benhall, Halesworth and Pakenham) successfully establishing replacement fen meadow habitats to the maximum extent across the optimal loci, this would provide an overall total of 8.1ha of compensatory fen meadow habitat compared to a total of 0.46ha being permanently lost from the SSSI.

2.10 Amenity and recreation

a) Introduction

2.10.1 This section provides an addendum to the amenity and recreation assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP-267];
- **Volume 2, Appendix 15E** of the **ES** (Doc Ref. 6.3) [APP – 270];
- **Volume 2, Appendix 15G** of the **ES** (Doc Ref. 6.3) [APP - 270];
- **Volume 2, Chapter 15, Figure 15I.4** of the **ES** (Doc Ref. 6.3) [APP-270]; and
- Access and Rights of Way Plans (Doc Ref 2.4(A) [AS-013].

2.10.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) Relevant Additional Information

2.10.3 The following Additional Information has been considered within the revised assessment for amenity and recreation receptors at the main development site:

- Corrections to **Access and Rights of Way plans** (refer to Doc Ref. 2.4(A) [AS-013]).
- Refinement to the strategic traffic flow model (refer to **Transport Assessment Addendum** (Doc Ref. 8.5(A)Ad) for further information) and subsequent revisions to traffic, noise and air quality modelling.

c) Relevant changes

2.10.4 The following design changes have been considered within the revised assessment for amenity and recreation at the main development site:

- Enhancement of the permanent BLF (**Change 2**).
- Construction of a new, temporary BLF (**Change 2**).
- Greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**).
- Change to certain parameter heights and activities on the main development site (**Change 4**).
- Surface water removed early in the construction process to be discharged to the foreshore via a temporary outfall structure (**Change 8**).
- Change to the sea defence to make the scheme more efficient and resilient to climate change (**Change 9**).
- Extension of the Order Limits to provide for additional fen meadow habitat at Pakenham as mitigation for fen meadow loss (**Change 11**).
- A new bridleway link between Aldhurst Farm and Kenton Hills (**Change 15**).
- Reduction in HGV numbers, as described within **section 2.2** of this chapter, and **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad), as a result of the potential increase in rail movements during

construction of Sizewell C (as a result of **Change 1**) and the additional temporary BLF (**Change 2**).

2.10.5 All other proposed changes described in **section 2.2** of this chapter would not alter the assessment of effects on amenity and recreation and, therefore, have not been considered further.

2.10.6 None of the changes would alter the results of the sound tranquillity assessment presented in **Volume 2, Appendix 15E** of the **ES** (Doc Ref. 6.3) [APP – 270].

d) Updated assessment – Additional Information

d) i) Corrections to Access and Rights of Way plans

2.10.7 Corrections to the **Access and Rights of Way plans** as shown in Doc Ref. 2.4(B) are considered to be minor and do not change the assessment presented within **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP-267].

d) ii) Revised traffic, noise and air quality modelling

d) ii) a) Traffic

2.10.8 The **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) has assessed:

- whether there would be any changes in assessments of impacts on links which were assessed in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198];
- whether any links that were screened out of the assessment in **Volume 2, Chapter 10** of the **ES** would now potentially experience effects, and the significance of these effects; and
- a sensitivity test has been undertaken based on 100% of HGVs from the A12 south (and 0% from the north) to understand if an alternative HGV distribution would result in any changes to effects.

2.10.9 The locations of each transport ‘link’ is shown on **Figures 10.2 to 10.5** of **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198].

2.10.10 The factors assessed in **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] and the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) which are relevant to the amenity and recreation impact assessment are effects on severance, pedestrian delay, amenity, and fear and intimidation, and these are addressed below. Effects on driver and

passenger delay, and accident and road safety are not considered further in this section.

- 2.10.11 **Volume 2, Chapter 10** of the **ES** (Doc Ref. 6.3) [APP-198] assessed a worst case of the Sizewell C busiest day for the peak of construction phase. The assessment of impacts on recreational receptors in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267] is also based on the busiest day (i.e. worst case) traffic volumes. The **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) has introduced an additional assessment scenario for the peak of construction phase – a typical day (with lower traffic levels than the busiest day). The new assessment for the typical day presented in the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) is not considered in this assessment on recreational receptors, and the assessment below presents the ‘worst case’ effects during the busiest day.

d) ii) b) Air quality

- 2.10.12 **Section 2.7d) Air Quality** of this document identifies that there would be some minor changes to air quality at a small number of locations due to the changes in strategic traffic modelling. Effects on all recreational receptors due to changes in air quality are assessed as negligible in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267] and **Volume 2, Appendix 15G** of the **ES** (Doc Ref. 6.3) [APP-270]. The minor changes assessed in **section 2.7d) Air Quality** of this document would not lead to any changes to the level of significance of the construction or operational phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267] (including **Appendix 15G** (Doc Ref. 6.3) [APP-270]). Air quality is therefore not discussed further.

d) ii) c) Early years of construction

- 2.10.13 The **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) identifies that, during the early years of construction:
- There would be no changes in assessments of impacts on links which were assessed in **Volume 2, Chapter 10** of the **ES**.
 - The only link that was screened out of the assessment in **Volume 2, Chapter 10** of the **ES** which would now potentially experience significant effects is link 6 (B1119 Saxmundham Road).

- 2.10.14 The changes in assessment at link 6 is therefore considered below.

- 2.10.15 The effects on severance at link 6 is now assessed as moderate adverse in the representative hour of 07:00-08:00. As noted in **section 1.2** of the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad):

- Link 6 is assessed of high sensitivity due to the presence of Leiston Children's Centre and Shining Stars Nursery.
- The absolute volume of traffic is very low, even with Sizewell C traffic, and only increases from 263 to 344 two-way vehicles per hour in the representative hour.

2.10.16 The **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) did not assess link 6 as high sensitivity due to the presence of recreational receptors. However, three PRoW connect to this section of the B1119 Saxmundum Road (E-363/003/0, E-363/002/0 and E-354/013/0) as shown on **Figure 15.5 of Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 271]. To connect between these PRoW pedestrians would walk along a section of the B1119 with no footways, and the additional traffic would cause some adverse effects.

2.10.17 Link 6 lies within recreational receptor group 16 North of Leiston (see **Figure 15.7 of Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 271]), where effects are assessed as moderate adverse (**significant**) at paragraph 15.6.158 of **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267]. The change in traffic volumes and additional impacts on recreational receptors would be relatively minor in the context of the construction of other elements of the main development site and would not change to the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

2.10.18 **Section 2.6d) Noise and Vibration** of this chapter identifies that there are no predicted significant changes to noise and vibration assessment outcomes during the early years of construction resulting from the revisions to the strategic traffic modelling. The changes would not change the results of the sound tranquillity assessment presented in **Volume 2, Appendix 15E** of the **ES** (Doc Ref. 6.3) [APP – 270].

2.10.19 Changes to traffic during the early years of construction do not, therefore, result in changes the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

d) ii) d) Peak years of construction

2.10.20 The **Transport Assessment Addendum** (Doc Ref. 8.5 Ad) identifies that, during the peak years of construction:

- There would be no changes in assessments of impacts on links which were assessed in **Volume 2, Chapter 10** of the **ES** except at links 4c (B1122 north), 7 (B1069 Coldfair Green), 34b (Main Road, Martlesham), 76 (B1069, Leiston) and 26 (A12 Marlesford).

- 2.10.21 The changes in assessments at links 4c 7, 34b, 76 and 26 are therefore considered below.
- 2.10.22 As noted in the **Transport Assessment Addendum** (Doc Ref. 8.5 Ad), the significance of effects change as follows:
- Link 4c (B1122) effects on severance during peak years of construction (busiest day) Annual Average Weekday Traffic (AAWT) total increases from minor adverse to moderate adverse.
 - Link 7 (B1069 Coldfair Green) effects on amenity during peak years of construction reduces from minor-moderate adverse to being screened out.
 - Link 76 (B1069, Leiston) effects on amenity during peak years of construction reduces from minor-moderate adverse to minor adverse.
 - Link 34b (Main Road, Martlesham) effects on severance during peak years of construction reduces from major adverse to minor adverse for 24 hour AAWT total traffic and for representative hour (07:00-08:00) total traffic, and effects on amenity reduces from negligible-major adverse to negligible-minor adverse.
 - 26 (A12 Marlesford) effects on fear and intimidation increase from minor adverse to minor adverse - moderate adverse.
- 2.10.23 As noted in the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad), as part of the primary mitigation, a shared footway/cycleway will be provided along link 4c with a Pegasus crossing and, as such, the effect on severance on link 4c would be **not significant**.
- 2.10.24 Links 7 and 76 lie on roads with footways and PRow connect to these roads. These links lie within receptor group 18 (Knodishall and Aldringham) where effects are assessed as minor adverse (**not significant**) at paragraph 1.2.52 of **Volume 2, Appendix 15G** of the **ES** (Doc Ref. 6.3) [APP – 270]. Although there would be improvements in amenity on the B1069 at links 7 and 76 compared to the assessment presented with the Application, the changes would not change the level of significance of the construction phase effects at receptor group 18 reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267], and **Appendix 15G** (Doc Ref. 6.3) [APP – 270].
- 2.10.25 Link 34b lies outside the amenity and recreation study area where receptors are scoped out of the assessment in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267] due to there being no potential for significant effects. The only potential effects at link 34b due to the Sizewell C Project would be due to road traffic. The changes in

assessment in the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) would potentially bring minor improvements at link 34b. The minor changes would not change the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

- 2.10.26 Link 26 lies on the edges of receptor groups G and H in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267], where effects are assessed as negligible neutral (**not significant**) (paragraph 15.3.59), and the only potential effects would be due to traffic. As noted in the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad), link 26 was just under the moderate adverse threshold in the ES assessment and is just over the threshold in the updated assessment as a result of the refined direct bus strategy. The **Transport Assessment Addendum** concludes that, on the typical day, there would be a minor adverse effect on fear and intimidation, which is **not significant**. The A12 would have limited use by recreational receptors. The small change would not change the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- 2.10.27 **Section 2.6d) Noise and Vibration** of this document identifies that there is only one existing road where a change in significance of outcome (**significant to not significant**) would occur as a result of the changes to the strategic traffic modelling and that is that Kings Road within the urban area of Leiston in both the 2028 typical and 2028 busiest scenarios of the peak construction phase. In this location, a moderate adverse effect (**significant**) was predicted in **Volume 2, Chapter 11 Noise and Vibration** of the **ES** (Doc Ref. 6.3) [APP-202]. As a result of the updates to modelling, a minor adverse effect (**not significant**) is now predicted in **Volume 2, Chapter 11** of the **ES**. Kings Road lies within recreational receptor group 17 (Leiston) where effects are assessed as minor adverse (**not significant**) at paragraph 1.2.47 of **Volume 2, Appendix 15G** of the **ES** (Doc Ref. 6.3) [APP – 270]. The change in significance of noise effects would bring minor local improvements to recreational receptors using Kings Road, but would not lead to any changes to the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267]. The changes would not change the results of the sound tranquillity assessment presented in **Volume 2, Appendix 15E** of the **ES** (Doc Ref. 6.3) [APP – 270].
- 2.10.28 Changes to traffic during the peak years of construction do not therefore result in changes to the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267] or **Volume 2, Appendix 15G** of the **ES** (Doc Ref. 6.3) [APP – 270].

d) ii) e) Operational phase

- 2.10.29 The **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) identifies that, during the operational phase:
- There would be no changes in assessments of impacts on links which were assessed in **Volume 2, Chapter 10** of the **ES** except at link 34b (Main Road, Martlesham).
 - No links that were screened out of the assessment in **Volume 2, Chapter 10** of the **ES** would now potentially experience significant effects.
- 2.10.30 At link 34b (Main Road, Martlesham) effects on severance reduces from major adverse to being screened out for 24 hour AAWT total traffic. As noted above the only potential effects due to the Sizewell C Project at link 34b would be due to road traffic. The change in assessment in the **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) would potentially bring minor improvements at link 34b. There would, however, be no changes to the level of significance of the operational phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- 2.10.31 **Section 2.6d) Noise and Vibration** of this document identifies that there are no predicted significant changes to noise and vibration assessment outcomes during the operational phase resulting from the revisions to the strategic traffic modelling. The changes would not change the results of the sound tranquillity assessment presented in **Volume 2, Appendix 15E** of the **ES** (Doc Ref. 6.3) [APP – 270].
- 2.10.32 Changes to traffic during the operational phase do not therefore result in changes to the level of significance of the operational phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- d) ii) f) Updated assessment – sensitivity test 100% HGVs from south
- 2.10.33 The **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) states that only those links that would experience an increase in HGVs to the core assessment set out earlier in the **Transport Assessment Addendum** have been considered in the sensitivity test. Those links that would have a reduction in HGVs (i.e. on the A12 north) have already been assessed with a worst case level of HGVs in the core updated assessment earlier in the **Transport Assessment Addendum**. The **Transport Assessment Addendum** concludes that the change in HDVs on the A12 as part of the 100% HGV A12 south sensitivity test will not change the effects on severance, pedestrian delay, amenity or fear and intimidation in the early years or peak years of construction on the A12 south to that concluded in

the updated core assessment summarised earlier in the **Transport Assessment Addendum**.

- 2.10.34 **Section 2.6d) Noise and Vibration** of this document identifies that there would be increases in noise on the A12 south, and reductions on the A12 north. These changes would occur at a distance of approximately 6.5km or greater from the main development site where the only potential effects due to the construction works at the main development site would be due to traffic. Changes to traffic noise on these receptors would not result in changes to the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- 2.10.35 A potential alternative HGV distribution of 100% of HGVs from the A12 south (and 0% from the north) would therefore not result in changes to the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- e) Updated assessment - enhancement of the permanent BLF (Change 2)
- e) i) Baseline
- 2.10.36 There are no changes to the baseline presented in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- e) ii) Environmental Design and Mitigation
- 2.10.37 Further design and mitigation measures are proposed as a result of the proposed changes, above those stated in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP-267].
- 2.10.38 The **Description of Construction** (paragraph 3.4.56 of **Volume 2, Chapter 3** of the **ES** (Doc Ref. 6.3) [APP-184]) states that part of the coastline would be closed for approximately six months during construction of the permanent BLF and a diversion of the Coast Path (the Suffolk Coast Path, Sandlings Walk and the future England Coast Path (which all follow the same route on Public Right of Way (PRoW) E-363/021/0 through the main development site and are, hereafter, referred to as the 'Coast Path') would be in place. Further detailed design work, which has been carried out since the submission of the Application, has identified measures which would enable the Coast Path to remain open during construction of the permanent BLF, except in rare circumstances where it is considered unsafe to do so. It would therefore now be assumed to remain open for substantially more of the construction period than in the submitted Application. However, shorter term temporary closures remain possible.

- 2.10.39 This reduction in potential closures would be achieved by moving the Coast Path west and east as the BLF is constructed in sections, avoiding areas where construction is occurring. If it is unsafe to keep the Coast Path open for temporary periods, use of the temporary inland diversion would be necessary, as shown at **Volume 2, Appendix 15I, Figure 15I.4** of the **ES** (Doc Ref. 6.3) [APP-270]. The inland diversion route remains unchanged.
- 2.10.40 Further detailed design work since the submission of the Application has also identified measures which would enable the Coast Path to remain open at all times during use of the permanent BLF. This is an improvement to the proposals presented in the Application which stated that closure of the Coast Path would be unavoidable at times due to the sea-borne delivery of exceptionally large and heavy materials (paragraphs 1.2.10 (construction phase) and 1.2.31 (operational phase) of **Volume 2, Appendix 15I** of the **ES** (Doc Ref. 6.3) [APP – 270]).
- 2.10.41 The Coast Path would now remain open during use of the permanent BLF by providing two alternative routes along the coast. The preferred route would be along the proposed permanent alignment of the Coast Path across the BLF access road. This would provide access at all times, except for when it would be necessary to temporarily close the Coast Path for approximately 1-2 hours whilst Abnormal Indivisible Loads (AILs) are delivered. During this time, a second route would be available along the beach, underneath the BLF deck, which would be open at all times. By having both options available, access along the coast would be kept open during BLF deliveries.
- e) iii) Assessment of effects
- e) iii) a) Construction
- 2.10.42 The proposed changes would introduce a new exceptional construction phase height parameter, increase the length of the enhanced permanent BLF and introduce additional permanent infrastructure to the original design, including additional piles and elevated cross beams. The proposed changes to the design would increase the ability of the enhanced permanent BLF to receive more regular deliveries, which would increase the number and frequency of Thames barges/tugs visible in the offshore environment (both moored and moving) and vehicles using the access road. These changes would lead to additional construction sound and views of construction works experienced by recreational receptors.
- 2.10.43 The proposed changes would have the potential to directly affect the following land-based receptors during construction, where effects are assessed as major adverse (**significant**) in **Volume 2, Chapter 15** of the **ES** (see summary table 15.11) (Doc Ref. 6.3) [APP – 267]: receptor group

12 Minsmere to Sizewell Coast; Suffolk Coast Path and the future England Coast Path; and Sandlings Walk. Although the changes confirming fewer Coast Path closures and temporary inland diversions would lessen adverse effects, the proposed design changes would cause additional adverse effects due to additional changes to noise and views. Overall, however, these changes would not alter the level of significance of the effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

2.10.44 The proposed changes would also have the potential to directly affect receptor group 24 Offshore, but the changes would be relatively minor within the context of other construction activity offshore, along the coast and at the main development site. As described at paragraph 1.2.83 of **Volume 2, Chapter 15, Appendix 15G** of the **ES** (Doc Ref. 6.3) [APP – 270], most recreational craft activity occurs between approximately 1km and 6km of the coastline opposite the main development site, with lower levels closer to the coast where the changes to the permanent BLF would be located. The proposed changes would not change the level of significance of the effects on receptor group 24 Offshore reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

2.10.45 Other recreational receptors which lie further from the enhanced permanent BLF would potentially experience additional changes to views and noise. However, the changes would be relatively minor in the context of the construction of other elements of the main development site. Overall, the changes to the permanent BLF would not change the level of significance of the effects on amenity and recreational receptors reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

e) iii) b) Operation

2.10.46 The proposed change to the permanent BLF would increase the number of piles and the length of the BLF, and introduce elevated horizontal cross beams to the piles, which would alter the appearance of the BLF when not in use during the operational phase. These changes would have limited additional effects on recreational receptors.

2.10.47 The Coast Path would remain open during AIL deliveries and the inland diversion assumed at paragraph 15.6.238 of **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267] would not be required. However, the inland diversion would have only been used very infrequently, every 5 to 10 years, so removal of the need to use this inland diversion would not lead to changes in the assessment of the level of significance of the effects on amenity and recreational receptors reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

- 2.10.48 The design changes to the permanent BLF would therefore bring some changes to the experience of recreational receptors, but they would not be substantial enough to change the level of significance of the effects on amenity and recreational receptors reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- f) Updated assessment - construction of a new, temporary BLF (Change 2)
- f) i) Baseline
- 2.10.49 There are no changes to the baseline within **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- f) ii) Environmental Design and Mitigation
- 2.10.50 No additional mitigation has been identified to that embedded in the changed design. This is further described in **section 2.10e)ii)**.
- f) iii) Assessment of effects
- f) iii) a) Construction
- 2.10.51 The proposed change would introduce a new temporary BLF for a duration of approximately eight years, and take up to approximately nine months to construct. The facility would be up to approximately 505m in length and located to the south of the permanent BLF. The temporary BLF includes a covered conveyor to transport materials into the construction site, which would pass over the Coast Path. The underside of the temporary BLF deck would be at least 3.7m above the ground level of the Coast Path, allowing equestrians to ride under the temporary BLF without dismounting. In addition to the temporary BLF structure, moving vehicles and other types of plant would be visible and audible. There would also be views of and sound from relatively large self-propelled vessels (up to approximately 120m in length) in the marine environment during year-round operational campaigns.
- 2.10.52 Approximately 114 piles would be required to construct the temporary BLF, of which approximately 12 would be located on the beach. Driving the piles would generate additional noise experienced by recreational receptors. Spacing between piles would be no less than 10m along the length of the BLF and no less than 12m across its width, and cross braces would be required between some of the piles for stability, restricting access to the beach where these structures are located.
- 2.10.53 The temporary BLF would operate at night and, as such, views would be possible to standard navigation lights on mooring dolphins and on nearby

navigation markers and buoys, and sound from the operating facility would be audible. Furthermore, task and ambient lighting would be required along the temporary BLF and vessels would be illuminated when moving and moored in the offshore environment. The Coast Path and beach are less likely to be used during the night than during the day.

- 2.10.54 The Coast Path would be kept open during construction of the temporary BLF by moving the path west and east as the BLF is constructed in sections, avoiding areas where construction is occurring, except in rare circumstances where it is considered unsafe to do so. In such instances, use of the temporary inland diversion would be necessary, as shown at **Volume 2, Appendix 15I, Figure 15I.4** of the **ES** (Doc Ref. 6.3) [APP-270]. During operation of the temporary BLF, the Coast Path would remain open, passing beneath the BLF deck and conveyor. Measures to prevent objects falling from the BLF would be provided to ensure safety of users of the Coast Path and beach.
- 2.10.55 Construction of the temporary BLF would have potential to directly affect the following land based receptors, where effects are assessed as major adverse (**significant**) in **Volume 2, Chapter 15** of the **ES** (see summary table 15.11) (Doc Ref. 6.3) [APP – 267]: receptor group 12 Minsmere to Sizewell Coast; Suffolk Coast Path and the future England Coast Path; and Sandlings Walk. Although the proposed changes would cause additional adverse effects on these receptors, impacts have already been assessed as major adverse (**significant**) and the new, temporary BLF would be consistent with rather than change the experience of walkers in close proximity to a major construction site.
- 2.10.56 The proposed changes would also directly affect receptor group 24 Offshore, including up to approximately 400 deliveries between April and October (inclusive) and up to approximately 200 additional deliveries for the remainder of the year, for each year of operation. As described at paragraph 1.2.83 of **Volume 2, Appendix 15G** of the **ES** (Doc Ref. 6.3) [APP – 270], most recreational craft activity occurs between approximately 1km and 6km of the coastline opposite the main development site where additional boat movements would occur, with lower levels closer to the coast where the temporary BLF would be located.
- 2.10.57 Impacts on receptor group 24 Offshore are assessed as minor adverse (**not significant**) at paragraph 1.2.84 of **Volume 2, Appendix 15G** of the **ES** (Doc Ref. 6.3) [APP – 270]. The proposed changes would increase the level of significance of the effects on receptor group 24 Offshore. Effects on recreational water users would be of medium to small scale, medium-term duration and affect an intermediate extent of the receptor group area. The impact on users would be of low magnitude and, taking into

consideration the high-medium sensitivity of receptors, would result in a moderate-minor adverse effect (**not significant**).

f) iii) b) Operation

- 2.10.58 The temporary BLF would be dismantled following its operation such that no elements would be visible, and it would not be present in the operational phase. As such there would be no change to the nature or the level of significance of the effects on amenity and recreational receptors reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

g) Updated assessment – greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**)

g) i) Baseline

- 2.10.59 There are no changes to the baseline in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

g) ii) Environmental Design and Mitigation

- 2.10.60 No additional mitigation has been identified to that embedded in the changed design.

g) iii) Assessment of effects

- 2.10.61 In the case of Option 1, the effects of the revised proposed development would be reduced during both construction and operation due to the removal of built development from Pillbox Field. The effects associated with the crossing of Bridleway 19 for access to Pillbox Field would be removed. In addition, construction activities would be located further away from the amenity and recreation receptors to the south of the site. However, the proposed change is not expected to reduce the magnitude of effect overall on amenity and recreation receptors.

- 2.10.62 The effects of Option 2 would remain the same as presented within **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

- 2.10.63 Overall, there is no change to the conclusions of the assessment presented within **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

h) Updated assessment - –change to certain parameter heights and activities on the main development site (**Change 4**)

h) i) Baseline

2.10.64 There are no changes to the baseline in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

h) ii) Environmental Design and Mitigation

2.10.65 No additional mitigation has been identified to that embedded in the changed design.

h) iii) Assessment of effects

h) iii) a) Construction

2.10.66 Construction phase stockpiling to an existing parameter zone would occur within an area surrounded by other construction activity within the main development site. This would be a relatively minor change in the context of the construction of other elements of the main development site and would not change the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

2.10.67 The construction phase marine tunnelling and shafts would lie west of the proposed temporary sea defence wall within an area already in the construction zone. The Coast Path and accessible beach lie east of the temporary sea defence wall and users would not be directly affected by the construction phase marine tunnelling and shafts. There might be changes to views and noise experienced by recreational receptors. However, the change would be relatively minor in the context of the construction of other elements of the main development site and would not change to the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

h) iii) b) Operation

2.10.68 The proposed permanent bat barn would be a small structure located to the north of Lower Abbey Farm. It could potentially be visible from PRow E-363/020/0 (the Eastbridge to Minsmere Sluice footpath) at a distance of over 200m seen in the context of existing buildings at Lower Abbey Farm. It is unlikely to be visible from other recreational receptors. The presence of the bat barn would not change the level of significance of the operational phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

- 2.10.69 Whilst reduction in the maximum height of the southernmost pylon from 79m AOD to 59mAOD would provide improvements to views for some recreational receptors from the south-west, west and north, the change would be very minor in the context of views of the other power station infrastructure. This change would not change the level of significance of the operational phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- i) Updated assessment - temporary discharge outfall (**Change 8**)
- i) i) Baseline
- 2.10.70 There are no changes to the baseline in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- i) ii) Environmental Design and Mitigation
- 2.10.71 No additional mitigation has been identified to that embedded in the changed design.
- i) iii) Assessment of effects
- i) iii) a) Construction
- 2.10.72 The temporary discharge outfall would be constructed across the Coast Path, and coastal margin. The ground would be reinstated over the buried discharge outfall with only the seaward end remaining visible. There may be short-term temporary diversions of the Coast Path, east or west along the beach, during construction. The Coast Path would remain open as far as it is reasonably practicable and safe to do so.
- 2.10.73 Although the proposed changes would cause additional adverse effects on users of the Coast Path and beach, they would be short-term and minor within the context of other construction activity along the coast and at the main development site. The temporary discharge outfall would not change the level of significance of the effects on amenity and recreational receptors reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].
- i) iii) b) Operation
- 2.10.74 The temporary discharge outfall would be removed and the beach fully reinstated. As such there would be no change to the level of significance of the operational phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

j) Updated assessment - change to the sea defence (**Change 9**)

j) i) Baseline

2.10.75 There are no changes to the baseline in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

j) ii) Environmental Design and Mitigation

2.10.76 No additional mitigation has been identified to that embedded in the changed design.

j) iii) Assessment of effects

j) iii) a) Construction

2.10.77 During the construction phase, the proposed changes would alter the nature of views and noise, and reduce the width of accessible land between the hard sea defence and the sea after it has been constructed, and move the permanent route of the Coast Path eastwards compared to the Application. An indicative drawing showing the location of the proposed permanent HCDF is shown in **Volume 2, Figure 2.2.24** of the ES Addendum.

2.10.78 The proposed changes would have potential to directly affect the following land based receptors during construction, where effects are assessed as major adverse (**significant**) in **Volume 2, Chapter 15** of the **ES** (see summary table 15.11) (Doc Ref. 6.3) [APP – 267]: receptor group 12 Minsmere to Sizewell Coast; Suffolk Coast Path and the future England Coast Path; and Sandlings Walk. Although the proposed changes would cause additional adverse effects on these receptors, impacts have already been assessed as major adverse (**significant**) and the proposed change would be consistent with rather than change the experience of walkers in close proximity to a major construction site.

2.10.79 The proposed changes would also have the potential to affect other receptor groups, due to changes to views and noise. However, the changes would be relatively minor within the context of other construction activity at the main development site.

2.10.80 There would be no change to the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

j) iii) b) Operation

- 2.10.81 During the operational phase, the proposed changes would alter the nature of views along the coast and towards Sizewell B and Sizewell C, and reduce the width of accessible land between the hard sea defence and the sea after it has been constructed, and move the permanent route of the Coast Path eastwards compared to the Application. The design changes to the sea defences would therefore bring some changes to the experience of recreational receptors, but they would not be substantial enough to change the level of significance of the effects on amenity and recreational receptors reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

j) iii) c) Adaptive design

- 2.10.82 Based upon the expected timescales for this design change, it is likely that the landscape context would differ from both the present baseline, given the timing of the 'End of Generation' when both Sizewell A and Sizewell B are likely to have completed decommissioning.
- 2.10.83 There would be some adverse amenity and recreation effects, during construction of the adaptive sea defence on users of the Coast Path, the coastal margin and nearby receptors. The nature and significance of effects would vary over the construction period, dependent on the nature of construction activity being undertaken, and it is anticipated that the greatest effects would occur when plant are in operation or activities are in close proximity to receptors, or when temporary closures to the Coast Path and / or areas of the coastal margin, or diversions of the Coast Path are required.
- 2.10.84 During operation, it is expected that the Coast Path may be realigned to the top of the sea defence, this would be captured as a requirement within the draft DCO.
- 2.10.85 There are substantial uncertainties with respect to the future baseline conditions so the exact nature of effects are difficult to ascertain. Due consideration will be given in future to minimise effects when finalising the design of the adaptive sea defence, the alignment of the Coast Path, and the extent of the coastal margin.

k) Updated assessment - extension of the Order Limits to provide for additional fen meadow habitat at Pakenham (**Change 11**)

k) i) Baseline

- 2.10.86 The area proposed for habitat enhancement site at Pakenham is crossed by one PRoW (W-425/003/0). Another PRoW (W-425/002/0) crosses two

potential construction access points between existing roads and the site. There are other PRoW within the landscape outside of the site which have potential to be indirectly affected by the proposals, due to changes to views and noise.

k) ii) Environmental Design and Mitigation

- 2.10.87 No additional mitigation has been identified to that embedded in the changed design.

k) iii) Assessment of effects

k) iii) a) Construction

- 2.10.88 PRoW crossing the site would not be temporarily or permanently diverted or closed during the construction phase of the proposed development.

- 2.10.89 The construction works would result in minor changes to the setting of PRoW, due to changes to views and noise. The proposals would not result in significant effects during construction.

k) iii) b) Operation

- 2.10.90 PRoW crossing the site would not be temporarily or permanently diverted or closed during the operational phase of the proposed development.

- 2.10.91 The creation of enhanced habitat is likely to enhance the landscape around the users of PRoW and enhance the recreational experience. These changes would not result in significant effects during operation.

l) Updated assessment - a new bridleway link between Aldhurst Farm and Kenton Hills (**Change 15**)

l) i) Baseline

- 2.10.92 There are no changes to the baseline in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

l) ii) Environmental Design and Mitigation

- 2.10.93 The proposed change forms part of the embedded mitigation for the Sizewell C Project. No additional mitigation has been identified to that embedded in the changed design.

l) iii) Assessment of effects

l) iii) a) Construction

- 2.10.94 The new permanent route and uncontrolled crossing of Lover's Lane would be made available for pedestrians in the construction phase once the entrance to the main development site from the B1122 is in place and the number of HGVs using the early years access is reduced, approximately two years post commencement of construction works.
- 2.10.95 The proposed change would provide an off-road pedestrian connection from west of Lover's Lane (including from the new off-road bridleway in Aldhurst Farm, Leiston, the accommodation campus and the contractors caravan park at the LEEIE) to the permissive footpath network in Kenton Hills and south of Kenton Hills, Leiston Common, Bridleway 19 on Sandy Lane, and further afield. When available, the link would enhance access to recreational resources by pedestrians.
- 2.10.96 The introduction of the crossing would result in the loss of additional hedgerow vegetation to that proposed in the Application to ensure appropriate visibility of the crossing by motorists and safe operation by pedestrians and horse riders. This would be mitigated by new replacement hedgerow planting.
- 2.10.97 This link would connect receptor groups 14 Northwest Site and 15 Sizewell Belts where effects are assessed as major adverse (**significant**) in **Volume 2, Chapter 15** (see table 15.11) of the **ES** (Doc Ref. 6.3) [APP – 267]. Although this footpath link would bring benefits to recreational receptors, it would be a relatively minor enhancement in the context of the larger scale adverse effects of construction activity at the main development site. As a result, there would be no change to the level of significance of the construction phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

l) iii) b) Operation

- 2.10.98 The new footpath link created during construction would be designated as a Bridleway once construction is complete. This would create a permanent more direct off-road north-south bridleway connection as part of longer routes within the Suffolk Coast and Heaths AONB, as well as providing a more direct west-east connection to the permissive footpath and PRoW network in and around Kenton Hills, and to Sandlings Walk and the coast. It would provide a link to deliver a more direct off-road (with the exception of a controlled road crossing on the B1122 and an uncontrolled road crossing on Lover's Lane) walking route between Leiston and the coast. This would provide substantial permanent recreational access enhancements.

2.10.99 This link would connect receptor groups 14 Northwest Site and 15 Sizewell Belts where effects are assessed as major beneficial (**significant**) in **Volume 2, Chapter 15** (see table 15.12) of the **ES** (Doc Ref. 6.3) [APP – 267] due to improvements to recreational resources already proposed. This assessment cannot increase further. Despite this substantial improvement, there would, therefore, be no change to the level of significance of the operational phase effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

m) Updated assessment – reduction in HGV movements (**Changes 1 and 2**)

2.10.100 The **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) assesses changes that would result from a reduction in HGV movements as a result of the proposed changes to rail and marine capacity, as explained in the **Freight Management Strategy** (Doc Ref 8.18). The **Transport Assessment Addendum** states that the benefit of these changes is likely to be most noticeable on the HGV routes during peak construction (i.e. A12 and Sizewell link road), and provides an assessment of changes in effect during the peak construction phase only.

2.10.101 The **Transport Assessment Addendum** (Doc Ref. 8.5(A) Ad) identifies that effects on severance at link 19b (A12 Lowestoft) was assessed as minor adverse in the ES and is now screened out (typical day), and that there would be no other changes in effects on severance and no changes to pedestrian delay during the peak construction typical day and busiest day, when comparing the assessments based on the Refined DCO flows (resulting from the refinements to the strategic traffic model) and the reduced HGV flows resulting from Changes 1 and 2. The only changes relevant to recreational receptors during peak construction (busiest day) would be the following reductions in effects on amenity and fear and intimidation:

- Amenity: Links 13b (B1122), 21c (A12 middle), 21e (A12 south of B1119) and 78 (A12 north of B1121) reduce from moderate adverse to minor adverse.
- Amenity: Link 21b (A12 north of B1119) reduces from major adverse to moderate adverse.
- Amenity: Link 19b (A12, Lowestoft) reduces from minor adverse to negligible.
- Fear and intimidation: Link 26 (A12, Marlesford) reduces from moderate adverse to minor adverse.

2.10.102 Whilst changes resulting from a reduction in HGV numbers as a result of the changes explained in the **Freight Management Strategy** would bring benefits to recreational receptors, through reduced opportunities for interaction with traffic and reduced noise, changes to HGV numbers do not change the assessment presented within **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

m) i) **Baseline**

2.10.103 There are no changes to the baseline in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

m) ii) **Environmental Design and Mitigation**

2.10.104 No additional mitigation has been identified to that embedded in the changed design.

m) iii) **Assessment of effects**

2.10.105 Reduction in HGV numbers as a result of the potential increase in rail movements (**Change 1**) and the provision of the enhanced permanent BLF and a new, temporary BLF (**Change 2**) would bring benefits to recreational receptors, through reduced opportunities for interaction with traffic and reduced noise. However, changes to HGV numbers do not change the level of the significance of effects reported in **Volume 2, Chapter 15** of the **ES** (Doc Ref. 6.3) [APP – 267].

2.11 **Terrestrial historic environment**

a) **Introduction**

2.11.1 This section provides an addendum to the terrestrial historic environment assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [[APP-272](#)]; and
- **Volume 2, Appendix 16H** of the **ES** (Doc Ref. 6.3) [[APP- 275](#)].

2.11.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) **Relevant Additional Information**

2.11.3 An updated Overarching Written Scheme of Investigation is provided (refer to **Volume 3, Appendix 2.11.A** of this **ES Addendum**).

2.11.4 The revised document addresses comments received from consultees – Suffolk County Council Archaeology Service (SCCAS) and Historic England on the document presented in **Volume 2, Appendix 16H** of the **ES** (Doc Ref. 6.3) [APP- 275].

2.11.5 The updates to the Overarching Written Scheme of Investigation do not change the assessment presented within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP-272] and, therefore, have not been considered further within this section.

c) Relevant changes

2.11.6 The following design changes have been considered within the revised assessment for terrestrial historic environment at the main development site:

- enhancement of the permanent BLF (**Change 2**),
- construction of a new temporary BLF (**Change 2**);
- greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**);
- change to certain parameter heights and activities on the main development site (**Change 4**);
- change to the location of the water resource storage area and the addition of flood mitigation measures to lower flood risk (**Change 5**), and
- extension of the Order Limits for additional fen meadow habitat at Pakenham (**Change 11**).

2.11.7 All other proposed changes described in **section 2.2** of this chapter would not alter the assessment of effects on terrestrial historic environment and, therefore, have not been considered further.

d) Updated assessment – enhancement of the permanent BLF (**Change 2**)

d) i) Baseline

2.11.8 Analysis of ZTV modelling (refer to **Volume 2, Figure 2.8.1** of the **ES Addendum**) did not identify any new receptors which would be subject to significant indirect effects as result of the proposed design change to the permanent BLF, above those considered within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

d) ii) Environmental Design and Mitigation

- 2.11.9 No additional mitigation has been identified to that embedded in the changed design.

d) iii) Assessment of effects

d) iii) a) Construction

- 2.11.10 The proposed change would introduce a new exceptional construction phase height parameter, increase the length of the enhanced permanent BLF and introduce additional permanent infrastructure compared to the design included within the Application.

- 2.11.11 There would be theoretical visibility of construction in some views from heritage assets to the north and south along the coast including the non-designated Coastguard Cottages, Leiston Abbey first site (SM 1015687), the edges of Aldeburgh and Southwold Conservation Areas – more notably when tall cranes and plant are operational within the exceptional height parameter as demonstrated in the Landscape and Visual viewpoint panels (e.g. **Figure 2.8.7** and **Figure 2.8.20**). However, the increased visibility and proposed changes would not serve to increase the magnitude of change and, therefore, the level of significance of the effects on the heritage significance of the assets above that assessed during the construction phase within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

d) iii) b) Operation

- 2.11.12 The enhanced permanent BLF would increase the number of piles and the length of the beach landing facility, and introduce elevated horizontal cross beams to the piles. Whilst the design change increases the amount of physical infrastructure visible above water and submerged, there are no new or different significant operational effects for the terrestrial historic environment as a result of the proposed change in comparison with **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

e) Updated assessment – construction of a new, temporary beach landing facility (**Change 2**)

e) i) Baseline

- 2.11.13 Analysis of ZTV modelling (refer to **Volume 2, Figure 2.8.2** of the **ES Addendum**) did not identify any new receptors which would be subject to significant indirect effects as result of the proposed design change, above those considered within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

e) ii) Environmental Design and Mitigation

- 2.11.14 No additional mitigation has been identified to that embedded in the changed design.

e) iii) Assessment of effects

e) iii) a) Construction

- 2.11.15 The proposed change would introduce a temporary BLF for up to 9.5 years. The facility would be up to 505m in length and located south of the permanent BLF. It would include features such as an unloading area, access road and pathway running along its length as well as a conveyor. Large vessels would also be present out to sea during operation. These would introduce new visual elements although from the north vehicles would be screened by the conveyor. During construction, plant including cranes would also be present.

- 2.11.16 There would be theoretical visibility of construction in some views from heritage assets to the north and south along the coast including the non-designated Coastguard Cottages, Leiston Abbey first site (SM 1015687), the edges of Aldeburgh and Southwold Conservation Areas. However, this would be seen within the wider context of construction related activity and would be relatively limited. The increased visibility of the proposed change would not serve to increase the magnitude of change and, therefore, the level of significance of the effects on the heritage significance of the assets above that assessed during the construction phase within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

e) iii) b) Operation

- 2.11.17 The temporary BLF would be dismantled following its operation during the construction phase. There would be no operational effects for the terrestrial historic environment as a result of the proposed change in comparison with **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

f) Updated assessment – greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**)

f) i) Baseline

- 2.11.18 There are no changes to the baseline in **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP – 272].

f) ii) Environmental Design and Mitigation

- 2.11.19 No additional mitigation has been identified to that embedded in the changed design.

f) iii) Assessment of effects

- 2.11.20 In the case of Option 1, the effects on archaeological remains in Pillbox Field and changes to the setting of the Pillbox would be avoided with the removal of the outage car park.
- 2.11.21 The landscaping scheme on Pillbox Field has been designed to avoid archaeologically sensitive areas and a site-specific WSI would set out a management plan outlining how remains are to be preserved in situ during and after proposed landscaping works.
- 2.11.22 The effects of Option 2 would remain the same as presented within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP – 272].
- 2.11.23 Overall, there is no change to the conclusions of the assessment presented within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP – 272].

g) Updated assessment – change to certain parameter heights and activities on the main development site (**Change 4**)

g) i) Baseline

- 2.11.24 Analysis of ZTV modelling (**Figures 2.8.1 to 2.8.3**) indicates that no new receptors would be affected by the proposed design change compared to those considered within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

g) ii) Environmental Design and Mitigation

- 2.11.25 No additional mitigation has been identified to that embedded in the changed design.

g) iii) Assessment of effects

g) iii) a) Construction

- 2.11.26 With reference to **Figures 2.8.20** and **2.8.22**, the proposed changes would increase the normal (+25m AOD) and exceptional working heights (+60m AOD) for the enhanced permanent BLF and new temporary BLF (construction zones C16 and C20); changes to marine shafts and tunnelling parameters which would introduce a new working construction zone (C21) with a normal height parameter of +40m and exceptional

height parameter of +70m AOD; an extension of the stockpile zone (5a); as well as the introduction of a bat barn with a new parameter zone 1G for a structure approximately 6m above ground level (up to 9m AOD), as shown at **Volume 2, Figure 2.2.1** of the **ES Addendum**.

- 2.11.27 These changes would serve to increase the visibility of construction phase activity on the coast and in the immediate offshore environment from locations along the coast including the non-designated Coastguard Cottages, Leiston Abbey first site (SM 1015687), the edges of Aldeburgh and Southwold Conservation Areas. However, the proposed changes would be seen within the context of other construction activity along the coast and at the main development site (which has a normal working height parameter of +160m AOD and exceptional working height parameter of +250m AOD), with different elements being seen over different (temporary) durations over the construction period.
- 2.11.28 The increased visibility and proposed changes would not serve to increase the magnitude of change and therefore the level of significance of the effects on the heritage significance of the assets above that assessed during the construction phase within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

g) iii) b) Operation

- 2.11.29 There would be no change to the level of significance of the operational phase effects arising from the proposed changes to the parameter heights and activities to those assessed within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272]. In terms of the bat barn, any views would be glimpsed and in the context of existing buildings and structures at Lower Abbey Farm, and would not increase any effects on setting on nearby designated assets.

h) Updated assessment – change to the location of the water resource storage area and the addition of flood mitigation measures (**Change 5**)

h) i) Baseline

- 2.11.30 No new receptors would be affected by the proposed design change compared to those considered within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

h) ii) Environmental Design and Mitigation

- 2.11.31 No additional mitigation has been identified to that embedded in the changed design.

h) iii) Assessment of effects

h) iii) a) Construction

- 2.11.32 **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272] assessed the potential for archaeological remains to be present within with site boundary, and the potential for to be impacted by any development within the site, rather than specific aspects of the development footprint. The proposed changes therefore do not alter the potential for disturbance to buried archaeological remains or the predicted level of effect, and the conclusion remains valid. The overall residual effect following the implementation of an agreed scheme of archaeological investigation would be the same as presented in **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272] and would be **not significant**.

h) iii) b) Operation

- 2.11.33 Any change as a result of the proposed change would have occurred during the construction phase. There would be no change to the level of significance of the operational phase effects arising from the proposed changes to the parameter heights to those assessed within **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272].

- i) Updated assessment – extension of the Order Limits to provide for additional fen meadow habitat at Pakenham (**Change 11**)

i) i) Baseline

- 2.11.34 The proposed changes would change the baseline for the terrestrial historic environment as described in **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 273]. The fen meadow habitat at Pakenham represents an addition to the scheme. A consideration of the baseline followed by an assessment of the effects is given below.

i) i) a) Designated heritage assets

i) i) a) a) Designated heritage assets within the site boundary

- 2.11.35 No designated assets lie within the site boundary for the proposed change.

i) i) a) b) Designated heritage assets within the study area

- 2.11.36 Within the 500m study area lies one scheduled monument (which is also recorded as a Heritage at Risk asset by Historic England), located c. 500m from the site boundary. There are also 14 listed buildings (3 at Grade II* and 11 at Grade II). These are found along Fen Road to the east

and within the settlement of Grimstone End to the north of the site (refer to **Volume 3, Appendix 2.11.B** and **Volume 2, Figure 2.11.1** of this **ES Addendum**).

i) i) b) Non-designated heritage records

- 2.11.37 The SCCAS Historic Environment Records (HER) note a multi-period site within the site boundary. The asset – Grimstone End (PKM 028)³ - lies at the northern edge of the site although the majority is recorded as lying outside the site boundary. Findings within the site range from Neolithic artefact scatters and a Bronze Age disc barrow to a Roman kiln and a Saxon sunken featured building (recorded as PKM 006).
- 2.11.38 Grimstone End has been under observation and has had various excavations undertaken at it since the first Roman kiln was found in 1944. Many of the excavations were undertaken in advance of quarrying and so findings are focused on areas where there has been a need for excavation. It is therefore likely that there are further associated remains within the fen meadow site.
- 2.11.39 Further records lie within the 500m study area including a possible Roman Road (PKM032) with associated cemetery (PKM001) to the west of the site boundary and a large number of findspots, representing a wide range of periods from a Bronze Age axe (PKM112) to Roman coins (PKM 117, 118) and post-medieval plaques (PKM125). The records are largely focused to the north and along the western edge of the site.

i) i) c) Historic landscape character

- 2.11.40 The Historic Landscape Characterisation (HLC) identifies the site as *Meadow or Managed Wetland*. The subcategory is *Meadow* – seasonally wet grassland mown for hay and/or grazed by animals.

i) i) d) Archaeological heritage assets within the site subject to potential direct effects

- 2.11.41 No designated heritage assets lie within the site and therefore no direct effects are anticipated.
- 2.11.42 The known multi-period site at Grimstone End (PKM 028) extends onto the northern edge of the site.
- 2.11.43 Given the known archaeology in the immediate vicinity of the site, there is a high potential for further as yet unknown remains dating to multiple periods to be present within the site boundary. These would likely be

³ The numbers in brackets indicate the SCCAS reference numbers for heritage assets listed in the gazetteer provided within **Volume 3, Appendix 2.11.B** and shown on **Volume 2, Figure 2.11.1** of this **ES Addendum**.

associated with the known assets including the settlement at Grimstone End (PKM028) and the Roman Road (PKM 032). If present further remains would likely be of local to regional heritage significance, and the effects on these are considered further below.

i) i) e) Built heritage assets within the study area subject to potential indirect effects

- 2.11.44 It is anticipated that the nature of the work required for the proposed change to land management regime would not affect the setting of the nearby listed building and historic landscape character would remain unaffected. **No significant** indirect effects are predicted and these assets are therefore not considered further within the assessment.

i) ii) Environmental Design and Mitigation

- 2.11.45 No further embedded mitigation measures are proposed as a result of the proposed fen meadow site at Pakenham, above those stated in **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 273].

i) iii) Assessment of Effects

i) iii) a) Construction

i) iii) a) a) Direct effects on heritage assets

- 2.11.46 The proposed works could give rise to disturbance of archaeological remains, resulting in, at worst, a total loss of any remains within the site. This would be an impact of high magnitude to remains of low to medium significance. This would represent a moderate to major adverse effect which would be **significant** in the absence of any further mitigation.

i) iii) b) Operation

i) iii) b) a) Direct effects on heritage assets

- 2.11.47 Any disturbance of archaeological heritage assets within the site would have occurred and been effectively mitigated during the construction of the proposed development; no direct effects are anticipated during the operation of the proposed development.

i) iii) b) b) Effects arising through change to historic landscape character

- 2.11.48 The works would serve to create a fen meadow habitat. However, the minor planned works would be difficult to discern in the landscape when compared to the current appearance, e.g. field patterns would not be altered. As a result, the proposed changes would result in a low

magnitude of change, which would be a minor adverse effect and **not significant**.

i) iv) **Additional mitigation and residual effects**

2.11.49 No additional mitigation measures are required above the measures reported in **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP- 272]. This set out that secondary mitigation would comprise the adoption of an agreed scheme of archaeological investigation (updated version provided within **Volume 3, Appendix 2.11.A** of this **ES Addendum**) to ensure that the archaeological interest of any significant deposits and features within the site could be appropriately investigated, recorded and disseminated, preserving the archaeological interest of these remains.

2.11.50 A site-specific written scheme of investigation (WSI) for the Pakenham fen meadow habitat would also be produced to supplement this. This would include a phase of archaeological evaluation, which would enable appropriate further archaeological investigation and recording to be undertaken. This would ensure that the magnitude of impact on buried archaeological remains from the proposed development would be reduced to low, resulting in a minor adverse effect, which would be **not significant**.

2.12 **Soils and agriculture**

a) **Introduction**

2.12.1 This section provides an addendum to the soils and agriculture assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [[APP-277](#)].

2.12.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) **Relevant Additional Information**

2.12.3 **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277] stated an incorrect area for the land associated with Old Abbey Farm and incorrect information on its use.

2.12.4 The area of land affected should be recorded as 13.04ha. The land is under irrigated arable production and is part of a Countryside Stewardship scheme. The sensitivity to change for this landholding is, therefore, high, resulting in a major adverse (**significant**) effect during construction.

- 2.12.5 Once land has been reinstated at the end of the construction period the sensitivity would remain high. However, as all of the land was proposed to be reinstated, the effect would remain as reported in **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277] (reported as no effect).

c) Relevant changes

- 2.12.6 The following design changes have been considered within the revised assessment for soils and agriculture at the main development site:
- extension of the Order Limits to provide for additional fen meadow habitat at Pakenham (**Change 11**); and
 - a new bridleway link between Aldhurst Farm and Kenton Hills (**Change 15**).

- 2.12.7 All other proposed changes described within **section 2.2** of this chapter do not change the assessment of effects for soils and agriculture and, therefore, have not been considered further.

d) Updated assessment – extension of the Order Limits to provide for additional fen meadow habitat at Pakenham (**Change 11**)

d) i) Baseline

- 2.12.8 The proposed change would require updates to the baseline assessment for soils and agriculture described in **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277].
- 2.12.9 Following the submission of the ES, an additional desk-based review has been undertaken in relation to the soils and agricultural receptors associated with the proposed additional fen meadow habitat at Pakenham.
- 2.12.10 This site lies north of Pakenham and comprises approximately 32ha of agricultural land. Pakenham Stream forms the eastern boundary.
- 2.12.11 The land appears to be grazed and is not under an environmental stewardship agreement.
- 2.12.12 The site is underlain by Chalk Formations overlain by peat deposits, supporting the fen peat soils mapped as being present. These soils are organic and naturally wet (Ref. 21).
- 2.12.13 Available Provisional Agricultural Land Classification (ALC) mapping shows the land is mapped as Grade 4 (poor quality agricultural land) (Ref. 22). No detailed ALC mapping is available for the site.

d) ii) Environmental Design and Mitigation

- 2.12.14 No further mitigation measures are proposed as a result of the proposed change, above those stated in **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277].

d) iii) Assessment of Effects

d) iii) a) Construction

- 2.12.15 The proposed change introduces additional agricultural land to that identified in the ES to facilitate construction.
- 2.12.16 During habitat improvement works, the site would be temporarily excluded from agricultural use. However, due to the short duration of any works required, the effects are considered to be **not significant**.
- 2.12.17 Following completion of works, it is anticipated that grazing of the land would continue, albeit with a possible reduction in intensity. This is not considered likely to result in a significant effect on existing farming operations.
- 2.12.18 As such, the effects are not considered to be significant and there are no new or different significant effects during construction to those presented within **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277].

d) iii) b) Operation

- 2.12.19 There are no new or different significant operational effects to soils and agriculture as a result of the proposed change, in comparison with **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277].

e) Updated assessment – a new bridleway link between Aldhurst Farm and Kenton Hills (**Change 15**)

e) i) Baseline

- 2.12.20 No Additional Information has been required beyond that presented in the baseline for soils and agriculture as described in **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277] for the assessment of the proposed change.
- 2.12.21 The proposed route of the new bridleway runs through an existing field, following the field boundary, reducing the extent of arable land affected.
- 2.12.22 The agricultural land has been mapped, through detailed ALC surveys, as predominantly Grade 3b, with the western limit of the proposed new route

comprising Grade 4 land. Neither Grade 3b nor Grade 4 land fall into the best and most versatile (BMV) land category.

2.12.23 From the detailed mapping the additional permanent land take resulting from the proposed change is 0.42ha, of which only a limited amount would comprise the edge of an arable field.

2.12.24 This additional permanent land take falls within two agricultural land ownerships:

- Old Abbey Farm; and
- EDF Energy Nuclear Generation Limited.

e) ii) Environmental Design and Mitigation

2.12.25 No further mitigation measures are proposed as a result of the proposed change, above those stated in **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277].

e) iii) Assessment of Effects

e) iii) a) Construction

2.12.26 There are no new or different significant construction phase effects for soils and agriculture as a result of the proposed change, in comparison with **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277].

e) iii) b) Operation

2.12.27 The updated baseline identified additional agricultural land required permanently to that identified in the ES to facilitate construction. The changes to the extent of permanent land take within the site boundary would require an area of 0.12ha of land from Old Abbey Farm, equating to 0.55% of the landholding. Previously no land associated with Old Abbey Farm was required permanently. The requirement for this permanent land take would result in a very low magnitude impact on a receptor of low sensitivity, which would be a negligible effect and **not significant**.

2.12.28 The small extent of additional land required permanently from the EDF Energy Nuclear Generation Limited landholding would not change the level of significance of effects on agricultural land reported in the ES, which were assessed as minor adverse (**not significant**).

2.12.29 As such, the effects are considered to remain **not significant** and there are no new or different significant effects during operation to those presented within **Volume 2, Chapter 17** of the **ES** (Doc Ref. 6.3) [APP-277].

2.13 Geology and land quality

a) Introduction

2.13.1 This section provides an addendum to the geology and land quality assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [[APP-280](#)]; and
- **Volume 2, Appendix 18A** of the **ES** (Doc Ref. 6.3) [[APP-281](#) to [APP-291](#)].

2.13.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) Relevant Additional Information

2.13.3 Relevant Additional Information for the assessment of effects on geology and land quality at the main development site includes the following updated baseline survey report:

- Main Development Site: Phase 2 Geo-Environmental Report, 2020 (refer to **Volume 3, Appendix 2.13.A** of this **ES Addendum**).

2.13.4 The Phase 2 Geo-Environmental Report submitted as part of the Application in **Volume 2, Appendix 18A** of the **ES** (Doc Ref. 6.3) [APP-281 to APP-291] has been updated following the completion of additional ground investigation and additional gas and groundwater monitoring, to supplement the assessments presented in the Application and to provide the most up-to-date data.

b) Relevant changes

2.13.5 The following proposed changes have been considered within the revised assessment for geology and land quality at the main development site, as these were considered to have a potential to change the assessment:

- greater flexibility as to where certain Sizewell B facilities are relocated to potentially avoid the need for car parking on Pillbox Field (**Change 3**);
- change to the location of the water resource storage area and the addition of flood mitigation measures to lower flood risk (**Change 5**); and
- extension of the Order Limits to provide for additional fen meadow habitat at Pakenham as mitigation for fen meadow loss (**Change 11**).

2.13.6 All other proposed changes described within **section 2.2** of this chapter do not change the assessment of effects for geology and land quality and, therefore, have not been considered further.

c) Updated assessment – Additional Information

c) i) Baseline

2.13.7 The Additional Information would update the baseline for geology and land quality, as described in **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

2.13.8 Following the submission of the ES, additional ground investigation and additional gas and groundwater monitoring has been completed for the main development site. The data collected has been used to update the contamination assessments and conceptual site model (CSM) for the main development site. The data has also informed the modelling and **Materials Management Strategy Update (Volume 3, Appendix 2.2.C** of this **ES Addendum**), where an increase in the depth of excavations within the main platform and subsequent increase in volume of materials has been identified.

2.13.9 Ground conditions encountered within the main development site were generally similar to those encountered in previous ground investigations. Made Ground up to 10.8 metres below ground level (m bgl) was encountered within the main construction area overlying Marine Deposits, Alluvium and Peat, Crag Group, London Clay, Lower London Tertiaries and Chalk. Ground conditions within the temporary construction area comprised Made Ground up to 3.2m bgl overlying Alluvium, the Lowestoft Till Formation and the Crag Group. Groundwater was recorded within the Peat and Crag Group.

2.13.10 As per the previous ground investigations, there were no exceedances of contaminants against the human health generic assessment criteria for either a commercial or public open space (parks) end use in the soil samples analysed. However, the presence of asbestos was identified in two locations in the south-west of the main construction area, which had not been identified in previous investigations. The identified asbestos was located between 4.0m and 5.0m bgl.

2.13.11 Leachate testing of soils identified limited exceedances of metals, inorganics and polycyclic aromatic hydrocarbons (PAHs) above water quality standards at several locations within the main construction area and temporary construction area in Made Ground and natural material. Elevated concentrations of inorganics, metals, BTEX (benzene, toluene, ethylene benzene and xylene), PAHs and volatile organic compounds (VOCs) were also recorded in the groundwater and surface water

samples tested. These results were similar to data collected from previous ground investigations.

- 2.13.12 As per the previous assessment, the ground gas regime at the site has been classified in accordance with BS8485:2015 (Ref. 1) as Characteristic Situation CS2 indicating that gas protection measures may be required depending on the final design and earthworks.

c) ii) Environmental Design and Mitigation

- 2.13.13 Further mitigation measures are proposed as a result of the Additional Information, above those stated in **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

- 2.13.14 The **CoCP** (Doc Ref. 8.11 (A)) and **Materials Management Strategy Update** (refer to **Volume 3, Appendix 2.2.C** of this **ES Addendum**) would ensure that suitable measures are in place to handle asbestos impacted materials. These measures include, but are not limited to:

- Materials potentially impacted with asbestos fibres to be excavated and segregated for additional testing and either placing on site or disposal off site in accordance with the **Materials Management Strategy Update** and **CoCP**.
- In accordance with the **CoCP**, short term acute exposure risks to construction workers would be assessed as part of the development of the construction phase health and safety plan and managed through standard good practice health and safety procedures.

c) iii) Assessment of Effects

c) iii) a) Construction

- 2.13.15 The presence of asbestos was identified within the main construction area in the additional ground investigation. Current site users are considered unlikely to be exposed to asbestos fibres as the impacted soils are at depth, are not currently being disturbed and likely to be saturated. Risks in relation to current site users are therefore considered to be very low. As part of the proposed development, the soils within this area of the site would be excavated and replaced with Crag Group and covered by hardstanding. This would effectively break the pathways associated with the generation and inhalation of asbestos fibres.
- 2.13.16 However, the excavation works would disturb the soil and potentially cause the release of asbestos fibres. Therefore, current and future site users and off-site users of adjacent areas could be at risk from exposure to asbestos during the construction works. Potential risks during the works

would need to be managed through the careful application of standard industry practice measures to minimise the release of asbestos fibres (refer to **section 2.13d)ii)** for further information). Potential contamination risks to current and future human health receptors are considered to be very low to low as per the assessment presented within **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

- 2.13.17 Leachate testing of soils identified limited exceedances of contaminants above water quality standards at several locations. Elevated concentrations of contaminants were also recorded in the groundwater and surface water samples tested. These results were similar to data collected from previous ground investigations. Therefore, potential contamination risks to controlled water receptors are considered to remain low to moderate/low as per the assessment presented within **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].
- 2.13.18 The incorporation of ground gas protection measures within the proposed development may be required depending on the detailed design of the proposed earthworks and construction works. Made Ground and organic Alluvium and Peat are considered to be the main sources of ground gas at the site. It is likely that the Made Ground and Alluvium and Peat would be removed as part of the excavation of material for the main platform. However, further assessment of gas risks and requirements for gas protection measures would be undertaken as part of detailed design and post earthworks, as outlined within **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].
- 2.13.19 Deeper excavations are now required within the main platform and additional materials will be excavated due to further ground investigation data and modelling being completed. However, this does not substantially change the impact assessment relating to physical effects (ground stability, compaction and erosion) and soils reuse.
- 2.13.20 In summary, the additional ground investigation data has not changed the potential physical effects or contamination risks to receptors from those considered within **Volume 2, Appendix 18** of the **ES** (Doc Ref. 6.3) [APP-280]. As such, no changes to the assessment presented within **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280] are required.

c) iii) b) Operation

- 2.13.21 There are no new or different significant operational effects to geology and land quality as a result of the new baseline information, in comparison with **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

- d) Updated assessment - greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**)

- d) i) Baseline

2.13.22 The proposed change to introduce greater flexibility as to where certain Sizewell B facilities are relocated does not change the existing and future baseline for geology and soils as described in **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280]. A new area of land within the Sizewell A power station complex has been identified for the relocation of the Sizewell B laydown area, however, this area of land was already included within the site boundary in the Application and, therefore, was considered as part of the baseline assessment within **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

- d) ii) Environmental design and mitigation

2.13.23 No further mitigation measures are proposed as a result of the proposed change, above those stated in **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280], which included (but were not limited to) measures set out within the **CoCP** (Doc Ref. 8.11 (A)).

- d) iii) Assessment of effects

- d) iii) a) Construction

2.13.24 There would be no change to the source-receptor-pathways considered within the conceptual site model for Sizewell B relocated facilities works. As such, no changes to the assessment presented within **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280] are required.

- d) iii) b) Operation

2.13.25 There are no new or different significant operational effects for geology and land quality as a result of the proposed change, in comparison with **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

- e) Updated assessment – change to the location of the water resource storage area and the addition of flood mitigation measures (**Change 5**)

- e) i) Baseline

2.13.26 The proposed change to the water resources storage area does not change the existing and future baseline for geology and soils as described in **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

- 2.13.27 The proposed location for the new water storage area has comprised open land since the 1800s and no additional potential historical contamination sources have been identified (refer to Envirocheck reports included in **Volume 3, Appendix 2.13.A** of this **ES Addendum**).

e) ii) Environmental Design and Mitigation

- 2.13.28 No further mitigation measures are proposed as a result of the proposed change, above those stated in **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280], which included (but were not limited to) measures set out within the **CoCP** (Doc Ref. 8.11 (A)).

e) iii) Assessment of effects

e) iii) a) Construction

- 2.13.29 Excavations will be required for the construction of the water storage area. This may result in physical effects to soils and geological receptors arising from changes in soil erosion and soil compaction associated with stripping of topsoil, vegetation clearance, stockpiling, earthworks and associated machine movements. However, these effects are anticipated to be minimal and would be mitigated by measures as set out in the **CoCP** (Doc Ref. 8.11 (A)).

- 2.13.30 Excavation would also potentially introduce new sources of contamination and disturb and mobilise existing sources of contamination. However, considering the likely absence of contamination sources, impacts due to contamination are not likely to be significant. If impacts associated with ground contamination are identified, they would be mitigated by good practice construction management measures, as set out in the **CoCP** (Doc Ref. 8.11 (A)).

- 2.13.31 Therefore, this will not change the level of significance of the effects on geology and land quality reported in **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

e) iii) b) Operation

- 2.13.32 There are no new or different significant operational effects for geology and land quality as a result of the proposed change, in comparison with **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

- f) Updated assessment – extension of the Order Limits to provide for additional fen meadow habitat at Pakenham (**Change 11**)

- f) i) Baseline

2.13.33 Publicly available information indicates that the proposed location for the additional fen meadow habitat has comprised fen land (Pakenham Fen) since the 1800s. Sand and gravel pits are indicated to have been present to the north-east and east of the proposed fen meadow habitat and are assumed to have been infilled. An old chalk pit and refuse tip were also indicated present to the east of the site.

- f) ii) Environmental Design and Mitigation

2.13.34 No further mitigation measures are proposed as a result of the proposed change, above those stated in **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280], which included (but were not limited to) measures set out within the **CoCP** (Doc Ref. 8.11 (A)).

- f) iii) Assessment of effects

- f) iii) a) Construction

2.13.35 Limited excavation would be required to reduce local ground levels, create low bunds and/or create minor surface watercourses to help distribute surface water. This may result in physical effects to soils and geological receptors arising from changes in soil erosion and soil compaction associated with stripping of topsoil, vegetation clearance, stockpiling, earthworks and associated machine movements. However, these effects are anticipated to be minimal and would be mitigated by measures set out in the **CoCP** (Doc Ref. 8.11 (A)).

2.13.36 Excavation would also potentially introduce new sources of contamination and disturb and mobilise existing sources of contamination. However, considering the likely absence of contamination sources, impacts due to contamination are not likely to be significant. If impacts associated with ground contamination are identified, they would be mitigated by good practice construction management measures as set out in the **CoCP** (Doc Ref. 8.11 (A)).

2.13.37 Therefore, this will not change the level of significance of the effects on geology and land quality reported in **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

f) iii) b) Operation

- 2.13.38 There are no new or different significant operational effects for geology and land quality as a result of the amendment, in comparison with **Volume 2, Chapter 18** of the **ES** (Doc Ref. 6.3) [APP-280].

2.14 Groundwater and surface water

a) Introduction

- 2.14.1 This section provides an addendum to the groundwater and surface water assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297].

- 2.14.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) Relevant Additional Information

- 2.14.3 Relevant Additional Information for the assessment of effects on groundwater and surface water for the main development site includes:

- updates to the Flood Risk Assessment, including a flood risk emergency plan (refer to the **Main Development Site Flood Risk Assessment Addendum** (Doc Ref. 5.2 (A)Ad)); and
- an updated version of the water monitoring and response strategy included within **Volume 2, Appendix 19F** of the **ES** (Doc Ref. 6.3) [APP-309] (refer to **Volume 3, Appendix 2.14.A** of this **ES Addendum**).

- 2.14.4 The Additional Information listed above does not change the assessment presented within **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297]. However, this information has been referenced, where appropriate, within this ES Addendum.

c) Relevant changes

- 2.14.5 The proposed changes of relevance to the assessment of effects on groundwater and surface water for the main development site include:

- greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**);
- change to the location of the water resources storage area and the addition of flood mitigation measures (**Change 5**);

- change to the SSSI crossing design to a single span bridge with embankments (**Change 6**);
- surface water removed early in the construction process to be discharged to the foreshore via a temporary outfall (**Change 8**);
- change to the sea defence to make the scheme more efficient and resilient to climate change (**Change 9**); and
- extension of the Order Limits for additional fen meadow habitat at Pakenham (**Change 11**).

2.14.6 All other proposed changes described in **section 2.2** of this chapter would not alter the assessment of groundwater and surface water effects and, therefore, have not been considered further.

d) Updated assessment - greater flexibility as to where certain Sizewell B facilities are relocated (**Change 3**)

2.14.7 The proposed change to introduce greater flexibility as to where certain Sizewell B facilities are relocated does not change the existing and future baseline for the assessment presented within **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297].

2.14.8 Option 1 of the proposed change would remove the outage car park from Pillbox Field, thereby, removing any impacts associated with the provision of built development at this location. Impacts of Option 2 would remain as presented within **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297]. Overall, these changes do not make a material difference for the assessment of the relocated facilities for either groundwater or surface water receptors. The findings of the assessment presented in **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297] remain valid.

2.14.9 Furthermore, the proposed change does not affect the conclusions of the Flood Risk Assessment (see **Main Development Site Flood Risk Assessment Addendum** (Doc Ref. 5.2 (A)Ad)) and the **Water Framework Directive Compliance Assessment** (Doc Ref. 8.14Ad).

e) Updated assessment - change to the location of a water storage area and the addition of flood mitigation measures (**Change 5**)

e) i) Water resources storage area

2.14.10 The proposed change includes re-locating the water resources storage area and resizing the infiltration basin in Water Management Zone (WMZ) 5 for it to provide water storage. WMZ 5 has been partitioned with the upstream component still functioning as an infiltration basin and the

downstream half of the basin used for water storage. The function and performance of the infiltration is unchanged, but the surface area would now be smaller.

- 2.14.11 This change in the design of the infiltration basin in WMZ5 would not have an effect on recharge to the underlying aquifer. The assessment presented in **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297] predicts minor adverse (**not significant**) effects on groundwater and negligible (**not significant**) effects on surface water receptors. The proposed change would not alter these effects. This applies both during construction and once operational. The proposed change does not affect the conclusions of the Flood Risk Assessment (see **Main Development Site Flood Risk Assessment Addendum** (Doc Ref. 5.2 (A)Ad)). Similarly, the proposed change does not alter the conclusions of the **Water Framework Directive Compliance Assessment** (Doc Ref. 8.14Ad).
- 2.14.12 The findings of the assessment presented in **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297] remain valid.
- e) ii) Flood mitigation area and wet woodland habitats
- 2.14.13 Repurposing the location of the infiltration basin in WMZ5 to have a dual purpose of infiltration basin and water resources storage area enables the use of the previously identified water resources storage area for flood mitigation and wet woodland habitat creation. The change in use of the area from a water resources storage area to flood mitigation represents a change in a primary mitigation for the project.
- 2.14.14 This changes the assessment for both groundwater and surface water receptors. The changes mean that the depth of excavation varies, but there is no longer a reduction in infiltration associated with a lined storage area. The assessment presented in **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297] predicts minor adverse (**not significant**) effects on groundwater and a negligible (**not significant**) effect on surface water receptors. For the design change, residual risks for groundwater receptors are marginally lower. Consequently, it is concluded that with the proposed change, the effects would remain **not significant** for groundwater and surface water receptors either during its construction or once operational.
- 2.14.15 The effect of the change is beneficial for flood risk, albeit it does not represent a meaningful change on what was previously assessed as a **not significant** effect. It is therefore concluded that the change is **not significant** either during its construction or once operational.
- 2.14.16 The proposed change does not alter the conclusions of the **Water Framework Directive Compliance Assessment** (Doc Ref. 8.14Ad).

Overall, the findings of the assessment presented in **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297] remain valid.

f) Updated assessment – change to the SSSI crossing design
(Change 6)

2.14.17 The change to the SSSI crossing will replace the culvert solution presented within the Application with a single-span bridge. The proposed change does not affect the construction footprint, temporary working areas or broad construction methods. The assessment presented in **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297] predicts minor adverse (**not significant**) effects on groundwater and surface water receptors. The proposed change would not alter this conclusion and the effects would remain **not significant** for groundwater and surface water receptors either during its construction or once operational.

2.14.18 For surface water receptors, the SSSI crossing did not drive significant effects for channel morphology, hydrological processes or flood risk. Therefore, whilst the change to a single-span bridge is driven by predicted improvements in performance for these aspects of surface water, it is concluded that the change is **not significant**.

2.14.19 The proposed change does not alter the conclusions of the **Water Framework Directive Compliance Assessment** (Doc Ref. 8.14Ad). Overall, the findings of the assessment presented in **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297] remain valid.

g) Updated assessment - temporary discharge outfall (Change 8)

2.14.20 This change would mean that rainfall falling onto the main platform area may be pumped to the coastal environment during the early phases of construction, prior to the commissioning of the permanent outfall. In the assumptions of the environmental assessment, water falling onto this area of the platform was assumed to be moved to the detention basins in Water Management Zones. As such, localised effects on groundwater and surface water were assessed during routine operation. Discharge to the marine environment does not represent a significant change to this assessment. Under extreme conditions the capacity of the drainage network would be exceeded.

2.14.21 The revised operation will allow continued drainage from the platform when under the previously assessed drainage arrangements water would discharge to the adjacent drainage network, within Sizewell Marshes SSSI. The revised drainage arrangements will divert discharge away from the SSSI and pump to the marine environment during conditions when the receptor is least sensitive to the change. It is therefore concluded that the change is **not significant**.

- 2.14.22 The findings of the assessment presented in **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297] remain valid. The proposed change also does not affect the conclusions of the Flood Risk Assessment (see **Main Development Site Flood Risk Assessment Addendum** (Doc Ref. 5.2 (A)Ad)) and the **Water Framework Directive Compliance Assessment** (Doc Ref. 8.14Ad).
- h) Updated assessment - changes to the sea defence (**Change 9**)
- 2.14.23 These changes do not make a material difference for the assessment of effects on either groundwater or surface water receptors, as set out within **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297], but would deliver flood risk benefits.
- 2.14.24 As described within the **Main Development Site Flood Risk Assessment Addendum** (Doc Ref. 5.2(A)Ad), coastal flood risk from wave overtopping during the construction phase was considered to be **significant** in the Application, with a tangible risk to people during the 1 in 200-year event. To mitigate this, a temporary defence (sheet pile wall) is now being proposed. Based on the results of the wave overtopping assessment with the temporary sheet pile wall in place, it is concluded that flood risk to the main construction site and its users during construction phase is **not significant**. Therefore, it is considered that the proposed design change successfully mitigates flood risk and removes the significant effect compared to the proposals set out in the Application.
- 2.14.25 The proposed change does not alter the conclusions of the **Water Framework Directive Compliance Assessment** (Doc Ref. 8.14Ad).
- i) Updated assessment – extension of the Order Limits for additional fen meadow habitat at Pakenham (**Change 11**)
- i) i) Baseline
- i) i) a) Current baseline
- 2.14.26 The proposed fen meadow site is immediately adjacent to the Pakenham Stream, which is classified as Main River by the Environment Agency (Ref 18) and is a reportable reach under the Water Framework Directive (GB105033043300) (Ref 19). The site lies within the functional floodplain for the Pakenham Stream (Ref 20).
- 2.14.27 The watercourse is designated as a heavily modified waterbody, and the 2019 classification gives the following reasons for it not being at Good Ecological Potential:

- Available mitigation measures have not fully been implemented, dissolved oxygen is bad, phosphate is poor.
- The publication of the 2019 classification concluded that the waterbody fails for polybrominated diphenyl ethers (PBDE).

2.14.28 There is an Anglian Water storm overflow upstream of the site.

i) i) b) Future baseline

2.14.29 There are no committed development(s) or forecast changes to the baseline conditions during the construction and operational phases of the proposed fen meadow compensation site.

i) ii) Environmental Design and Mitigation

i) ii) a) Construction

2.14.30 As set out within **Volume 2, Chapter 19** of the **ES** (Doc Ref. 6.3) [APP-297], engineering works would be designed to avoid disturbance to the water environment. Ground investigation and risk assessment would be undertaken prior to commencement of construction. All site activities would be carried out in accordance with the **CoCP** (Doc Ref. 8.11(A)). No further mitigation would need to be embedded within design due to the proposed change.

i) ii) b) Operation

2.14.31 The design of the proposed change would create a mosaic of habitats, with small-scale water management controls operated to maximise the area of fen meadow created within the site. This would have benefits for surface water systems, creating floodplain habitats that complement the form and function of the adjacent watercourse.

i) iii) Assessment of Effects

i) iii) a) Construction

2.14.32 A minor adverse, short-term effect is predicted on groundwater and surface water receptors. Physical effects including erosion and sediment transport associated with stripping of topsoil, vegetation clearance, stockpiling, earthworks and associated machine movements is anticipated to be minimal. The effect would, therefore, be **not significant**.

i) iii) b) Operation

- 2.14.33 A potentially minor adverse, long-term effect is predicted to affect conveyance of flows through the surface water drainage network within the floodplain. The effect would be **not significant**.
- 2.14.34 It is anticipated that the design would complement the existing floodplain and riverine habitats. A potentially minor beneficial effect (**not significant**) is predicted for surface waters.
- 2.14.35 As with the other fen meadow compensation sites, the proposed additional fen meadow is primarily within Flood Zone 3 (high risk), although, as noted above the use for the site comprises a water compatible development which is appropriate for this location. The floodplain is well defined and has no properties within it. Further detailed studies and engagement with the Environment Agency, Lead Local Flood Authority and Natural England will determine the suitability of the areas identified and inform the development of the detailed design and plans.
- 2.14.36 As summarised within the **Water Framework Directive Compliance Assessment Addendum** (Doc Ref. 8.14Ad), the proposed change would not result in the deterioration in the status of the Pakenham Stream river water body or prevent Water Framework Directive objectives being achieved in this water body in the future.

i) iv) Additional Mitigation and Residual Effects

- 2.14.37 No additional mitigation during construction is considered to be required. However, once operational, ongoing monitoring and management would be required to deliver and maintain the target habitats.
- 2.14.38 The residual effects are identified as minor adverse (**not significant**) during construction and minor adverse (**not significant**) to minor beneficial (**not significant**) during operation on surface water receptors.

2.15 Coastal geomorphology and hydrodynamics

a) Introduction

- 2.15.1 This section provides an addendum to the coastal geomorphology and hydrodynamics assessment with reference to the following documents submitted with the Application:
- **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [[APP-311](#)];
 - **Volume 2, Appendix 20A** of the **ES** (Doc Ref. 6.3) [[APP-312](#)]; and

- **Figure 20.1** in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [[APP-313](#)].

2.15.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in the sections below.

b) Relevant Additional Information

2.15.3 Relevant Additional Information for the assessment of effects on coastal geomorphology and hydrodynamics includes:

- Coastal Processes Monitoring and Mitigation Plan (CPMMP) provided within **Volume 3, Appendix 2.15.A** of this **ES Addendum**.

2.15.4 Follow-up studies, such as storm modelling for setting trigger thresholds for the soft coastal defence feature (SCDF) and beach maintenance, will be reported in the CPMMP, which itself will require regulatory approval under the Marine Licence.

c) Relevant changes

2.15.5 The proposed changes of relevance to the assessment of coastal geomorphology and hydrodynamics include:

- enhancement of the permanent BLF and construction of a new, temporary BLF (**Change 2**);
- surface water removed early in the construction process to be discharged to the foreshore via a temporary outfall (**Change 8**); and
- change to the sea defence to make the scheme more efficient and resilient to climate change (**Change 9**).

2.15.6 A description of the proposed changes is provided within **section 2.2** of this chapter.

2.15.7 With regards to Change 9, as the temporary sea defence would be landward of the HCDF included within the Application, which itself was assessed as a terrestrial feature with no impacts to coastal geomorphology receptors during the construction phase (see **section 20.6** in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [[APP-311](#)]), the temporary sea defence is also considered to be a terrestrial feature and is not assessed further in this section.

2.15.8 Furthermore, all other proposed changes described within **section 2.2** of this chapter do not change the assessment of effects for coastal

geomorphology and hydrodynamics assessment and, therefore, have not been considered further.

c) i) Enhanced permanent BLF (Change 2)

- 2.15.9 The design specifications of the enhanced permanent BLF are detailed in **section 2.2** of this chapter. **Table 2.37** compares the design details specific to coastal geomorphology receptors for the assessment reported within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311] and the enhanced permanent BLF. Model results from the original assessment have been extrapolated based on expert judgement to determine the effects of the enhanced permanent BLF.
- 2.15.10 The enhanced permanent BLF would be positioned in the same location as the original BLF. It would be approximately 16m longer than that specified in the Application to allow incoming barges to align more efficiently with the BLF platform.
- 2.15.11 The enhanced permanent BLF would be approximately 16m longer than that specified in the Application to allow incoming barges to align more efficiently with the BLF platform. The enhanced permanent BLF would consist of 28 permanent piles in total, comprising 24 piles (12 seaward of MHWS) with approximately 1m in diameter and four mooring dolphins or fender piles with approximately 2.5m in diameter.
- 2.15.12 To increase the capacity of the enhanced permanent BLF, a submerged pre-cast concrete base known as a grounding platform or grillage would be installed.
- 2.15.13 Construction of the permanent BLF would commence from the beach and progress out to sea using a cantilever method (“Cantitravel”). This means that heavy plant on the beach would be minimised or not required.
- 2.15.14 A grounding pocket would be used for barge grounding during the operational phase (as per the original assessment).

Table 2.37: BLF specification in the Application, and the proposed changes for the enhanced permanent BLF.

Parameter	DCO Application BLF.	Enhanced permanent BLF.
Presence	Permanent – present during all Sizewell C phases.	Permanent – present during all Sizewell C phases.
BLF in use.	Sizewell C construction: April-October each year. Sizewell C operation: 3 – 4 weeks every 5 – 10 years.	Sizewell C construction: April-October for four years only. Sizewell C operation: 3 – 4 weeks every 5 – 10 years.

Parameter	DCO Application BLF.	Enhanced permanent BLF.
No. of piles (excluding dolphins and fenders).	14 piles (2 x 7) at 1m diameter (8 seaward of MHWS).	24 piles (2 x 12) at 1m diameter (12 seaward of MHWS).
Cross-shore pile spacing.	11.2m	9.2m
Alongshore pile spacing.	6.3m	12m
Length	85m	101m
Dolphins / fenders.	Four piles at 1.5m diameter.	Four piles at 2.5m diameter.
Barge visits per season.	50	Up to 100
Barge grounding method.	Dredged grounding pocket.	Construction phase: grillage platform (protruding by up to 1 m) Operational phase: grounding pocket
Dredging – Sizewell C construction phase	Capital dredge of 4,600m ³ by plough dredger to allow clearance over longshore bars and allow level grounding surface (grounding pocket). Maintenance dredging of approx. 10% of initial capital volume (460m ³) at monthly frequency.	Capital dredge of 4,600m ³ for grillage installation. Capital dredge of 4,600m ³ or less for access. Maintenance dredging as required to hold the bed below -3.0m ODN on barge approach and to keep the grillage clear of sediment. Regular monitoring during the campaign period would determine the requirement for maintenance dredging. Plough and/or injection methods could be used. A grounding pocket is not required.
Dredging – Sizewell C operational phase.	As per construction phase (up to 4,600m ³).	Dredging for access and a grounding pocket (which would extend deeper into the longshore bar than the original assessment). The dredge volume would be 9,255m ³ .
Installation and removal methods.	Cantilever and jack-up.	Cantilever for all BLF pier piles. Jack-up barge for grillage and dolphin piles.

c) ii) Temporary BLF (Change 2)

2.15.15 The design specifications of the temporary BLF are detailed in **section 2.2** of this chapter. **Table 2.38** compares the design details specific to coastal geomorphology receptors for the temporary BLF with two existing models that are utilised in this assessment to characterise effects of the

temporary BLFs pier and unloading platform, respectively. which have been used to indicate the likely effects of the temporary BLF. They are phase-resolving wave models, which is the same numerical method used in the original BLF assessment (see **Volume 2, Appendix 20A** of the **ES** (Doc Ref. 6.3) [APP-312]. Model results have been extrapolated based on expert judgement to determine the effects of the temporary BLF on coastal geomorphology receptors.

Table 2.38: Specification of the temporary BLF and extrapolated models

Property	Temporary BLF (pier & unloading platform).	BLF pier model.	BLF unloading platform model.
Duration	Sizewell C construction phase – approximately 8 years.		
Vessel visits per season.	Up to 400 deliveries between April and October and up to approximately 200 deliveries for the remainder of the year.		
Grounding method.	No grounding.		
Dredging requirement.	None		
Installation / removal method.	Cantilever for all BLF pier landing platform piles. Jack-up barge for dolphin piles.		
BLF pier parameters			
Pier piles.	Seaward of MHWS: 68 trestle piles before the landing platform (2 x 34).	Seaward of MHWS: 104 trestle piles (2 x 52).	
BLF length.	444m seaward of MHWS (506m in total).	580m seaward of MHWS.	
Pier pile diameter.	1.2m	1m	
Pile spacing.	12m	10m	
Spacing between pairs.	9m	10m	
BLF unloading platform parameters			
Unloading platform location.	648074 – 648110 E (408 - 444m from MHWS).		648220 – 648250 (552 – 582m from MHWS).

Property	Temporary BLF (pier & unloading platform).	BLF pier model.	BLF unloading platform model.
Unloading platform configuration (excluding pier).	24 piles (4 x 6 piles on a 12 x 12m grid).		30 piles (5 x 6 piles on a denser 7 x 7 m grid).
Number of dolphins.	4		10
Diameter of dolphins.	2.5m		3.6m

c) iii) Temporary sea defence (Sizewell C construction phase) (**Change 9**)

2.15.16 The design specifications of the temporary sheet-pile sea-defence are detailed in **section 2.2** and **Figure 2.2.21** of this chapter. The temporary sea defence would have a crest height of approximately +7.3m AOD and be 13.5m landward of the HCDF toe design included within the Application. It would be present during the construction phase only.

2.15.17 Accordingly, as the temporary sea defence would be landward of the HCDF included within the Application, which itself was assessed as a terrestrial feature with no impacts to coastal geomorphology receptors during the construction phase, the temporary sea defence is also considered to be a terrestrial feature and is not assessed further.

c) iv) Permanent HCDF (**Change 9**)

2.15.18 The design specifications of the permanent HCDF are detailed in **section 2.2** and **Figure 2.2.22** of this chapter. The HCDF would have a crest height of approximately +12.6m AOD and its 0.0m OD toe would be approximately 2m seaward of the HCDF included within the Application for most of its length. However, at the abutment with the enhanced permanent BLF the toe would be up to 10m seaward of the Application's design.

2.15.19 The north-east corner of the HCDF has been reshaped (compared with the application), moving it further southward (20m) away from the boundary with the Minsmere designated sites, particularly on the north-east corner.

2.15.20 The creation and use of the SCDF, seaward of the HCDF, to supply sediment to the beach as and when (or where) it is needed is a “working with nature approach” (Ref. 23) – that is, sediment supply would be controlled by natural coastal processes. The SCDF's primary functions are to maintain the longshore shingle transport corridor (thereby minimising or avoiding erosive impacts to neighbouring shores and reduce

wave action on the HCDF during extreme storms (see **Main Development Site Flood Risk Assessment Addendum** (Doc Ref. 5.2(A)Ad)).

- 2.15.21 The shoreline position is expected to be similar to its 2020 baseline position.

c) v) Permanent HCDF adaptive design (**Change 9**)

- 2.15.22 The specifications of the adaptive permanent HCDF are detailed in **section 2.2** and **Figure 2.2.25** of this chapter. The adaptive HCDF would have a raised crest height. The HCDF toe at the BLF abutment would remain in the same position, but the remainder of the HCDF would be extended approximately 20m seaward of the HCDF design in the Application, to align with the easting of the BLF abutment.

- 2.15.23 The adaptation is not likely to be required within the operational life of the station as even under the UKCP18 95th percentile of the high emissions scenario (RCP8.5), it would not be required until at least 2140.

d) Updated assessment – enhancement of the permanent BLF (**Change 2**)

d) i) Baseline

- 2.15.24 The proposed changes to the permanent BLF do not change the existing and future baseline for coastal geomorphology receptors as described in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

d) ii) Environmental Design and Mitigation

- 2.15.25 The cantilever installation method removes the need for jack-up barges in the nearshore (except for the mooring dolphins) and removes or minimises the need for heavy vehicles on the beach, the effects of which were assessed in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

- 2.15.26 The use of grillage removes the need for a grounding pocket and the associated dredging during the Sizewell C construction phase. A grounding pocket would be required for BLF use during the operation phase.

d) iii) Assessment of Effects

- 2.15.27 This section presents the findings of the assessment of the enhanced permanent BLF during the construction and operational phases of the proposed development. The summary table at the beginning of each

assessment is for the worst-case effect on any coastal geomorphology receptor, for a direct comparison of the effects presented within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

- 2.15.28 This assessment of effects on coastal geomorphology receptors is based on expert judgement and extrapolation of modelling results used in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].
- 2.15.29 Due to uncertainty, some effects have been assessed on a precautionary basis.
- 2.15.30 The coastal geomorphology receptor of the Greater Sizewell Bay (GSB) has five morphological elements (see **Figure 20.1** in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-313]), which may interact directly or indirectly with one another:
- the shoreline/beach (which encompasses sections fronting the Minsmere to Walberswick Heaths and Marshes SAC and the Minsmere to Walberswick SPA), containing UK priority Biodiversity Action Plan's Coastal Vegetated Shingle Habitat (Annual vegetation of drift lines, Annex I habitat 1210) and the potential for nesting Little Terns;
 - two (inner and outer) longshore bars;
 - the Sizewell - Dunwich Sandbank; and
 - the Coralline Crag outcrops (at Thorpeness and seaward of the Sizewell-Dunwich Sandbank).
- 2.15.31 Effects on the geomorphic receptor elements would occur either directly (such as dredging the sea floor) or indirectly, e.g. the presence of piles altering the flow regime and causing bed lowering (scour). In addition to direct pressures, the assessment considers how the indirect pressures (such as changes to hydrodynamics, sediment suspension or substrate disturbance) affect different geomorphic receptors (the beach, bars, bank or crag). Both direct and indirect pressures affect sediment transport, which in turn determines sedimentation and the geomorphic response.
- 2.15.32 The enhanced permanent BLF installation and usage have no pathways to impact for the Coralline Crag and Sizewell - Dunwich Bank receptor elements, due to the distance between the receptors and the pressure, so these are not considered in the BLF assessment.

d) iii) a) Construction phase

d) iii) a) a) Heavy plant on the beach

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Low	Very Low	Very low	Medium	High

2.15.33 The pressure arising from any heavy plant activities on the beach would be the substrate disturbance arising from compaction of surface sediments. If used, the area affected would have a very low spatial extent (+/- 50m around the BLF) and a low duration (weeks - months).

2.15.34 The resistance of the beach to compaction would be medium, as mixed beaches are generally already compact. Resilience would be high as sediments would be mobilised and re-worked during storms, allowing the beach to function normally and restore any minor changes in form.

2.15.35 The proposed cantilever (Cantitravel) construction method would reduce, or avoid (if there were no plant on the beach), the impact relative to the assessment presented within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

2.15.36 The effect significance is classified as negligible (**not significant**), due to the very low magnitude of impact and low sensitivity of the beach receptor. Therefore, the proposed change does not alter the original assessment presented within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

d) iii) a) b) Capital dredging for BLF installation (grillage and access)

Effect: Minor, Not Significant				
Value: High				
Impact Magnitude: Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Low	Very low	Low	Medium	High

2.15.37 The enhanced permanent BLF would introduce a 100m x 30m grillage for the four years that the BLF will be in use during the construction phase. This will require dredging through a section of the outer bar to a fixed level of -3.5m ODN.

- 2.15.38 A capital dredge for the grillage installation replaces the previously assessed capital and regular maintenance dredging of the grounding pocket, potentially reducing the amount of maintenance dredging required.
- 2.15.39 Dredging would be conducted using a plough dredger. Sediment would be pushed to the side of the dredged area rather than extracting/removing it, and hence sediment volumes and supply along the bars would be maintained. The reprofiled BLF approach would result in localised and temporary changes to hydrodynamics, bed shear stress and sedimentation, similar to those assessed in the ES.
- 2.15.40 The dredging represents a direct impact on the area and volume of the bar receptor, resulting in associated localised changes to suspended sediment, hydrodynamics, bed shear stress and sedimentation (due to infilling via longshore transport). The area reprofiled by dredging would have a very low spatial extent (1.1ha) and there would be no net loss of sediment. The volume moved in the capital dredge, but retained in the bars, would be up to 4,600m³ for the grillage dredging and approximately 4,600m³ for navigational access.
- 2.15.41 Plough dredging also generates low changes in suspended sediment concentration (SSC of 50 - 200mg/L). As the two capital dredging activities would be separated in time, the plume from the grillage dredging would have completely dispersed before the access dredging begins. As there would be no interaction between these plumes and individually the volumes are the same or less than the original SSC assessment (based on a 4,600m³ dredge; **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311]), the impact magnitude and extent are unchanged. The changes in SSC would occur over 6.5km of coast for up to three days for each dredge activity, which is assessed as a low duration. Sediments would be deposited over a 0 - 12-hour period as a 2 - 20mm thick layer covering 1 - 6ha, which is a very low impact magnitude from this pressure.
- 2.15.42 The modelled changes to tidal currents over the dredged outer bar are the same as for the original assessment and, as a result of the reprofiled bed, are up to 0.11m/s and extend around 470m (alongshore), an increase from 355m in the original assessment due to wider (alongshore) dredging requirement. The shoreline receptor would have low sensitivity to this hydrodynamic pressure as it would be unaffected by the shore-parallel tidal currents.
- 2.15.43 Localised changes in wave energy (-52% to +150%) would be expected inshore of the reprofiled bathymetry during storms, but over a very small area. The bed shear stress change exceeding +/-5% metric is used to indicate the extents of an impact, as it was in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

- 2.15.44 Bed shear stress changes exceeding +/-5% as a result of the reprofiled (dredged) sea bed (before/during grillage installation) would occur over an area of up to 3ha (up from 2.25ha) corresponding to 515m of frontage (an increase from 400m due to the wider dredge requirement), extending onto the southern 225m of the Minsmere SPA frontage. However, these impacts are unlikely to occur as the dredging for grillage installation would not be operationally scheduled during stormy weather as dredged areas could infill faster than the grillage installed. Therefore, the duration, change and spatial extent of the impact are all low, as is the overall impact magnitude.
- 2.15.45 Due to the very low magnitude of impact, the effect including the High value shoreline receptor is assessed as minor and **not significant**.

d) iii) a) c) BLF installation

Effect: Negligible, Not Significant				
Impact Magnitude: Very Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Low	Very low	Very low	Medium	High

- 2.15.46 The BLF piles, fender piles and deck would be installed using the cantilever (Cantitravel) method (i.e. building from each previously assembled BLF section). A jack-up barge would only be used to install the mooring dolphins and the grillage, as these are too far from the BLF deck for the cantilever (Cantitravel) method. The cantilever (Cantitravel) method has no geomorphic impacts.
- 2.15.47 The piling works for the BLF would have a very low duration and very low spatial extent. The magnitude of impact on pressures including hydrodynamics, physical loss or change of substrate, changes to suspension and sedimentation would, in all cases, be very low and have negligible (**not significant**) effects on geomorphic receptors.
- 2.15.48 The impact of a jack-up barge installing the mooring dolphins and grillage would be equivalent to that of the BLF structure (presence of piles), albeit for a substantially shorter duration and extent, and so would be **not significant**. The jack-up barge would have minor hydrodynamic effects around the legs and would not be present for long enough to allow equilibrated scour pits to develop. It would have a negligible effect (**not significant**) on the outer longshore bar near the mooring dolphin locations.

2.15.49 The changes to the installation method do not alter the assessment presented within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311], however the impacts would be reduced in comparison to the original assessment as most piles would be installed using the cantilever (Cantitravel) method.

2.15.50 Although the enhanced BLF has more piles than the original design, the BLF would still be highly transmissive and highly localised effects would still cover a very low extent. The impact of piling would not differ substantially.

2.15.51 Installation of the grillage would result in a partial change in substrate over the 100m x 30m area, the effect of which is considered negligible, **not significant**.

d) iii) a) d) BLF presence (including grillage)

Effect: Minor, Not Significant				
Value: High				
Impact Magnitude: Very Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
High	Very low	Very low	Medium	High

2.15.52 During the Sizewell C construction phase, the enhanced BLF would be in use for four years, during which grillage would be present. For the remainder of the construction phase, grillage would not be present, having been removed. Both cases, with and without grillage, are considered in this section.

2.15.53 The cross-shore pile spacing is similar to that assessed in the ES, whilst the alongshore pile spacing is much wider. Therefore, the modelling used in the ES is considered to be similar to the 'without grillage' assessment.

2.15.54 The BLF piles would be installed in the first or second year of the Sizewell C construction phase and be present for the remainder of the construction phase and the operational phase. Their presence would result in localised changes to wave and current flows, seabed substrate, scour and sedimentation around the piles. The piles would present a long-term obstruction to nearshore hydrodynamics, but their small diameter (1m trestle piles and approximately 2.5m fender/dolphin piles), low number (16 piles seaward of MHWS; 12 trestle and four fender/dolphin piles) and very low density (spacing of 9.2m alongshore and 11.5m cross-shore), which means they would be transmissive to both water and sediment.

- 2.15.55 In the ES, worst-case modelled currents show a reduction of 0.2m/s up to 45m from the dolphin pile furthest offshore, and a 5% change in wave energy over 0.1ha (115m of frontage). These values would increase slightly due to the longer enhanced permanent BLF, but would not affect the assessment conclusions. The impact magnitudes for both beach and bar receptors are very low. The effect on hydrodynamics would be negligible (**not significant**).
- 2.15.56 Bed shear stress changes exceeding +/- 5% due to the piles would affect up to 0.14ha of seabed. Maximum worst-case scour around individual piles would be 2m depth with a 2.4m extent. None of this area is expected to be within the Minsmere SPA/SAC boundary.
- 2.15.57 Once the Sizewell C construction-phase use of the BLF is complete (after approximately year six), the area affected by bed shear stress change exceeding +/-5% due to piles alone would be 56% larger than that assessed in the ES (2,159m² compared to 1,384m²) and would affect around 100m of frontage, including the southern 10 – 15m of the SPA/SAC.
- 2.15.58 The very low extent and very low amounts of change to substrate, suspended sediment and associated sedimentation gives very low impact magnitudes and negligible effects (**not significant**) on coastal geomorphology receptors.
- 2.15.59 During the four year in-use period, the area of bed affected by a change of +/-5% in bed shear stress is expected to increase by 20% relative to the ES estimate for the original BLF design with a grounding pocket, from 34,096m² to 40,914m².
- 2.15.60 The limited area of substrate change due to the grillage is not considered significant.
- 2.15.61 The changes in elevation due to the grillage (up to 1m) are less than that assessed in the ES for the dredged grounding pocket (1.9m) and have a similar location and extent. Therefore, the ES provides a good indication of the +/-5% bed shear stress change extents for the grillage. Although the exact patterns would differ, the effects of the grillage are assessed as equivalent to the original dredging assessment: minor, **not significant**.
- 2.15.62 The impact magnitude of grillage presence (as a submerged structure) on hydrodynamics can be estimated from the impact of the in-situ barge previously reported in the ES. As the barge is a full-depth obstruction, the impact of the grillage would be substantially less, but of greater duration (four years rather than intermittent).
- 2.15.63 The grillage is expected to act as a partial blockage to longshore transport along the bar. As a consequence, small volumes of sediment will

gradually accumulate against protruding sides of the grillage during summer conditions when sand transport rates are low. When the BLF is in use, sand deposits on the grillage may need to be removed by injection dredging.

- 2.15.64 During stormy winter conditions, the fixed-elevation grillage (standing proud of the sediment by up to 1m) would cause additional wave breaking and localised, alternating, scour (due to changing storm directions), creating a small wave shadow on the adjacent beach. This is not considered to change the assessment of impact significance to a higher category.
- 2.15.65 Expert judgement and analysis suggests a minor, **not significant** effect over the four-year delivery period on bar position due to the presence of grillage (and hence the fraction of bar width affected), and the extension of impacts due to the slightly longer BLF.
- 2.15.66 The monitoring and mitigation strategy as set out in the CPMMP (**Volume 3, Appendix 2.15.A** of the **ES Addendum**) is unaffected as this section of the beach is already proposed to be routinely monitored throughout the construction phase.

d) iii) a) e) Grounded barge at the BLF

Effect on Geomorphology: Negligible, Not Significant				
Impact Magnitude: Very low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
High	Very low	Very low	Medium	High

- 2.15.67 Grounding and docking of barges at the permanent enhanced BLF would temporarily impede the flow of tidal currents and subtidal sediments. The effect on waves would be negligible because the BLF can only be used during low wave conditions (wave height less than 0.5m). The barge would also cause a temporary loss of seabed area, local suspension and bed level change due to flow acceleration around the barge (and scour) and a temporary blockage to longshore sand transport along part of the inner bar. In all cases, these pressures would be present for a single tidal cycle per docked barge, but during Sizewell C construction docking may occur on every tidal cycle for many months in some years.
- 2.15.68 The duration remains conservatively set to high as it was in the original assessment (**Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311]), despite the reduction in barge docking from ten years to four years (during Sizewell C construction). Barge docking would not occur, or be infrequent, during November – March due to wave conditions.

- 2.15.69 The assessment for currents around the landward and seaward ends of the barge would be the same as the original assessment, as the barge would be in almost the same position: that is, currents would increase by up to 0.38m/s and 0.16m/s respectively. The beach is highly resistant to this magnitude of change in currents, as it would not cause entrainment of beach shingle, however the bar would be less resistant with small patches of short-lived scour followed by rapid infilling (high resilience). The overall sensitivity for the bar and shoreline receptors is low and the effect is negligible and **not significant**.
- 2.15.70 The area affected by grounding of the barge at the longer enhanced permanent BLF can be assumed to approximate that affected by the grillage itself – i.e. around 460 m, of frontage, including 170 m of the SPA/ SAC. However, as per the ES assessment, the additional effect of the barge on impact magnitude would be very low and within the natural background range, and so would not lead to impacts on the designated frontage.
- 2.15.71 The impact on the bars is unlikely to alter in significance compared to the ES – the frequency of barge presence may increase but due to the seasonal nature of the mostly summertime operations and the required calm sea surface conditions, the changes are not sufficient to increase the effect significance.
- 2.15.72 The significance of the small area of seabed temporarily lost beneath grounded barges has already been considered (paragraph 2.15.60) and the additional effect of the in-situ barge is negligible, **not significant**. Scour around the barge, and the temporary change in sedimentation entailed, would have a very low impact as the barge would only be present during low energy conditions. Any additional sand transport changes would be over a very small area (0.22ha) inshore of the barge during peak tidal flows and would be small (less than three percent increase in bed shear stress).

d) iii) a) f) Vessel traffic

Effect: Minor, Not Significant				
Impact Magnitude: Medium			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
High	Low	High	Medium	High

- 2.15.73 Tugboats would be used to guide the barges into place at the enhanced permanent BLF. Propeller wash would have the potential to locally entrain bed sediments over the longshore bars, especially where the draught below the propeller is small. The duration of impact magnitude

may increase compared to the ES due to the increased barge visits per campaign, but is not considered sufficient to increase the assessed significance.

- 2.15.74 The SSC would be expected to exceed the natural suspension in the quiescent conditions that would occur during BLF usage (hence a high assessment of change) over a very small area, but this would also settle rapidly and locally in these same conditions. As a result, despite the frequency and degree of change, precedence is given to the intermittency and the small extent of the effect on the resilient receptor, in determining a low impact magnitude and a minor, **not significant** effect.

d) iii) b) Operational phase

d) iii) b) a) BLF presence (excluding grillage)

- 2.15.75 The assessment for the presence of piles during the Sizewell C operational phase is identical to that of the Sizewell C construction phase (without grillage), so effects on geomorphology receptors are classified as negligible (**not significant**), as they were within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

d) iii) b) b) BLF in use – dredging for access and grounding pocket

Effect: Minor, Not Significant				
Value: High				
Impact Magnitude: Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Very low	Low	Medium	Medium	High

- 2.15.76 Access to the enhanced permanent BLF throughout the operational period would require dredging for access over the outer longshore bar (although dredging may be negated by increased clearance due to sea level rise), and a grounding pocket, as per the original assessment presented within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

- 2.15.77 As assessed in the ES, dredging over the longshore bars required for the BLF approach would reducing the bar crest to -3.5m ODN. However, this would be over 170m of bar crest compared to the ES assessment of 56m. As per the construction phase, the dredging method would be plough.

- 2.15.78 Additional dredging for the grounding pocket when added to the access dredging (around 4,300m³ but up to 4,600m³), gives approximately 9,255m³, which is double the original assessment (4,600m³) within the

ES, due to increased BLF length displacing the grounding pocket a further 16m (seaward) into the outer longshore bar. Most (over half) of the grounding pocket would require relatively light dredging (a few tens of centimetres), however the seaward section would require dredging up to 2m deep into the outer longshore bar.

- 2.15.79 Changes in the outer bar position and elevation will also affect dredge volumes, with crest increases and landward movement increasing the dredging, whilst decreases and seaward movement would lessen it. The associated dredging magnitudes per se would not affect the effects assessment as the volumes are relatively small.
- 2.15.80 The modelled changes to tidal currents over the dredged outer bar are the same as for the original assessment presented within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311], and as a result of the reprofiled bed are up to 0.11m/s and are to extend around 470m (alongshore), up from 355m from the original assessment due to wider (alongshore) dredging requirement.
- 2.15.81 Localised changes in wave energy of -52% to +150% would be expected inshore of the reprofiled bathymetry during storms, but over a very small area. Changes exceeding +/-5% would occur over an area of up to 3ha (up from 2.25ha in the original assessment in the ES) corresponding to 460m of frontage (up from 410m due to the wider dredge requirement), extending onto the southern 170m of the Minsmere SPA frontage.
- 2.15.82 The spatial extent and the duration of storms that drive peak shear stresses would be low, although during storms there would be small patches with a high amount of change. The overall magnitude and spatial extent of change affecting this area of the receptor would be low. As a result, the impact magnitude is assessed as low.
- 2.15.83 The shoreline receptor would have a low sensitivity to this hydrodynamic pressure as it would be unaffected by the shore-parallel tidal currents and the occurrence of waves over a dredged seabed would also promote infilling and thereby progressively reduce any impacts.
- 2.15.84 Whilst the dredge requirement may vary slightly from time to time, the volumes, elevation change and extent are small, and the activity is short (3 – 4 weeks) and infrequent (every 5 – 10 years) with the sediment retained in the system, which would have **no significant effect** on the geomorphic receptors.
- 2.15.85 The grounding pocket could leave a depression in the bar lasting for several months, especially if the dredge requirement increases as a result of shoreward bar movement. As the bar dredging would be infrequent

(once every 5 – 10 years) and during calm weather, effects on bar integrity are not anticipated.

- 2.15.86 However, if the dredged grounding pocket depression were very large (occupying most, or all, of the bar cross-section) and present during a significant storm, the leeward increase in wave energy could lead to localised shoreline erosion. The impact would be of low duration as storm-induced sediment transport would increase the rate of infilling at the grounding pocket.
- 2.15.87 Monitoring and mitigation would be employed in line with the CPMMP (refer to **Volume 3, Appendix 2.15.A** of this **ES Addendum**). As BLF use during operation would take place during calm weather, monitoring would be used to assess the topographic changes in the outer longshore bar (a threshold for mitigation), and, if triggered, the mitigation would be to move the accumulated dredged sediments back into the grounding pocket.
- 2.15.88 As the erosion would be short-lived and small-scale (within the patterns that naturally occur on this beach), the assessment for a north-easterly storm would be minor, **not significant**.
- 2.15.89 Given that the BLF use during the operational phase would be infrequent (once every 5 – 10 years), of short duration (3 – 4 weeks), occur during calm weather (April – October), and its dredging pocket would be infilled naturally or as a triggered mitigation event, a minor, **not significant** effect is assigned.

d) iii) b) c) Grounded barge at the beach landing facility

- 2.15.90 The change due to the enhanced permanent BLF with a grounded barge has been assessed under the construction phase. The scale of impacts will be similar in all respects except for the much-reduced duration (3 – 4 weeks, separated by 5 – 10 years of natural conditions), giving a negligible, **not significant** effect.

d) iii) b) d) Vessel traffic

- 2.15.91 Vessel traffic impacts are as assessed under the construction phase but are also reduced due to their shorter duration and less frequent occurrence compared to the operational phase. The effect would be minor, **not significant**.

e) Updated assessment – construction of a new, temporary BLF
(Change 2)

e) i) Baseline

2.15.92 The proposed change for the provision of a new temporary BLF does not change the existing and future baseline for coastal geomorphology receptors as described in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

e) ii) Environmental Design and Mitigation

2.15.93 As with the permanent enhanced BLF, the temporary BLF's slender widely spaced piles minimise the obstruction to water and sediment flow.

2.15.94 The cantilever installation method removes the need for jack-up barges except for the mooring dolphins, and avoids or minimises the need for heavy vehicles on the beach.

2.15.95 The selection of a long BLF pier that extends into deep water, seaward of the outer longshore bar, avoids the need to dredge for access and barge grounding, which would have been required for shorter pier designs under consideration in the DCO change consultation. Changes to bed shear stress are accordingly reduced as, aside from the pile impacts, the seabed is not reprofiled.

e) iii) Assessment of effects

2.15.96 This section presents the findings of the assessment of the temporary BLF, which would be present during the construction phase only. The summary table at the beginning of each assessment is for the worst-case effect on any coastal geomorphology receptor.

2.15.97 Two existing models have been used to indicate the likely effects of the temporary BLF, as referenced within **Table 2.38**. These models have similar properties to the temporary BLF's pier and unloading platform, respectively. The model results are extrapolated based on expert judgement for the effects assessments of the temporary BLF on coastal geomorphology receptors. Where uncertainty remains, this is outlined within the assessment.

2.15.98 As set out within **section 2.15d)iii)**, the coastal geomorphology receptor of the GSB has five morphological elements (see **Figure 20.1** in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-313]), which may interact directly or indirectly with one another:

- the shoreline/beach (which encompasses sections fronting the Minsmere to Walberswick Heaths and Marshes SAC and the Minsmere

to Walberswick SPA), containing UK priority Biodiversity Action Plan's Coastal Vegetated Shingle Habitat (Annual vegetation of drift lines, Annex I habitat 1210) and the potential for nesting Little Terns;

- two (inner and outer) longshore bars;
- the Sizewell - Dunwich Sandbank; and
- the Coralline Crag outcrops (at Thorpeness and seaward of the Sizewell-Dunwich Sandbank).

2.15.99 Effects on the geomorphic receptor elements would occur either directly (such as dredging the sea floor) or indirectly, e.g. the presence of piles altering the flow regime and causing bed lowering (scour). In addition to direct pressures, the assessment considers how the indirect pressures (such as changes to hydrodynamics, sediment suspension or substrate disturbance) affect different geomorphic receptors (the beach, bars, bank or crag). Both direct and indirect pressures affect sediment transport, which in turn determines sedimentation and the geomorphic response.

2.15.100 The temporary BLF installation, usage and removal have no pathways to impact the Coralline Crag and Sizewell - Dunwich Bank receptor elements, so these are not considered in the BLF assessment.

e) iii) a) Construction phase

e) iii) a) a) Heavy plant on the beach

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Low	Very Low	Very low	Medium	High

2.15.101 The pressure arising from any heavy plant activities on the beach would be the substrate disturbance arising from compaction of surface sediments. If used, the area affected would have a very low spatial extent (+/- 50m around the BLF) and a low duration (weeks - months).

2.15.102 The resistance of the beach to compaction would be medium, as mixed beaches are generally already compact. Resilience would also be high as sediments would be mobilised and re-worked during storms, allowing the beach to function normally and restore any minor changes in form.

- 2.15.103 The temporary BLF would increase the area affected compared to the ES, however the impacts would be minimised (or avoided) due to the cantilever (Cantitravel) construction method.
- 2.15.104 The effect significance is classified as negligible (**not significant**), due to the very low magnitude of impact and low sensitivity of the beach receptor. Therefore, the proposed change does not alter the conclusions of the assessment presented within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

e) iii) a) b) Temporary BLF installation and removal

Effect: Negligible, Not Significant				
Impact Magnitude: Very Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Very low	Very low	Very low	Medium	High

- 2.15.105 The temporary BLF piles and deck would be installed using the cantilever (Cantitravel) method (i.e. building from each previously assembled temporary BLF section). A jack-up barge would only be used to install the dolphins. The cantilever (Cantitravel) method has no geomorphic impacts.
- 2.15.106 The piling works for the temporary BLF would have a very low duration and very low spatial extent. The magnitude of impact on pressures including hydrodynamics, physical loss or change of substrate, changes to suspension and sedimentation would, in all cases, be very low and have negligible (**not significant**) effects on geomorphic receptors. Though the temporary structure increases the total number of piles to be installed, the beach and bars would only be affected by the piling works occurring at these locations and so the impacts would not be substantially increased by the construction works.
- 2.15.107 The impacts of a jack-up barge (for installing mooring dolphins) would be equivalent to that of the temporary BLF structure (presence of piles), albeit for a substantially shorter duration, and so would have a negligible effect on the seabed (**not significant**). The jack-up barge would have minor hydrodynamic effects around the legs and would not be present for long enough to allow equilibrated scour pits to develop.
- 2.15.108 Removal of the temporary BLF applies the installation methods in reverse. If any piles cannot be fully extracted, they will be cut off below the seabed, which is standard practice in the North Sea.
- 2.15.109 Overall, the effects are assessed as negligible and **not significant**.

e) iii) a) c) Temporary BLF presence

Effect: Minor, Not Significant				
Value: High				
Impact Magnitude: Very Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
High	Low	Very low	Medium	High

2.15.110 The temporary BLF's piles would be installed in the first or second year of the Sizewell C construction phase and be present for the majority of the remainder of the construction phase (eight years). Their presence would result in localised changes to wave and current flows, seabed substrate, scour and sedimentation around the piles.

2.15.111 The temporary BLF's pier piles would present a long-term obstruction to nearshore hydrodynamics, but their small diameter (1.2m trestle piles), low number (66 trestle piles seaward of MHWS) and very low density (spacing of 9m alongshore and 12m cross-shore) mean they would be transmissive to both water and sediment.

2.15.112 The piles are sufficiently close together to result in interacting scour pits. The calculated group scour dimensions have a worst-case depth of 2.97m over an elliptical area of 10.37m x 5.92m under conservative spring tide plus surge for piles at the 8m contour. Scour dimensions reduce in both deeper (offshore) and shallower (inshore) depths, and for lower tidal flows. Once formed and fluctuating around equilibrium, scour pits will not affect the wider sediment transport processes in either the bar or surrounding bed and so are of low impact magnitude.

2.15.113 Existing BLF pier modelling, which has a very similar spacing and pile diameter to the temporary BLF, indicates a low change that generally does not exceed the bed shear stress change threshold +/-5% and is thus of insignificant magnitude.

2.15.114 Compared to the temporary BLF, the unloading platform model which has been used as a reference for determining the likely effects of the temporary BLF, includes the following differences:

- greater number of piles (30 instead of 24 piles and ten 3.6m diameter dolphins compared to the temporary BLF's four 2.5m dolphins);
- piles are located further from shore (582m instead of 444m); and
- piles are more densely spaced (7x7m instead of 12x12m).

2.15.115 The assessment of the unloading platform indicates prominent zones of raised and lowered bed shear stress (compared to the adjacent background) extending landward on each side of the unloading platform and corresponding to the two prevailing storm directions. Although these zones do not reach the shoreline, they are based on the model of an unloading platform that is 142m further from shore, leading to some uncertainty regarding bed shear stress patterns and potential effects on the shoreline.

2.15.116 Expert judgement and analysis of the pier and unloading platform modelling suggests a likely minor, **not significant** effect associated with the temporary BLF.

e) iii) a) d) Navigational dredging

2.15.117 No navigational dredging (access or berthing) is required for the temporary BLF, as it terminates in water deep enough to dock vessels without it.

e) iii) a) e) Vessel traffic

Effect: Negligible, Not Significant				
Impact Magnitude: Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
High	Low	Low	Medium	High

2.15.118 The temporary BLF would use self-propelled vessels that would dock on high tide and reduce their draft as they unload. They would be oriented with the tidal stream and so would not present a significant obstruction to the tidal flow. The high presence of vessels over summer may result in a minor depression at the unloading platform, but this would only have a subtle, local effect on the geomorphology of the area.

2.15.119 Since tugs are not required and the water is deeper, the effects are expected to be lower than those assessed for the permanent BLF in the ES and are considered **not significant**.

e) iii) b) Operational phase

2.15.120 As the temporary BLF would be removed before the end of the construction phase, there are no impacts during the operation of Sizewell C power station.

f) Updated assessment – temporary discharge outfall (**Change 8**)

f) i) Baseline

2.15.121 The proposed change does not alter the existing and future baseline for coastal geomorphology receptors as described in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

f) ii) Environmental Design and Mitigation

2.15.122 The temporary surface water outfall would only be required if a storm event (1 in 30-year return interval) were to occur prior to the construction of the combined drainage outfall (CDO). Consequently, it may never be used during the approximate 2-year period in which it is in place. To balance the likelihood of its use (and associated impacts) against scour caused by the interaction of the outfall with wave run-up, it would be set back from MHWS at around 2 – 3m above ODN. This design measure increases the likelihood that the unused temporary surface water outfall would have no impacts aside from those occurring as a result of its installation and removal.

f) iii) Assessment of effects

2.15.123 This section presents the findings of the temporary surface water outfall assessment for the construction phase of the proposed development. As the outfall would be removed following use during construction, there are no effects during the operational phase of the proposed development. The summary table at the beginning of each assessment is for the worst-case effect on any coastal geomorphology receptor.

2.15.124 Installation and usage/presence of the outfall have no pathway to impact the longshore bars, Coralline Crag and Sizewell - Dunwich Bank receptor elements, and so these are not considered in this assessment.

f) iii) a) Excavation and removal

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Low	Very Low	Very low	High	High

2.15.125 Installation and removal of the outfall may require the overlying sediment to be excavated from the shingle ridge above MHWS (unless the installation goes over rather than through the shingle ridge). A narrow

trench would be cut, the pipe installed (or removed) and backfilled. Excavation represents both penetration and removal of the substrate. As this takes place above MHWS, no plume is created.

- 2.15.126 The excavation and removal would not affect the longshore continuity of the beach system.
- 2.15.127 No hydrodynamic change due to the excavation and removal is expected as this work will occur above MHWS and will be temporary.
- 2.15.128 The pressure arising from any heavy plant activities on the beach would be the substrate disturbance arising from compaction of surface sediments.
- 2.15.129 The area affected would have a very low spatial extent (+/- 50m around the temporary surface water outfall) and a low duration (weeks - months), as sediments would not be mobilised and re-worked until storms with high water levels occurred, during which the beach would be reshaped and function normally to restore any minor changes in form.
- 2.15.130 The resistance of the beach to compaction would be high, as mixed beaches are generally already compact. Resilience would also be high.
- 2.15.131 The effect significance is classified as negligible (**not significant**), due to the very low magnitude of impact and low sensitivity of the beach receptor.

f) iii) b) Physical presence and use of the outfall

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
High	Very low	Very low	Medium	High

- 2.15.132 The presence of the outfall pipe would result in a minor (due to its small size) obstruction to flow and sediment movement in the upper supra-tidal beach, if it were exposed during storms. A scour pit may form, but the duration of the event and the likely high wave activity would limit the scale of the immature pit, which would not reach an equilibrium. However, any pit would persist until it was naturally reprofiled by a storm with high water levels or until it was manually reprofiled as part of the SCDF creation. The impact on entrainment and deposition of sediment would be minimal, as sediment mobility is likely to be high in any wave run-up events that reach the temporary surface water outfall. During a high surge without swash-

mobilised sediments, as is commonly the case at Sizewell, there would be little interaction with the structure.

- 2.15.133 In the event of a 1-in-30-year storm, the discharge (up to 200 l/s and 1.02m/s at the outlet) would generate a jet scour pit. The most conservative estimate of scour yields a 0.66m deep and 2.2m wide pit beneath the outfall, with a gully extending 5m or more down the beach and across the intertidal. This would have a minimal impact on longshore transport, and the gully would rapidly infill. However, the scour in the supra-tidal could be considered long-term as no flow processes will act to repair the scour pit and outflow channel.
- 2.15.134 Despite the potential high duration of impact on the upper supra-tidal (impact duration is small on the intertidal beach), the scale and magnitude of direct change are very low, and there is no mechanism to transmit secondary impacts beyond the immediate location, so the effect is considered as negligible and **not significant**.

g) Updated assessment – change to the sea defence (**Change 9**) - permanent HCDF

- 2.15.135 The changes to the permanent HCDF from the Application that require further assessment for effects on coastal geomorphology receptors are due to its change in position, two to ten metres seaward compared to the location proposed in the Application. Recharging the SCDF and secondary beach maintenance mitigation are expected sooner in the operational phase, compared to the Application (Doc Ref. 6.3) [APP-311].

g) i) Baseline

- 2.15.136 The proposed change does not alter the existing and future baseline for coastal geomorphology receptors as described in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

g) ii) Environmental Design and Mitigation

- 2.15.137 The environmental design and (embedded) mitigation features for the HCDF include:
- Southerly retraction of the north-east corner of the HCDF away from the eroding zone to the north and the Minsmere designated sites boundary.
 - Maintenance of the SCDF's shingle reservoir in line with the CPMMP (refer to **Volume 3, Appendix 2.15.A** of this **ES Addendum** and **section 20.14** in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311]), which is needed to retain a wide beach that ensures continuity of the shingle transport corridor (thereby minimising or avoiding erosive

impacts to neighbouring shores) and reduces wave action on the HCDF during extreme storms (see **Main Development Site Flood Risk Assessment Addendum** (Doc Ref. 5.2(A)Ad)).

- 2.15.138 Release of sediment supply from the SCDF would be a natural process, determined by individual storm parameters. That is, sufficiently elevated water levels, combined with waves capable of entraining shingle, would be required to draw sediment from the SCDF reservoir to the active beach face.
- 2.15.139 Although the exact timing of such events cannot be known, they are expected to begin early in the operational phase and, as a consequence, a substantially larger volume of additional sediments (in particular shingle) will be introduced to the coast at Sizewell C over the life of the station (compared to that considered in the ES).
- 2.15.140 Longshore shingle transport processes will act to slowly disperse the SCDF shingle drawn onto the active beach, which will benefit Sizewell C and the adjacent shorelines by slowing or reversing their natural rates of erosion.

g) iii) Assessment of Effects

- 2.15.141 This section presents the findings of the assessment of the proposed change for the permanent HCDF during the construction and operational phases of the proposed development. The summary table at the beginning of each assessment is for the worst-case effect on any coastal geomorphology receptor.
- 2.15.142 The coastal geomorphology receptor of the Greater Sizewell Bay (GSB) has five morphological elements (see **Figure 20.1 in Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-313]), which may interact directly or indirectly with one another:
- the shoreline/beach (which encompasses sections fronting the Minsmere to Walberswick Heaths and Marshes SAC and the Minsmere to Walberswick SPA), containing UK priority Biodiversity Action Plan's Coastal Vegetated Shingle Habitat (Annual vegetation of drift lines, Annex I habitat 1210) and the potential for nesting Little Terns;
 - two (inner and outer) longshore bars;
 - the Sizewell - Dunwich Sandbank; and
 - the Coralline Crag outcrops (at Thorpeness and seaward of the Sizewell-Dunwich Sandbank).

- 2.15.143 Effects on the geomorphic receptor elements would occur either directly or indirectly. Both direct and indirect pressures affect sediment transport, which in turn determines sedimentation and the geomorphic response.
- 2.15.144 The permanent HCDF installation and usage have no pathways to impact the Coralline Crag and Sizewell - Dunwich Bank receptor elements, due to the distance between the receptors and the pressure, so these are not considered in the HCDF assessment.

g) iii) a) Construction phase

g) iii) a) a) Shingle ridge excavation and beach reprofiling

Effect: Minor, Not Significant				
Impact Magnitude: Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Low	Low	High	Low	High

- 2.15.145 Excavation for the HCDF toe would require translation of the existing 5m shingle ridge and the upper beach seaward by approximately 10m. The excavated material – sand and shingle of the same particle size range found on the active beach – would be formed into a new ridge to protect the excavated site whilst the HCDF toe is installed. The ridge would be subsequently reprofiled and added to, if necessary, to form the SCDF.
- 2.15.146 Excavation would be in sequential sections along the frontage.
- 2.15.147 The magnitude of change is assessed as high, since the shingle ridge is altered, sediment is disturbed to depth and the existing subsurface structure is disrupted over a considerable length of frontage. However, the beach would be reprofiled according to beach management guidance (Ref. 24) and sediments naturally reworked by coastal processes. The magnitude of change is not outside the possible range of natural changes.
- 2.15.148 Although the resistance of the beach to the activity is low, the beach would be reprofiled to natural slopes, which combined with natural coastal processes would allow the beach to re-equilibrate rapidly following excavation and reprofiling, giving a high resilience. Hence, the overall effect is judged to be minor and **not significant**.

g) iii) b) Operational phase

- 2.15.149 This section assesses the presence of the HCDF from the start of the operational phase until either the decommissioning phase (see Section 9 of the CPMMP (**Volume 3, Appendix 2.15.A of the ES Addendum**)) or

the HCDF adaptation to accommodate a higher crest as a result of unexpected climate change and sea level rise.

g) iii) b) a) HCDF presence

Effect: negligible, not significant				
Value: High				
Impact Magnitude: Very low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Very low	Very low	Very low	Low	High

2.15.150 The presence of the HCDF landward of the supra-tidal beach will have no direct impact of the beach receptor as the SCDF and the wide beach will be maintained in front of it. Consequently, the HCDF will largely remain a terrestrial feature and would only be inundated during extreme storms. During such extreme events the natural impacts to the surrounding regime would be so severe that any adverse HCDF impacts would be small relative to natural change.

2.15.151 The effects on geomorphology receptors are classified as negligible (**not significant**), as they were in the ES assessment (**Volume 2, Chapter 20** of the **ES**) (Doc Ref. 6.3) [APP-311].

g) iii) b) b) Natural release of sediments from the SCDF

Effect: Major, significant (beneficial)				
Value: High				
Impact Magnitude: Medium			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Medium	Medium	High	Low	High

2.15.152 Sediment release from the SCDF would be controlled by natural coastal processes. That is, sufficiently elevated water levels, combined with waves capable of entraining shingle, would be required to mobilise shingle in the SCDF reservoir and draw it seaward to the active beachface.

2.15.153 Although the exact timing of such events cannot be known, they are expected to begin early in the operational phase and, as a consequence, a substantially larger volume of additional sediments (in particular shingle) will be introduced to the coast at Sizewell C over its life (compared to that considered in the assessment presented within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311]). Typical volumetric contributions will be

assessed as part of the storm modelling used to determine SCDF recharge thresholds (and will form part of the finalised and approved CPMMP (as defined in the Marine Licence)).

- 2.15.154 Longshore shingle transport processes will act to slowly disperse the SCDF shingle drawn onto the active beach, which will benefit Sizewell C and the adjacent shorelines by slowing or reversing their rates of erosion.
- 2.15.155 Sediment supply from the SCDF would be intermittent but occurring over the life of the station and so has a medium duration to reflect the short intermittent phases of SCDF activity over a long period. The change magnitude is high as the release of SCDF sediments would prevent or reduce erosion on the high value shorelines at Sizewell C and the southern part of the designated Minsmere frontage.
- 2.15.156 The volumes of sediment supplied, giving rise to the major, **significant** (beneficial) effect, would be substantially larger than in the original assessment as the SCDF would supply sediment several decades earlier as a result of its anticipated position immediately behind the active beach. Furthermore, the SCDFs reservoir would be recharged earlier, whenever the beach volume on a given 50-m frontage falls below the SCDF volumetric threshold, which is being determined in the CPMMP (**Volume 3, Appendix 2.15.A of the ES Addendum**).
- 2.15.157 Without the maintained SCDF and a wide beach there would be increased risks of HCDF exposure to wave attack, disruption of longshore shingle transport and erosion to the neighbouring beaches.
- 2.15.158 Neighbouring beaches, in particular those immediately north of Sizewell C on the SAC/SPA frontage, would experience a reduction erosion rates as a result of the additional sediment supplied by the SCDF at Sizewell C.
- 2.15.159 Consequently, this intentional effect of the natural release of sediments from the SCDF is classified as major, **significant** (beneficial).

g) iii) b) c) SCDF reservoir recharge

Effect: Negligible, not significant				
Impact Magnitude: Very Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Very low	Very low	Low	Medium	High

- 2.15.160 Natural volumetric depletion of the SCDF would occasionally trigger its recharge. This activity could be undertaken from landward or seaward, with the preferential method to be determined in line with the CPMMP (the

method may need to vary according to conditions at the time of SCDF recharge). Within the SCDF area, the topography would increase because of the recharge, but it would not have a direct impact on the shoreline until sediment is released (as described in the section above). Heavy plant would be used to transport, deposit and reprofile the SCDF, as per its construction.

2.15.161 The short-duration and narrow extent of these works on the upper supra-tidal are assessed as very low. The amount of change is assessed as low, as the SCDF would be maintained rather than fully depleted and reformed. The effect is assessed as negligible, **not significant**.

2.15.162 Overall, because of the function of the SCDF, its seaward starting position (compared to the original Assessment), and its maintenance via reservoir recharge, there are no significant adverse effects of the HCDF. There are intentional, major, beneficial effects arising from SCDF sediment supply during extreme storms, which would be redistributed naturally and reduce erosion rates at Sizewell C and on neighbouring beaches.

h) Updated assessment – change to the sea defence (**Change 9**) - permanent HCDF adaptive design

2.15.163 The proposed change to the permanent adapted HCDF requires further assessment of effects on coastal geomorphology receptors due to its change in position, primarily seaward movement of its eastern side by 20m. The HCDF's BLF abutment and north face would be unchanged.

h) i) Baseline

2.15.164 The proposed change does not alter the existing and future baseline for coastal geomorphology receptors as described in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

h) ii) Environmental Design and Mitigation

2.15.165 The environmental design and (embedded) mitigation features for the adapted HCDF are as for the permanent HCDF described within **section 2.15g)ii** and include:

- Southerly retraction of the north-east corner of the HCDF away from the eroding zone to the north and the Minsmere designated sites boundary.
- Maintenance of the SCDF's shingle reservoir until the mitigation cessation report, expected during the decommissioning phase, has been agreed (see **section 20.14, Chapter 20, Volume 2**, of the **ES** (Doc Ref. 6.3) [APP-311] and the CPMMP (**Volume 3, Appendix 2.15.A** of this **ES Addendum**)).

- 2.15.166 As described for the HCDF feature, sediment supply from the SCDF would be a natural process, determined by individual storm parameters.
- 2.15.167 Longshore shingle transport processes will act to slowly disperse the SCDF shingle drawn onto the active beach, which will benefit Sizewell C and the adjacent shorelines by slowing or reversing their natural rates of erosion.

h) iii) Assessment of effects

- 2.15.168 This section presents the findings of the assessment of the adapted HCDF, which would only be required if unexpected climate change and sea level rise occurs. The summary table at the beginning of each assessment is for the worst-case effect on any coastal geomorphology receptor.
- 2.15.169 The coastal geomorphology receptors described for the permanent HCDF are also relevant to the adapted HCDF (refer to **section 2.15g)iii)**).
- 2.15.170 Effects on the geomorphic receptor elements would occur either directly or indirectly. Both direct and indirect pressures affect sediment transport, which in turn determines sedimentation and the geomorphic response.
- 2.15.171 The adapted HCDF installation and usage have no pathways to impact for the Coralline Crag and Sizewell - Dunwich Bank receptor elements, due to the distance between the receptors and the pressure, so these are not considered in the adapted HCDF assessment.

h) iii) a) Construction phase

- 2.15.172 There are no construction phase impacts as the adaptive HCDF, if required, would be installed during the operational phase.

h) iii) b) Operational phase

- 2.15.173 This section assesses the activity associated with installing the adaptive HCDF and its presence.
- 2.15.174 As per **section 20.14, Chapter 20, Volume 2**, of the **ES** (Doc Ref. 6.3) [APP-311] and CPMMP (**Volume 3, Appendix 2.15.A** of the **ES Addendum**), the long-term fate of the HCDF beyond the decommissioning phase is not considered in this assessment as the detail required cannot be known until much closer to that time, when the future options for the HCDF, the broad geomorphic setting and the locations of designated sites and features are all known with confidence.
- 2.15.175 The CPMMP (**Volume 3, Appendix 2.15.A** of the **ES Addendum**) sets out the requirements for reporting during the decommissioning phase that

would determine the final actions to be completed before the end of decommissioning. The report and its action plan would require agreement from the relevant regulators at that time.

h) iii) b) a) Shingle ridge excavation and beach reprofiling

Effect: Minor, Not Significant				
Impact Magnitude: Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Very low	Low	High	Low	High

2.15.176 Excavation for the HCDF toe would require seaward translation of the SCDF and upper beach between the BLF abutment and Sizewell B by a further 18m (approximately) compared to the permanent HCDF (20m relative to the ES). The BLF abutment position would not be altered. The excavated material – sand and shingle of the same particle size range found on the active beach – would be formed into a new ridge to protect the excavated site whilst the HCDF toe was installed. The ridge would be subsequently reprofiled and added to, if necessary, to reform the SCDF.

2.15.177 Excavation would be in sequential sections along the frontage between the BLF abutment and Sizewell B.

2.15.178 Seaward translation of the SCDF and subsequent beach reprofiling may lead to similar seaward movement of the shoreline.

2.15.179 The long-term beach management carried out during the operational phase would maintain the general shoreline position and longshore transport corridor in front of the HCDF. Furthermore, the HCDF toe will only be moved as far seaward as the existing BLF abutment. Consequently, reprofiling of the shingle ridge can be considered to be no more significant for the adaptive HCDF than for the permanent HCDF, so impacts are as already assessed, minor and **not significant**.

h) iii) b) b) Cofferdams

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Low	Very Low	Low	Low	High

2.15.180 The assessment of the effect of coffer dams in the maintained beach frontage would be no greater than already assessed for the permanent HCDF. The coffer dams would only be present for short periods of time

(months) and occupy only part of the longshore transport corridor, any resulting impacts would be localised and negligible; therefore, **not significant**.

h) iii) b) c) Adapted HCDF presence

Effect: Negligible, not significant				
Value: High				
Impact Magnitude: Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Very low	Low	Low	Low	High

2.15.181 The presence of the adapted HCDF landward of the supra-tidal beach will have no direct impact on the beach receptor as the SCDF and the beach will be maintained in front of it, however easterly movement of the HCDF would correspond to easterly movement of the beach. With its fronting SCDF and beach, the HCDF will largely remain a terrestrial feature and would only be inundated during extreme storms. During such extreme events the natural impacts to the surrounding regime would be so severe that any adverse HCDF impacts would be small relative to natural change.

2.15.182 The seaward translation of the SCDF and beach may increase the rate at which it erodes, however as the frontage would be maintained, any losses from the Sizewell C frontage would equate to gains on neighbouring frontages and net benefit there.

2.15.183 The effects on geomorphology receptors are classified as negligible (**not significant**), as they were in the assessment presented within **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311].

h) iii) b) d) Natural release of sediments from the SCDF reservoir

Effect: Major, significant (beneficial)				
Value: High				
Impact Magnitude: Medium			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Medium	Medium	High	Low	High

2.15.184 The SCDF would continue to function in the same way following seaward translation to accommodate the adapted HCDF. The seaward translation of the SCDF and beach may increase the net Sizewell C erosion rate, however as the frontage would be maintained, any losses from the

Sizewell C frontage would equate to gains on neighbouring frontages and net benefit there.

- 2.15.185 The release of sediment from the SCDF would prevent or reduce erosion on beaches, including the high value frontage at Sizewell C and the southern part of the designated frontage. This intentional effect (maintaining the Sizewell C shoreline) is classified as major, **significant** (beneficial).

h) iii) b) e) SCDF reservoir recharge

Effect: negligible, not significant				
Impact Magnitude: Very Low			Sensitivity: Low	
Duration	Extent	Change	Resistance	Resilience
Very low	Very Low	Low	Medium	High

- 2.15.186 The assessment for recharging the SCDF reservoir is the same for both HCDFs. The short-duration and narrow extent on the upper supra-tidal are assessed as very low. The amount of change is assessed as low, as the SCDF would be maintained rather than fully depleted and reformed. The assessment of effects is negligible, **not significant**.

- 2.15.187 Despite its more easterly position, the adapted HCDF would not have an adverse impact on the SPA/SAC frontage because the SCDF would continue to supply sediment to that area. The beach's more easterly position may also locally reduce longshore transport (due to changes between the angle of the coast and the incoming waves) and cause further natural deposition immediately north of Sizewell C. This would not lead to downdrift (southerly) erosion as any supply lost to the process would be compensated by supply from the SCDF during NE storms.

- 2.15.188 Reduced erosion rates to neighbouring beaches can be expected in the long-term, following release of SCDF sediments, as demonstrated in **section 7.4.1 of Volume 2, Appendix 20A of the ES** (Doc Ref. 6.3) [APP-311]. The shoreline position with Sizewell C is likely to be larger (for both versions of the HCDF) than the initial Assessment because the SCDF would release a substantially larger volume of sediment over the station life.

i) Updated assessment - combined effects

i) i) Permanent and temporary BLFs

i) i) a) Construction phase

2.15.189 Installation of the enhanced permanent and temporary BLFs would result in additive impacts from heavy plant on the beach at two locations (if used), but the areas would be discrete, and the impacts would remain negligible, **not significant**.

2.15.190 The two BLFs are too far apart (over 165m) for scour from their piles (maximum length of 11m) to interact.

2.15.191 Due to the distance and angle between the temporary BLF's unloading platform and the permanent BLF, impacts do not directly overlap, suggesting that significant combined effects are unlikely to occur.

2.15.192 Expert judgement and analysis of the unloading platform model results suggests effects would be minor, **not significant**.

2.15.193 The fish recovery outfalls lie within the envelope of impacts on wave and currents (shear) from the temporary BLF. Due to their small scale and the general reduction in wave energy from the structures, the in-combination effect may be a slight reduction in wave-driven amelioration of the scour around the outfalls. However, the ES presented worst-case scour results which occur in the complete absence of wave action: therefore, the in-combination impacts do not worsen the assessment and the effects are **not significant**.

i) i) b) Operational phase

2.15.194 As the temporary BLF would be removed at the end of the construction phase, there are no further in-combination effects during the operational phase.

i) ii) Permanent and temporary BLFs and sea defence

i) ii) a) Construction phase

2.15.195 Since the HCDF would be landward of the SCDF, no significant in-combination effects with other marine activities are expected.

2.15.196 Construction impacts from the BLFs and HCDF (including rolling the shingle ridge and beach seawards and SCDF creation) will effectively be the same pressure – overlapping areas of heavy plant movement. Neither activity increases the impact of the excavation and reprofiling associated with the other.

2.15.197 If sufficiently large storms occur during the construction phase, the SCDF would release sediment onto the beach face, as expected. There will be an inter-relationship between this (positive) impact and the impacts of the enhanced and temporary BLFs, access dredging and the FRR and CDO outfalls. The release of sediment from the SCDF would reduce any erosional impacts occurring in the nearshore. As such, this inter-relationship effect can be assessed as moderate, **significant** (beneficial).

i) ii) b) Operational phase

2.15.198 Since the HCDF would largely remain a terrestrial feature, inundated only during extreme storms, the only impacts on the coastal geomorphology receptors would occur during extreme storm events, during which the natural impacts to the surrounding regime would be so severe that adverse impacts from the HCDF would be small relative to natural change.

2.15.199 The combined effects assessment for the adapted HCDF, if required, is the same as for the permanent HCDF.

2.15.200 The combined effects assessment for release of SCDF sediments with the enhanced permanent BLF is the same as during the construction phase. The SCDF has moderate (beneficial), **significant** effect of reducing any erosion due to the impacts from nearshore structures (e.g. piles).

2.16 Marine water quality and sediments

a) Introduction

2.16.1 This section provides an addendum to the marine water quality and sediments assessment with reference to the following documents submitted with the Application:

- **Volume 2 Appendix 20A** of the **ES** (Doc Ref 6.3) [[APP-312](#)];
- **Volume 2, Chapter 21** of the **ES** (Doc Ref. 6.3) [[AS-034](#)];
- **Volume 2, Appendix 21D** of the **ES** (Doc Ref. 6.3) [[APP-315](#)];
- **Volume 2, Appendix 21E** of the **ES** (Doc Ref. 6.3) [[APP-315](#)];
- **Volume 2, Appendix 22J** of the **ES** (Doc Ref. 6.3) [[APP-327](#)].

2.16.2 There is no Additional Information relevant to the marine water quality and sediments assessment. The relevant proposed changes are summarised in sections below.

b) Relevant changes

- 2.16.3 The proposed changes of relevance to the assessment of marine water quality and sediments effects include:
- enhancement of the permanent beach landing facility and construction of a new, temporary beach landing facility (**Change 2**); and
 - surface water removed early in the construction process to be discharged to the foreshore via a temporary outfall (**Change 8**).
- 2.16.4 All other proposed changes described within **section 2.2** of this chapter do not change the assessment of effects for marine water quality and sediments assessment and, therefore, have not been considered further within this section.
- 2.16.5 The proposed changes to the dredging requirements for the permanent BLF which may alter the marine water quality and sediments assessment are summarised in **Table 2.39**. Beside the change to the dredging requirements, the enhanced permanent BLF would not alter the assessment presented within **Volume 2, Chapter 21** of the **ES** (Doc Ref. 6.3) [AS-034].
- 2.16.6 The new temporary BLF would not give rise to any additional impacts to those assessed within **Volume 2, Chapter 21** of the **ES** (Doc Ref. 6.3) [AS-034], as it would not require any dredging. Therefore, the temporary BLF has not been considered further within this section.

Table 2.39: Key changes to the enhanced permanent BLF.

Parameter	DCO Application BLF.	Enhanced permanent BLF.	Change
Grounding platform.	The original assessment considered a dredge profiled grounding pocket.	A concrete grillage grounding platform would be installed to facilitate increased AIL deliveries. The grillage would cover a seabed area of 100m x 30m.	The addition of the hard grillage structure reduces requirement for maintenance works.
Dredging	Initial capital dredge of 4,600m ³ by plough dredger to allow clearance over longshore bars and allow level grounding surface. Maintenance dredging of approx.	Initial capital dredge volumes remain within the envelope of the Application. Use of grillage removes the need for maintenance dredging of the berthing platform, though navigational	Initial capital dredge volumes are likely to be lower, to a maximum of 4,600 m ³ as per the original assessment in the ES. As such, no further assessment is made. Maintenance dredging of the navigation channel would be required at increased frequencies, however, the volumes of material routinely displaced by plough

Parameter	DCO Application BLF.	Enhanced permanent BLF.	Change
	10% of initial capital volume (460m ³) at monthly frequency.	dredging would still be required. Continuous monitoring during the campaign period would determine the requirement for navigational dredging. Low volume high frequency dredging is anticipated at weekly intervals or more frequently. Plough and/or injection methods could be used.	dredging is anticipated to be lower than originally assessed in the ES. Water injection or similar would be required to clear any accreted sediment from the grillage but the volume of material routinely displaced is anticipated to be lower than originally assessed in the ES. Following removal of the grillage at the end of the construction phase, operational phase dredging would be required to create the grounding pocket for barges to unload at the enhanced permanent BLF, every 5-10 years to facilitate AIL deliveries. Whilst the dredge area is likely to be similar to the ES, based on the current position of the longshore bar, the anticipated operational dredge volume would be approximately 9,255m ³ (approximately twice that of the assessment in the ES).

c) Updated assessment – enhancement of the permanent BLF
(Change 2)

- 2.16.7 The proposed changes to the permanent BLF from the Application that require further assessment of effects on marine water quality and sediments are described in **Table 2.39** and are considered in the following sections.
- 2.16.8 The installation of the concrete grillage will reduce the requirement for maintenance works. Although maintenance dredging is anticipated at increased frequencies, the volumes of sediment displaced will be much lower. However, during the operational phase, capital dredge volumes are likely to be twice those considered within **Volume 2, Chapter 21** of the **ES** (Doc Ref. 6.3) [AS-034].

c) i) Baseline

- 2.16.9 The proposed change to the permanent BLF does not alter the existing and future baseline for marine water quality and sediments, as described in **Volume 2, Chapter 21** of the **ES** (Doc Ref. 6.3) [AS-034].
- 2.16.10 Suspended sediment concentration data collected from the MODIS (Moderate Resolution Imaging Spectroradiometer) satellite database. showed average mean SSC values at Sizewell during April to August of 31mg/l and average maximum values of 80mg/l. Between September to

March mean SSC values of 73mg/l were recorded in the surface waters at Sizewell with average maximum values of 180mg/l.

- 2.16.11 Based on satellite data, the surface waters at Sizewell are classed as ‘intermediate turbidity’ (10–100mg/l) (refer to **Volume 2, Appendix 21D** of the **ES** (Doc Ref. 6.3) [APP-315].

c) ii) Environmental Design and Mitigation

- 2.16.12 The proposed change does not alter the mitigation required for the permanent BLF as described within **Volume 2, Chapter 21** of the **ES** (Doc Ref. 6.3) [AS-034].

c) iii) Assessment of Effects

- 2.16.13 During construction, the initial capital dredge volumes associated with the construction of the enhanced permanent BLF are likely to be lower than considered within **Volume 2, Chapter 21** of the **ES** (Doc Ref.6.3) [AS-034] and no further assessment has therefore been undertaken. However, during operation, the capital dredge volume required to provide access to the enhanced permanent BLF is approximately twice that described in the Application so an updated assessment is provided within this section.
- 2.16.14 During the operational phase, deliveries of AILs to the enhanced permanent BLF would require an initial capital dredge to create a grounding pocket and allow navigation access over the longshore bar. The BLF would be in use for a few weeks at a time during which maintenance dredging may be required.
- 2.16.15 Dredge plume modelling was completed as part of the Application for the permanent BLF and for infrastructure installation both within and seaward of the Sizewell-Dunwich Bank (**Volume 2, Chapter 22; Appendix 22J** of the **ES** (Doc Ref 6.3) [APP-327]).
- 2.16.16 The dredge plume modelled for the Application was a volume of 4,600m³ by plough dredger for a continuous duration of 2.1 days. Operational dredging for the longer enhanced permanent BLF grounding pocket would require greater dredge volumes.
- 2.16.17 The assessment of the magnitude of the plume assessed herein is based on expert judgement based on interpretation of existing modelled plumes for a range of dredging activities (**Table 2.40**).
- 2.16.18 The worst-case dredge volume modelled for the installation of the cooling water intakes was 17,400m³ (**Volume 2, Chapter 22; Appendix 22J** of the **ES** (Doc Ref 6.3) [APP-327]). Dredging for each head was estimated to take 8.5h via cutter suction with local disposal. During spring tides, maximum depth average SSC of more than 100mg/l above background

would extend approximately 13km to the north and 22km to the south of the disposal location illustrated by the large maximum plume area. However, the maximum instantaneous plume extent above 100mg/l was 373ha and SSC reduced to background levels within days of the dredge event.

Table 2.40: Suspended sediment plumes and changes in sedimentation rates assessed in the Application, used to envelope the changes to the enhanced permanent BLF.

Component	Dredge parameters			Changes in SSC: spatial extent and amount of change.			Siltation rate changes.	
	Dredge volume.	Position relative to Sizewell-Dunwich Bank.	Duration.	Depth average (maximum instantaneous plume ¹).	Depth average (maximum plume ²).	Persistence	Spatial extent & amount of change.	Persistence.
Permanent BLF: capital dredging.	4,600m ³	Inshore	2.1 days.	83ha (100mg/l) 6ha (1,000mg/l)	332ha (100mg/l) 17ha (1,000mg/l)	Return to background levels within several days.	3ha (>50mm) 1ha (>300mm)	0ha >50mm after 15 days (3ha remains >20mm).
Permanent BLF: maintenance dredging.	460m ³	Inshore	5 hours.	28ha (100mg/l) 1ha (1,000mg/l)	41ha (100mg/l) 4ha (1,000mg/l)	Return to background levels within several days.	0ha (>20mm)	0ha >10mm after 15 days.
Cooling water intakes (each head).	17,400m ³	Offshore	8.5 hours.	373ha (100mg/l) 14ha (1,000mg/l)	3,757ha (100mg/l) 52ha (1,000mg/l)	Return to background levels within several days.	7ha (>50mm) 2ha (>300mm).	0ha >5mm after 15 days.

¹ Instantaneous areas indicate the maximum extent of the plume at a specified threshold at any given time during the model run.

² The maximum plume represents the cumulative area within the model domain that exceeds a specified threshold for at least 1 hour during the 15 days model run (100th percentile). Maximum areas at intermediate concentrations have little ecological relevance in a system where maximum daily background concentrations are 357 – 609mg/l at 0.3m above the seabed, and 266 – 459mg/l at 1m above the seabed (**Table 2.41**).

- 2.16.19 By comparison, at the location of the permanent enhanced BLF the tidal flows are reduced and any SSC plume would have a reduced north-south extent. The doubling of the dredge volume for the enhanced permanent BLF would increase the area of the SSC plume above 100mg/l beyond that assessed in the Application. It is likely that instantaneous SSC plumes of 100mg/l above background would extend over an area of several hundred hectares (compared with 83ha in the Application). In close proximity to the dredge area SSC may exceed 1,000mg/l above ambient during dredging activities over tens of hectares (compared 17ha in the Application **Volume 2, Chapter 22** of the **ES** (Doc Ref 6.3) [APP-317])(**Table 2.40**).
- 2.16.20 The spatial extent of the increased SSC elevation at >100mg/l, would be equivalent to a WFD ‘turbid’ classification (i.e. 100 – 300mg/l) when considered in addition to mean SSC background concentration during most of the year.
- 2.16.21 The predicted extent of this change in SSC over several hundred hectares would represent ca. 2% of the Suffolk Coastal waterbody area and would last for several days (so would be equivalent to a few percent of the annual assessment period for the turbidity classification).
- 2.16.22 This level of change is therefore considered medium in extent, as is the amount of change and duration of the plume, resulting in an impact magnitude of medium.
- 2.16.23 Ambient conditions at the site are highly variable and the surface waters are considered as ‘intermediate turbidity’ according to WFD criteria, as provided in **Volume 2, Appendix 21E** of the **ES** (Doc Ref. 6.3) [APP-315]. Dredging would temporarily increase the classification to ‘Turbid’. Changes in SSC in the shallow subtidal near the enhanced permanent BLF must be contextualised in relation to ambient conditions. A MiniLander deployed at the seabed 500m offshore the proposed development recorded daily minimum, mean and maximum SSCs provided in **Table 2.41 (Volume 2, Appendix 20A** of the **ES** (Doc Ref 6.3)) [APP-312].

Table 2.41: Seabed SSC 500m off the Sizewell C coast.

SSC statistic.	SSC at 0.3m above the seabed (mg/l).	SSC at 1m above the seabed (mg/l).
Daily minimum	26	17
Daily mean	103 – 161	72 – 105
Daily maximum	357 – 609	266 – 459

- 2.16.24 In the Application, areas of 1ha were exposed to heavy sedimentation rates of >300mm whereas an area of 3ha was exposed to >50mm of sedimentation. Localised heavy sedimentation is likely to increase but a relatively small area would be impacted.
- 2.16.25 Tidal resuspension resulted in no areas with deposits above 50mm at the end of the 15-day model run. It is feasible a larger dredge volume could result in areas exposed to greater than 50mm deposits after 15 days over small spatial scales. The impact is predicted to be short-term.
- 2.16.26 The duration of the plume is likely to be short-lived and is expected to return to baseline concentrations within days of dredging ceasing. Dredging would be infrequent, occurring every 5-10 years during the operational phase. Low volume maintenance dredging may occur at weekly frequency for the few weeks the BLF is in use.
- 2.16.27 The extent of the plume would be greater than assessed in **Volume 2, Chapter 21** of the **ES** (Doc Ref. 6.3) [AS-034]. However, due to the short-term duration of the activity, the temporary nature of the plume and the variable natural background, sensitivity to this influence is predicted to be low.
- 2.16.28 The impact of increased SSC resulting from dredging activities is predicted to have a minor adverse effect on turbidity status. Effects are predicted to be short-lived and **not significant** relative to natural variation in background SSC.
- d) Updated assessment – temporary discharge outfall (**Change 8**)
- d) i) Baseline
- 2.16.29 The proposed changes do not alter the existing and future baseline for marine water quality and sediments assessment, as described in **Volume 2, Chapter 21** of the **ES** (Doc. Ref: 6.3) [AS-034].
- d) ii) Environmental Design and Mitigation
- 2.16.30 During construction of the main development site and prior to the completion of the CDO, management of surface water run-off and discharge is required to prevent flooding of the site and any adverse effects on the nearby water quality and ecology. Surface water is proposed to be pumped eastwards beyond the sheet pile wall towards the shoreline.
- 2.16.31 An environmental permit would be sought to allow a discharge rate to sea of up to 200 litres per second. The total suspended solids content of water discharged into the sea would be no greater than 250 mg/l.

- 2.16.32 A treatment system comprising settlement areas, either lagoons or lamella clarifiers, would be constructed to reduce the total suspended solids to the required level.
- 2.16.33 Where ground materials consist of clay particles, Siltbuster™ technology would be applied and monitored to ensure chemicals are added only when required.
- 2.16.34 The pH levels of the water would be assessed and treated, as required, to ensure they meet the levels of 6-9, as required by the Environment Agency for the WDA permit.

d) iii) Assessment of effects

- 2.16.35 This section details the effects associated with the temporary drainage outfall, as this was not assessed within **Volume 2, Chapter 21** of the **ES** (Doc. Ref: 6.3) [AS-034].
- 2.16.36 Based on a discharge concentration of 250 mg/l suspended solids and the discharge rate of 200 litres per second, the equivalent mass discharge rate is 0.05 kg per second. By comparison drill arisings for the intake and outfall structure for Sizewell C would generate 1.9 and 2.4 kg per second. These have been modelled within **Volume 2, Appendix 22J** of the **ES** (Doc Ref. 6.3) [APP-327], with the results referenced for comparison.
- 2.16.37 The dispersion of the drill arisings from the construction of the intake and outfalls was modelled for a continuous 7.5-day period with drill arisings released in the surface layer of the model (the top 2% of the water column).
- 2.16.38 From the modelling of the drill arisings the maximum depth average suspended sediment concentrations (SSC) are typically less than 10mg/l above background concentrations and, as such, not detectable against the natural background variability.
- 2.16.39 The proposed temporary site drainage outfall would only cater for extreme events and, therefore, there is a low likelihood of its use during the approximately two-year period prior to construction of the CDO.
- 2.16.40 Based on a 1 in 30-year storm event, there is a 6.6% chance that a storm event of this magnitude would occur over the two years prior to construction of an operational CDO.
- 2.16.41 Ambient conditions at the site are highly variable, as presented in **section 21.4** of **Volume 2, Chapter 21** of the **ES** (Doc. Ref: 6.3) [AS-034] and the surface waters are considered as of 'intermediate turbidity' according to WFD criteria in **Volume 2, Appendix 21E** of the **ES** (Doc Ref. 6.3) [APP-315].

- 2.16.42 A storm event via the temporary drainage outfall of the magnitude expected (i.e. of 0.05 kg / second) has a low likelihood and would not raise the SSC above a level discernible above background variation, except at the immediate point of discharge. Therefore, the extent and amount of change and duration are evaluated as very low.
- 2.16.43 The sensitivity of water quality to increases in SSC is evaluated as low as the waters off Sizewell are well mixed.
- 2.16.44 The impact of increased SSC resulting from discharge from the temporary drainage outfall is predicted to have a negligible adverse effect on water quality. Effects are predicted to be short-lived and **not significant** relative to natural variation.
- 2.16.45 As such, there would be no materially new or different significant effects compared to the assessment presented within **Volume 2, Chapter 21** of the **ES** (Doc. Ref: 6.3) [AS-034].

2.17 Marine ecology and fisheries

a) Introduction

- 2.17.1 This section provides an addendum to the marine ecology and fisheries assessment with reference to the following documents submitted with the Application:
- **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [[AS-035](#)];
 - **Volume 2, Appendix 22C** of the **ES** (Doc Ref 6.3) [[APP-320](#)];
 - **Volume 2, Appendix 22L** of the **ES** (Doc Ref. 6.3) [[APP-329](#)]; and
 - **Volume 2, Appendix 22N** of the **ES** (Doc Ref. 6.3) [[APP-331](#)].
- 2.17.2 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.
- ### b) Relevant Additional Information
- 2.17.3 Relevant Additional Information for the assessment of effects on marine ecology and fisheries includes:
- Supplementary information on fish assessments provided within **Volume 3, Appendix 2.17.A** of this **ES Addendum**. This appendix includes the following reports:

- SPP099 - Predicted performance of the Sizewell C Low Velocity Side Entry intake heads compared with the Sizewell B intakes;
- SPP100 - Estimates of European populations of twaite shad and cucumber smelt of relevance to Sizewell;
- SPP101 - Implications of tidal elevation and temperature on smelt, *Osmerus eperlanus*, impingement at Sizewell;
- SPP102 - Use of Spawning Production Foregone Equivalent Adult Values for impingement assessment;
- SPP103 - Consideration of potential effects on selected fish stocks at Sizewell;
- SPP104 - Worst case glass eel entrainment assessment for Sizewell C;
- SPP108 - Sensitivity of the Alde & Ore Transitional Fish Classification Index (TFCI) to changes in smelt, *Osmerus eperlanus*, abundance;
- TR339 - Sizewell Comprehensive Impingement Monitoring Programme 2009 – 2017;
- TR406: Impingement predictions based upon specific cooling water system design; and
- TR520: Sizewell C Water quality effects of the fish recovery and return system.

2.17.4 The fish assessments described above provide the evidence base that underpins the revised impingement predictions for Sizewell C following the Application based on meetings and written comments from statutory stakeholders. Notable changes to BEEMS Technical Report TR406 include: updated Sizewell B impingement predictions using an updated low-velocity side-entry (LVSE) factor, a bootstrapping approach, akin to the methods employed at Hinkley Point, with an additional step to account for periods when sampling was not possible due to station outages and local effects assessment. An update to the Low Velocity Side Entry (LVSE) head has also been applied. The updated evidence has in some cases resulted in changes to absolute impingement predictions, however, in terms of numbers and biomass, the scale of effects have not altered, and the conclusions remain unchanged. Therefore, these reports do not change the conclusions of the assessment presented within **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035].

c) Relevant changes

- 2.17.5 The proposed changes of relevance to the marine ecology and fisheries assessment include the enhancement of the permanent BLF and the construction of a new temporary BLF (**Change 2**).
- 2.17.6 A detailed description of **Change 2** is provided in **section 2.2** of this chapter. However, a summary of key assumptions associated with **Change 2** made within the updated marine ecology and fisheries assessments is provided below.
- 2.17.7 All other proposed changes described within **section 2.2** of this chapter do not change the assessment of effects for marine ecology and fisheries assessment and, therefore, have not been considered further within this section.

c) ii) Enhancement of the permanent BLF

- 2.17.8 The enhanced permanent BLF, for delivery of AILs during construction, would be located in the same place as stated in the Application (see **Chapter 2, Volume 2** of the **ES** (Doc Ref. 6.3) [APP-180 to APP-186]. Installation of the permanent BLF would begin in year 1.
- 2.17.9 The enhanced BLF would consist of 24 piles (12 below MHWS) with four fenders/mooring dolphins. Piles would be approximately 1m diameter and the fenders/dolphins approximately 2.5m diameter.
- 2.17.10 To improve resilience of the enhanced permanent BLF to wave conditions, a submerged grillage would be installed. Prior to placement of the grillage the seabed would be plough dredged to a depth of approximately 0.7m. Following installation, the grillage and supporting beams would protrude up to 1m above the bed level and broadly align with the seabed profile. The grillage would cover an area of approximately 100m x 30m and would be removed by the end of the construction of Sizewell C.
- 2.17.11 Light injection dredging may be required to remove accumulated sand from the grillage. For deliveries during the operation of Sizewell C (every 5-10 years) a grounding pocket for delivery barges would be dredged. A summary of dredging parameters used to determine the need to update the marine ecology and fisheries assessment is provided in **Table 2.42**.

Table 2.42: Summary of dredging parameters for the enhanced permanent BLF.

Activity	Phase	Dredge type.	Frequency and duration.	Estimated volume*.	Method	Sediment characteristics.	Assessed further?
Installation of the grillage.	Construction	Capital dredge.	Single occurrence. Short-term (few days)	Between 2,000m ³ to maximum likely volume of 4,600m ³ for grillage installation.	Plough	100% fine to medium sand (63µm-210µm).	Capital dredge volume is likely to be less than and not more than the parameters assessed in the Application (Volume 2 Chapter 22 of the ES (Doc Ref 6.3) [AS-035]). No further assessment
Maintenance of the grillage.	Construction	Maintenance dredge.	Frequent, very low volume activity during seasonal use of the BLF.	Variable, very low volume.	Injection	Sediment and shingle in the grillage.	Minor activity within the scope of the ES assessment. No further assessment.
Navigational access over the longshore bar (formally included grounding pocket).	Construction	Capital dredge.	Initial capital dredge at start of works.	Within the envelope of the assessment in the Application (4,600m ³).	Plough	100% fine to medium sand (63µm-210µm).	Within the envelope of the Application (Volume 2 Chapter 22 of the ES (Doc Ref 6.3) [AS-035]). No further assessment.
Maintenance of navigational access over the longshore bar.	Construction	Maintenance dredge.	Large dredge, potentially the same as initial capital dredge, at start of each annual campaign.	Within the envelope of the assessment in the Application (4,600m ³).	Plough	100% fine to medium sand (63µm-210µm).	Within the envelope of the Application (Volume 2 Chapter 22 of the ES (Doc Ref 6.3) [AS-035]). No further assessment.
Maintenance of navigational access over the longshore bar.	Construction	Maintenance dredge.	Smaller more frequent (weekly or more) maintenance dredge during use. Continuous	Assessed in the Application as 460m ³ (10% of	Plough	100% fine to medium sand (63µm-210µm).	Within the envelope of the Application (Volume 2 Chapter 22 of the ES (Doc Ref 6.3) [AS-035]).

Activity	Phase	Dredge type.	Frequency and duration.	Estimated volume*.	Method	Sediment characteristics.	Assessed further?
			monitoring will inform requirements.	the capital dredge).			No further assessment. Lower volume but more frequent dredging is anticipated than assessed in the Application (Volume 2 Chapter 22 of the ES (Doc Ref 6.3) [AS-035]). Effects on ecological receptors are expected to remain minor. No further assessment.
Grounding pocket and navigational access over the longshore bar.	Operation	Capital dredge.	Occasional occurrence (every 5-10 years).	Changes in the BLF design indicate the dredge volume would be approx. 9,255m ³ based on the current bathymetry.	Plough	100% fine to medium sand (63µm-210µm).	The increase in length of the enhanced permanent BLF results in double the 4,600m ³ dredge assessed in the Application (Volume 2 Chapter 22 of the ES (Doc Ref 6.3) [AS-035]) due to the longshore bar. Additional assessments are provided for the effects of SSC and sedimentation.
Maintenance of the grounding pocket.	Operation	Maintenance dredge.	Weekly or more frequent during maintenance dredges would be required during use.	Approximately 925m ³ (10% of the capital dredge).	Plough	100% fine to medium sand (63µm-210µm).	Within envelope of low volume dredge assessed in the Application (Volume 2 Chapter 22 of the ES (Doc Ref 6.3) [AS-035]). Effects were minor. No further assessment.

* Dredge volumes for the grounding pocket are based on the most recent available bathymetry and will be dependent on the onshore/offshore migration of the longshore bar.

2.17.12 The piling assumptions used for modelling instantaneous and cumulative (24-hour) auditory effects are presented in **Table 2.43**.

Table 2.43: Piling assumptions for the enhanced permanent BLF used in underwater noise modelling.

Parameter	Piles	Dolphins / Fenders
Number (below MHWS).	12	4
Pile diameter.	1m	2.5m
Modelled depth of deepest pile (depth includes +1.4m chart datum to encompass a range of tidal conditions).	5.1m	5.1m
Hammer energy.	120kJ	280kJ
Strike rate.	44 blows / minute.	44 blows / minute.
Piling duration.	45 minutes (+ 20-minute ramp-up).	45 minutes (+ 20-minute ramp-up).
Acoustic conversion efficiency.	0.5%	1%
Maximum piles installed in 24-hour period.	2	2
Minimum piling interval (worst-case).	15 minutes.	15 minutes.
Mitigation see section 2.17d)ii	- Pre-start marine mammal searches. - 20-minute linear ramp-up in hammer strike rate. - Additional mitigation including a 'hydrohammer' to dampen sound exposure level (SEL) and sound pressure level (SPL).	

2.17.13 The key changes to the enhanced permanent BLF considered in the marine ecology and fisheries assessment are detailed in **Table 2.44**.

Table 2.44: Key changes to the enhanced permanent BLF.

Parameter	DCO Application BLF.	Enhanced permanent BLF.	Change
Marine piles installed below MHWS.	4 pile pairs (8 piles).	6 pile pairs (12 piles)	Additional 4 piles below MHWS.
Dolphins / fenders.	4 dolphin/fenders ca. 1.5m in diameter.	4 dolphin/fenders ca. 2.5m in diameter	Increase in pile diameter assessed.
Piling parameters.	90kJ and 200kJ options for piles and dolphins/fenders.	Piles would be installed with a 120kJ hammer.	BLF piles within envelope of the original 200kJ assessment.

Parameter	DCO Application BLF.	Enhanced permanent BLF.	Change
	Piling duration 33 minutes. A hammer energy to acoustic energy conversion efficiency of 0.5% was applied, for small diameter piles in shallow water.	Dolphins to be installed with 280kJ hammer. Piling duration 45 minutes.	Larger diameter dolphins/fender piles and increased hammer energy means a 1% hammer energy to acoustic energy conversion efficiency is applied. The value of 0.5% still applies for the small diameter piles in shallow water. Piling effects reassessed to consider the updated piling assumptions detailed in Table 2.43.
Maximum piling rate per 24-h period.	Cumulative acoustic assessments assumed five (5) piles and/or dolphins per day. Equating to 3 days of piling.	Maximum installation rate of 2 piles <u>or</u> 2 dolphins per day. Equating to 2 days of piling to install dolphins and 6 days of piling to install piles.	Cumulative (24-hour) auditory effects are reduced due to sequencing and maximum of two pile per day. However, the duration of piling events increases. Inter-relationship effects arising from piling for the temporary BLF are also assessed.
Grounding platform.	Dredge profiled grounding pocket.	The grillage would cover a seabed area of 100m x 30m.	Reduced dredging for grillage. Installation and presence of structure considered.

c) iii) Temporary BLF

2.17.14 The design specifications of the temporary BLF are detailed in **section 2.2** of this chapter. Here the design details specific to the assessments of effects on marine ecology and fisheries receptors are summarised.

2.17.15 The temporary BLF would consist of a trestle pier and an enlarged unloading platform with a single berth. The temporary BLF would be up to approximately 505m in length and extend approximately 440m seaward of MHWS. The temporary BLF would cross the outer longshore sand bar. As such, there are no requirements for dredging and vessels could berth alongside with sufficient under keel clearance.

c) iii) a) Piling assumptions

2.17.16 The piling assumptions for the temporary BLF used for modelling instantaneous and cumulative (24-hour) auditory effects are presented in **Table 2.45**.

Table 2.45: Piling assumptions for the temporary BLF used in underwater noise modelling.

Parameter	Piles	Mooring dolphins.
Number (seaward of MHWS).	98 (30 unloading platform piles) (68 trestle piles).	4
Pile diameter.	1.2m	2.5m
Modelled water depth of deepest pile. (depth includes +1.4m chart datum to encompass a range of tidal conditions).	8.5m at the unloading platform (seaward end). 5.3m within the outer longshore sand bar (trestle pier).	8.5m
Hammer energy.	120kJ	280kJ
Strike rate.	44 blows / minute.	44 blows / minute.
Piling duration.	45 minutes (+ 20-minute ramp-up).	45 minutes (+ 20-minute ramp-up).
Acoustic conversion efficiency.	0.5%	1%
Maximum piles installed in 24-hour period.	2 for trestle – (ca 34 days). 3 for unloading platform (ca 10 days).	2 (2 days of piling).
Minimum piling interval (worst-case).	15 minutes.	15 minutes.
Mitigation see section 2.16c) ii).	- Pre-start marine mammal searches. - 20-minute linear ramp-up in hammer strike rate from 1 blow per minute to full strike rate. - Additional mitigation including a 'hydrohammer' to dampen SEL and SPL.	

c) iii) b) Installation sequence assumptions

2.17.17 Installation of the enhanced permanent BLF is anticipated to last six months. Installation of the temporary BLF is anticipated to last nine months. For assessment purposes, year 1 is assumed to be 2022.

2.17.18 Installation is assumed to start in August year 1 for both BLFs and be completed by April of year 2 (i.e. 2023) of the construction phase. No piling would occur in the months of May to August inclusive to minimise the potential for effects on designated breeding birds. Assuming no temporal overlap of piling activities, a total of 54 days piling would occur during this period. If piling for the piers for the enhanced permanent BLF and temporary BLF occurred simultaneously, a total of 48 days of piling would be required. No consecutive piling would occur when the mooring dolphins are installed.

2.17.19 It is anticipated that the temporary BLF would not progress seaward beyond the outer longshore sand bar before the enhanced permanent BLF was completed. Therefore, the worst-case underwater noise scenario for the combined effects of installation of the two BLFs would be installation of two piles per day at the enhanced permanent BLF and two piles per day within the sand bar for the temporary BLF (four piles in a 24-hour period). The combined effects of the two BLFs are assessed in **section 2.17f**). For the purposes of underwater noise assessment, the locations of the deepest piles at the relevant position for each BLF are incorporated into the model to allow a precautionary assessment (**Table 2.43** and **Table 2.45**).

c) iii) c) Decommissioning of the temporary BLF

2.17.20 The temporary BLF would be dismantled after eight years. The full superstructure would be dismantled from seaward working back toward land.

2.17.21 Piles would be removed by a combination of very short duration impact piling to loosen the pile, followed by vibropiling. In a similar fashion to installation, two piles would be removed per day followed by two days to dismantle the span. The sequence for removing piles is provided in **Table 2.46**.

2.17.22 Piles and dolphins that are not possible to be removed by vibropiling would be cut off below the seabed.

Table 2.46: Assumptions for removing piles during dismantling of the temporary BLF.

Parameter	Piles
Impact piling duration.	10 minutes / 50 blows.
Hammer energy.	120kJ
Vibropiling duration.	30 minutes.
Maximum piles removed in 24-hour period.	2 for trestle.
Minimum piling interval (worst-case).	15 minutes.

c) iv) Vessel traffic

2.17.23 A summary of the vessel activity associated with the enhanced permanent BLF and the new temporary BLF is provided in **Table 2.47**.

Table 2.47: Summary of vessel activity associated with the BLFs.

Parameter	Permanent enhanced BLF.	Temporary BLF.
Campaign period.	1 st April to 31 st October (outside this period if weather is suitable)	
Day / night operation.	Daylight only.	Day and night.
Annual vessel deliveries.	Up to 100 deliveries in the campaign period.	400 deliveries in the campaign period, up to 600 per annum.
Vessel type.	Barges	Self-unloading vessels.
Accompanying vessels.	Two tugs.	None.
Estimated mean monthly vessel activity during the campaign period.	12-13 AIL deliveries per month during the campaign period (<1 every two days).	Approx. 44 deliveries per month during the campaign period.
BLF length.	101m	505m
Dredge requirements during use.	Yes - dependent upon monitoring (Table 2.42).	None.

c) v) Vessel noise

c) v) a) Enhanced permanent BLF

2.17.24 Baseline modelling of the shipping lanes in the southern North Sea and Channel indicated median sound levels exceed 115 dB over much of domain, due to intense shipping traffic, with levels above 130 dB in many hotspots (**Volume 2, Appendix 22L** of the **ES**) (Doc Ref. 6.3) [APP-329]. A vessel noise assessment was completed as part of the Application in **Volume 2, Chapter 22** of the **ES** (Doc Ref 6.3) [AS-035], where additional shipping was added to the baseline to determine the effects of the proposed development.

2.17.25 Assessments in **Volume 2 Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035] were modelled based on the feasible maximum number of vessels that could land at the BLF due to tidal restrictions. The precautionary model predicted that the potential increase in ambient noise levels associated with the BLF deliveries from vessel traffic during the construction phase is likely to be modest and within the natural variability at the site. The increase in vessel traffic due to the enhanced permanent BLF is within the envelope of the original assessment.

c) v) b) Temporary BLF

2.17.26 The increases in vessel traffic associated with the temporary BLF alone and acting in-combination with the permanent enhanced BLF has been considered further through empirical modelling. The vessel noise assessment assumes sound source levels for an average oceangoing

vessel whilst steaming, located at the position of the BLFs for 24 hours (the worst-case for cumulative auditory effects). Vessel source levels across the frequency spectrum are the same as those assessed within **Volume 2, Appendix 22L** of the **ES** (Doc Ref. 6.3) [APP-329].

- 2.17.27 Vessels on approach to the proposed development would operate at lower speeds prior to mooring. For example, the **Code of Construction Practice (CoCP)** (Doc Ref. 8.11(A)) recommends site speed restrictions of <10 knots to minimise disturbance effects. As such modelled noise levels are considered precautionary.
- d) Updated assessment– enhancement of the permanent BLF (**Change 2**)
- d) i) Baseline
- 2.17.28 The enhancement of the permanent BLF does not change the existing and future baseline for marine ecology and fisheries receptors as described in **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035].
- d) ii) Environmental Design and Mitigation
- 2.17.29 Reduction of environmental impacts on marine ecology and fisheries receptors is sought through introducing a series of mitigation measures. Mitigation measures including tertiary mitigation for vessel traffic and pollution are consistent to those presented in **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035] and are summarised in this section.
- 2.17.30 Further mitigation measures are proposed as a result of the proposed change.
- d) ii) a) Piling noise mitigation
- 2.17.31 As for the permanent BLF proposed in the Application, tertiary mitigation will include implementation of the *JNCC Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise* (Ref. 25).
- 2.17.32 A draft marine mammal mitigation plan (MMMP) was submitted as part of the Application, provided in (**Volume 2, Chapter 22 Appendix 22N** of the **ES**) (Doc Ref. 6.3) [APP-331]. The draft MMMP and **CoCP** (Doc Ref. 8.11(A)) will be updated to reflect the piling specifications and mitigation measured assessed herein.
- 2.17.33 To mitigate the potential for impacts on breeding birds, no piling would occur in May to August inclusive.

2.17.34 In addition, further mitigation has been proposed to minimise the effects of underwater noise that includes the use of a hydrohammer, which has hydraulic plungers filled with water designed to dampen the impact and reduce the source noise of impact piling. Hydrohammers may reduce sound exposure levels (SEL) by 3 to 6dB and sound peak pressure level (SPL) by 9 to 12 dB (Ref. 26) - the lower values have been used in the updated assessment presented within this chapter as a precaution. The potential effectiveness of the mitigation measure is assessed by presenting impact ranges with and without the use of the hydrohammer.

d) ii) b) Vessel traffic and pollution

2.17.35 Tertiary mitigation for effects of vessel traffic on marine ecology receptors at the site are detailed in the **CoCP** (Doc Ref. 8.11(A)).

d) ii) c) Lighting strategy for the BLFs

d) ii) c) a) Installation

2.17.36 During installation, works will be undertaken on a two shifts/day basis and lighting will be required to provide a safe working environment. Lighting requirements are anticipated to be as follows:

- Low height road lighting is anticipated along the jetty approximately every 20m.
- On the Cantitravel and main working areas.
- Additional lighting on the crane boom.

d) ii) c) b) Use

2.17.37 Navigational lights would be provided (see **section 2.19** of this chapter).

d) iii) Assessment of Effects

2.17.38 This section details the effects associated with enhanced permanent BLF that are not within the envelope of the assessment provided in **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035].

2.17.39 Effects are described for the installation of the enhanced permanent BLF and the usage during the construction and operational phases of the proposed development.

d) iii) a) Construction phase

2.17.40 **Table 2.48** details the pressures associated with the installation and construction phase use of the enhanced permanent BLF. Pressures that

have changed due to the modified design specifications detailed in **section 2.17c)** with the potential to exceed the envelope of the assessment in the Application are assessed further.

Table 2.48: Pressures associated with the enhanced permanent beach landing facility activities during the construction phase (* in-combination effects are presented in section 2.17f). .

Pressure	Activity resulting in Pressure.	Receptors	Updated Assessment.
Habitat change - Reprofilng of substratum.	Capital dredging.	Benthic Ecology Fish	The initial capital dredge footprint (area) is within the envelope of the Application. No further assessment is made.
Changes in suspended sediments.	Capital dredging and maintenance dredging.	Plankton Benthic ecology Fish Marine mammals.	The initial capital dredge volume is within envelope of the Application. No further assessment is made. Maintenance dredging is anticipated to increase in frequency but dredge volumes and thus suspended sediment concentrations would reduce. No further assessment is made.
Sedimentation rate changes.	Capital dredging and maintenance dredging.	Plankton Benthic ecology Fish	The initial capital dredge volume is within envelope of the Application. No further assessment is made. Maintenance dredging is anticipated to increase in frequency but dredge volumes and thus the potential for sedimentation rate changes would reduce. No further assessment is made.
Underwater noise.	Dredging (continuous noise source).	Fish Marine mammals.	The frequency of maintenance dredging would increase; however, dredging is anticipated to be short term and within the envelope of the Application. No further assessment is made.
	Impact piling (impulsive noise source).	Plankton Benthic ecology Fish Marine mammals	The changes in piling specifications require additional assessments. Changes in piling parameters modelled are detailed in Table 2.43 . The changes in piling parameters result in changes in instantaneous and cumulative effect areas and are assessed further.
	Vessel traffic	Fish Marine mammals.	Whilst the enhanced permanent BLF would facilitate increased AIL deliveries

Pressure	Activity resulting in Pressure.	Receptors	Updated Assessment.
	(continuous noise source).		the original assessment envelopes the proposed change (section 2.17c iv)). No further assessment is made.
Visual disturbance.	Activities for the BLF installation and construction phase.	Marine mammals.	Whilst the enhanced permanent BLF would facilitate increased AIL deliveries the original assessment enveloped the worst-case scenario (section 2.17c iv)). No further assessment is made.
Changes in wave exposure.	Presence of structure.	Benthic ecology.	The enhanced BLF design will increase the area exceeding +/-5% in wave energy, however, the total area remains small (see section 2.15 of this chapter). The increase in localised changes in wave exposure are not predicted to have a material change to the assessment of effects. No further assessment is made.
Physical change to another seabed type.	Presence of structure (grillage and piles).	Benthic ecology.	An additional assessment is provided to determine the effects of changes in seabed type for benthic receptors.
Spread of non-indigenous species.	Presence of structure (grillage and piles).	Benthic ecology.	An additional assessment is provided to determine the potential for spread of non-indigenous species.
Loss of access to fishing areas.	Physical presence of infrastructure.	Commercial fishers and recreational boat anglers.	Loss of fishing access due to the installation and use of the BLF was assessed in the Application. The proposed changes to the design are within the envelope of the original assessment. No further assessment is made.
Restricted access to beach frontage.	Whilst the BLF is constructed and operational, access to the beach may be restricted for fishers.	Commercial fishers and recreational anglers.	Mitigation is in place to prevent disruption to beach access (section 2.10 of this chapter). Temporary disruption due to installation and BLF deliveries is within the envelope of the Application. No further assessment is made.

d) iii) a) a) Underwater noise – Impact piling: Marine mammals

d) iii) a) a) a) Impact Magnitude

- 2.17.41 The low energy impact piling associated with the enhanced permanent BLF is assessed not to result in instantaneous Permanent Threshold Shift (PTS) or Temporary Threshold Shift (TTS) outside the standard 500m marine mammal mitigation zone at the onset of piling for harbour porpoise or seals (**Table 2.49**).
- 2.17.42 Cumulative sound exposure was predicted for pile driving two consecutive piles within 24-hours using 120kJ and 280kJ hammer energy for piles and mooring dolphins, respectively. Impact of noise with fleeing behaviour has also been assessed (parametrisation is described in **Volume 2, Appendix 22L** of the **ES** (Doc Ref. 6.3) [APP-329]). The results are presented unmitigated and with additional mitigation provided by the hydrohammer (**Table 2.49**).
- 2.17.43 The cumulative auditory PTS impact zones for harbour porpoise is predicted to be less than 25m (0ha) for both piles and mooring dolphins with, or without additional mitigation. Cumulative TTS was predicted over areas of 501ha and 5,258ha for piles and mooring dolphins, respectively. Cumulative TTS effect areas are reduced by approximately 50% to 98ha and 1,894ha for piles and mooring dolphins, respectively with the application of the hydrohammer (**Table 2.49**). The auditory effect zones are illustrated in **Volume 2, Figure 2.17.1** of this **ES Addendum**.
- 2.17.44 The corresponding TTS and PTS zones for cumulative noise exposure were predicted to be smaller for seals than for harbour porpoise with no appreciable effect areas (**Table 2.49**).
- 2.17.45 Considering the short duration of the proposed piling activity, small pile sizes, low corresponding hammer energies required for piling and relatively small scale of the work related to the installation of the enhanced permanent BLF, the expected effects are predicted to be small-scale and short-term occurring within a spatially limited area.
- 2.17.46 The magnitude of the impact is therefore considered to be *low*.

Table 2.49: Marine mammal auditory impact zones for piling activities associated with the enhanced permanent BLF with no additional mitigation and following the use of additional mitigation measures.

Pile type.	Threshold	Instantaneous		Cumulative (24-hour): fleeing.	
		Harbour porpoise.	Phocid seals.	Harbour porpoise.	Phocid seals.
No additional mitigation.					
Pile	PTS	32m	5m	0ha (<25m)	0ha (<25m)
	TTS	53m	10m	501ha (2,363m)	0ha (<25m)
Mooring dolphin.	PTS	69m	16m	0ha (25m)	0ha (<25m)
	TTS	106m	30m	5,258ha (8,657m)	0ha (<25m)
Additional mitigation.					
Pile	PTS	11m	2m	0ha (<25m)	0ha (<25m)
	TTS	24m	4m	98ha (1,051m)	0ha (<25m)
Mooring dolphin.	PTS	33m	5m	0ha (25m)	0ha (<25m)
	TTS	55m	10m	1,894ha (4,589m)	0ha (<25m)

d) iii) a) a) b) **Sensitivity**

2.17.47 The sensitivity assessment remains, as presented within **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035], with the exception of the changes described below.

2.17.48 Recovery from the effects of TTS are anticipated to remain rapid (for example 4 to 96 minutes depending on the exposure level, duration, and the TTS induced (Ref. 27). However, behavioural responses to piling can alter the local density of mobile marine mammals for a limited period.

2.17.49 Piling duration has an important bearing on harbour porpoise displacement; with longer pile driving durations leading to a longer displacement (Ref. 28). The expected number of porpoises affected during piling for the installation of the enhanced permanent BLF is likely to be low given the short duration and the fact that porpoises prefer waters

10-20km from the coast (Ref. 29). There is currently no indication that harbour porpoises are significantly affected by construction piling at the population level (Ref. 30).

- 2.17.50 Behavioural changes due to underwater noise, for example avoidance, have also been observed in harbour seals, however, they returned to the area within 2h of piling cessation (Ref. 31). Marine mammals displaced following short-term piling activities associated with the installation of this BLF are expected to return to the area shortly after the activity ceases, affording a high degree of population resilience.
- 2.17.51 It is commonly accepted that marine mammals follow the abundance and distribution of their prey, therefore, the effect of underwater noise on prey species could have indirect effects on marine mammals. **Table 2.50** presents the results of underwater noise modelling for fish with different sensitivities to underwater noise. The largest instantaneous impact range was for fish with swim bladder during the piling of mooring dolphins (i.e. 46m for mortality and recoverable injury). Thus, lethal effects on fish as prey species would present a negligible loss in the amount of prey for marine mammals. The potential for behavioural effects on fish receptors extends up to 4.2km for hearing specialists with unmitigated piling (**Table 2.51**). Behavioural responses to instantaneous noise sources do not necessarily lead to displacement but may have consequences for prey availability. Behavioural responses or displacement of prey species from these areas has the potential to temporarily affect marine mammals. However, the primary trigger for marine mammal displacement from the ensonified area is more likely to remain fleeing behaviour than changes in prey availability.
- 2.17.52 The sensitivity of marine mammal populations to underwater noise from piling at the enhanced permanent BLF is predicted to remain *medium*.
- 2.17.53 The impact of increased underwater noise resulting from piling activities for the installation of the enhanced permanent BLF is predicted to remain as a minor adverse effect on marine mammals. Effects would be short-lived and return to baseline conditions after piling activity ceases with no population level effects predicted. Effects are **not significant**. The assessment is consistent with **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035].

d) iii) a) b) Underwater noise – Impact piling: Fish

- 2.17.54 Underwater noise modelling utilised the Popper criteria (Ref. 32) applicable to piling, for fish belonging to three hearing categories (see **Volume 2, Appendix 22L of the ES**) (Doc Ref. 6.3) [APP-329].

d) iii) a) b) a) Impact Magnitude

- 2.17.55 The instantaneous and cumulative auditory effects of piling for the enhanced permanent BLF have been assessed based on the piling assumptions detailed in **Table 2.43** and results are presented unmitigated and with additional mitigation provided by the hydrohammer.
- 2.17.56 Instantaneous impact ranges are predicted to be spatially limited for all species assessed. Fish with a swim bladder, eggs and larvae would be susceptible to mortality or recoverable injury to a range of 18m from the sound source during installation of the piles reducing to 5m with the addition of mitigation measures.
- 2.17.57 Cumulative auditory effects are not predicted to cause mortality for any species. Recoverable injury is predicted for fish remaining within 50m of the sound source for the duration of piling activities, whilst TTS ranges extend to 20ha. Additional mitigation reduces the TTS range to 11ha for all species (**Table 2.50**).
- 2.17.58 During the installation of the dolphins, fish with a swim bladder, eggs and larvae would be susceptible to mortality or recoverable injury to a range of 46m from the sound source without additional mitigation and 19m with mitigation.
- 2.17.59 Cumulative auditory effects are predicted to cause mortality for hearing specialists, those that use a swim bladder for hearing, up to 3ha in the unmitigated scenario if they remain within the area for the duration of the piling. Recoverable injury is predicted for fish with a swim bladder remaining within 7ha of the sound source for the duration of the daily piling, whilst TTS ranges extend to 157ha for all species. Additional mitigation would result in reductions in the auditory effect ranges to 2h for mortality, 4ha for recoverable injury and 84ha for recoverable injury (**Table 2.50**).
- 2.17.60 In total, piling for the enhanced permanent BLF would result in eight days of impulsive noise generating activities (<17 hours including ramp-ups) during the 6-month installation period starting in August year 1.
- 2.17.61 The use of soft-start procedures would encourage the movement of fish away from the piling activity, thereby minimising the potential for cumulative auditory effects. Direct empirical evidence to support fleeing behaviour in models of fish behaviour is limited. Therefore, the assessment approaches for fish do not include assumptions of fleeing behaviour. This adds a level of precaution to the assessment of effects.
- 2.17.62 The impact magnitude is assessed as *low*.

d) iii) a) b) b) Sensitivity

- 2.17.63 In the immediate location of piling, mortality is possible. Exposure within the spatially limited zones of recoverable injury and TTS may reduce the survival and fitness of individuals, while physical and/or physiology effects may lower fitness levels until recovery. The population effects of reductions in individual fitness due to TTS are very low and TTS effects are short-term with recovery possible.
- 2.17.64 In the specific case where species are displaced from ensonified areas, mobility of the species should facilitate return to the affected areas after impact piling has ceased. Return to previously ensonified areas may be influenced by motivational state and exposure to predation. Mortality or reductions of fitness of eggs and larvae is not considered to be significant given the small area of impacts and the naturally high losses to natural mortality at this early life history stage of fish.
- 2.17.65 The sensitivity of fish receptors to impact piling for the enhanced BLF is predicted to remain *low*.
- 2.17.66 Minor adverse effects are predicted for fish receptors. Effects are **not significant**
- 2.17.67 Changes to piling parameters warranted additional modelling, however, effects remain consistent with **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035].

Table 2.50: Fish auditory impact zones for piling activities associated with the enhanced permanent BLF with no additional mitigation and following the use of additional mitigation measures.

Pile type.	Hearing category.	Threshold	No additional mitigation	Additional mitigation.		
				Cumulative (no fleeing).	Instantaneous	Cumulative (no fleeing).
Piles	(1) Fish with swim bladder to aid hearing.	Mortality	18m	0ha (<50m)	5m	0ha (<50m)
		Recoverable injury.	18m	0ha (50m)	5m	0ha (<50m)
		TTS		20ha (363m)		11ha (299m)
	(2) Fish with swim bladder that does not aid hearing.	Mortality	18m	0ha (<50m)	5m	0ha (<50m)
		Recoverable injury.	18m	0ha (50m)	5m	0ha (<50m)
		TTS		20ha (363m)		11ha (299m)
	(3) Fish without a swim bladder.	Mortality	8m	0ha (<50m)	3m	0ha (<50m)
		Recoverable injury.	8m	0ha (50m)	3m	0ha (<50m)
		TTS		20ha (363m)		11ha (299m)

Pile type.	Hearing category.	Threshold	No additional mitigation	Additional mitigation.		
				Cumulative (no fleeing).	Instantaneous	Cumulative (no fleeing).
Mooring dolphins.	(1) Fish with swim bladder to aid hearing.	Mortality	46m	3ha (111m)	19m	2ha (111m)
		Recoverable injury.	46m	7ha (206m)	19m	4ha (158m)
		TTS		157ha (1,245m)		84ha (802m)
	(2) Fish with swim bladder that does not aid hearing.	Mortality	46m	2ha (111m)	19m	1ha (70m)
		Recoverable injury.	46m	7ha (206m)	19m	4ha (158m)
		TTS		157ha (1,245m)		84ha (303m)
	(3) Fish without a swim bladder.	Mortality	27m	0ha (<25m)	8m	0ha (<25m)
		Recoverable injury.	27m	0ha (<25m)	8m	0ha (<25m)
		TTS		157ha (1,245m)		84ha (303m)

d) iii) a) b) c) Fish Behaviour: Migration and Prey Availability

- 2.17.68 Behavioural response thresholds have not been formally assigned and assessment thresholds are based on behavioural responses to instantaneous noise sources reported in the literature. As such, they are subject to a lower degree of confidence than established criteria for injury and auditory damage assessments (**Volume 2 Chapter 22, Appendix 22L**) (Doc Ref. 6.3) [APP-329]). The applied threshold for behavioural effects are based on observations of a startle response in sprat (135 dB re 1 $\mu\text{Pa}^2\text{s}$) and in mackerel (142 dB re 1 $\mu\text{Pa}^2\text{s}$) reported in the literature (Ref. 33).
- 2.17.69 The sound contour for the instantaneous thresholds is presented in **Table 2.51**. The inshore position of the enhanced permanent pier piles⁴ results in a reduced spatial extent of the behavioural contour than originally assessed in **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035]. The potential for behavioural responses in hearing specialists, such as sprat, extends up to 4.2km from the sound source for mooring dolphins and 2km for piles. Additional mitigation reduces the extent of the worst-case behaviour effect contour to a maximum of 3.3km from the source for dolphins and 1.5km for piles (**Table 2.51**).
- 2.17.70 The effects of behavioural responses may have consequences for distribution, foraging, and survival of selected fish species. Underwater noise from piling, may cause localised behavioural responses in prey species and changes in swimming behaviour. Such behavioural responses are likely to be short-lived and do not necessarily lead to the displacement from the whole ensonified area. The population level effects of startle responses remain unresolved and the assessment is applied as a precautionary tool. For example, sprat responses were observed during daylight hours during periods of schooling but not at night (Ref. 33).
- 2.17.71 The potential for behavioural responses due to impact piling is predicted to remain as a minor adverse effect on the availability of fish as prey items for designated species or fisheries resources. Additional mitigation has the potential to minimise the impacted areas. The short duration of the effects and alternative foraging areas available indicate effects would be **not significant**.
- 2.17.72 Shads, eel, salmonids, smelt and lampreys are migratory species. The potential for coastal noise has the potential to cause migratory barriers should piling coincide with periods of migratory behaviour. However, the total duration of impulsive underwater noise from piling is anticipated to be short-term consisting of 16 events lasting, in-combination, a total of

⁴ In the DCO Application all piles were modelled from the point of the deepest dolphin as piling parameters were consistent for piles and smaller diameter dolphins.

approximately 17 hours over a 6-month installation period (or < 2.2 hours in a given day of piling). As such, the impacts represent a very small proportion of the migratory period described in **Volume 2, Chapter 22** of the **ES** (Doc Ref 6.3) [AS-035]. Displaced species would be able to return to the ensonified area and no barriers to migration are anticipated. Fish in active migration may not avoid the ensonified area, in which case the mortality, recoverable injury and TTS areas would be the same as for the assessments described in **Table 2.50**.

Table 2.51: Behavioural impact zones for impact piling for the enhanced permanent BLF, based on startle response observations in sprat and mackerel.

Pile type.	Threshold	Indicative hearing groups.	Behavioural range.
Unmitigated			
Piles (120kJ).	135dB re 1 $\mu\text{Pa}^2\text{s}$	Sprat: hearing specialists.	456ha (1,991m)
	142dB re 1 $\mu\text{Pa}^2\text{s}$	Mackerel: hearing generalists.	82ha (787m)
Mooring Dolphins (280kJ).	135dB re 1 $\mu\text{Pa}^2\text{s}$	Sprat: hearing specialists.	2,019ha (4,184m)
	142dB re 1 $\mu\text{Pa}^2\text{s}$	Mackerel: hearing generalists.	632ha (2,283m)
Additional mitigation.			
Piles (120kJ).	135dB re 1 $\mu\text{Pa}^2\text{s}$	Sprat: hearing specialists.	234ha (1,464m)
	142dB re 1 $\mu\text{Pa}^2\text{s}$	Mackerel: hearing generalists.	46ha (519m)
Mooring Dolphins (280kJ).	135dB re 1 $\mu\text{Pa}^2\text{s}$	Sprat: hearing specialists.	1206ha (3,280m)
	142dB re 1 $\mu\text{Pa}^2\text{s}$	Mackerel: hearing generalists.	358ha (1778m)

d) iii) a) c) Underwater noise – Impact piling: Benthic ecology

d) iii) a) c) a) Impact Magnitude

2.17.73 Benthic invertebrates are expected to be sensitive to particle motion and sediment-borne vibration rather than sound pressure changes (Ref. 34). There are currently no published sound pressure thresholds for benthic invertebrates and fish without a swim bladder that ‘hear’ by particle motion detection (Ref. 32) are used as a proxy to estimate the effect areas.

- 2.17.74 The threshold for potential mortality or recoverable injury would be exceeded within 8m of the source for piles and within 27m of the source for mooring dolphins. Additional mitigation measures would reduce the mortality or recoverable injury areas to 3m and 8m from the source for piles and mooring dolphins, respectively (**Table 2.50**). However, each equates to an area of <0.1ha. A total of 12 piles and four mooring dolphins are expected to be installed consecutively (up to two piles or mooring dolphins per day) over eight days within the 6-month installation period of the enhanced permanent BLF (**Table 2.37**).
- 2.17.75 Despite the very limited spatial area in exceedance of thresholds for mortality or recoverable injury and the short duration of the pressure, impact magnitude is precautionarily assessed as *low* due to the required use of proxy thresholds to indicate exposure to the pressure.
- d) iii) a) c) b) *Sensitivity*
- 2.17.76 Benthic invertebrates at all life stages would be exposed to noise and sediment-borne vibration caused by piling associated with the installation of the enhanced permanent BLF (refer to **Volume 2, Appendix 22C** of the **ES**) (Doc Ref. 6.3) [APP-320].
- 2.17.77 Very little evidence is available on the sensitivity of benthic invertebrates to anthropogenic noise and vibration. But, given the small spatial scale of the pressure and wide distributions of receptor benthic invertebrate taxa within the GSB and southern North Sea (**Volume 2, Appendix 22C** of the **ES**) (Doc Ref 6.3) [APP-320], the capacity for population-level effects due to direct mortality remains very limited.
- 2.17.78 Behavioural alterations could potentially occur over a larger area than the area where mortality or injury are predicted. However, as the ability of crustaceans to detect particle motion appears to be five orders of magnitude weaker than in fish (Ref. 32) any effects would likely be limited.
- 2.17.79 As mortality would be restricted to a very small area while any population-level effects of behaviour alterations are uncertain but likely to be small, benthic invertebrates are precautionarily assessed as having *low* sensitivity to noise and sediment-borne vibration caused by piling associated with the installation of the enhanced permanent BLF.
- 2.17.80 A minor adverse effect is predicted to remain for benthic ecology receptors. The effect is **not significant**.

d) iii) a) d) Underwater noise – Impact piling: Zooplankton

d) iii) a) d) a) Impact Magnitude

2.17.81 As with the assessment for benthic invertebrates (see assessment above), published sound pressure thresholds for fish without a swim bladder that ‘hear’ by particle motion detection (Ref. 32) are used as a proxy to estimate the areas in which zooplankton could experience mortality or recoverable injury due to noise caused by piling associated with the installation of the enhanced permanent BLF. The potential effects of any behavioural responses to noise are considered in the sensitivity assessment.

2.17.82 Impact magnitude remains *low*, reflecting the very small area in exceedance of thresholds for mortality or recoverable injury (<0.1ha for the installation of piles and mooring dolphins; **Table 2.50**) and the short duration of the pressure (8 days over the 6-month installation period; **Table 2.45**).

d) iii) a) d) b) Sensitivity

2.17.83 The sensitivity assessment is focused on invertebrates that are part of the zooplankton throughout their life cycle. Noise effects on ichthyoplankton and planktonic life stages of benthic invertebrates are considered in the fish and benthic ecology assessments, respectively.

2.17.84 It is precautionarily assumed that mortality or injury would occur in zooplankton within the area that exceeds the relevant threshold for fish without a swim bladder, i.e. <0.1ha. Behavioural alterations may occur over a larger area and are most likely in crustaceans, as evidence suggests that this group can detect particle motion (Ref. 34). However, the ability to detect particle motion appears to be five orders of magnitude weaker in crustaceans than in fish (Ref. 34). Therefore, any behaviour alterations are likely to be limited and have little effect at the population level.

2.17.85 As mortality and injury would be restricted to a very small area (<0.1ha), while any behavioural effects that may occur over a larger area are uncertain but likely to be small, zooplankton are precautionarily assessed as having *low* sensitivity to noise caused by piling associated with the installation of the enhanced permanent BLF.

2.17.86 A minor adverse effect is predicted to remain for zooplankton receptors. The effect is **not significant**.

d) iii) a) e) Physical change to another seabed type: Benthic ecology

d) iii) a) e) a) Impact Magnitude

- 2.17.87 The installation of grillage, additional piles and larger mooring dolphins would result in further change in seabed type from soft sediment (fine to medium sand) to a hard surface. Benthic species with preferences for soft or hard substrate would therefore be affected by this change in sediment type.
- 2.17.88 Changing the seabed from a soft sediment habitat to a hard surface constitutes a large amount of change based on the Marine Evidence-Based Sensitivity Assessment benchmark threshold for changes in EUNIS classification (change in sediment type by one Folk class). The spatial extent of habitat change is very small (0.3ha) in relation to the area of the GSB (>4,000ha). The grillage is also due to be removed at the end of the construction period. Approximately 0.003ha of seabed would be subject to permanent change due to the installation of piles and mooring dolphins.
- 2.17.89 The impact magnitude remains *low*.
- d) iii) a) e) b) Sensitivity
- 2.17.90 The benthic invertebrates inhabiting the area where the grillage and piles would be installed would have been largely removed by dredging prior to installation. Due to vessel activity and maintenance dredging, the original assessment considered that full community recovery would not occur during the construction phase (**Volume 2, Chapter 22 of the ES**) (Doc Ref. 6.3) [AS-035]. Therefore, it is unlikely that any additional effect could occur as a result of the grillage and piles installation.
- 2.17.91 While the area within the footprint of grillage and piles would no longer be able to support soft sediment invertebrates following installation, species that prefer hard surfaces and were previously absent or rare would be able to colonise. Capacity to colonise the grillage would however be limited by regular grounding of vessels on the surface.
- 2.17.92 As benthic invertebrate taxa within the footprint of the enhanced BLF would have already been lost due to other activities, this receptor is deemed to be *not sensitive* to this pressure. The potential for the hard substrate to influence colonisation by INNS is considered further below.
- 2.17.93 Given the small extent of the change of the seabed type, a negligible effect on benthic receptors is predicted. The effect is **not significant**.

d) iii) a) f) Spread of non-indigenous species: Benthic ecology

d) iii) a) f) a) Impact Magnitude

2.17.94 Additional piles, larger mooring dolphins, and the installation of a grillage would introduce hard substrata to an area consisting primarily of soft sediments. This change could facilitate the spread of benthic INNS that prefer hard habitats and have detrimental effects on indigenous species.

2.17.95 The total surface area available to INNS after the installation of the enhanced permanent BLF increases from 0.003ha in the original assessment to 0.3ha in the subtidal zone, mostly due to the presence of the grillage on the seabed. In the intertidal, the area increases from 0.007ha to 0.010ha.

2.17.96 The total area potentially available for colonisation after the installation of the new BLF is approximately 0.3ha, which remains below the Marine Evidence-Based Sensitivity Assessment pressure benchmark for colonisation (1ha) (Ref. 35).

2.17.97 The impact magnitude is *low*.

d) iii) a) f) b) Sensitivity

2.17.98 The introduction of hard substrata to a soft sediment environment is typically followed by rapid colonisation by fouling organisms (**Volume 2, Chapter 22** of the **ES**) (Doc Ref 6.3) [AS-035].

2.17.99 Subtidal benthic invertebrates are precautionarily assessed as having *low* sensitivity to this pressure. This reflects the composition of the subtidal fouling community in the GSB and the limited effects of documented INNS expansion on indigenous communities in the North Sea.

2.17.100 While artificial hard substrates in the intertidal zone may be particularly susceptible to INNS colonisation, the absence of natural hard substrates in the intertidal zone of the GSB means that there is very limited capacity for the introduction of artificial hard substrates to affect the broader intertidal benthic ecology in the area. However, the possibility of the physical structure acting as a steppingstone for further geographical spread is again noted. Intertidal benthic invertebrates are deemed to have *low* sensitivity to this pressure.

2.17.101 As impact magnitude is low and both subtidal and intertidal benthic invertebrates have low sensitivity to this pressure, the spread of INNS due to the presence of the enhanced BLF is predicted as having a minor adverse effect on benthic receptors during the construction phase. The effect is **not significant**.

d) iii) b) Operational phase

2.17.102 This section considers the pressures associated with operational dredging of the enhanced permanent BLF. **Table 2.52** summarises the pressures that have changed due to the proposed change.

2.17.103 With the exception of dredging, there are no new or different significant operational effects to marine ecology and fisheries receptors as a result of the enhanced permanent BLF, in comparison with **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035].

Table 2.52: Pressures associated with the enhanced permanent beach landing facility activities during the operational phase.

Pressure	Activity resulting in Pressure.	Receptors	Updated Assessment.
Changes in suspended sediments.	Capital dredging for the grounding pocket.	Plankton Benthic ecology Fish Marine mammals.	The advancement of the BLF by 16m in comparison to the ES means more of the longshore bar will need to be removed. This is not necessary during the construction phase due to the installation of the grillage.
Sedimentation rate changes.	Capital dredging for the grounding pocket.	Plankton Benthic ecology Fish	The dredge volume estimate would be double the volume assessed in the Application (Table 2.42), therefore additional assessments are required.
Underwater noise.	Dredging (continuous noise source).	Fish Marine mammals.	Operational dredging would be infrequent but the duration of each event would increase. Dredging in the Application was based 24-hour operations and represents the worst-case cumulative noise scenario. Effects are within the envelope of the assessment presented within the ES. No further assessment.

d) iii) b) a) Change in suspended sediment – dredging: Plankton

d) iii) b) a) a) Impact Magnitude

2.17.104 Operational phase deliveries of AILs to the enhanced permanent BLF would require an initial maintenance dredge to create a grounding pocket and allow navigation access over the longshore bar. The BLF would be in use for a few weeks at a time during which period maintenance dredging may be required. The changes in the dredge parameters are described in detail in **section 2.17c)**.

2.17.105 A near doubling in dredge volume is anticipated based on the current bathymetry. This would result in instantaneous SSC plumes of 100mg/l

above background over an area of several hundred hectares (compared to 83ha in the Application). In close proximity to the dredge area, SSC may exceed 1,000mg/l above ambient during dredging activities over tens of hectares (compared to 6ha in the Application).

2.17.106 The duration of the plume will be short-lived and return to baseline concentrations within days of dredging ceasing. Dredging would be infrequent, occurring every 5-10 years during the operational phase. Low volume maintenance dredging may occur at weekly frequency for the few weeks the BLF is in use.

2.17.107 The extent of the plume would be greater than assessed in the Application. However, due to the short-term duration of the activity and the temporary nature of the plume, impact magnitude is assessed as *medium*.

d) iii) b) a) b) Sensitivity of phytoplankton

2.17.108 Phytoplankton may be affected by dredging due to light limitation (**Volume 2, Chapter 22** of the **ES**) (Doc Ref 6.3) [AS-035]. The short duration of dredging activity (days) and temporary nature of the resulting SSC plume indicate that small declines in primary productivity may occur. Recovery would be rapid following cessation of the dredging activity. The sensitivity of phytoplankton to increases in SSC due to dredging is therefore assessed as *low*.

2.17.109 Increased SSC resulting from dredging activities is predicted to have a minor adverse effect on phytoplankton receptors. The effect is **not significant**.

d) iii) b) a) c) Sensitivity of zooplankton

2.17.110 Many species of zooplankton live in turbid environments and are adapted to a wide range of SSC (Ref. 36).

2.17.111 The sensitivity of zooplankton to increases in SSC is likely to be species specific and can depend on natural food availability. Reductions in feeding rates and fecundity may occur in sensitive taxa. However, the baseline conditions within the GSB mean zooplankton are adapted to large daily and seasonal changes in SSC.

2.17.112 The short duration of dredging activity (days) and temporary nature of the resulting SSC plume mean reductions in fitness are likely to be indiscernible at the population level, while high natural fecundity and exchange with the wider southern North Sea afford a high degree of resilience. Therefore, the sensitivity of zooplankton populations to increases in SSC due to dredging events is predicted to be *low*.

2.17.113 The impact of increased SSC resulting from dredging activities is predicted to have a minor adverse effect on zooplankton receptors. The effect is **not significant**.

d) iii) b) b) Change in suspended sediment – dredging: Benthic ecology

d) iii) b) b) a) Impact Magnitude

2.17.114 There is an increased amount of change in suspended sediment in comparison to the ES (see **section 2.17c**) of this chapter), however, due to the short-term duration of the activity and the temporary nature of the plume, the impact magnitude remains *medium*.

d) iii) b) b) b) Sensitivity

2.17.115 Organisms that filter their food from the water column are potentially vulnerable to changes in SSC. The focus of the assessment is therefore placed on benthic invertebrates that are suspension-feeders as adults (up to 20% of infaunal and epifaunal organisms within the GSB) and those that have planktonic larvae that feed in the water column ('planktotrophic' larvae; up to 90% of infaunal organisms and almost 100% of epifaunal organisms). Most benthic invertebrate taxa in the area predicted to be exposed to changes in SSC are not suspension-feeders as adults and are therefore assumed to be *not sensitive* to increases in SSC during the adult life-stage.

2.17.116 Given the unlikelihood of an adverse response to the pressure (**Volume 2, Chapter 22** of the **ES**) (Doc Ref. 6.3) [AS-035], adult suspension-feeding benthic invertebrates are assessed as being *not sensitive* to elevated SSC associated with navigational dredging for the BLF.

2.17.117 There is no clear evidence that planktotrophic larvae would be adversely affected by elevated SSC associated with navigational dredging for the BLF and this receptor sub-group is deemed *not sensitive*.

2.17.118 *Sabellaria spinulosa* reefs are present on Coralline Crag outcrops in the GSB. *S. spinulosa* reefs are often found in areas of high turbidity, including the immediate vicinity of aggregate dredging sites where sediment plumes are common (Ref. 37). Therefore, any effects of elevated SSC on suspension-feeding by *S. spinulosa* do not appear to be a major factor limiting reef distribution. On the contrary, *S. spinulosa* relies on a supply of suspended solids to build tubes that form the reef structure, and tube erosion occurs when the supply is insufficient (Ref. 38). Models from the Severn Estuary suggest that the optimal SSC concentrations for a closely related species (*S. alveolata*) range from

~500 to 900mg/l during neap tides to ~850 to 1,600mg/l during spring tides 33). Specific modelling results for the SSC induced by navigational dredging has not been completed so the plume concentrations at the point of the *S. spinulosa* reefs are not available, however, inshore daily maximum background SSC is 609 mg/l at 0.3 m above the seabed (**Table 2.41**) and SSC plumes are predicted to be moderate in relation to background conditions in the inshore area where *S. spinulosa* reef is known to be present. Reef building by *S. spinulosa* is hence unlikely to be impeded, and may even be enhanced, by changes in SSC associated with navigational dredging for the BLF. The SSC plume is not expected to overlap the offshore Coralline Crag outcrops where *S. spinulosa* reef has also been observed.

2.17.119 *Sabellaria spinulosa* reef is unlikely to be adversely affected by elevated SSC associated with navigational dredging for the BLF (the effect may be positive), this receptor is assessed as *not sensitive*.

2.17.120 As impact magnitude is assessed as *medium* and all benthic ecology receptors are *not sensitive* to this pressure, changes in SSC associated with operation phase dredging for the enhanced permanent BLF is predicted to have a minor adverse effect on this receptor (and potentially minor beneficial effect for *S. spinulosa* reefs). The effect is **not significant**.

d) iii) b) c) Change in suspended sediment – dredging: Fish

d) iii) b) c) a) Impact Magnitude

2.17.121 There is an increased amount of change in suspended sediment in comparison to the ES (see **section 2.17c**) of this chapter), however, due to the short-term duration of the activity and the temporary nature of the plume, the impact magnitude remains *medium*.

d) iii) b) c) b) Sensitivity

2.17.122 **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035] assessed the impact of increased suspended sediment from dredging on different fish receptors. Effects on juvenile fish and adults may differ and can be lethal and sub-lethal depending on the concentration and exposure time.

2.17.123 At the highest SSC, egg/larvae mortality may occur, however, such localised losses are minimal compared to natural mortality. A very small part of the spawning or nursery grounds for demersal species would be impacted.

- 2.17.124 The sensitivity of demersal fish and elasmobranch eggs/ egg cases and larvae to increases in suspended sediment from dredging, is predicted to be *low*.
- 2.17.125 Pelagic fish eggs and larvae are predicted to be *not sensitive* to operational dredge SSC plumes due to negligible losses relative to high levels of natural mortality.
- 2.17.126 Adult stages of key epibenthic and demersal species in the GSB including Dover sole, dab, plaice, flounder, gobies, thornback ray, whiting, seabass, and thin-lipped mullet are exposed to naturally elevated suspended sediments through wave and tidal action. Species with a benthic association are typically more resistant with evidence of lethal effects at concentrations > 1g/l (Ref. 40). Such concentrations would only occur in the immediate location of dredging activities. The natural daily fluctuations in SSC benthic associated species are exposed to in shallow subtidal areas of the GSB (**Table 2.41**) suggest they would have high resistance to changes in SSC from dredging activities. There is a possibility that physiological and/or behavioural responses including localised displacement to areas away from the plume may change species distribution locally and increase energy expenditure. The impact is infrequent and short lived, demersal fish are expected to have *low* sensitivity to operational dredging.
- 2.17.127 Pelagic fish including filter feeding species and the clupeids are less resistant to SSC (**Volume 2, Chapter 22** of the **ES**) (Doc Ref. 6.3) [AS-035]. The least tolerant species may incur mortality is exposed to concentrations <1g/l (Ref. 40). Exposure to the highest concentrations would be spatially limited areas and effects are most likely to be sublethal or behavioural. Avoidance behaviours may cause local displacement and increases in energy expenditure. However, impacts are short lived and infrequent. Mobile pelagic species would be able to return following the impact. Pelagic fish are predicted to have *low* sensitivity to operational dredging for the enhanced permanent BLF.
- 2.17.128 Suspended sediment plumes from the enhanced permanent BLF are highly unlikely to cause lethal effects in mobile species. Migratory species are precautionarily assessed as having *low* sensitivity to operational dredging for the enhanced permanent BLF.
- 2.17.129 Increases in suspended sediments due to operational dredging for the enhanced permanent BLF is predicted to have a minor adverse effect on fish receptors. Effects are **not significant**.

d) iii) b) c) c) Indirect effects of localised displacement

2.17.130 The avoidance of fish to sediment plumes, notably pelagic species, would be influenced by factors such as motivation, mobility and condition of the fish. Fish within the GSB would be acclimated to a highly variable natural SSC baseline.

2.17.131 Fish may exhibit limited movements away from the areas of highest SSC, remaining in proximity to the plume and utilising the area once the plume dissipates. Localised and temporary displacement of sensitive taxa may occur. No significant changes in the availability of fish as prey items for designated features and as fisheries resources are predicted.

d) iii) b) d) Change in suspended sediment – dredging: Marine mammals

d) iii) b) d) a) Impact Magnitude

2.17.132 Operational dredging for the enhanced permanent BLF is anticipated to cause increases in SSC by 100mg/l above background at the scale of several hundred hectares. Marine mammals at Sizewell have wide foraging ranges. The temporary impact of increases in SSC represents a very small proportion of the foraging range of harbour porpoise and significant changes in the availability of fish as prey items due to SSC generated during operational dredging for the enhanced permanent BLF is not predicted.

2.17.133 The magnitude of the impact is *low*.

d) iii) b) d) b) Sensitivity

2.17.134 Harbour porpoise and seals are well adapted to existence in turbid coastal waters (Ref. 41). Marine mammals are *not sensitive* to increases in SSC associated with operational dredging for the enhanced permanent BLF.

2.17.135 Increases in suspended sediments due to operational dredging for the enhanced permanent BLF is predicted to have a negligible effect on marine mammal receptors. Effects are **not significant**.

2.17.136 Underwater noise effects on marine mammals due to dredging would occur simultaneously and are assessed within **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035]. The Application considered worst-case 24-hour dredging operations for underwater noise assessments which envelope the proposed change to the permanent BLF. As such the effects of dredging noise are consistent with the Application.

d) iii) b) e) Sedimentation rate change – dredging: Zooplankton

d) iii) b) e) a) Impact Magnitude

2.17.137 The changes in the dredge parameters would result in increases in sedimentation in shallow subtidal areas. However, high resuspension rates and limited areas of ecologically relevant impacts for zooplankton receptors predicted in the modelling within **Volume 2, Appendix 22J** of the **ES** (Doc 6.3) [APP-327] are expected to remain following the change to the enhanced permanent BLF dredge parameters.

2.17.138 Impact magnitude is assessed as *low*.

d) iii) b) e) b) Sensitivity

2.17.139 Deposition of sediment suspended by dredging can cause smothering and burial of animals associated with the seabed or change the sediment characteristics (**Volume 2, Chapter 22** of the **ES**) (Doc 6.3) [AS-035].

2.17.140 Smothering may affect zooplankton that spend some or all of their life cycle on or near the seabed. In close proximity to dredging activities, sedimentation may be sufficient to cause localised mortality. However, zooplankton are likely to be resistant to sedimentation levels predicted throughout much of the impacted area. Any losses would be expected to recover quickly due to the short duration of the dredging activities and the ability of the species to recolonise. Therefore, the sensitivity of zooplankton populations to increases in sedimentation due to the dredging activities is assessed as *low*.

2.17.141 Sediment deposition following dredging for the BLF is predicted to have a minor adverse effect on zooplankton receptors. The effect is **not significant**.

d) iii) b) f) Sedimentation rate change – dredging: Benthic ecology

d) iii) b) f) a) Impact Magnitude

2.17.142 Sediment suspended by plough dredging and dispersed by ambient flows would subsequently be deposited onto the seabed. Sediment deposition due to plough dredging has the potential to affect benthic invertebrates by smothering.

2.17.143 Localised heavy sedimentation is likely to increase but a relatively small area would be impacted and tidal resuspension would limit sediment accumulation. The changes in the dredge parameters are described in detail in **section 2.17c**).

- 2.17.144 The impact magnitude was predicted to be *low* in **Volume 2 Chapter 22** of the **ES** (Doc Ref 6.3) [AS-035], however, it is assessed as *medium* for the enhanced permanent BLF on a precautionary basis.
- d) iii) b) f) b) Sensitivity
- 2.17.145 Benthic invertebrates are grouped for assessment according to their mobility – high-mobility (mobile) vs. low-mobility (sessile) – which is an important trait for determining the ability of an organism to resurface and avoid smothering following sediment deposition.
- 2.17.146 Highly mobile benthic invertebrate species within the GSB (e.g. the brown crab, common lobster, brown shrimp and pink shrimp) are assumed to be able to resurface during sedimentation and/or migrate away from the affected area. Mortality as a result of smothering is therefore considered unlikely and mobile benthic invertebrates are assessed as being *not sensitive* to this pressure.
- 2.17.147 Smothering due to sediment deposition is more likely to affect benthic invertebrates with low mobility (refer to **Volume 2, Chapter 22** of the **ES** (Doc Ref 6.3) [AS-035]).
- 2.17.148 The key taxa and broader benthic invertebrate community that would be exposed to changes in sedimentation rates are widely distributed within the GSB and the wider region (**Volume 2, Appendix 22C** of the **ES**) (Doc Ref. 6.3) [APP-320]). Therefore, only a small proportion of any benthic invertebrate population would be exposed to this pressure.
- 2.17.149 If populations of any sessile/low mobility benthic invertebrates are affected by sedimentation associated with dredging for the enhanced permanent BLF, then recovery would be facilitated by most species having pelagic eggs and pelagic (planktotrophic or lecithotrophic) larvae (**Volume 2, Appendix 22C** of the **ES**) (Doc Ref. 6.3) [AS-035].
- 2.17.150 As only a small proportion of any benthic invertebrate population would be exposed to elevated sedimentation rates and the most sensitive taxa (e.g. *M. edulis*) show a degree of tolerance to this pressure, sessile/low mobility benthic invertebrates are assessed as having *low* sensitivity to increases in sedimentation.
- 2.17.151 *Sabellaria spinulosa* reef associated with Coralline Crag outcrops in the GSB (Ref. 42) could potentially be affected by increases in sedimentation rates resulting from navigational dredging for the BLF. Given the ability of *S. spinulosa* to withstand heavier and more prolonged sedimentation than would be associated with dredging for the enhanced permanent BLF, it is unlikely that reef habitat would be adversely affected by this pressure. The offshore area of Coralline Crag where *S. spinulosa* reef has been

observed would not experience sediment deposition as a result of dredging for the enhanced permanent BLF. *S. spinulosa* reef is therefore deemed *not sensitive* to this pressure.

- 2.17.152 As impact magnitude is precautionarily set as *medium* and the sensitivity of benthic ecology sub-receptors range from *not sensitive* to *low* sensitivity, sedimentation rate changes associated with dredging for the enhanced permanent BLF is predicted to have a minor adverse effect on benthic receptors. The effect is **not significant**.

d) iii) b) g) Sedimentation rate change – dredging: Fish

d) iii) b) g) a) Impact Magnitude

- 2.17.153 The changes in the dredge parameters would result in increases in sedimentation in shallow subtidal areas. However, high resuspension rates and limited areas of ecologically relevant impacts for fish receptors predicted in the modelling within **Volume 2, Appendix 22J** of the **ES** (Doc Ref. 6.3) [APP-327] are expected to remain following the change to the enhanced permanent BLF dredge parameters.

- 2.17.154 The magnitude of the impact is *low*.

d) iii) b) g) b) Sensitivity

- 2.17.155 Adult fish are predicted to be *not sensitive* to the impact of light levels of increased suspended sediment predicted from operational dredging for the enhanced permanent BLF. Juveniles and benthic eggs or egg cases have the potential to incur mortality due to smothering in close proximity to the dredge activity (tens of hectares), however high resuspension would limit mortality and losses would be small relative to natural mortality. Eggs and larval stages of fish receptors are precautionarily assessed as having *low* sensitivity to operational dredging for the enhanced permanent BLF.

- 2.17.156 Increases in sedimentation due to operational dredging for the enhanced permanent BLF is predicted to have a minor adverse effect on fish receptors. Effects are **not significant**.

e) Updated assessment – temporary BLF (**Change 2**)

e) i) Baseline

- 2.17.157 The proposed change does not change the existing and future baseline for marine ecology and fisheries receptors as described in **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035].

e) ii) Environmental Design and Mitigation

2.17.158 The environment design and mitigation for the temporary BLF is consistent with the mitigation of the enhanced permanent BLF summarised in **section 2.17c)ii).**

e) iii) Assessment of effects

2.17.159 This section details the effects associated with the temporary BLF that were not assessed as part of **Volume 2, Chapter 22** of the **ES** (Doc Ref 6.3) [AS-035].

2.17.160 Effects are described for the installation of the temporary BLF, its usage during the construction phase and removal.

e) iii) a) Construction phase

2.17.161 **Table 2.53** details the pressures associated with the installation and construction phase use of the temporary BLF.

Table 2.53: Pressures associated with the temporary beach landing facility activities during the construction phase.

Pressure	Activity resulting in pressure.	Receptors	Updated Assessment
Underwater noise.	Impact piling (impulsive noise source).	Plankton Benthic ecology Fish Marine mammals.	Piling parameters for the temporary BLF are described in Table 2.45 . The results of underwater noise assessments are provided in this section
	Vessel traffic (continuous noise source).	Fish Marine mammals.	An assessment of increased vessel traffic is provided in this section
Visual disturbance.	Activities for the BLF installation and usage during the construction phase.	Marine mammals.	An assessment of visual disturbance due to the installation and use of the temporary BLF is provided in this section.
Changes in wave exposure.	Presence of structure.	Benthic ecology.	Presence of the temporary BLF in the shallow subtidal zone would affect local wave exposure. The effect on benthic ecology receptors is assessed further.
Physical change to another seabed type.	Presence of structure.	Benthic ecology.	The pile parameters for the temporary BLF are described in Table 2.45 . The change in seabed type as a result of the installation of piles is assessed.
Spread of non-indigenous species.	Presence of structure.	Benthic ecology.	The pile parameters for the temporary BLF are described in Table 2.45 . The potential for spread of non-indigenous

Pressure	Activity resulting in pressure.	Receptors	Updated Assessment
			species as a result of the installation of piles is assessed.
Loss of access to fishing areas.	Installation and physical presence of infrastructure.	Commercial fishers (potters, netters, trawlers and long-liners).	The installation and presence of the temporary BLF has the potential to affect access to fishing areas. Effects on local commercial fishing is assessed further.
Restricted access to beach frontage.	Whilst the BLF is constructed and operational, access to the beach may be restricted for fishers.	Commercial fishers and recreational anglers.	Mitigation is in place to prevent disruption to beach access (section 2.10 of this chapter) Temporary disruption due to installation and BLF deliveries is within the envelope of the original DCO Application. No further assessment is made.

e) iii) a) a) Underwater noise – Impact piling: Marine mammals

e) iii) a) a) a) Impact Magnitude

2.17.162 Without additional mitigation, maximum instantaneous TTS and PTS auditory effect ranges are estimated to be 169m and 93m respectively for harbour porpoise during piling of mooring dolphins. The additional mitigation in a form of a hydrohammer reduces the impacts. TTS and PTS auditory effect ranges are estimated to be 68m and 31m respectively during piling of mooring dolphins (**Table 2.54**).

2.17.163 The cumulative auditory PTS impact zones for harbour porpoise was predicted to be 25m (0ha) for both piles and mooring dolphins with and without additional mitigation. Cumulative TTS was predicted 441ha and 3,761ha for unloading platform piles and mooring dolphins, respectively without additional mitigation, reducing to 94ha and 1,451ha for unloading platform piles and mooring dolphins, respectively with mitigation (**Table 2.54**).

2.17.164 Seal auditory impacts zones were considerably smaller with instantaneous ranges not exceeding 10m in any of the assessment scenarios and cumulative effects <25m (**Table 2.54**).

2.17.165 All the scenarios modelled for instantaneous TTS and PTS have impact ranges well within the 500m, which falls within the standard mitigation zone as per JNCC guidance (Ref. 25). A draft marine mammal mitigation plan (MMMP) was submitted as part of the Application, provided in **Volume 2, Appendix 22N** of the **ES** (Doc Ref. 6.3) [APP-331]. The draft MMMP will be amended to encompass relevant updates concerning the

new temporary BLF (i.e. piling specifications, the results of modelling and mitigation measures).

2.17.166 The magnitude of the impact of underwater noise from piling for the temporary BLF on marine mammals is *low*.

e) iii) a) a) b) Sensitivity

2.17.167 Sensitivity is the same as defined for the enhanced BLF is **section 2.17d) iii))** of this chapter, i.e. *medium*.

2.17.168 The impact of increased underwater noise resulting from piling activities for the installation of the temporary BLF is predicted to have a **minor** adverse effect on marine mammals. Effects would be short-lived and return to baseline conditions after piling activity ceases with no population levels effects predicted. Effects are **not significant**.

Table 2.54: Marine mammal auditory impact zones for piling activities associated with the temporary BLF with no additional mitigation and following the use of a additional mitigation measures.

Pile type.	Threshold	Instantaneous		Cumulative (24-hour): fleeing.	
		Harbour porpoise.	Phocid seals.	Harbour porpoise.	Phocid seals.
No additional mitigation.					
Unloading platform piles.	PTS	30m	5m	0ha (25m)	0ha (25m)
	TTS	66m	8m	441ha (1,856m)	0ha (25m)
Mooring dolphin.	PTS	93m	2m	0ha (25m)	0ha (25m)
	TTS	169m	4m	3,761ha (7,126m)	0ha (25m)
Additional mitigation.					
Unloading platform piles.	PTS	9m	2m	0ha (25m)	0ha (25m)
	TTS	20m	4m	94ha (774m)	0ha (25m)
Mooring dolphin.	PTS	31m	5m	0ha (25m)	0ha (25m)
	TTS	68m	8m	1,451ha (4,203m)	0ha (25m)

e) iii) a) b) Underwater noise – Impact piling: Fish

2.17.169 Impact piling for the installation of the temporary BLF has the potential to cause mortality, mortal injury, recoverable injury and sub-lethal behavioural effects in fish, eggs, and larval stages.

e) iii) a) b) a) Impact Magnitude

2.17.170 The instantaneous and cumulative auditory effects of piling for the temporary BLF have been assessed based on the piling assumptions detailed in **Table 2.45** with no additional mitigation and with the employment of additional mitigation measures.

2.17.171 Instantaneous impact ranges are predicted to be spatially limited for all species assessed. The most sensitive species groups would be susceptible to mortality or recoverable injury up to a range of 15m from the sound source during installation of the piles and 52m for the installation of the mooring dolphins. Additional mitigation reduces the range of mortality to just 6m for the piles and 16m for the dolphins, respectively (**Table 2.45**).

2.17.172 Cumulative auditory effects for piling in the worst-case mooring dolphin scenario is predicted to cause mortality for fish with a swim bladder that aids hearing if individuals remained within 11ha of the sound source during piling activities. Recoverable injury is predicted for fish species with a swim bladder remaining within 31ha of the sound source for the duration of the piling, whilst TTS ranges extend to 583ha for all species. Additional mitigation would result in the area of mortality reducing to 5ha for the installation of mooring dolphins. Additional mitigation is predicted to reduce the areas of recoverable injury for fish species with a swim bladder to within 15ha of the sound source for the duration of the daily piling, whilst TTS ranges extend to 403ha for all species (**Table 2.55**).

2.17.173 During installation of the piles (e.g. unloading platform), cumulative auditory effects are only predicted to cause mortality for fish with a swim bladder that aids hearing if individuals remained within 3ha of the sound source during unloading platform piling activities in the with no further mitigation. Additional mitigation eliminates areas of mortal injury. Recoverable injury is predicted for fish species with a swim bladder remaining within 8ha of the sound source for the duration of the daily piling, whilst TTS ranges extend to 310ha for all species in the unmitigated scenario. With additional mitigation recoverable injury and TTS reduces to 3ha and 193ha, respectively (**Table 2.55**).

2.17.174 The assessment considers a sequence of piling of two (pier) or three (unloading platform) piles in a given 24-hour period followed by two days to lay the span between piles. The duration of piling for the temporary

BLF would result in a total of 98 piles (44 days of piling) and four dolphins (two days of piling) being installed in the marine environment during the 9-month installation period. This would result in 2.2 to 3.25 hours of noise generating activities every three days (**Table 2.45**).

2.17.175 Although the notion is reasonable, direct empirical evidence to support fleeing behaviour in models of fish behaviour is limited so the assessment has not included fleeing. This adds a level of precaution to the assessment of effects.

2.17.176 The impact magnitude is assessed as *low*.

e) iii) a) b) b) Sensitivity

2.17.177 In the immediate location of piling, mortality is possible. Mortality or reduced fitness of eggs and larvae is not considered to be significant given the small area of impacts and the naturally high losses to natural mortality at this early life history stage of fish. Exposure within the spatially limited zones of recoverable injury and TTS may reduce the survival and fitness of individuals through hearing impairment and masking, while physical and/or physiology effects may lower fitness levels until recovery. Fish in the zone of TTS exposure may suffer reduced fitness due to influences on communication and predator detection. The population effects of reductions in individual fitness due to TTS is low and TTS effects are short-term with recovery possible. In the case where species are displaced from ensonified areas, the mobility of the species should facilitate return to the affected areas after impact piling has ceased. Return to previously ensonified areas may be influenced by motivational state and exposure to predation.

2.17.178 The most sensitive fish species are the hearing specialists. The effects presented in **Table 2.55** are considered precautionary since the fleeing response of fish was not taken account of in the cumulative models. The sensitivity of fish receptors to impact piling for the temporary BLF is assessed as *medium* on a precautionary basis.

2.17.179 Minor adverse effects are predicted for fish receptors. Effects are **not significant**.

Table 2.55: Fish auditory impact zones for piling activities associated with the temporary BLF with no additional mitigation and following the use of additional mitigation measures.

Pile type.	Hearing category.	Threshold	No additional mitigation	Additional mitigation		
			Instantaneous	Cumulative (no fleeing).	Instantaneous	Cumulative (no fleeing).
Unloading platform piles.	(1) Fish with swim bladder to aid hearing.	Mortality	15m	3ha (100m)	6m	0ha (<25m)
		Recoverable injury.	15m	8ha (158m)	6m	3ha (111m)
		TTS		310ha (1,385m)		193ha (1,074m)
	(2) Fish with swim bladder that does not aid hearing.	Mortality	15m	0ha (<25m)	6m	0ha (<25m)
		Recoverable injury.	15m	8ha (158m)	6m	3ha (111m)
		TTS		310ha (1,385m)		193ha (1,074m)
	(3) Fish without a swim bladder.	Mortality	7m	0ha (<25m)	3m	0ha (<25m)
		Recoverable injury.	7m	0ha (<25m)	3m	0ha (<25m)
		TTS		310ha (1,385m)		193ha (1,074m)

Pile type.	Hearing category.	Threshold	No additional mitigation	Additional mitigation		
			Instantaneous	Cumulative (no fleeing).	Instantaneous	Cumulative (no fleeing).
Mooring dolphins.	(1) Fish with swim bladder to aid hearing.	Mortality	52m	11ha (180m)	16m	5ha (111m)
		Recoverable injury.	52m	31ha (334m)	16m	15ha (223m)
		TTS		583ha (1,992m)		403ha (1,605m)
	(2) Fish with swim bladder that does not aid hearing.	Mortality	52m	5ha (111m)	16m	2ha (70m)
		Recoverable injury.	52m	31ha (334m)	16m	15ha (223m)
		TTS		583ha (1,992m)		403ha (1,605m)
	(3) Fish without a swim bladder.	Mortality	24m	0ha (<25m)	8m	0ha (<25m)
		Recoverable injury.	24m	0ha (<25m)	8m	0ha (<25m)
		TTS		583ha (1,992m)		403ha (1,605m)

Table 2.56: Behavioural impact zones for impact piling for the temporary BLF, based on startle response observations in sprat and mackerel with no additional mitigation and following the use of additional mitigation measures.

Tile type.	Threshold	Indicative hearing groups.	Behavioural range.
No additional mitigation.			
Landing platform piles (120kJ).	135dB re 1 $\mu\text{Pa}^2\text{s}$	Sprat: hearing specialists.	1,204ha (3,186m)
	142dB re 1 $\mu\text{Pa}^2\text{s}$	Mackerel: hearing generalists.	602ha (2,053m)
Mooring Dolphins (280kJ).	135dB re 1 $\mu\text{Pa}^2\text{s}$	Sprat: hearing specialists.	2,683ha (4,680m)
	142dB re 1 $\mu\text{Pa}^2\text{s}$	Mackerel: hearing generalists.	1,174ha (3,111m)
Additional mitigation.			
Unloading platform piles (120kJ).	135dB re 1 $\mu\text{Pa}^2\text{s}$	Sprat: hearing specialists.	917ha (2,632m)
	142dB re 1 $\mu\text{Pa}^2\text{s}$	Mackerel: hearing generalists.	416ha (1,665m)
Mooring Dolphins (280kJ).	135dB re 1 $\mu\text{Pa}^2\text{s}$	Sprat: hearing specialists.	1,769ha (3,870m)
	142dB re 1 $\mu\text{Pa}^2\text{s}$	Mackerel: hearing generalists.	890ha (2,566m)

e) iii) a) b) c) Fish Behaviour: Migration and Prey Availability

- 2.17.180 The effects of behavioural responses may have consequences for distribution, foraging, survival, and migratory behaviour past the Power station. The potential for coastal noise has the potential to cause migratory barriers should piling coincide with periods of migratory behaviour.
- 2.17.181 The position of the unloading platform piles approximately 440m offshore results in a larger spatial extent for behavioural responses in hearing specialists, such as sprat, up to 3.2km. The larger diameter and higher energy dolphins result in the potential for behavioural responses in hearing specialists, such as sprat, up to 4.7km from the sound source (**Table 2.56**). The use of additional mitigation would reduce the extend of the behavioural contour to 2.6km for hearing specialists during the installation of piles and 3.9km during the installation of mooring dolphins (**Table 2.56**).
- 2.17.182 Avoidance behaviours in mobile species in response to injurious noise levels may result in localised displacement near the sound source (However, displacement of fish from the area within the behavioural contour is not anticipated with response being more akin to startle responses or changes in swimming behaviour (**section 2.17d) iii)** of this chapter). Mitigation of piling impacts includes the absence of piling during sensitive period (May-August inclusive) for designated breeding birds. Thereby, reducing the potential for implications on prey availability during sensitive periods.
- 2.17.183 The 9-month installation period coincides with migrations of shads, eel, smelt and lampreys. Modest noise levels at several kilometres distance from the sound source are unlikely to alter migratory behaviour particularly in species using tidal transport. Fish in active migration closer to the sound source may not avoid the ensonified area, in which case the mortality, recoverable injury and TTS areas would be the same as for the assessments described in (**Table 2.55**).
- 2.17.184 Behavioural responses due to impact piling is predicted to have a minor adverse effect on the availability of fish as prey items for designated species and a minor adverse effect on fish migration behaviour. The timing of piling (no piling in May-August), duration of piling (1.8% of the installation period) and short-term nature of behavioural indicates effects would be **not significant**.

- e) iii) a) c) Underwater noise – Impact piling: Benthic ecology
- e) iii) a) c) a) Impact Magnitude
- 2.17.185 Impact magnitude is assessed following the same approach used to assess the impact of noise caused by piling associated with the installation of the enhanced permanent BLF (**section 2.17d) iii)**).
- 2.17.186 Assumptions for impact piling associated with the installation of the temporary BLF are summarised in **Table 2.45**. Given the differences in required hammer energy, the threshold for potential mortality or recoverable injury is exceeded within 7m and 24m from the source for piles and mooring dolphins, respectively without additional mitigation (**Table 2.55**) equating to <0.1ha. A total of 68 trestle piles, 30 unloading platform piles, and four mooring dolphins are expected to be installed consecutively (up to two trestle piles or mooring dolphins per day and up to three unloading platform piles per day) over 46 days within the 9-month installation period.
- 2.17.187 Impact magnitude is precautionarily assessed as *low*.
- e) iii) a) c) b) Sensitivity
- 2.17.188 The area in which thresholds for mortality or recoverable injury are exceeded is comparable to the area in which these thresholds are exceeded due to piling for the enhanced permanent BLF (<0.1ha; see **section 2.17d) iii)**). Therefore, as within **Volume 2, Chapter 22** of the **ES** (Doc Ref 6.3) [AS-035], benthic invertebrates are precautionarily assessed as having *low* sensitivity to noise caused by piling associated with the installation of the temporary BLF.
- 2.17.189 A minor adverse effect is predicted for benthic ecology receptors. The effect is **not significant**.
- e) iii) a) d) Underwater noise – Impact piling: Zooplankton
- e) iii) a) d) a) Impact Magnitude
- 2.17.190 Impact magnitude is assessed following the same approach used to assess the impact of noise caused by piling associated with the installation of the enhanced permanent BLF (**section 2.17d) iii)**).
- 2.17.191 Impact magnitude is *low*, reflecting the very small area in exceedance of thresholds for mortality or recoverable injury (<0.1ha for the installation of piles and mooring dolphins; **Table 2.55**) and the short duration of the

pressure (46 days of piling within the 9-month installation period; **Table 2.45**).

e) iii) a) d) b) Sensitivity

2.17.192 The areas in which thresholds for mortality or recoverable injury are exceeded are comparable to the area in which these thresholds are exceeded due to piling for the enhanced permanent BLF (<0.1ha; see **section 2.17d) iii)**). Therefore, as within **Volume 2, Chapter 22** of the **ES** (Doc Ref 6.3) [AS-035], zooplankton are precautionarily assessed as having *low* sensitivity to noise caused by piling associated with the installation of the temporary BLF.

2.17.193 A minor adverse effect is predicted for zooplankton receptors. The effect is **not significant**.

e) iii) a) e) Underwater noise – Vessel traffic: Marine mammals

e) iii) a) e) a) Impact Magnitude

2.17.194 The anticipated vessel traffic associated with the temporary BLF is described in **Table 2.47**. The greatest number of deliveries are anticipated in year three and year four of the construction phase.

2.17.195 The increase in vessel traffic and the option for day/night deliveries to the temporary BLF would increase the baseline ambient noise levels at the site with the potential to cause disturbance to marine mammals.

2.17.196 A precautionary vessel traffic assessment has been completed, assuming sound source levels for an average oceangoing vessel whilst steaming, located at the position of the temporary BLF for 24 hours (the worst-case for cumulative auditory effects). Vessels on approach to the proposed development would operate at lower speeds, as such the source terms are precautionary.

2.17.197 The results of the modelling indicate negligible PTS ranges for harbour porpoise and seals even for stationary animals. TTS was predicated as 1,137m (256ha) and 111m (3ha) for harbour porpoise and seals, respectively. As such, animals would have to remain within the immediate vicinity of the temporary BLF for 24 hours to incur TTS (**Table 2.57**).

2.17.198 The impact magnitude is *low*.

Table 2.57: Stationary marine mammal cumulative auditory impact zones in the case of 24-hour vessel activity at the temporary BLF.

Vessel activity.	Threshold	Cumulative (24-hour): no fleeing.	
		Harbour porpoise.	Phocid seals.
Vessel noise including 24-hour utilisation of the temporary BLF.	PTS	0ha (25m)	0ha (<25m)
	TTS	256ha (1,137m)	3ha (111m)

e) iii) a) e) b) Sensitivity

2.17.199 Marine mammals demonstrate a variable level of adverse reactions towards vessel traffic (see **Volume 2, Chapter 22** of the **ES**) (Doc Ref 6.3) [AS-035].

2.17.200 The vessel traffic noise can cause displacement of marine mammals thus reducing their numbers in the area during the period of the intense vessel activity. The sensitivity of marine mammals to vessel noise is considered *medium*. Further details are provided in the combined effects assessment in **section 2.17f)**

2.17.201 The impact of vessel noise during construction activities of the temporary BLF is predicted to have a minor adverse effect on marine mammal receptors. Effects are **not significant**.

e) iii) a) f) Visual disturbance: Marine mammals

e) iii) a) f) a) Impact Magnitude

2.17.202 Artificial lighting is a likely requirement on the temporary BLF and moored vessels would introduce light into the marine environment. During installation, lighting requirements include low height road lighting is along the jetty approximately every 20m; lighting on the Cantitravel and main working areas; and the additional lighting on the crane boom.

2.17.203 Navigational lights will be installed as described in **section 2.19** of this chapter.

2.17.204 When works are completed at the unloading platform of the temporary BLF, higher lighting levels are anticipated. Low height road lighting is anticipated along the jetty of the temporary BLF.

2.17.205 The magnitude of the impact is therefore considered as *low*.

e) iii) a) f) b) Sensitivity

- 2.17.206 Introduction of artificial light could potentially cause visual disturbance (see **Volume 2, Chapter 22 of the ES**) (Doc Ref 6.3) [AS-035].
- 2.17.207 The sensitivity of marine mammals to visual disturbance from artificial light during the construction and use of the temporary BLF (and construction site lighting) is *low*.
- 2.17.208 The impact of visual disturbance from artificial light is predicted to have a minor effect on marine mammal receptors. Effects are **not significant**.

e) iii) a) g) Underwater noise – Vessel traffic: Fish

- 2.17.209 This increase in vessel traffic due to the temporary BLF has the potential to increase the baseline ambient noise levels at the site particularly given the option for day/night deliveries and potential cause disturbance to fish receptors.
- 2.17.210 A precautionary vessel traffic assessment has been completed, assuming sound source levels for an average oceangoing vessel whilst steaming, located at the position of the temporary BLF for 24 hours.
- 2.17.211 Cumulative auditory effects are not predicted to cause mortality or recoverable injury for fish. TTS is predicted for fish species remaining within 31ha of the sound source for 24 hours, assuming continuous vessel activity (**Table 2.58**).
- 2.17.212 Behavioural responses to continuous noise sources do not have established thresholds. Provisional noise thresholds for startle responses to impulsive noises have been observed in sprat (135 dB) and mackerel (142 dB) (Ref. 33). These have precautionarily been applied to the continuous noise sources from vessel activity and indicate a limited spatial extent of the 135dB and 142dB behavioural contours to 45ha (429m) and 8ha (158m), respectively.
- 2.17.213 The assigned impact magnitude is *low*.

Table 2.58: Fish cumulative auditory impact zones in the case of 24-hour vessel activity at the temporary BLF.

Pile type.	Hearing category.	Threshold	Cumulative (no fleeing).
Vessels at the temporary BLF.	(1) Fish with swim bladder to aid hearing.	Mortality	0ha (<25m)
		Recoverable injury.	0ha (<25m)
		TTS	31ha (352m)
	(2) Fish with swim bladder that does not aid hearing.	Mortality	0ha (<25m)
		Recoverable injury.	0ha (<25m)
		TTS	31ha (352m)
	(3) Fish without a swim bladder.	Mortality	0ha (<25m)
		Recoverable injury.	0ha (<25m)
		TTS	31ha (352m)

e) iii) a) g) a) Sensitivity

2.17.214 Fish have low physiological sensitivity to the continuous noise associated with vessel movements (Ref. 32) and the primary concern is therefore behavioural effects.

2.17.215 Vessel movements can elicit behavioural responses in different fish species. Behavioural reactions are species specific and depend on the properties of the environment such as water depth and vessel noise signature. Herring have been observed to react at ranges of 220-270m (Ref. 43), whereas cod and haddock were found to react to approaching vessel at a distance of 200m (Ref. 44). Pelagic fish (including sardine and mackerel) schools have demonstrated avoidance reactions at ranges of between 150m to 400m (Ref. 45). Reported behavioural ranges are relatively consistent with the behavioural contours predicted in assessments, however, the precautionary assumptions of the assessment suggest effects in the shallow waters at Sizewell when vessels are not steaming would occur over smaller spatial scales.

2.17.216 Following vessel disturbance, fish return to previously disturbed areas has been shown to occur rapidly for a range of species. The original pattern

of haddock distribution was re-established by the time the vessel was 400m away, some four or five minutes later (Ref. 45). Recovery of herring densities along the vessel track began after 40 seconds following vessel (Ref. 43) passage. A study on the Arctic cod in a small high Arctic Resolute Bay demonstrated that movement of vessels induced a horizontal shift in the distribution of this fish with low overlap when compared to days without vessel activity in the bay, but fish quickly restored their original distribution after the vessel left the port (Ref. 46).

2.17.217 The sensitivity of fish to vessel noise is predicted to be *low*.

2.17.218 The effects of vessel noise from the temporary BLF is minor adverse. Effects are **not significant**.

e) iii) a) h) Changes in wave exposure: Benthic Ecology

e) iii) a) h) a) Impact Magnitude

2.17.219 The presence of the temporary BLF in the shallow subtidal zone (<6m ODN) would affect local wave exposure. The BLF is expected to be used for aggregate deliveries until it is decommissioned after 8 years.

2.17.220 Specific modelling has not been completed however modelling was carried out for the BLF pier in the Application, which has very similar spacing and pile diameter to the temporary BLF and, therefore, provides an indication of the likely effects of the temporary BLF. The results indicated a low change that generally does not exceed the bed shear stress change threshold +/-5% and it was thus considered of insignificant magnitude.

2.17.221 For the presence of the temporary BLF structure, impact magnitude of changes in hydrodynamics processes is precautionarily assessed as *medium*, reflecting the spatial extent and the level of change of the pressure.

e) iii) a) h) b) Sensitivity

2.17.222 Changes in hydrodynamic processes due to the presence of the temporary BLF could influence benthic invertebrate communities in the intertidal and shallow subtidal zones.

2.17.223 The intertidal benthic invertebrates inhabiting the beach at the GSB are characterised by a similar species composition along the shore, with local spatial differences primarily due to variation in the abundance or biomass of taxa rather than species composition (Ref. 47). Intertidal benthic invertebrate populations are expected to be variable over time (**Volume 2, Appendix 22C** of the **ES**) (Doc Ref 6.3) [APP-320].

- 2.17.224 Given the nature of the intertidal environment and biota in the GSB, it is likely that any changes to benthic invertebrate communities induced by wave exposure would be within the range of natural variability. Intertidal benthic invertebrates are therefore assessed as *not sensitive* to changes in wave exposure.
- 2.17.225 Benthic invertebrates in the shallow subtidal zone inhabit an area where surface sediments shift on a regular basis, encouraging a high natural variability in population densities and a prevalence of *r*-selected taxa. An increase in wave energy and shear stress is predicted in the shallow subtidal zone that could affect abundance and biomass of shallow subtidal benthic assemblage. The effect of the presence the BLF would last for approximately eight years. Benthic fauna would be able to recover once the level of shear stress and wave energy are reduced again after the decommissioning of the temporary BLF. The shallow subtidal benthic invertebrates have a *low* sensitivity to the pressure.
- 2.17.226 The *medium* impact magnitude and *low* sensitivity of shallow subtidal benthic invertebrates to changes in wave exposure indicate a minor adverse effect on this receptor. The effect is **not significant**.
- e) iii) a) i) Spread of invasive non-native species (INNS): Benthic Ecology
- e) iii) a) i) a) Impact Magnitude
- 2.17.227 BLF piles and mooring dolphins located within the marine environment would introduce hard substrata to an area consisting primarily of soft sediments, which could facilitate the spread of benthic INNS that prefer hard habitats and have detrimental effects on indigenous species.
- 2.17.228 The area of new three-dimensional surface (piles and dolphins) available to INNS would be less than 0.3ha in both the subtidal and intertidal zones, which is less than the Marine Evidence-Based Sensitivity Assessment pressure benchmark for colonisation (1ha) (Ref. 35). These surfaces would be available for colonisation for medium term (eight years) until the temporary BLF is decommissioned. While BLF piles and mooring dolphins could facilitate the spread of INNS, the spatial scale of the structure remains small at the scale of the GSB and the impact would be temporary.
- 2.17.229 The impact magnitude is *low*.
- e) iii) a) i) b) Sensitivity
- 2.17.230 The sensitivity of benthic invertebrates to the spread of INNS due to the presence of the piles and mooring dolphins would be the same as the

sensitivity of this receptor to the presence of enhanced permanent BLF piles and mooring dolphins, provided in **section 2.17d) iii)** of this chapter. As such, benthic invertebrates have *low* sensitivity to this pressure.

- 2.17.231 As impact magnitude is low and benthic invertebrates have low sensitivity to this pressure, the spread of INNS due to the presence of the temporary BLF is predicted to have a minor adverse effect on this receptor during the construction phase. The effect is **not significant**.

e) iii) a) j) Physical loss/change in habitat type: Benthic Ecology

e) iii) a) j) a) Impact Magnitude

- 2.17.232 The presence of the temporary BLF piles and mooring dolphins in the intertidal and shallow subtidal zones would result in a change in seabed type from soft sediment to a hard surface. Benthic species with preferences for soft or hard substrates would therefore be affected by this change in seabed type.

- 2.17.233 The spatial extent of change in seabed type due to BLF piles and mooring dolphins is very small, with the removal of 0.014ha of soft sediment replaced by approximately 0.3ha of vertical artificial substate in relation to the area of the GSB (>4,000ha). This change in seabed type would last for approximately eight years, until the dismantlement of the temporary BLF. The BLF piles and mooring dolphins would only be in place for the construction period and occupy a very small spatial extent.

- 2.17.234 Impact magnitude is therefore assessed as *low*.

e) iii) a) j) b) Sensitivity

- 2.17.235 The temporary BLF installation would cause a loss of soft sediment biota and a small decline in the total area of suitable habitat for these species within the GSB.

- 2.17.236 Intertidal benthic invertebrate communities are broadly similar throughout the GSB and not particularly diverse (see **Volume 2, Chapter 22 of the ES**) (Doc Ref 6.3) [AS-035] so only a very small proportion of any intertidal benthic invertebrate population (and their supporting habitat) is likely to be adversely affected by temporary BLF installation.

- 2.17.237 Recovery of soft sediment intertidal benthic invertebrate communities would be possible once the piles present in the intertidal areas are dismantled. The effect of the removal pile and mooring dolphins on benthic habitat is assessed in the decommissioning section below.

- 2.17.238 Given that only a small proportion of any intertidal benthic invertebrate population and associated habitat would likely be adversely affected by the presence of the temporary BLF structure, and that recovery to soft sediment habitat would occur once the piles are removed, sensitivity is assessed as *low*.
- 2.17.239 As in the intertidal zone, the transformation of the shallow subtidal seabed from a soft to a hard habitat due to the presence of the temporary BLF piles and mooring dolphins would cause a loss of soft sediment biota in the affected area and a small decline in the total area of suitable habitat for these species within the GSB. Community recovery would be possible in the small area affected once the piles are removed after eight years, sensitivity is assessed as *low*.
- 2.17.240 The low impact magnitude and low sensitivity of both intertidal and shallow subtidal benthic invertebrates to the pressure indicate a *minor adverse* effect on this receptor. The effect is **not significant**.
- e) iii) a) k) Loss of access to fishing areas: Commercial fishing (potters, netters, otter trawlers and long-liners).
- e) iii) a) k) a) Impact Magnitude
- 2.17.241 During the installation of the temporary BLF, hierarchical safety buffer zones of 250m to 500m depending on the activity and stage of installation would likely be applied surrounding construction vessels. These safety buffer zones would be implemented through Notice to Mariners (NtM).
- 2.17.242 Once constructed, the temporary BLF would extend approximately 440m seaward of MHWS beyond the CDO and FRR outfalls and restrict access to inshore fishing areas within the Sizewell-Dunwich Bank. The presence of the structure would also require small diversions for vessels navigating close to the coastline.
- 2.17.243 During navigational baseline surveys in summer 2019, an average of three unique fishing vessels per day were recorded regularly off Sizewell. One vessel was recorded regularly operating inshore of the Sizewell-Dunwich Bank, within the main development site boundary (**Figure 24.4**) (**Volume 2 Chapter 24 of the ES**) (Doc Ref. 6.3) [APP-337].
- 2.17.244 Throughout the Winter survey period, there was an average of one unique fishing vessel every three to four days in the study area (**Volume 2 Chapter 24 of the ES**) (Doc Ref. 6.3) [APP-337].
- 2.17.245 A review of the commercial fishing off Sizewell and the wider area is provided in **Volume 2, Appendix 22F** of the **ES** (Doc Ref. 6.3) [APP-323]. Shore-based observations suggest that most fishing near the proposed

BLF is carried out by potting and trawling vessels. Trawling takes place to the northeast and southeast of the proposed development approximately 2nm offshore (refer to **Volume 2, Appendix 24A** of the **ES** (Doc Ref 6.3) [APP-338]).

2.17.246 MMO data suggest that one vessel, a beach-launched $\leq 10\text{m}$ netter and potter, operates from Sizewell beach (Ref. 48), out to approximately 1nm (inside the Sizewell-Dunwich Bank). The temporary BLF would be in soft sediment environments and unlikely to restrict potting activities, which are focussed off Thorpeness.

2.17.247 Fishing activity near the proposed temporary BLF infrastructure is low, and the magnitude of impact is assessed as *low*.

e) iii) a) k) b) Sensitivity

2.17.248 The temporary BLF has the potential to restrict access to fishing areas and limit the ability to deploy drift nets inshore of the Sizewell-Dunwich Bank. Previous observations have demonstrated reduced inshore fishing activity due to the presence of a jack-up barge and associated vessels in summer 2019 (**Volume 2, Chapter 24** of the **ES**) (Doc Ref 6.3) [APP-337]. However, alternative fishing areas are available locally and alternative gears may be deployed.

2.17.249 The sensitivity of local fishing activities to the temporary BLF is assessed as *medium*.

2.17.250 Loss of access is predicted to have a minor adverse effect on local commercial fishing activities. Effects are **not significant**.

2.17.251 Nonetheless, a Fisheries Liaison Officer will be in post for the duration of the installation and use of the temporary BLF.

e) iii) b) Dismantling of temporary BLF

2.17.252 **Table 2.59** details the pressures associated with the decommissioning of the temporary BLF during the construction phase of the proposed development.

Table 2.59: Pressures associated with decommissioning the temporary beach landing facility.

Pressure	Activity resulting in Pressure.	Receptors	Justification
Underwater noise.	Removal of piles (impact piling and vibropiling).	Plankton Benthic ecology. Fish Marine mammals.	The removal of the temporary BLF would require a combination of short-term impact piling followed by vibro-piling, described in Table 2.46 . An additional assessment for this activity has been provided.
Increase in SSC.	Cutting-off dolphins.	Benthic ecology.	The cutting of steel sections in the offshore environment during decommissioning process is usually carried out with a mechanical approach (such as diamond wire, abrasive water jet or hydraulic sheers) (Ref. 49). Excavation of the sediment around the piles is needed to allow the cutting device and frame to be attached to the pile. The small amount of sediment resuspended is minor and within the envelope of the Application. No further assessment is made.
Change in habitat type	pile removal	Benthic ecology	Removal of piles could create a small depression on the seabed. This depression would infill over time and benthic habitat will reverse to a soft sediment from hard artificial substrate. The effects of the decommissioning of the temporary BLF on the benthic receptors is assessed.

e) iii) b) a) Underwater noise – Pile removal: Marine mammals

e) iii) b) a) a) Impact Magnitude

2.17.253 Piles of the temporary BLF would be removed using a combination of very short duration impact piling to loosen the pile, followed by vibropiling. The required hammer energy is 120kJ. In a similar fashion to installation, two piles would be removed per day followed by two days to dismantle the span. Noise generating activities during decommissioning are anticipated to occur on approximately 50 occasions (**Table 2.46**).

- 2.17.254 The predicted acoustic effect ranges are smaller for pile removal in comparison to other modelled piling scenarios associated with installations of both BLFs (**Table 2.60**). Cumulative impacts were not predicted for porpoise and seals due to fleeing behaviours. Potential impacts will be mitigated using JNCC protocols (Ref. 25). Behavioural avoidance during initial impact piling may cause localised displacement beyond the auditory effect ranges.
- 2.17.255 The magnitude of the impact is precautionarily assessed as *low* due to the potential for displacement.
- e) iii) b) a) b) **Sensitivity**
- 2.17.256 Marine mammals could be displaced from a small area following short-term, low energy impact and vibropiling. Animals are expected to return to the area shortly after the activity ceases. Sensitivity is predicted to be *low*.
- 2.17.257 The impact of increased underwater noise resulting from removal of the temporary BLF is predicted to have a minor adverse effect on marine mammals. Effects would be short-lived and return to baseline conditions after piling activity ceases with no population levels effects predicted. Effects are **not significant**.

Table 2.60: Marine mammal auditory impact zones for activities associated with the removal of the temporary BLF.

Pile type.	Threshold	Instantaneous		Cumulative (24-hour): fleeing.	
		Harbour porpoise.	Phocid seals.	Harbour porpoise.	Phocid seals.
Removal of piles (impact piling followed by vibropiling).	PTS	30m	5m	0ha (25m)	0ha (<25m)
	TTS	66m	8m	0ha (25m)	0ha (25m)

e) iii) b) b) **Underwater noise – Pile removal: Fish**

e) iii) b) b) a) **Impact Magnitude**

- 2.17.258 Instantaneous impact ranges are consistent with installation and predicted to be spatially limited for all species assessed. The most sensitive species, those with a swim bladder, eggs and larvae would be susceptible to mortality or recoverable injury to a range of 15m from the sound source during installation of the piles (**Table 2.61**).

2.17.259 Cumulative auditory effects of the combined impact piling and vibropiling (detailed in **section 2.17c iii)**) is minimal. Effect areas for mortality or recoverable injury are negligible. TTS is predicted for all fish species remaining within 11ha of the sound source for the duration of the activity (**Table 2.61**).

2.17.260 The impact magnitude is *low*.

e) iii) b) b) b) Sensitivity

2.17.261 Fish are assessed as having *low* sensitivity to the impact.

2.17.262 Underwater noise generated by removal of the temporary BLF is predicted to have minor adverse effects on fish receptors. Effects are **not significant**.

Table 2.61: Fish auditory impact zones for pile removal activities associated with decommissioning the temporary BLF.

Pile type.	Hearing category.	Threshold	Instantaneous	Cumulative (no fleeing).
Removal of piles (impact piling followed by vibropiling).	(1) Fish with swim bladder to aid hearing.	Mortality	15m	0ha (<25m)
		Recoverable injury.	15m	0ha (<25m)
		TTS		11ha (206m)
	(2) Fish with swim bladder that does not aid hearing.	Mortality	15m	0ha (<25m)
		Recoverable injury.	15m	0ha (<25m)
		TTS		11ha (206m)
	(3) Fish without a swim bladder.	Mortality	7m	0ha (<25m)
		Recoverable injury.	7m	0ha (<25m)
		TTS		11ha (206m)

e) iii) b) c) Underwater noise – Pile removal: Benthic ecology and Zooplankton

2.17.263 As with the assessments of noise from the installation of the BLFs, sound pressure thresholds for fish without a swim bladder have been used as a

- proxy for benthic organisms and zooplankton (**Volume 2, Chapter 22** of the **ES**) (Doc Ref 6.3) [AS-035].
- 2.17.264 The threshold for potential mortality of recoverable injury is exceeded just 7m from the source (**Table 2.61**), which equates to <0.1ha. Piles would be removed at a rate comparable to the rate at which they were installed (two piles per day). Therefore, the *low* impact magnitude that was precautionarily assumed for the installation of the temporary BLF is also applied to its removal. Likewise, the sensitivity of benthic ecology receptors to noise generating activities precautionarily remains *low*.
- 2.17.265 A minor adverse effect is predicted for benthic ecology receptors. The effect is **not significant**.
- e) iii) b) d) Change in habitat type – Pile removal: Benthic ecology
- e) iii) b) d) a) Impact Magnitude
- 2.17.266 Once removed; the sediment contained in the BLF piles would potentially remain on the seabed. In the case where the sediment is lifted with the pile, an impression would be left on the seabed that would affect a very low spatial extent within the GSB and be would be filled in naturally relatively quickly. As a comparison, the seabed impressions left by a jack-up barge would be infilled in less than 131 days, based on low energy summertime conditions, as provided in **Volume 2, Chapter 20** of the **ES** (Doc Ref. 6.3) [APP-311]. The sediment infilling the depression left with the pile is expected to return to soft sediment habitat.
- 2.17.267 Changing the seabed from a hard surface to similar sediment habitat constitutes a large amount of change based on the Marine Evidence-Based Sensitivity Assessment benchmark threshold for changes in EUNIS classification (change in sediment type by one Folk class). However, this change is a return to natural soft sediment habitat present in the area where the temporary BLF is planned. This change is over a very small spatial extent (approximately 0.01ha) and is permanent.
- 2.17.268 The impact magnitude is *very low*.
- e) iii) b) d) b) Sensitivity
- 2.17.269 The subtidal part of the temporary BLF is in a large area of infralittoral fine sand habitat (**Volume 2, Appendix 22C** of the **ES** (Doc Ref 6.3) [APP-320]) therefore once the pile and mooring dolphins are removed, the sedimentary habitat is likely to return to this soft sediment environment. Benthic fauna is likely to recolonise very quickly by displacement of

sessile/low mobility benthic invertebrates, or by recruitment into the new patch of sediment left after the removal of the pile.

- 2.17.270 Similarly, given the sparse nature of intertidal benthic invertebrate fauna and the life-history constraints of inhabiting an environment as challenging as intertidal beaches, recolonisation is expected to be rapid.
- 2.17.271 The return to natural soft sediment habitat expected after the removal of the piles and dolphin of the temporary BLF represent very small increase in habitat back to pre-impact levels. Benthic receptors are not sensitive to the change in habitat associated to the removal of the BLF piles and mooring dolphins.
- 2.17.272 As impact magnitude is very low and the benthic invertebrates are not sensitive, the pile removal is predicted to have negligible effect on this receptor. The effect is **not significant**.

f) Updated assessment - combined effects

- 2.17.273 **Table 2.62** details the pressures associated with the coincident installation and use of the two BLFs. These would only occur during the construction phase of the Sizewell C Project, as the temporary BLF would be removed at the end of construction.
- 2.17.274 The sequence of installation of the two BLFs is detailed in **section 2.17c) iii)**. Based on the anticipated rate of progress two piles from the enhanced permanent BLF and two trestle piles from the temporary BLF could be installed in the same 24-hour period. This inter-relationship would increase the incidence of cumulative auditory effects. A piling restriction to reduce the incidence of marine noise mean no additional piling would occur when mooring dolphins for the enhance permanent BLF are installed. Therefore, the maximum duration for daily overlap between the two BLFs would be six days of piling.

Table 2.62: Pressures associated with the beach landing facilities installation and utilisation in-combination during the construction phase.

Pressure	Activity resulting in pressure.	Receptors	Updated Assessment
Underwater noise.	Impact piling (impulsive noise source).	Fish Marine mammals.	The instantaneous and cumulative auditory effect ranges for the combined piling scenario is assessed in this section. The results are smaller than in the case of the worst-case scenarios for individual piling. No further assessment.

Pressure	Activity resulting in pressure.	Receptors	Updated Assessment
	Vessel traffic (continuous noise source).	Fish Marine mammals.	Vessel traffic associated with the temporary BLF and enhanced permanent BLF are considered in the section.
Visual disturbance.	Activities for the BLF installation and construction phase.	Marine mammals.	The effects of visual disturbance on marine mammals from the use of both BLFs is consistent with the assessment of the temporary BLF alone. No further assessment.
Physical change to another seabed type.	Presence of structure.	Benthic ecology. Fish	The addition of additional infrastructure from the temporary BLF and enhanced permanent BLF are considered in the section along with the other proposed infrastructure elements.
Changes in wave exposure.	Presence of structure.	Benthic ecology.	Presence of the temporary BLF and the enhanced permanent BLF in proximity has the potential for inter-relationship effects and modifications in local hydrodynamics and wave exposure. The effect on benthic ecology receptors is assessed further.
Spread of non-indigenous species.	Presence of structure.	Benthic ecology.	The addition of additional infrastructure from the temporary BLF and enhanced permanent BLF are considered in the section along with the other proposed infrastructure elements.

f) i) Underwater noise – Vessel traffic: Marine mammals

f) i) a) Impact Magnitude

2.17.275 The vessel traffic in the proposed development area would increase after the completion of the two BLFs construction (**Table 2.47**). The highest frequency of expected deliveries would occur during the nine months annual campaign period with expected 12-13 deliveries per month at the enhanced permanent BLF and an approximately monthly average of 50 deliveries to the temporary BLF (**Table 2.47**). The operation of the enhanced permanent BLF would be restricted to daytime while temporary BLF would operate 24 hours a day. The life of the temporary BLF is approximately eight years, thus any in-combination effects associated with the vessel traffic on both BLFs would occur in this time frame.

- 2.17.276 Due to the day-time only regime and tidal restrictions at the enhanced permanent BLF, the in-combination effects with permanent BLF would only occur during daylight hours and high tides. Thus, a potential of 12-13 deliveries per month at the permanent BLF could overlap with approximately half of the monthly deliveries at the temporary BLF.
- 2.17.277 The underwater noise modelling considered 24-hour utilisation of the enhanced permanent BLF and the temporary BLF. Cumulative stationary PTS was 2ha and 0ha for harbour porpoise and seals, respectively. The TTS range for harbour porpoise extended to 436ha while it was limited to 7ha for seals (**Table 2.63**).
- 2.17.278 Increases in vessel traffic is anticipated to occur during the campaign period (April to October inclusive) whereas the greatest utilisation of the inshore waters off Sizewell by marine mammals occurs during the winter (Ref. 29). The spatial extent of the porpoise PTS and TTS auditory effect ranges and seal TTS range for the operation of both BLFs is illustrated in **Volume 2, Figure 2.17.2** of this **ES Addendum**.
- 2.17.279 The impact magnitude is *low*.
- f) i) b) **Sensitivity**
- 2.17.280 Whilst auditory damage would be restricted to localised areas, marine mammals demonstrate a variable level of behaviours towards vessel traffic (Ref. 50). Behavioural responses to vessel noise are generally short-term, but can come at the cost of the energetic investment in moving, lost opportunities in foraging and social behaviour, as well as potential abandonment of calves (Ref. 51).
- 2.17.281 Vessel noise is generally within the low frequency range, however, low levels of medium to high frequency components in vessel noise can elicit strong behavioural responses in harbour porpoises and low levels of noise may be experienced up to 1km from the vessel (Ref. 51). Areas with high volumes of sea traffic have been shown to have lower porpoise densities than areas with a low volume of sea traffic (Ref. 52). Approximately 20,000 vessels per year (approximately 80 vessels per day within a 5km² area) appears to be the threshold for changes in density (Ref. 53).
- 2.17.282 The majority of the increase in vessel traffic is anticipated to occur during the period of the year when the least number of harbour porpoises are expected within the area of proposed development (Ref. 29).
- 2.17.283 Underwater noise monitoring at Sizewell predicted a transect of increasing ambient noise further from the shore for both the median (P50) and P90 (90th percentile) models. The observed 7-month median sound levels at a recording site 700m offshore were 101 dB re 1 µPa at a water depth of

5m. The P50 model predictions 200m offshore were 92 dB and 104 dB (1.5 km offshore), gradually increase to 111 dB (3km offshore), 114 dB (5km offshore) and 117 dB (10km offshore). The corresponding P90 model predictions are about 5-10 dB (**Volume 2, Appendix 22L** of the **ES**) (Doc Ref. 6.3) [APP-329]. As such, vessel traffic is likely to have the greatest impact close to the shore where the signal to noise ratio would be the greatest due to the lowest baseline conditions. Surveys conducted in the area show that there is a higher abundance of harbour porpoises further offshore (10-20km from the coast predominantly on the edge and beyond the Sizewell-Dunwich sandbank) (Ref. 29) (**Volume 2, Appendix 22E** of the **ES**) (Doc Ref. 6.3) [APP-321]. Thus, the animals would be subject to smaller relative changes in noise in these waters.

- 2.17.284 Studies on the effects of vessel noise to pinnipeds at sea are scarce. A recent study showed that passing vessels provoked an energetic response that terminated the natural resting cycle and precipitated a behavioural change that continued after the vessel had passed. It has been calculated that at low ambient noise levels, vessel noise of around 0.25kHz and 2kHz, the zone of audibility will be approximately 20km and 3km for harbour seals respectively. However, there is no evidence to suggest that vessel noise adversely affects seals, suggesting they may have a lower sensitivity than cetacean species (Ref. 54).
- 2.17.285 The vessel traffic noise can cause displacement of marine mammals thus reducing their numbers in the area during the period of the intense vessel activity. The sensitivity of marine mammals to vessel noise is considered *medium*.
- 2.17.286 The impact of vessel noise arising from vessel traffic at both BLF locations is predicted to have a minor adverse effect on marine mammal receptors. Effects are **not significant**.

Table 2.63: Cumulative auditory impact zones in the case of 24-hour vessel activity at the enhanced permanent BLF and temporary BLF for stationary (no fleeing) marine mammals.

Vessel activity	Threshold	Cumulative (24-hour): no fleeing.	
		Harbour porpoise.	Phocid seals.
Vessel noise including 24-hour utilisation of the enhanced permanent BLF and the temporary BLF.	PTS	2ha	0ha
	TTS	436ha	7ha

f) ii) Underwater noise – Vessel traffic: Fish

f) ii) a) Impact Magnitude

- 2.17.287** A precautionary vessel traffic assessment has been completed, assuming sound source levels for an average ocean-going vessel whilst steaming, located at the position of the temporary BLF and at the enhanced permanent BLF for 24 hours. Operational restrictions, particularly at the permanent BLF where only daylight operations and tidal restrictions apply mean this assessment envelopes a worst-case scenario.
- 2.17.288** Vessels on approach to the proposed development would operate at low speeds, as such the source terms are precautionary. The **CoCP** (Doc Ref. 8.11 (A)) recommends site speed restrictions of <10 knots to minimise disturbance effects.
- 2.17.289** Cumulative auditory effects would not cause mortality or recoverable injury for fish. TTS is predicted for fish species remaining within 40ha of the sound source for 24 hours, assuming continuous vessel activity throughout that period (**Table 2.64**). The combined utilisation of the two BLFs increases the spatial extent of the TTS zone to 40ha, a 29% increase compared to the temporary BLF alone (refer to **Volume 2, Figure 2.17.3** of this **ES Addendum**).
- 2.17.290** Behavioural responses to continuous noise sources do not have established thresholds. Provisional noise thresholds for startle responses to impulsive noises have been observed in sprat (135 dB) and mackerel (142 dB) (Ref. 33). These have precautionarily been applied to the continuous noise sources from vessel activity and indicate a limited spatial extent of the 135dB and 142dB behavioural contours to 55ha and 11ha, respectively (**Volume 2, Figure 2.17.3** of this **ES Addendum**).
- 2.17.291** The assigned impact magnitude is *low*.

Table 2.64: Fish cumulative auditory impact zones in the case of 24-hour vessel activity at the enhanced permanent BLF and temporary BLF.

Pile type.	Hearing category.	Threshold	Cumulative (no fleeing).
Vessel noise including 24-hour utilisation of the enhanced permanent BLF	(1) Fish with swim bladder to aid hearing.	Mortality	0ha
		Recoverable injury.	0ha
		TTS	40ha

Pile type.	Hearing category.	Threshold	Cumulative (no fleeing).
and the temporary BLF.	(2) Fish with swim bladder that does not aid hearing.	Mortality	0ha
		Recoverable injury.	0ha
		TTS	40ha
	(3) Fish without a swim bladder.	Mortality	0ha
		Recoverable injury.	0ha
		TTS	40ha

f) ii) b) Sensitivity

2.17.292 The sensitivity of fish to vessel noise is predicted to be remain as *low*, as stated for the temporary BLF alone.

2.17.293 The effects of vessel noise from the temporary BLF is minor adverse. Effects are **not significant**.

f) iii) Changes in wave exposure: Benthic Ecology

f) iii) a) Impact Magnitude

2.17.294 The two BLFs would be spaced approximately 165m apart, suggesting that changes to wave exposure caused by the two structures could interact. However, any area of overlap would be small and medium-term, as the temporary BLF is expected to be removed after 8 years.

2.17.295 The precautionary impact magnitude of *medium* concluded for the temporary BLF is therefore applied for the inter-relationship between the two BLFs.

f) iii) b) Sensitivity

2.17.296 Intertidal benthic invertebrates are assessed as *not sensitive* to changes in wave exposure and benthic invertebrates in the shallow subtidal zone have a *low* sensitivity, as stated for the temporary BLF alone.

2.17.297 The *medium* impact magnitude and *not sensitive/low* sensitivity of benthic invertebrates to changes in wave exposure indicate a minor adverse effect on this receptor. The effect is **not significant**.

f) iv) Physical loss/change in habitat type: Benthic Ecology

f) iv) a) Impact Magnitude

2.17.298 Benthic species with preferences for soft or hard substrates would be affected by a change in seabed type from soft sediment to a hard surface. Such a change in seabed type would occur in the subtidal zone due to the installation of both BLFs, CDO head, CWS intake and outfall heads, and FRR outfall heads.

2.17.299 In the intertidal zone, changes to seabed type would occur only from installing both BLFs. The approximate area of seabed that would be changed from soft sediment to a hard surface for each development component according to the engineering design are presented in **Table 2.65**.

Table 2.65: Indicative area (m²) of change in soft sediment seabed habitat due to the installation of hard infrastructure in the Greater Sizewell Bay – Update of Table 22.46 provided in Volume 2, Chapter 22 of the ES [APP-317].

Component	Area of habitat change (m ²)		Description
	intertidal	subtidal	
Enhanced beach landing facility.	3	3026	Four steel tubular piles of ca.1m diameter are intertidal only. Eight steel tubular piles of ca.1m diameter four mooring dolphins of ca. 2.5m diameter have intertidal and subtidal surface area. Grillage with subtidal surface only.
Temporary beach landing facility	7	128	Six piles steel tubular piles of ca.1.2m diameter are intertidal only. 102 steel tubular piles of ca. 1.2m diameter and four mooring dolphins of ca.2.5m diameter have intertidal and subtidal surface area.
Combined drainage outfall.	-	207	One concrete block and scour protection.
Fish recovery and return.	-	414	Two concrete heads and scour protection..
CWS outfalls.		2,420	Two cooling water outfall headworks and scour protection.

Component	Area of habitat change (m ²)		Description
	intertidal	subtidal	
CWS Intakes.		4,078	Four cooling water intakes and scour protection (Unit 2) ⁵ .
Total	10	10,273	

2.17.300 The combined extent of change to another seabed type within the subtidal zone is very small (1ha) in comparison to the area of the GSB (>4,000ha of available soft sediment habitat within the GSB). Changing the seabed type from a soft sediment habitat to a hard surface constitutes a large amount of change based on the Marine Evidence-Based Sensitivity Assessment benchmark threshold for changes in EUNIS classification (change in sediment type by one Folk class). Most change in seabed type would last for the lifetime of the proposed development, with the exception of the enhanced permanent BLF grillage, the temporary BLF piles and mooring dolphins (ca. 0.3ha), which would be removed after the construction phase.

2.17.301 The very small spatial extent of the pressure and the long-term presence in the marine environment results in a *low* impact magnitude.

f) iv) b) **Sensitivity**

2.17.302 Subtidal soft sediment benthic invertebrates were determined not to be sensitive to physical change to another seabed type due to the installation of hard infrastructure, as biota would have been largely removed by dredging prior to installation. The same sensitivity is therefore applied here for the combination of all development components (enhanced permanent BLF, temporary BLF, CDO, CWS and FRR).

2.17.303 Fauna will not be dredged prior to the installation of the temporary BLF, however the loss of habitat for this structure is very small and the benthic assemblage will return once the structure is dismantled after eight years, therefore the receptor remains not sensitive to the pressure.

2.17.304 Given that impact magnitude would be low, and that benthic invertebrates are not sensitive to this pressure, the physical change to another seabed type associated with the installation of all development components combined, is predicted to have a negligible (**not significant**) effect on this receptor.

⁵ Assessments of change in soft sediment seabed account for the infrastructure and total extent of the scour pit. The application of scour protection would reduce the scour footprint. Therefore, assessments are precautionary.

f) v) Spread of invasive non-native species (INNS): Benthic Ecology

f) v) a) Impact Magnitude

- 2.17.305 The introduction of hard substrata to an area consisting primarily of soft sediments could facilitate the spread of INNS that prefer hard habitats. Six development components would contribute to the introduction of new hard substrata within the GSB, both in the intertidal zone (temporary BLF and enhanced permanent BLF piles and mooring dolphins), and subtidal zone (both BLFs piles and mooring dolphins, enhanced permanent BLF grillage, CDO head, CWS intake and outfall heads and FRR heads).
- 2.17.306 The marine evidence-based sensitivity assessment pressure benchmark for colonisation (1ha) (see **Volume 2, Chapter 22** of the **ES**) (Doc Ref. 6.3) [AS-035]. The total surface of hard substrate introduced is predicted to be 1ha (subtidal and intertidal) cumulatively between the discrete structures of the cooling water heads, inshore FRR, CDO, enhanced permanent BLF and temporary BLF. Each development component would be a permanent feature within the GSB with the exception of the temporary BLF and grillage for the enhanced permanent BLF. The total three-dimensional surface area of new hard habitat would be very small at the scale of the GSB (>4000ha) and whilst the structures exceed the benchmark for the pressure, they are spatially distinct.
- 2.17.307 A precautionary impact magnitude of *medium* remains.
- f) v) b) Sensitivity
- 2.17.308 The introduction of hard substrata to a soft sediment environment is typically followed by rapid colonisation by fouling organisms. If the introduced habitat is atypical of the area, then this could allow INNS that would otherwise be unable to colonise to become established.
- 2.17.309 Only one subtidal INNS was recorded in the GSB during the Sizewell C benthic baseline surveys, the American jackknife *E. leei* (previously *E. directus*), which was found in a single grab sample (see in **Volume 2, Appendix 22C** of the **ES**; Doc Ref 6.3) [APP-320]. This species has been present on East Anglian coasts since 1990 (Ref. 55). As *E. leei* lives in soft sediments, the addition of new artificial hard substrate would not influence its distribution within the GSB or the southern North Sea.
- 2.17.310 The sensitivity of subtidal benthic invertebrates to the spread of INNS due to infrastructure installation was determined to be low for each development component. The same sensitivity is applied here for the combination of all development components (BLFs, CDO, CWS and FRR).

- 2.17.311 The spread of INNS due to the presence of all development components combined is predicted to have a minor adverse effect on this receptor. The effect is **not significant**.
- 2.17.312 The potential in-combination influence of infrastructure (combined components) and temperature uplifts – due to cooling water discharges and climate change – on benthic ecology receptors via the spread of INNS was assessed for the operation phase of the power station in **Volume 2, Chapter 22** of the **ES** (Doc Ref. 6.3) [AS-035]. The temporary BLF will only be in place for approximately eight years and the increase in additional hard substrate from the enhanced permanent BLF is very small therefore the original assessment stands.

2.18 Marine historic environment

a) Introduction

- 2.18.1 This section provides an addendum to the marine historic environment assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 23** of the **ES** (Doc Ref. 6.3) [[APP-334](#)].

- 2.18.2 There is no Additional Information relevant to the marine historic environment assessment. However, this assessment considers the proposed changes, as summarised in sections below.

b) Relevant changes

- 2.18.3 The proposed changes to the Sizewell C Project, most notably the proposed change to the BLFs (**Change 2**), have been reviewed to determine the potential for new or different significant effects to occur with regards to the marine historic environment assessment presented within **Volume 2, Chapter 23** of the **ES** (Doc Ref. 6.3) [APP-334].

c) Updated assessment – enhancement of the permanent BLF and construction of a new, temporary BLF (**Change 2**)

- 2.18.4 The proposed change to enhance the permanent BLF and to provide a new temporary BLF would result in additional construction activity within the marine environment and impact upon the seabed. Further refinements to the proposed dredging area for the permanent BLF have also been reviewed.
- 2.18.5 These changes could increase the risk of impacting maritime material culture, such as wrecks, or submerged palaeolandscapes features. Previous marine surveys of the area have not identified any wreck sites

within the immediate vicinity of the proposed marine development. Previous geotechnical site investigations in close proximity to the proposed BLFs have determined the submerged palaeolandscape (refer to **Figure 23.1** within **Volume 2, Appendix 23C** of the **ES** (Doc Ref. 6.3) [APP-335]).

- 2.18.6 Visual impact (originally assessed in **Volume 2, Chapter 16** of the **ES** (Doc Ref. 6.3) [APP-272] is assessed in **section 2.11 Terrestrial historic environment**; see also **section 2.8 Landscape and visual**.
- 2.18.7 The assessment of the likely geomorphological impacts from the proposed BLFs (see **section 2.15 Coastal geomorphology and hydrodynamics**) suggests minimal additional impacts, such as scour.
- 2.18.8 No major effects to known wreck sites, as identified within **Volume 2, Chapter 23** of the **ES** (Doc Ref. 6.3) [APP-334], are expected from the proposed changes to the Sizewell C Project.
- 2.18.9 The proposed additional activities would not alter the assessment presented in **Volume 2, Chapter 23** of the **ES** (Doc Ref. 6.3) [APP-334]. The mitigation measures proposed for the marine historic environment in the **ES**, consisting of a finds reporting protocol and geoarchaeological and palaeoenvironmental analysis and academic dissemination, remain unchanged. Archaeological assessment of future site investigations (marine geophysical survey and geotechnical site investigations), in relation to the proposed temporary BLF, would be undertaken.

2.19 Marine navigation

a) Introduction

- 2.19.1 This section provides an addendum to the marine navigation assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 24** of the **ES** (Doc Ref. 6.3) [[APP-337](#)].

- 2.19.2 There is no Additional Information relevant to the marine navigation assessment. However, this assessment considers the proposed changes, as summarised in sections below.

b) Relevant changes

- 2.19.3 The following design changes have been considered within the revised assessment for marine navigation at the main development site:
- Enhancement of the permanent BLF (**Change 2**): The original design of the BLF has changed to include a grounding platform. Vessels would no

longer be required to ground at the BLF, which would allow a larger number of deliveries and reduce the requirement for dredging. The grounding platform would be comprised of concrete slabs protruding up to 1m above the seabed. Installation works would be underwater using marine plant and equipment. Up to approximately 100 beach landings per annual campaign could be achieved in total for up to approximately four years.

- Construction of a new, temporary BLF (**Change 2**): A second, temporary BLF would be located approximately 165m to the south of the permanent BLF, consisting of a number of pairs of marine piles extending seaward of the outer nearshore sand bar, approximately 505m from the beach and culminating in a single berth loading platform at its seaward end to provide space to handle the cargo, maintain equipment and to allow the mooring of vessels parallel to the beach. The temporary BLF is expected to receive up to 400 deliveries between April and October (inclusive), and up to approximately 200 additional deliveries for the remainder of the year, for each year of operation.

c) Updated assessment - enhancement of the permanent BLF
(**Change 2**)

c) i) Baseline

- 2.19.4 The proposed changes do not change the existing and future baseline for marine navigation as described in **Volume 2, Chapter 24** of the **ES** (Doc Ref. 6.3) [APP-337].

c) ii) Environmental Design and Mitigation

- 2.19.5 The mitigation measures set out within **Volume 2, Chapter 24** of the **ES** (Doc Ref. 6.3) [APP-337] include circulation of information in advance of and during the works, and establishing temporary safety zones around the BLF and construction works, marking of offshore pilings for the BLF with buoys, delivery and logistics plans for delivery vessels, Competent Harbour Authority, marine procedures and a Safety Management System. Furthermore, suitable lighting and marking of the BLF in consultation with Trinity House is proposed.

c) iii) Assessment of effects

c) iii) a) Construction

- 2.19.6 The increase in the number of deliveries leads to increased collision risk of passing vessels and vessels actively fishing and with vessels using the BLF (referred to as AIL delivery vessels in the ES). However, with

mitigation in place, as described within **section 2.19c)ii)** above, the frequency of occurrence of this effect (i.e. predicted frequency of collision) is assessed to remain extremely unlikely and the overall ranking tolerable (**not significant**).

2.19.7 The increase in the number of deliveries leads to an increased risk of a delivery vessel/tug grounding due to shallow waters in the surrounding area. With appropriate mitigation in place, as described above, the frequency of this effect remains extremely unlikely and the overall ranking remains tolerable (**not significant**).

2.19.8 The increase in the number of deliveries leads to increased disruption to fishing and recreational activities close to the shore. The frequency of disruption to fishing and recreational activities remains reasonably probable and the overall ranking remains tolerable (**not significant**).

c) iii) b) Operation

2.19.9 There are no new or different significant operational effects for marine navigation as a result of the design change, in comparison with **Volume 2, Chapter 24** of the **ES** (Doc Ref. 6.3) [APP-337], as the proposed change would not alter proposals for the operational use of the permanent BLF.

d) Updated assessment - temporary BLF

d) i) Baseline

2.19.10 The proposed changes do not change the existing and future baseline for marine navigation as described in **Volume 2, Chapter 24** of the **ES** (Doc Ref. 6.3) [APP-337].

d) ii) Environmental Design and Mitigation

2.19.11 The following mitigation measures set out within **Volume 2, Chapter 24** of the **ES** (Doc Ref. 6.3) [APP-337] would also apply to the proposed temporary BLF: circulation of information in advance of and during the works, and establishing temporary safety zones around the BLF and construction works, delivery and logistics plans for delivery vessels, Competent Harbour Authority, marine procedures and a Safety Management System.

2.19.12 In addition, the temporary BLF would be required to be suitably marked and lit in accordance with Trinity House requirements.

d) iii) Assessment of effects

d) iii) a) Construction

- 2.19.13 An updated Collision Risk Assessment to account for the proposed change is provided within **Volume 3, Appendix 2.19.A** of this **ES Addendum**.
- 2.19.14 The additional construction works required for the temporary BLF would lead to an increased collision risk of passing vessels and vessels actively fishing with construction vessels. Construction would commence on the beach and progress out to sea using a crane and associated equipment located on the constructing parts (Cantitravel). Construction is expected to take nine months to complete. With mitigation in place, as described within **section 2.19d)ii)** above, the frequency of occurrence of this effect (i.e. predicted frequency of collision between passing vessels and vessels actively fishing with construction vessels) is assessed to be extremely unlikely and the severity moderate, resulting in a risk ranking of tolerable (**not significant**).
- 2.19.15 During its operation, the increase in the number of deliveries leads to increased collision risk of passing vessels and vessels actively fishing with vessels using the temporary BLF. The collision frequency associated with delivery vessels was assessed using collision risk modelling. Based on the results, with mitigation in place, as described above, the frequency is expected to remain extremely unlikely and the severity moderate, resulting in an overall risk ranking of tolerable (**not significant**).
- 2.19.16 The increase in the number of deliveries, as well as the additional construction works, leads to increased collision risk between construction vessels and delivery vessels. With mitigation in place, as described above, the frequency is expected to be remote and the severity moderate, resulting in an overall risk ranking of tolerable (**not significant**).
- 2.19.17 The increase in the number of deliveries could lead to an increased risk of a delivery vessel/tug grounding due to shallow waters in the surrounding area. However, for the temporary BLF, the delivery vessels would moor in deeper water and therefore the risk of grounding is expected to be tolerable (**not significant**).
- 2.19.18 The increase in the number of deliveries and larger footprint covered by the temporary BLF leads to increased disruption to fishing and recreational activities close to the shore. The frequency of this effect is considered to be frequent, and the severity minor, resulting in a risk ranking of tolerable (**not significant**).

d) iii) b) Operation

- 2.19.19 As the temporary BLF would be dismantled following its use during the construction phase, there are no new or different significant effects for marine navigation during the operation of the Sizewell C Project, as a result of the design change, in comparison with **Volume 2, Chapter 24** of the **ES** (Doc Ref. 6.3) [APP-337].

e) Updated assessment – combined effects

- 2.19.20 The increased use of the permanent BLF combined with the temporary BLF could lead to increased collision risk between the delivery vessels. With mitigation in place, as described above, the frequency of collision is expected to be remote and the severity moderate, resulting in an overall risk ranking of tolerable (**not significant**).

2.20 Radiological considerations

- 2.20.1 Proposed changes to the Sizewell C Project have been reviewed to determine the potential for new or different significant effects to occur with regards to the radiological impact assessment presented within **Volume 2, Chapter 25** of the **ES** (Doc Ref. 6.3) [APP-340]. The proposed changes do not impact on any work activities, facilities or processes which involve the handling or the production of radioactive items or material. Therefore, there would be no change to the radiological impact assessment presented within **Volume 2, Chapter 25** of the **ES** (Doc Ref. 6.3) [APP-340].

2.21 Climate change

a) Introduction

- 2.21.1 This section provides an addendum to the climate change assessment with reference to the following documents submitted with the Application:
- **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342].
- 2.21.2 The climate change assessment presented within **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342] provided a project-wide assessment. Therefore, where appropriate, in addition to considering the Additional Information and proposed changes for the main development site, relevant information for associated developments has also been considered.
- 2.21.3 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) Relevant Additional Information

2.21.4 The following Additional Information is relevant to the assessment of climate change reported within **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342]:

- Greenhouse Gas (GHG) assessment:
 - updated materials management strategy assumptions (as described in **section 2.2** of this chapter);
- Climate Change Resilience (CCR) and In-Combination Climate Impact (ICCI) assessments:
 - two village bypass and Sizewell link road outline landscape and ecology management plans (Doc Ref. 8.3A and 8.3B) (as described in **Chapters 5 and 6** of this **ES Addendum**).

c) Relevant changes

2.21.5 The following proposed design changes are relevant to the climate change assessment:

- GHG assessment:
 - potential increase in rail movements (**Change 1**) and vessel movements by sea (**Change 2**) during the construction of Sizewell C, and consequent reduction in HGV movements, as described in **section 2.2** of this chapter;
 - extension of the Order Limits to provide for additional fen meadow habitat at Pakenham as mitigation for fen meadow loss (**Change 11**); (as described in **section 2.2.** of this chapter); and
 - revised waste quantities as a result of changes to the two village bypass and Sizewell link road site areas (**Change 12**).
- CCR and ICCI assessments:
 - change to the location of the water resource storage area and the addition of flood mitigation measures to lower flood risk (**Change 5**) (as described in **section 2.2.** of this chapter);
 - change to the SSSI crossing design to a single span bridge with embankments (**Change 6**) (as described in **section 2.2.** of this chapter);

- change to the sea defence to make the scheme more efficient and resilient to climate change (**Change 9**) (as described in **section 2.2.** of this chapter);
- change to the drainage design of Sizewell link road (**Change 12**) (as described in **Chapter 6** of this **ES Addendum**).

d) GHG updated assessment – Additional Information

2.21.6 To account for the updated material quantities required for construction at the main development site, as set out within the **Materials Management Strategy Update (Volume 3, Appendix 2.2.C of this ES Addendum)**, the construction GHG emissions of the Sizewell C Project have been re-calculated. With the increase in the quantity of materials required, the total embedded carbon in materials would equate to 5,340,327 tonnes of CO₂ equivalents (tCO₂e). This is an increase of 508,085 tCO₂e compared to the values reported in **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342]. However, as described in further detail in **section 2.21h** of this chapter, the overall conclusion of **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342] of **no significant** effect on the UK's ability to meeting its carbon budgets through to 2032 would remain valid.

e) GHG updated assessment – potential increase in rail and vessel movements and reduction in HGV movements (**Changes 1 and 2**)

2.21.7 With the potential increase in rail movements (**Change 1**) and vessel movements by the sea (**Change 2**), and the associated reduction in HGV movements, the GHG emissions associated with the transport of materials to site have been recalculated. The total GHG emissions associated with the transport of materials to site would equate to 274,323 tCO₂e. This is an decrease of 9,126 tCO₂e compared to the values reported in **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342], However, as described in further detail in **section 2.21h** of this chapter, the overall conclusion of **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342] of **no significant** effect on the UK's ability to meeting its carbon budgets through to 2032 would remain valid.

f) GHG updated assessment – extension of the Order Limits for additional fen meadow habitat at Pakenham (**Change 11**)

2.21.8 The provision of a new fen meadow site at Pakenham would generate an additional carbon sink benefit of 1,563 tCO₂e. The provision of this site would increase the overall carbon sink net gain associated with the habitat creation proposals of the Sizewell C Project to 2,870 tCO₂e. However, as described in further detail in **section 2.21h** of this chapter, this would not change the overall conclusion of **Volume 2, Chapter 26** of the **ES** (Doc

Ref. 6.3) [APP-342] of **no significant** effect on the UK's ability to meeting its carbon budgets through to 2032.

g) GHG updated assessment - revised waste quantities (**Change 12**)

2.21.9 To account for the updated waste quantities estimated from the construction of the Sizewell C Project, as described within **section 2.3** of this chapter, the construction GHG emissions of the Sizewell C Project have been re-calculated. With the estimated increase in the quantity of waste generated, the total GHG emissions from waste management would equate to 54,151 (tCO₂e). This is an increase of 227 tCO₂e compared to the values reported in **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342]. However, as described in further detail in **section 2.21h)** of this chapter, the overall conclusion of **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342] of **no significant** effect on the UK's ability to meeting its carbon budgets through to 2032 would remain valid.

h) GHG updated assessment – combined effects

h) i) Construction

2.21.10 An updated summary of construction GHG emissions from the Sizewell C Project is provided within **Table 2.66** below.

Table 2.66: Construction GHG emissions (Sizewell C Project)

Lifecycle stage	Project activity / Emissions source	Emissions (tCO ₂ e) as set out within Volume 2, Chapter 26	% of construction emissions as set out within Volume 2, Chapter 26	Updated emissions (tCO ₂ e)	Updated % of construction emissions
Construction	Embedded carbon in materials	4,832,242	84%	5,340,327	86%
	Construction activities	204,880	4%	204,880	3%
	Transport of materials to site	283,449	5%	274,323	4%
	Construction worker commuting	302,566	5%	302,566	5%
	Waste treatment and disposal	53,924	<1%	54,151	<1%
	CHP (worker accommodation)	52,735	<1%	52,735	<1%

Lifecycle stage	Project activity / Emissions source	Emissions (tCO ₂ e) as set out within Volume 2, Chapter 26	% of construction emissions as set out within Volume 2, Chapter 26	Updated emissions (tCO ₂ e)	Updated % of construction emissions
	Removal and treatment of materials from temporary associated developments	8,286	<1%	8,286	<1%
	Total	5,738,084		6,237,269	

2.21.11 Table 2.67 below presents the updated estimated construction emissions against the carbon budget period during which they arise. The final full year of construction, 2033, is currently outside of the set carbon budget periods.

Table 2.67: UK carbon budgets relevant to construction period

UK Carbon Budget (applicable years)	UK Carbon Budget (MtCO ₂ e)	Construction emissions during carbon budget period (MtCO ₂ e) as set out within Volume 2, Chapter 26	Construction emissions as a proportion of Carbon Budget as set out within Volume 2, Chapter 26	Updated construction emissions during carbon budget period (MtCO ₂ e)	Updated construction emissions as a proportion of Carbon Budget
3 rd (2018 – 2022)	2,554	0.48	0.02%	0.52	0.02%
4 th (2023 – 2027)	1,950	2.39	0.12%	2.60	0.13%
5 th (2028 – 2032)	1,765	2.39	0.14%	2.60	0.15%

2.21.12 Emissions from the construction of the Sizewell C Project would be 0.02-0.15%, i.e. remain well below 1% of the total emissions (the threshold used to determine the magnitude of impact) during any five-year carbon period under which they arise. The magnitude of effect during construction would therefore remain low and **no significant** effect on the UK's ability to meeting its five carbon budgets through to 2032 would arise.

h) ii) Operation and long-term operational benefits

2.21.13 There is no change to the operational GHG emissions as a result of the Additional Information and proposed design changes. Over the 60 year

operational life of the Sizewell C Project, the lifecycle GHG emissions would equate to 4.8g CO₂e/kWh following the update to construction emissions (as opposed to 4.5g CO₂e/kWh reported in **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342]).

2.21.14 On the basis of a conservative estimate, the updated construction GHG emissions would be offset within the first six years of operation by GHG emissions displaced, assuming the equivalent energy were otherwise to be generated by the anticipated mix of grid electricity generation sources.

2.21.15 When comparing the GHG impact of electricity generated at Sizewell C against the impact of generating the equivalent energy from the anticipated future mix of alternative generation, Sizewell C would provide a **significant** beneficial effect. GHG emissions reduced as a result of Sizewell C would equate to over 3% of the total UK energy sector emissions in 2034.

i) CCR and ICCI updated assessment

2.21.16 The Additional Information and proposed design changes validate or improve the design of the Sizewell C Project in terms of flood resilience. Furthermore, the outline landscape and ecology management plans for two village bypass (Doc Ref. 8.19) and Sizewell link road (Doc Ref. 8.20) have been drafted to incorporate planting tolerant to existing and future climatic conditions (e.g. resilient to drought and disease) and to provide a strategy for the long-term management of habitats that takes into account climate change adaptation and resilience. As a result, there is no change to the CCR or ICCI assessments reported within **Volume 2, Chapter 26** of the **ES** (Doc Ref. 6.3) [APP-342].

2.22 Major accidents and disasters

a) Introduction

2.22.1 This section provides an addendum to the major accidents and disasters assessment with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 27** of the **ES** (Doc Ref. 6.3) [APP-344]; and
- **Volume 2, Appendix 27A** of the **ES** (Doc Ref. 6.3) [APP-345].

2.22.2 The major accidents and disasters assessment presented within **Volume 2, Chapter 27** and **Appendix 27A** of the **ES** (Doc Ref. 6.3) [APP-344, APP-345] provided a project-wide assessment. Therefore, where appropriate, in addition to considering the Additional Information and

proposed changes for the main development site, relevant information for associated developments has also been considered.

- 2.22.3 There is no Additional Information of relevance to the assessment of major accidents and disasters. However, a review of the relevant proposed changes is provided in sections below.

b) Relevant changes

- 2.22.4 All of the proposed changes to the Sizewell C Project (**Changes 1 – 15**) have been reviewed to determine the potential for new or different significant effects to occur with regards to the major accidents and disasters assessment presented within **Volume 2, Chapter 27** and **Appendix 27A** of the **ES** (Doc Ref. 6.3) [APP-344 and APP-345].

- 2.22.5 The conclusions drawn within the updated assessment apply to all proposed changes and, therefore, the assessment is not split up by proposed change.

c) Updated assessment – proposed changes (**Changes 1 – 15**)

- 2.22.6 The proposed changes would not introduce any new major accidents and disasters hazard sources to those already identified within **Volume 2, Chapter 27** of the **ES** (Doc Ref. 6.3) [APP-344 and APP-345].

- 2.22.7 Furthermore, the proposed changes would not adversely affect the vulnerability of the proposed development to major accidents and disasters. In fact, the proposed changes would reduce risks associated with flood risk at the main development site, through the addition of further flood mitigation measures to reduce flood risk (**Change 5**), change of the SSSI crossing design to a single span bridge with embankments (**Change 6**) and change to the sea defence (**Change 9**).

- 2.22.8 Whilst there could be an increase in train movements on the rail extension route by one train per day (**Change 1**), as the railway and level crossings are to be designed and operated in accordance with relevant Network Rail standards, this additional movement would not alter the assessment with regards to the risk of train derailment (Risk ID 30), collision or injury to members of the public using level crossings (Risk ID 31).

- 2.22.9 The proposed change to enhance the permanent BLF and to provide a new temporary BLF (**Change 2**) would also result in additional construction activity within the marine environment. These changes could therefore increase hazards associated with construction in the marine environment (Risk ID C27) and maritime unexploded ordnance (UXO) (Risk ID C16). However, these additional activities would not alter the assessment as the mitigation measures proposed for these hazards in the

ES, including the requirements relating to pollution prevention in the marine environment, as set out in the **CoCP** (Doc Ref. 8.11 (A)), and the completion of detailed marine UXO risk assessment, would ensure that risk remains tolerable if as low as reasonably practicable (**not significant**).

- 2.22.10 The navigational risk (Risk ID C26) associated with the increased number of vessel movements by sea and the construction and operation of the two BLFs due to **Change 2** is considered within **section 2.19** of this chapter.
- 2.22.11 **Volume 2, Chapter 27** of the **ES** (Doc Ref. 6.3) [APP-344 and APP-345] also presented the major accidents and disasters for the associated development sites. None of the changes described within **Volume 1, Chapters 3 to 9** of the ES Addendum would alter the findings of the major accidents and disaster assessment as no new hazard sources would be introduced and there would be no change to the vulnerability of the proposed development to major accidents and disasters hazards.
- 2.22.12 Overall, there would be no change to the conclusions of the assessment presented within **Volume 2, Chapter 27** of the **ES** (Doc Ref. 6.3) [APP-344 and APP-345], and all major accidents and disasters risks would remain as tolerable or tolerable if as low as reasonably practicable (**not significant**).

2.23 Health and wellbeing

a) Introduction

- 2.23.1 This section provides an addendum to the health and wellbeing assessment with reference to the following documents submitted with the Application:
- **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [[APP-346](#)].
- 2.23.2 The health and wellbeing assessment presented within **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346] provided a project-wide assessment. Therefore, where appropriate, in addition to considering the Additional Information and proposed changes for the main development site, relevant information for associated developments has also been considered.
- 2.23.3 This assessment considers the relevant Additional Information and proposed changes, as summarised in sections below.

b) Relevant Additional Information

2.23.4 Inter-related technical assessments that informed the health and wellbeing assessment within **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346] have been updated as part of this ES Addendum to include relevant Additional Information, namely:

- noise and vibration;
- air quality; and
- transport.

2.23.5 All three technical assessments have updated modelling. On the basis that the health and wellbeing assessment relies on key modelling outputs from these technical assessments, the health and wellbeing section within this chapter outlines the key updates based on this relevant Additional Information, and considers whether or not they are material enough to alter the effects predicted and conclusions drawn within **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346].

c) Relevant changes

2.23.6 The following proposed changes have been considered within the updated assessment for health and wellbeing, as they change the inter-related technical assessments (detailed above) that influence health and wellbeing:

- Increase in the frequency of freight train movements to facilitate bulk material imports by rail (**Change 1**).
- Enhanced permanent BLF and a new, temporary BLF to import material by sea (**Change 2**).

2.23.7 However, due to the location of the BLFs away from populated areas, there is limited potential for changes in environmental determinants during construction and operation that influence health and wellbeing. As a result, these have been scoped out from further assessment.

2.23.8 Both the increase in freight train movements and proposed BLFs would contribute to changes in road traffic flows whereby, as a larger quantity of material would be transported by rail and sea, there would be an offset in HGV movements on existing roads. The potential health and wellbeing effects associated with this is considered in **section 2.23f** of this chapter.

d) Updated assessment – Additional Information

d) i) Baseline

- 2.23.9 The Additional Information does not alter the existing and future baseline for Health and Wellbeing as described in **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346].

d) ii) Environmental Design and Mitigation

- 2.23.10 As per **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346], primary and tertiary mitigation measures detailed within each of the technical assessments that influence health are inherently in place to remove or manage environmental hazards to preclude potentially adverse health and wellbeing effects. No changes are proposed to mitigation measures as a result of the Additional Information.

d) iii) Assessment of effects

d) iii) a) Road traffic noise

- 2.23.11 As detailed in the noise and vibration sections across **Chapters 2, 5, 6, 7** and **9** of this **ES Addendum**, changes have been made to the noise and vibration assessment based on an update to the refined strategic traffic flow model and corrections of errors found in the road traffic noise predictions.
- 2.23.12 Reported noise effects which have improved or remain beneficial in comparison to the baseline scenario have not been listed below, but are conveyed qualitatively. For further detailed analysis on changes in noise, refer to the relevant noise and vibration sections of this **ES Addendum**.
- 2.23.13 The Additional Information results in no change to the significance of effects from road noise on existing roads, as described in **section 2.6** of this chapter.
- 2.23.14 At the two village bypass, the following changes have been identified to the noise and vibration assessment, resulting from the Additional Information (refer to **Chapter 5** of this **ES Addendum**):
- one change from minor adverse (**not significant**) to moderate adverse (**significant**) during the 2028 Typical Night scenario (at Receptor 1).
- 2.23.15 The change from minor adverse to moderate adverse during the 2028 Typical Night scenario at Receptor 1 is based on an updated noise difference between the baseline and with development of +3.0 dB rather than +2.9 dB (reported in the ES). While only a change of +0.1 dB, as the

increase takes place on an existing road and is no longer “less than +3.0 dB”, it moves up a magnitude classification category.

2.23.16 At the Sizewell link road, the following changes have been identified to the noise and vibration assessment resulting from the Additional Information (refer to **Chapter 6** of this **ES Addendum**):

- two changes from minor adverse (**not significant**) to moderate adverse (**significant**) during the 2034 Typical Day scenario (at Receptors 15 and 37); and
- one change from minor adverse (**not significant**) to moderate adverse (**significant**) during the 2028 Typical Day scenario (at Receptor 35).

2.23.17 On the basis that the adverse changes identified at the Sizewell link road would be during the daytime period only, the potential health and wellbeing effect would be limited to daytime annoyance.

2.23.18 At the Yoxford roundabout, the following changes have been identified to the noise and vibration assessment, resulting from the Additional Information (refer to **Chapter 7** of this **ES Addendum**):

- one change from minor adverse (**not significant**) to moderate adverse (**significant**) during the 2028 Typical Night scenario (at Receptor 14); and
- one change from minor adverse (**not significant**) to moderate adverse (**significant**) during the 2028 Busiest Night scenario (at Receptor 14).

2.23.19 In total, there would be adverse changes at five different human receptors due to the Additional Information. Beneficial changes (i.e. reductions in noise exposure) as a result of the Additional Information have been identified at 15 human receptors.

2.23.20 On this basis, a larger population is likely to experience noise improvements rather than noise worsening. The net change to the effects would therefore be beneficial, as would the resulting health and wellbeing effect at the population level. While an improvement, the Additional Information does not materially change the assessment of significance reported within **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346].

d) iii) b) Air quality

2.23.21 As detailed in the air quality sections across **Chapters 2-9** of this **ES Addendum**, changes have been made to the air quality assessment based on an update to the refined strategic traffic flow model; corrections

of an error found in reported transport-related pollutant concentrations at receptor SX6; updated background concentration maps from Defra's updated Emissions Factors Toolkit; and an updated NO_x to NO₂ conversion tool.

- 2.23.22 The updated air quality baseline shows that background pollutant concentrations in the study area remain well below the relevant air quality objectives. Future background pollutant concentrations in the study area also remain well below the relevant air quality objectives set to protect the environment and health, showing an overall decrease in all pollutant levels from 2023 to 2034.
- 2.23.23 The Additional Information does not change the assessment of construction dust, and construction and operational non-mobile plant emissions. However, there are changes associated with construction and operational transport emissions which have been reviewed to analyse potential health and wellbeing effects as a result.
- 2.23.24 As detailed in **Chapter 5** of this **ES Addendum**, with the Additional Information, a small number of receptors adjacent to the two village bypass will now experience a minor adverse effect from NO₂ during the peak year of construction scenario, which is **not significant**. This remains consistent with what is reported in the **ES**, where the impact of transport emissions in all modelled scenarios during construction would have a negligible effect at most residential receptor locations, with only a limited number of receptors experiencing a minor adverse effect, or a minor or moderate beneficial effect. It should also be noted that the minor adverse effects would not persist, as they would occur during the peak year of construction and would therefore be limited in their potential to cause chronic adverse health and wellbeing effects.
- 2.23.25 Similarly, as reported in the **ES**, during operation the impact of transport emissions in all modelled scenarios would have a negligible effect at most residential receptor locations, with only a limited number of receptors experiencing a minor or moderate beneficial effect in the villages of Stratford St Andrew and Farnham.
- 2.23.26 As such, changes in air quality associated with the Additional Information do not substantially differ from what is reported in the **ES**, with the resultant significance of effect on health and wellbeing remaining the same.
- d) iii) c) [Transport \(road safety and journey delays\)](#)
- 2.23.27 As detailed in **section 2.5** of this chapter, in light of updates to the refined strategic traffic flow model, all traffic assessments have been revisited.

2.23.28 While the approach adopted in **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346] only considers the conclusions relating to likely significant effects on road safety, due to concerns raised during consultation the health and wellbeing assessment addendum also considers potential impacts on driver delays and how this would affect the ability to serve the community (i.e. travel associated with community healthcare, ambulance conveyance and emergency response).

d) iii) c) a) Road safety

2.23.29 As detailed in **section 2.5** of this chapter, prior to any mitigation, it is estimated that there would be an additional 14 collisions per annum across the entire study area during the Early Years. When applying the distribution of incident severity, this would indicate a split of 12 slight collisions and 2 serious collisions. During peak construction (busiest day), there is the potential for a 18 collisions per annum across the entire study area, of which trends would indicate 15 to be slight and 2-3 serious collisions.

2.23.30 Local trend data indicates that fatal accidents on the existing road network are far less frequent but do occur. During peak construction (i.e. the busiest day), the increase in traffic movements directly attributable to the proposed development has the potential to result in 0.25 of a fatality per year. It is important to note that the 0.25 of a fatality per year is an aggregate value shared across the entire road network study area, applies two-way traffic movements which would occur only on the busiest day during the peak construction year, and remains considerably lower on the majority of individual road links assessed.

2.23.31 On the basis of the above and considering the embedded mitigation measures in place to reduce the potential number of collisions, there is no material change to the potential health and wellbeing effects reported within **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346].

d) iii) c) b) Journey delays

2.23.32 As stated in **section 2.5** of this chapter, as a result of the Additional Information, journey times during peak construction on the A12 northbound are predicted to increase by up to 62 seconds between 08:00-09:00 and for all other hours the increase would be less than 36 seconds. In the southbound direction, the model predicts a journey time increase of 0-28 seconds. Over the 14 km route, this is considered to be imperceptible to drivers and even combined impacts from multiple trips throughout the day would not affect the scheduling or delivery of community health services or materially impact on ambulance conveyance and emergency response.

- 2.23.33 As no health and wellbeing assessment relating to journey delays was provided in **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346], **section 2.5** of this chapter should be referred to for a comprehensive assessment of significance in comparison to the ES.
- e) Updated assessment – increase in the frequency of freight train movements to facilitate bulk material imports by rail (**Change 1**)
- e) i) Baseline
- 2.23.34 The proposed change does not alter the existing and future baseline for health and wellbeing as described in **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346].
- e) ii) Environmental Design and Mitigation
- 2.23.35 As per **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346], primary and tertiary mitigation measures detailed within each of the technical disciplines that influence health are inherently in place to remove or manage environmental hazards to preclude potentially adverse health and wellbeing effects.
- 2.23.36 In the majority of instances, there is no change to the mitigation measures proposed. However, the Rail Noise Mitigation Strategy (**Volume 3, Appendix 9.3.E** of this **ES Addendum**) has been refined.
- e) iii) Assessment of effects
- 2.23.37 The increase in the frequency of freight train movements to facilitate bulk material imports by rail would increase instances of significant rail noise effects at receptor groups. The potential impact on sleep disturbance associated with rail noise from the proposed changes is assessed in **Volume 3, Appendix 9.3.D** of this **ES Addendum**.
- 2.23.38 However, as reported in the ES, significantly affected receptors would fall under the provisions of the Noise Mitigation Scheme and further assessments would be undertaken to identify where additional mitigation is required to avoid and manage any receptor group exposure to noise exceeding the significant observed adverse effect level (SOAEL). Furthermore, the number of properties experiencing noise levels between the lowest observed adverse effect level (LOAEL) and SOAEL would not materially change. On this basis, the health and wellbeing effects would remain the same as reported in the ES.
- 2.23.39 The increase in quantity of material transported by rail indirectly contributes to a reduction in HGV movements on existing road traffic flows. This is addressed in **section 2.23f**).

f) Updated assessment – reduction in HGV movements as a result of **Changes 1 and 2**

f) i) Road traffic noise

- 2.23.40 As detailed in the noise and vibration sections across **Chapters 2, 5, 6, 7 and 9** of this **ES Addendum**, a reduction in HGV numbers would occur as a result of the revised freight management strategy assumptions (i.e. a larger quantity of material is to be transported by rail and sea). Although some noise impacts are predicted to remain the same, any changes in road traffic noise levels would result in an improvement when compared with the corrected and updated values. There is no worsening of road traffic noise resulting from the revised freight management strategy assumptions.
- 2.23.41 Specifically, as a result of the reduction in reliance on HGVs to transport material to the main development site, there would be a reduction in noise effect from minor (**not significant**) reported in the assessment with refined traffic modelling updates to negligible (**not significant**) during the 2028 Typical Day scenario at four human receptors.
- 2.23.42 As further described within **Chapter 5** of this **ES Addendum**, at the two village bypass, there would be a reduction in noise at three human receptors during the 2028 Busiest Day scenario. At two of these receptors, the reductions in noise would occur where the assessment with the refined traffic modelling identified an already beneficial noise impact. At the remaining receptor, the reductions in noise would occur where the assessment with refined traffic modelling updates identified an adverse noise impact.
- 2.23.43 As further described within **Chapter 6** of this **ES Addendum**, at the Sizewell link road, the following changes have been identified compared to the assessment with the refined traffic modelling:
- two changes from major adverse (**significant**) to moderate adverse (**significant**) during the 2028 Typical Day scenario (R33 and R38);
 - one change from moderate adverse (**significant**) to minor adverse (**not significant**) during the 2028 Typical Day scenario (R35);
 - one change from major adverse (**significant**) to moderate adverse (**significant**) during the 2028 Typical Night scenario (R34);
 - one change from moderate adverse (**significant**) to minor adverse (**not significant**) during the 2028 Busiest Day scenario (R2);

- one change from minor adverse (**not significant**) to negligible (**not significant**) during the 2028 Busiest Night scenario (R4);
- one change from moderate beneficial (**significant**) to major beneficial (**significant**) during the 2028 Busiest Day scenario (R10);
- one change from negligible (**not significant**) to minor beneficial (**not significant**) during the 2028 Busiest Day scenario (R11);
- one change from minor beneficial (**not significant**) to moderate beneficial (**significant**) during the 2028 Busiest Day scenario (R22); and
- two changes from major adverse (**significant**) to moderate adverse (**significant**) during the 2028 Busiest Day scenario (R38 and R42).

2.23.44 All the changes identified above, either reduce the adverse impacts reported in the ES (**Volume 6, Chapter 4** of the **ES** (Doc Ref. 6.7) [APP-451]), or are beneficial, reducing noise exposure and contributing to health and wellbeing benefits at these human receptors. However, a residual number of HGV movements would remain, and while representing an improvement to what was previously assessed within **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346], this does not materially change the health and wellbeing effects reported.

f) ii) Air quality

2.23.45 As detailed in the air quality sections across **Chapters 2-9** of this **ES Addendum**, the revised freight management strategy assumptions would only change transport emissions at receptors during the peak construction year.

2.23.46 The impact of transport emissions would have a negligible effect at most residential receptor locations, with only a limited number of receptors experiencing a minor adverse effect, or a minor or moderate beneficial effect. As such, there is no material change to the potential health and wellbeing effect reported within **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346].

f) iii) Transport (road safety and journey delays)

f) iii) a) Road safety

2.23.47 As stated in **section 2.5** of this chapter, the reduction in HGVs as a result of the revised freight management strategy assumptions (i.e. a larger quantity of material is to be transported by rail and sea) would further

reduce the likelihood and severity of collisions on the HGV routes described in **section 2.23d**).

- 2.23.48 On this basis, there is no material change to the potential health and wellbeing effects reported within **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346].

f) iii) b) Journey delays

- 2.23.49 With the proposed changes (i.e. increase in the frequency of freight train movements to facilitate bulk material imports by rail, refinements to the permanent BLF and the introduction of a second, temporary BLF), on the busiest day during peak construction (700 two-way HGV movements), the increase in journey time on the A12 northbound is predicted to be 11-42 seconds depending on the hour and 0-29 seconds on the A12 southbound depending on the hour. This represents a reduction of 3-20 seconds on the northbound route depending on the hour and 0-10 seconds on the southbound route depending on the hour when compared to the busiest day during peak construction without the proposed changes, which would require 1,000 two-way HGV movements.
- 2.23.50 On this basis, the proposed changes represent an improvement to the already imperceptible journey delays described in **section 2.23d**) and as already concluded, even combined impacts from multiple trips throughout the day would not affect the scheduling or delivery of community health services or materially impact on ambulance conveyance and emergency response.
- 2.23.51 As no health and wellbeing assessment relating to journey delays was provided in **Volume 2, Chapter 28** of the **ES** (Doc Ref. 6.3) [APP-346], **section 2.5** (Transport) of this chapter should be referred to for a comprehensive assessment of significance in comparison to the **ES**.

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