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HRA – Vol3 – Appendix 5 Ramsar Screening And Integrity Matrices

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Advice Note 10

Habitats Regulations Assessment Report

Appendix 5: Ramsar Screening and Integrity Matrices

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Ramsar Screening Matrices - Potential Effects

Potential effects upon the Ramsar(s)* which are considered within the submitted Habitat Regulations Assessment ('HRA') Report (APP-491, Rev 002) are provided in the table below. Effects have been grouped where appropriate for ease of presentation.

Effects considered within the screening matrices for marine ornithology features

#The information in this column relates to all phases of the project (i.e. construction, operation and decommissioning) unless otherwise stated.

Designation	Effects described in submission information #	Presented in screening matrices as
Portsmouth Harbour Ramsar Chichester and Langstone Harbours Ramsar Solent and Southampton Water Ramsar Pagham Harbour Ramsar Alderney West Coast and Burhou Islands Ramsar	Alone: • Disturbance & displacement • Indirect effects • Collision • INIS • Accidental spills • Litter	Alone: • Disturbance & displacement • Indirect effects • Collision • INIS • Accidental spills • Litter
	In combination: • Disturbance & displacement • Indirect effects • Collision • INIS • Accidental spills • Litter	In combination: • Disturbance & displacement • Indirect effects • Collision • INIS • Accidental spills • Litter

Effects considered within the screening matrices for onshore ecology features

#The information in this column relates to all phases of the project (i.e. construction, operation and decommissioning) unless otherwise stated.

Designation	Effects described in submission information #	Presented in screening matrices as
Portsmouth Harbour Ramsar Chichester and Langstone Harbours Ramsar	Alone: • Disturbance & displacement • Visual disturbance • Light pollution • Indirect effects • INIS • Accidental spills • Litter	Alone: • Disturbance & displacement • Visual disturbance • Light pollution • Indirect effects • INIS • Accidental spills • Litter

* As defined in Advice Note 10.

Designation	Effects described in submission information #	Presented in screening matrices as
	In combination: • Disturbance & displacement • Visual disturbance • Light pollution • Indirect effects • INIS • Accidental spills • Litter	In combination: • Disturbance & displacement • Visual disturbance • Light pollution • Indirect effects • INIS • Accidental spills • Litter

Effects considered within the screening matrices for fish features

#The information in this column relates to all phases of the project (i.e. construction, operation and decommissioning) unless otherwise stated.

Designation	Effects described in submission information #	Presented in screening matrices as
Baie de Somme Ramsar Marais Vernier et Vallée de la Risle maritime Ramsar	**Alone:**	**Alone:**
	• Increased SSC	• Increased SSC
	• Physical Injury	• Physical Injury
	• Invasive species	• Invasive species
	• Pollution events	• Pollution events
	• Noise and vibration	• Noise and vibration
	• Visual disturbance	• Visual disturbance
	• EMF (Operation)	• EMF
	• Temperature changes (Operation)	• Temperature changes
	In combination:	**In combination:**
	• Increased SSC	• Increased SSC
	• Noise and Vibration	• Noise and Vibration

Effects considered within the screening matrices for marine mammal features

#The information in this column relates to all phases of the project (i.e. construction, operation and decommissioning) unless otherwise stated. All of the effects listed were assessed for both the Proposed Development alone and for the Proposed Development in combination with other plans/projects.

Designation	Effects described in submission information#	Presented in screening matrices as
Baie de Somme Ramsar	• Auditory injury	• Auditory injury
	• Disturbance	• Disturbance
	• Collision	• Collision
	• Indirect effects	• Indirect effects
	• Pollution	• Pollution

STAGE 1: RAMSAR SCREENING MATRICES

The Ramsar sites included within the screening assessments are:

- Portsmouth Harbour Ramsar
- Chichester and Langstone Harbours Ramsar
- Solent and Southampton Water Ramsar
- Pagham Harbour Ramsar
- Alderney West Coast and Burhou Islands Ramsar
- Baie de Somme Ramsar
- Marais Vernier et Vallée de la Risle maritime Ramsar

The only features assessed are those features under the criteria applied to the designation of the Ramsar site in the Ramsar Information Sheets.

Pre-screened out sites for marine ornithology features:
- Baie de Somme Ramsar
- Marais Vernier et Vallée de la Risle maritime Ramsar

No marine ornithology features identified as part of these French Ramsar sites.

Pre-screened out sites for Annex I habitat features:
- Portsmouth Harbour Ramsar
- Chichester and Langstone Harbours Ramsar
- Solent and Southampton Water Ramsar
- Pagham Harbour Ramsar
- Baie de Somme Ramsar
- Marais Vernier et Vallée de la Risle maritime Ramsar

In discussions with Natural England, pressures and effects on most supporting habitat were screened out of the assessment and it was requested that only the potential for LSE on supporting habitat (water column) was considered in addition to marine ornithology features for SPA and Ramsar sites (see Appendix 4 Doc. Ref. APP-504 and Consultation Report Doc. RefAPP-025).

Pre-screened out sites for fish features:
- Portsmouth Harbour Ramsar
- Chichester and Langstone Harbours Ramsar
- Solent and Southampton Water Ramsar
- Pagham Harbour Ramsar

No fish features identified as part of these UK Ramsar sites.

Pre-screened out sites for marine mammal features:
- Portsmouth Harbour Ramsar
- Chichester and Langstone Harbours Ramsar
- Solent and Southampton Water Ramsar

- Pagham Harbour Ramsar
- Marais Vernier et Vallée de la Risle maritime Ramsar

No marine mammal features identified as part of these Ramsar sites.

Pre-screened out sites for onshore ornithology features:
- Solent and Southampton Water Ramsar
- Pagham Harbour Ramsar

No connectivity with the Proposed Development due to distance to Ramsar sites.

Evidence for, or against, likely significant effects on the Ramsar site(s) and its feature(s) is detailed within the footnotes to the screening matrices below.

Matrix Key:

✓ = Likely significant effect **cannot** be excluded
✕ = Likely significant effect **can** be excluded

C = construction
O = operation (and repair/maintenance)
D = decommissioning

B = breeding
W = wintering/non-breeding
P = passage

Where effects are not applicable to a particular feature they are greyed out.

HRA Ramsar Screening Matrix 1A: Portsmouth Harbour Ramsar (Marine Ornithology)

Name of Site: Portsmouth Harbour Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 4.9 km																		
Features	**Likely Effects of the Proposed Development (Alone)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		

HRA Ramsar Screening Matrix 1B: Portsmouth Harbour Ramsar (Marine Ornithology – In Combination)

Name of Site: Portsmouth Harbour Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 4.9 km																		
Features	**Likely Effects of the Proposed Development (In Combination)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		

HRA Ramsar Screening Matrix 1C: Portsmouth Harbour Ramsar (Onshore Ecology)

Name of Site: Portsmouth Harbour Ramsar (Onshore Ecology)																				
Distance to Proposed Development: 4.9 km																				
Features	**Likely Effects of the Proposed Development (Alone)**																			
	Disturbance & displacement			Visual disturbance			Light pollution			Indirect effects			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose	**✓a**	**×b**	**✓a**	**×c**	**×c**	**×c**	**×d**	**×d**	**×d**	**×e**	**×e**	**×e**	**×f**	**×f**	**×f**	**✓g**	**✓g**	**✓g**	**✓h**	**✓h**	**✓h**

Evidence supporting conclusions:

a. Cutts *et al.* (2013) determines that dark-bellied brent goose is highly sensitive to disturbance. While the distance between the Proposed Development and favoured foraging/roosting areas in Portsmouth Harbour is considered to be sufficient as to ensure that there no disturbance or displacement direct to the Ramsar site, there is potential for brent geese to be disturbed when using functionally linked / supporting habitat (SWBGS) during the construction and decommissioning phases.. Therefore, LSE applies to disturbance and displacement HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10). Potential adverse effects on site integrity are considered in the Stage 2 Integrity matrices below (See Ramsar Integrity Matrix 1A).

b. There is predicted to be no disturbance or displacement events as a result of onshore activities during the operational phase. Therefore, no LSE applies to disturbance and displacement for these features (HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10).

c. The distance between the Proposed Development and favoured foraging/roosting areas in Portsmouth Harbour is considered to be sufficient as to ensure no visual disturbance of any qualifying features or supporting habitat takes place during any development phase. Therefore, no LSE applies to visual disturbance (HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10).
d. The distance between the Proposed Development and favoured foraging/roosting areas in Portsmouth Harbour is considered to be sufficient as to ensure no light pollution effects of any qualifying features or supporting habitat takes place during any development phase. Therefore, no LSE applies to light pollution (HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10).
e. Increases in suspended sediment as a result of HDD works, cable burial activities and cable maintenance are expected to be highly localised and return to within comparable background concentrations within days. Given the distance between the Proposed Development and the Ramsar site, it is considered that there is no potential for impact during any development phase on dark-bellied brent goose as result of indirect effects. Therefore, no LSE applies to indirect effects (HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10).
f. There is no pathway for onshore construction work activities associated with the Proposed Development to introduce invasive non-indigenous species to the SPA. Therefore, no LSE applies to INIS.
g. Unplanned oil or chemical spillages from construction activity may occur during all development phases. Spills have the potential to directly affect all Ramsar features when in contact supporting habitat through direct oiling resulting in mortality. Therefore, LSE applies to accidental spills (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2). Potential adverse effects on site integrity are considered in the Stage 2 Integrity matrices below (see Ramsar Integrity Matrix 1A).
h. Unplanned disposal of industrial or user plastic during all development phases has the potential to directly affect Ramsar features and supporting habitat when utilising intertidal habitat through ingestion or entanglement resulting in mortality. Therefore, LSE applies to litter (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2). Potential adverse effects on site integrity are considered in the Ramsar Integrity Matrix 1A).

HRA Ramsar Screening Matrix 1D: Portsmouth Harbour Ramsar (Onshore Ecology – In Combination)

Name of Site: Portsmouth Harbour Ramsar (Onshore Ecology – In Combination)																					
Distance to Proposed Development: 4.9 km																					
Features	**Likely Effects of the Proposed Development (In Combination)**																				
	Disturbance & displacement			Visual disturbance			Light pollution			Indirect effects			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose	✓**a**	✕**b**	✓**a**	✕**c**	✕**c**	✕**c**	✕**d**	✕**d**	✕**d**	✕**e**	✕**e**	✕**e**	✕**f**	✕**f**	✕**f**	✓**g**	✓**g**	✓**g**	✓**h**	✓**h**	✓**h**

Evidence supporting conclusions:

a. LSE applies to the Proposed Development alone. Therefore, potential in combination LSE is considered in the Stage 2 Integrity Matrices below (Ramsar Integrity Matrix 1B).
b. There is predicted to be no disturbance or displacement events as a result of onshore activities during the operational phase. Therefore, no in combination LSE applies to disturbance & displacement for these features (HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10).
c. The distance between the Proposed Development and favoured foraging/roosting areas in Portsmouth Harbour is considered to be sufficient as to ensure no visual disturbance of any qualifying features or supporting habitat takes place during any development phase. Therefore, no in combination LSE applies to visual disturbance (HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10).
d. The distance between the Proposed Development and favoured foraging/roosting areas in Portsmouth Harbour is considered to be sufficient as to ensure no light pollution effects of any qualifying features or supporting habitat takes place during any development phase. Therefore, no in combination LSE applies to light pollution (HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10).
e. Increases in suspended sediment as a result of HDD works, cable burial activities and cable maintenance is expected to be highly localised and return to within comparable background concentrations within days. Given the distance between the Proposed Development and favoured foraging, breeding and roosting grounds of the SPA, it is considered that there is no potential for impact during any development phase on either qualifying features or supporting habitat. Therefore, no in combination LSE applies to indirect effects (HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10).
f. There is no pathway for onshore construction work activities associated with the Proposed Development to introduce invasive non-indigenous species to the SPA. Therefore, no in combination LSE applies to INIS (HRA Report (APP-491, Rev 002) Section 7.3 and Table 7.10).
g. LSE applies to the Proposed Development alone (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).. Therefore, potential for adverse effects on site integrity are considered in Ramsar Integrity Matrix 1B
h. LSE applies to the Proposed Development alone (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2). Therefore, the potential for in combination adverse effects on site integrity are considered in the Ramsar Integrity Matrix 1B.

HRA Ramsar Screening Matrix 2A: Chichester and Langstone Harbours Ramsar (Marine Ornithology)

Name of Site: Chichester and Langstone Harbours Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 0.1 km																		
Features	**Likely Effects of the Proposed Development (Alone)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		
Shelduck																		
Ringed plover																		
Common redshank																		
Grey plover																		
Little tern	**✓a**	**✓a**	**✓a**	**✓b**	**✓b**	**✓b**	**✕c**	**✕c**	**✕c**	**✕d**	**✕d**	**✕d**	**✓e**	**✓e**	**✓e**	**✓f**	**✓f**	**✓f**
Black-tailed godwit																		
Dunlin																		
Waterfowl Assemblage																		

Evidence supporting conclusions:

a. The presence of vessels and associated activities during all development phases may displace these moderately sensitive features from favoured foraging and/or roosting habitat through both visual disturbance and unpredictable noise events. Therefore, LSE applies to disturbance and displacement (HRA Report (APP-491, Rev 002) Sections 7.2.4 and 9.1.5, Tables 7.9 and 9.1) and is assessed in Ramsar Integrity Matrix 2A below.

b. Increases in SSC as a result of HDD works, cable burial activities and cable maintenance may affect prey availability within these foraging range of these features. Therefore, LSE applies to indirect effects (HRA Report (APP-491, Rev 002) Sections 7.2.4 and 9.1.5, Tables 7.9 and 9.1) and is assessed in Ramsar Integrity Matrix 2A below.

c. Structures or devices which have the potential to pose an above water collision risk to these features will not be introduced during any development phase. Surface feeding species are not considered to be vulnerable to below water collisions. The potential for an effect is therefore considered negligible and therefore no LSE applies to collision (HRA Report (APP-491, Rev 002) Section 7.2.4, Table 7.9).

d. There is no pathway for marine works to introduce invasive non-indigenous predators (e.g. mink) to breeding colonies for these features and therefore no LSE applies to INIS (HRA Report (APP-491, Rev 002) Section 7.2.4, Table 7.9).

e. Unplanned oil or chemical spillages from vessels may occur during all development phases. Spills have the potential to directly affect these features when utilising the sea surface e.g. through direct oiling resulting in mortality. Therefore, LSE applies to accidental spills (HRA Report (APP-491, Rev 002) Sections 7.2.4 and 9.1.5, Tables 7.9 and 9.1) and is assessed in Ramsar Integrity Matrix 2A below.

f. Unplanned disposal of industrial or user plastic into the water column during all development phases has the potential to directly affect these features and their prey species present in the water column e.g. through ingestion or entanglement resulting in mortality. Therefore, LSE applies to litter (HRA Report (APP-491, Rev 002) Sections 7.2.4 and 9.1.5, Tables 7.9 and 9.1).

HRA Ramsar Screening Matrix 2B: Chichester and Langstone Harbours Ramsar (Marine Ornithology – In Combination)

Name of Site: Chichester and Langstone Harbours Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 0.1 km																		
Features	**Likely Effects of the Proposed Development (In Combination)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		
Shelduck																		
Ringed plover																		
Common redshank																		
Grey plover																		
Little tern	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**×b**	**×b**	**×b**	**×c**	**×c**	**×c**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**	**✓a**
Black-tailed godwit																		
Dunlin																		
Waterfowl Assemblage																		

Evidence supporting conclusions:

a. LSE applies to the Proposed Development alone. (HRA Report (APP-491, Rev 002) Sections 8.2.4 and 9.1.5, Table 9.1). Therefore, potential in combination adverse effects on site integrity are considered in the Stage 2 Integrity matrices below (see Ramsar Integrity Matrices 2A and 2B below).

b. Structures or devices which have the potential to pose an above water collision risk to these features will not be introduced during any development phase. Surface feeding species are not considered to be vulnerable to below water collisions. The potential for an in combination effect is therefore considered negligible and therefore no in combination LSE applies to collision (HRA Report (APP-491, Rev 002) Section 8.2.4).

c. There is no pathway for marine works to introduce invasive non-indigenous predators (e.g. mink) to breeding colonies for these features and therefore no in combination LSE applies to INIS (HRA Report (APP-491, Rev 002) Section 8.2.4).

HRA Ramsar Screening Matrix 2C: Chichester and Langstone Harbours Ramsar (Onshore Ecology)

Name of Site: Chichester and Langstone Harbours Ramsar (Onshore Ornithology)																					
Distance to Proposed Development: 0.1 km																					
Features	**Likely Effects of the Proposed Development (Alone)**																				
	Disturbance & displacement			Visual disturbance			Light pollution			Indirect effects			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose	**✓a**	**×d**	**✓a**	**×e**	**×e**	**×e**	**×f**	**×f**	**×f**	**×g**	**×g**	**×g**	**×h**	**×h**	**×h**	**✓i**	**×l**	**✓i**	**✓j**	**×l**	**✓j**
Shelduck	**✓a**	**×d**	**✓a**	**×e**	**×e**	**×e**	**×f**	**×f**	**×f**	**×g**	**×g**	**×g**	**×h**	**×h**	**×h**	**✓i**	**✓i**	**✓i**	**✓j**	**✓j**	**✓j**
Ringed plover	**×b**	**×d**	**×b**	**×e**	**×e**	**×e**	**×f**	**×f**	**×f**	**×g**	**×g**	**×g**	**×h**	**×h**	**×h**	**✓i**	**✓i**	**✓i**	**✓j**	**✓j**	**✓j**
Common redshank	**✓a**	**×d**	**✓a**	**×e**	**×e**	**×e**	**×f**	**×f**	**×f**	**×g**	**×g**	**×g**	**×h**	**×h**	**×h**	**✓i**	**✓i**	**✓i**	**✓j**	**✓j**	**✓j**
Grey plover	**✓a**	**×d**	**✓a**	**×e**	**×e**	**×e**	**×f**	**×f**	**×f**	**×g**	**×g**	**×g**	**×h**	**×h**	**×h**	**✓i**	**✓i**	**✓i**	**✓j**	**✓j**	**✓j**

Name of Site: Chichester and Langstone Harbours Ramsar (Onshore Ornithology)																					
Distance to Proposed Development: 0.1 km																					
Features	**Likely Effects of the Proposed Development (Alone)**																				
	Disturbance & displacement			Visual disturbance			Light pollution			Indirect effects			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Little tern	✕**c**	✕**c**	✕**c**	✕**e**	✕**e**	✕**e**	✕**f**	✕**f**	✕**f**	✕**g**	✕**g**	✕**g**	✕**h**	✕**h**	✕**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Black-tailed godwit	✓**a**	✕**d**	✓**a**	✕**e**	✕**e**	✕**e**	✕**f**	✕**f**	✕**f**	✕**g**	✕**g**	✕**g**	✕**h**	✕**h**	✕**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Dunlin	✕**b**	✕**d**	✕**b**	✕**e**	✕**e**	✕**e**	✕**f**	✕**f**	✕**f**	✕**g**	✕**g**	✕**g**	✕**h**	✕**h**	✕**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Waterfowl Assemblage	✓**a**	✕**d**	✓**a**	✕**e**	✕**e**	✕**e**	✕**f**	✕**f**	✕**f**	✕**g**	✕**g**	✕**g**	✕**h**	✕**h**	✕**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**

Evidence supporting conclusions:

a. Cutts *et al.* (2013) determines that these species are either highly or moderately sensitive to disturbance. All these species were recorded in varying numbers in intertidal areas adjacent to the onshore works of the Proposed Development (APP-421, ES Technical Appendix 16.13). Therefore, LSE applies to disturbance and displacement (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2). Potential adverse effects on site integrity are considered in the Ramsar Integrity matrices below (see Ramsar Integrity Matrix 2C and 2D).

b. Cutts *et al.* (2013) determines that ringed plover and dunlin are of low sensitivity to disturbance. Although all these species were found to be present in intertidal habitat adjacent to onshore works of the Proposed Development (APP-421, ES Technical Appendix 16.13) these species are considered to be extremely tolerant of any disturbance mechanisms from the Proposed Development and are likely to rapidly habituate. Therefore, no LSE applies to disturbance & displacement for these features (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).

c. While tern colonies exist within both Chichester and Langstone Harbours, specific surveys for the Proposed Development did not locate any breeding individuals or indeed foraging flights (APP-421, ES Technical Appendix 16.13). Therefore, terns are not expected to be exposed disturbance and displacement effects from any phase of the Proposed Development from onshore activities (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).

d. There is predicted to be no disturbance or displacement events as a result of onshore activities during the operational phase. Therefore, no LSE applies to disturbance & displacement for these features (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).

e. Visual disturbance is considered to be of a negligible magnitude as a result of the Proposed Development. The SPA is in an urban setting and recent research has established that Disturbance does not have a significant impact on waders in an estuary close to conurbations (Goss-Custard et al., 2019). Therefore, no LSE applies to visual disturbance for these features.

f. Onshore works from the Proposed Development are not considered to result in any light spillage into the SPA. Therefore, no LSE applies to light pollution for these features (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).

g. Wading bird species are not expected to be affected by any changes in water turbidity. Increases in suspended sediment as a result of HDD works, cable burial activities and cable maintenance is expected to be highly localised and return to within comparable background concentrations within days. Terns are visual foragers and are likely to be affected by an increase in turbidity which can make it harder to see prey in the water column. They are considered to be moderately sensitive to habitat disturbance and subsequent potential effects on prey (Bradbury et al., 2014). Given the distance between the Proposed Development and favoured foraging and breeding grounds of tern species, it is considered that there is no potential for impact during any development phase. Therefore, no LSE applies to indirect effects (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).

h. There is no pathway for onshore construction work activities associated with the Proposed Development to introduce invasive non-indigenous predators to tern breeding colonies. The risk of other invasive non-indigenous species affecting other waterbird species and supporting habitat is considered negligible through the techniques applied to construction (i.e. HDD). Therefore, no LSE applies to INIS (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).

i. Unplanned disposal of industrial or user plastic during all development phases has the potential to directly affect Ramsar features and supporting habitat when utilising intertidal habitat through ingestion or entanglement resulting in mortality. Therefore, LSE applies to litter (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2). Potential adverse effects on site integrity are considered in the Stage 2 Integrity matrices below (see Ramsar Integrity Matrix 2C).

j. Unplanned disposal of industrial or user plastic during all development phases has the potential to directly affect Ramsar features and supporting habitat when utilising intertidal habitat through ingestion or entanglement resulting in mortality. Therefore, LSE applies to litter (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2). Potential adverse effects on site integrity are considered in the Stage 2 Integrity matrices below (see Ramsar Integrity Matrix 2C).

HRA Ramsar Screening Matrix 2D: Chichester and Langstone Harbours Ramsar (Onshore Ecology – In Combination)

Name of Site: Chichester and Langstone Harbours Ramsar (Onshore Ecology – In Combination)																					
Distance to Proposed Development: 0.1 km																					
Features	**Likely Effects of the Proposed Development (In Combination)**																				
	Disturbance & displacement			Visual disturbance			Light pollution			Indirect effects			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose	✓**a**	×**d**	✓**a**	×**e**	×**e**	×**e**	×**f**	×**f**	×**f**	×**g**	×**g**	×**g**	×**h**	×**h**	×**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Shelduck	✓**a**	×**d**	✓**a**	×**e**	×**e**	×**e**	×**f**	×**f**	×**f**	×**g**	×**g**	×**g**	×**h**	×**h**	×**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Ringed plover	×**b**	×**d**	×**b**	×**e**	×**e**	×**e**	×**f**	×**f**	×**f**	×**g**	×**g**	×**g**	×**h**	×**h**	×**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Common redshank	✓**a**	×**d**	✓**a**	×**e**	×**e**	×**e**	×**f**	×**f**	×**f**	×**g**	×**g**	×**g**	×**h**	×**h**	×**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Grey plover	✓**a**	×**d**	✓**a**	×**e**	×**e**	×**e**	×**f**	×**f**	×**f**	×**g**	×**g**	×**g**	×**h**	×**h**	×**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Little tern	×**c**	×**c**	×**c**	×**e**	×**e**	×**e**	×**f**	×**f**	×**f**	×**g**	×**g**	×**g**	×**h**	×**h**	×**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Black-tailed godwit	✓**a**	×**d**	✓**a**	×**e**	×**e**	×**e**	×**f**	×**f**	×**f**	×**g**	×**g**	×**g**	×**h**	×**h**	×**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Dunlin	×**b**	×**d**	×**b**	×**e**	×**e**	×**e**	×**f**	×**f**	×**f**	×**g**	×**g**	×**g**	×**h**	×**h**	×**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**
Waterfowl Assemblage	✓**a**	×**d**	✓**a**	×**e**	×**e**	×**e**	×**f**	×**f**	×**f**	×**g**	×**g**	×**g**	×**h**	×**h**	×**h**	✓**i**	✓**i**	✓**i**	✓**j**	✓**j**	✓**j**

Evidence supporting conclusions:

a. LSE applies to the Proposed Development alone. Therefore, potential for adverse effects on site integrity are considered in the Stage 2 Integrity matrices below (see Ramsar Integrity Matrix 2D).
b. Given that these features are not considered to be sensitive to disturbance the potential for an in combination effect from displacement is considered to be negligible across all development phases. Therefore, no in combination LSE applies to disturbance & displacement for these features (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).
c. Terns and red-breasted merganser being marine features which have either breeding colonies (terns) and wintering foraging areas (red-breasted merganser) that are distant from onshore components of the Proposed Development. These features are not expected to be exposed disturbance and displacement effects from any phase of the Proposed Development from onshore activities. Therefore, no in combination LSE applies to disturbance & displacement for these features (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).
d. Given that no operational effects of disturbance are predicted, no in combination LSE applies (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).
e. Visual disturbance is considered to be of a negligible magnitude as a result of the Proposed Development. Therefore, no in combination LSE applies for these features (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).
f. Onshore works from the Proposed Development are not considered to result in any light spillage into the Ramsar site. Therefore, no in combination LSE applies for these features (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).
g. Given that wading bird species are not expected to be affected by any changes in water turbidity and the distance between the Proposed Development and favoured foraging and breeding grounds of tern species, it is considered that there is no potential for impact during any development phase. Therefore, no in combination LSE applies for these features (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).
h. There is no pathway for onshore construction work activities associated with the Proposed Development to introduce invasive non-indigenous predators to tern breeding colonies. The risk of other invasive non-indigenous species affecting other waterbird species and supporting habitat is considered negligible through the techniques applied to construction (i.e. HDD). Therefore, no in combination LSE applies for these features (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).
i. LSE applies to the Proposed Development alone (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2). Therefore, potential for adverse effects on site integrity are considered in the Stage 2 Integrity matrices below (see Ramsar Integrity Matrix 2D).
j. LSE applies to the Proposed Development alone (HRA Report (APP-491, Rev 002) Sections 7.3 and 9.2, Tables 7.10 and 9.2).. Therefore, potential for adverse effects on site integrity are considered in the Stage 2 Integrity matrices below (see Ramsar Integrity Matrix 2D).

HRA Ramsar Screening Matrix 3A: Solent and Southampton Water Ramsar (Marine Ornithology)

Name of Site: Solent and Southampton Water Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 6.6 km																		
Features	**Likely Effects of the Proposed Development (Alone)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		
Teal																		
Ringed plover																		
Black-tailed godwit																		
Waterfowl assemblage																		

HRA Ramsar Screening Matrix 3B: Solent and Southampton Water Ramsar (Marine Ornithology – In Combination)

Name of Site: Solent and Southampton Water Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 6.6 km																		
Features	**Likely Effects of the Proposed Development (In Combination)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		
Teal																		
Ringed plover																		
Black-tailed godwit																		
Waterfowl assemblage																		

HRA Ramsar Screening Matrix 4A: Pagham Harbour Ramsar (Marine Ornithology)

Name of Site: Pagham Harbour Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 9.5 km																		
Features	**Likely Effects of the Proposed Development (Alone)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		
Black-tailed godwit																		

HRA Ramsar Screening Matrix 4B: Pagham Harbour Ramsar (Marine Ornithology – In Combination)

Name of Site: Pagham Harbour Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 9.5 km																		
Features	**Likely Effects of the Proposed Development (In Combination)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		
Black-tailed godwit																		

HRA Ramsar Screening Matrix 5A: Baie de Somme Ramsar (Fish)

Name of Site: Baie de Somme Ramsar (Fish)																											
Distance to Proposed Development: 87 km																											
Features	**Likely Effects of the Proposed Development**																										
	Increased SSC			Physical Injury			Invasive species			Pollution events			Noise and vibration			Visual Disturbance			EMF			Temperature changes			In combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
European eel	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**	**×a**					**×a**			**×a**		**×a**	**×a**	**×a**
Creeping marshwort																											
Sea kale																											
Pedunculate sea-purslane																											
Fen orchid																											
Aquatic warbler																											
Northern pintail																											
Northern shoveler																											
Eurasian bittern																											
Baillon’s crake																											
Common shelduck																											
Narrow-mouthed whorl snail																											
Grey seal																											
Harbour seal																											
Moor frog																											
Northern crested newt																											

Evidence supporting conclusions:

a. European eel’s primary migratory route is to and from the Sargasso Sea in the western Atlantic. Accordingly, these fish will primarily be travelling away from the Proposed Development and will not be affected by any impacts resulting from the Proposed Development therefore no LSE can be concluded.

HRA Ramsar Screening Matrix 5B: Baie de Somme Ramsar (Marine Mammals)

Name of Site: Baie de Somme Ramsar (Marine Mammals)																		
Distance to Proposed Development: 87 km																		
Features	**Likely Effects of the Proposed Development**																	
	Auditory injury			Disturbance			Collision			Indirect effects			Pollution			In combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Grey seal	**×a**	**×a**	**×a**	**×b**	**×b**	**×b**	**×c**	**×c**	**×c**	**×d**	**×d**	**×d**	**✓e**	**✓e**	**✓e**	**✓f**	**✓f**	**✓f**
Harbour seal	**×a**	**×a**	**×a**	**×b**	**×b**	**×b**	**×c**	**×c**	**×c**	**×d**	**×d**	**×d**	**✓e**	**✓e**	**✓e**	**✓f**	**✓f**	**✓f**
Creeping marshwort																		
Sea kale																		
Pedunculate sea-purslane																		
Fen orchid																		
Aquatic warbler																		
Northern pintail																		
Northern shoveler																		
Eurasian bittern																		
Baillon's crake																		
Common shelduck																		
European eel																		
Narrow-mouthed whorl snail																		
Moor frog																		
Northern crested newt																		

Evidence supporting conclusions:

a. Given the geophysical survey and positioning equipment likely to be used, and the activities which have been proposed, there is negligible potential for the sound produced to induce the onset of auditory injury (PTS). Therefore, no LSE as a result of auditory injury can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.3, Table 7.8).

b. Although there is potential for disturbance of a very small number of individuals as a result of increased anthropogenic noise from the geophysical survey and positioning equipment likely to be used, any effects are likely to be temporary and reversible with suitable alternative local habitat being available in the meantime. Disturbance ranges as a result of increased anthropogenic noise from the activities and vessels proposed are likely to be small therefore there is negligible potential for disturbance; furthermore, any effects are likely to be temporary and reversible with suitable alternative local habitat being available in the meantime. Any changes to swimming behaviour as a result of the presence of EMF (operational phase only) are likely to be corrected within a few metres and therefore have minimal effect. The potential for disturbance of seals hauled out within this Ramsar is considered to be nil due to the distance between the Proposed Development and the Ramsar (87 km). Therefore, no LSE as a result of disturbance can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.3, Table 7.8).

c. Given the number, type and behaviour of vessels required, and the fact that the species under consideration are small and agile, the risk of collision is considered to be negligible. Therefore, no LSE as a result of collision can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.3, Table 7.8).

d. Indirect effects such as changes in suspended sediment levels as a result of trenching and dredging have the potential to affect prey availability/quality and alter marine mammal foraging behaviour/success. However, because marine mammals range widely and forage in a variety of habitats using a variety of cues, any short-term local level changes in prey availability/quality will not result in a reduction in either fitness or breeding success. Therefore, no LSE as a result of indirect effects can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.3, Table 7.8).

e. Pollution (unplanned spills/disposal of litter) may affect marine mammal species directly (if water quality is affected as a result of an unplanned spill, litter is ingested or animals become entangled in marine debris) and/or indirectly (if contaminated prey items are ingested). Therefore LSE applies to pollution (HRA Report (APP-491, Rev 002) Sections 7.2.3 and 9.1.4, Table 7.8 and 9.1, and Ramsar Integrity Matrix 3 below).

f. There is negligible potential for the Proposed Development to contribute to any potential in combination effects on either grey seal or harbour seal which are features under the criteria applied to the designation of the Baie de Somme Ramsar with the exception of pollution. This is because there is negligible potential for the sound produced by the Proposed Development to induce the onset of auditory injury (PTS), any disturbance is likely to be temporary and reversible with suitable alternative local habitat being available in the meantime, the risk of collision with vessels is considered to be negligible, and short term local level changes in prey availability/quality as a result of indirect effects will not result in a reduction in either fitness or breeding success. Therefore, no LSE as a result of the contribution of the Proposed Development to any potential in combination effects (with the exception of pollution) on the marine mammal features of the Baie de Somme Ramsar can be concluded. However, LSE applies in relation to pollution therefore in combination effects for pollution have been taken through to AA (HRA Report (APP-491, Rev 002) Section 8.2.3 and 9.1.4, Table 9.1 and Ramsar Integrity Matrix 3 below).

HRA Ramsar Screening Matrix 6: Marais Vernier et Vallée de la Risle maritime Ramsar (Fish)

Name of Site: Marais Vernier et Vallée de la Risle maritime Ramsar (Fish)																												
Distance to Proposed Development: 90 km																												
Features	**Likely Effects of the Proposed Development**																											
	Increased SSC			Physical Injury			Invasive species			Pollution events			Noise and vibration			Visual Disturbance			EMF			Temperature changes			In combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Twaite shad	**×a**	**×a**	**×a**	**×b**	**×b**	**×b**	**×c**	**×c**	**×c**	**✓d**	**✓d**	**✓d**	**×e**	**×e**	**×e**	**×f**	**×f**	**×f**		**×g**			**×h**		**✓i**	**✓i**	**✓i**
Sea lamprey	**×a**	**×a**	**×a**	**×b**	**×b**	**×b**	**×c**	**×c**	**×c**	**✓d**	**✓d**	**✓d**	**×e**	**×e**	**×e**					**×g**			**×h**		**✓i**	**✓i**	**✓i**
River lamprey	**×a**	**×a**	**×a**	**×b**	**×b**	**×b**	**×c**	**×c**	**×c**	**✓d**	**✓d**	**✓d**	**×e**	**×e**	**×e**					**×g**			**×h**		**✓i**	**✓i**	**✓i**
Atlantic salmon	**×a**	**×a**	**×a**	**×b**	**×b**	**×b**	**×c**	**×c**	**×c**	**✓d**	**✓d**	**✓d**	**×e**	**×e**	**×e**	**×f**	**×f**	**×f**		**×g**			**×h**		**✓i**	**✓i**	**✓i**
Brown trout	**×a**	**×a**	**×a**	**×b**	**×b**	**×b**	**×c**	**×c**	**×c**	**✓d**	**✓d**	**✓d**	**×e**	**×e**	**×e**	**×f**	**×f**	**×f**		**×g**			**×h**		**✓i**	**✓i**	**✓i**
European eel	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**					**×j**			**×j**		**×j**	**×j**	**×j**
European smelt	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**	**×j**		**×j**			**×j**		**×j**	**×j**	**×j**
Lesser sandeel																												
European bass																												
Thinlip mullet																												
European flounder																												
Common goby																												
Sand goby																												
European sprat																												
Common bream																												
Common barbel																												
Common bleak																												
Silver bream																												
European bullhead																												
Pike																												
Three spined stickleback																												
Common dace																												
European perch																												
Common minnow																												
European bitterling																												

Name of Site: Marais Vernier et Vallée de la Risle maritime Ramsar (Fish)

Distance to Proposed Development: 90 km

Features	**Likely Effects of the Proposed Development**																											
	Increased SSC			Physical Injury			Invasive species			Pollution events			Noise and vibration			Visual Disturbance			EMF			Temperature changes			In combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Common roach																											
Rudd																											
Common chub																											
Tench																											
Loose flowered orchid																											
Anacamptis palustris																											
Early marsh orchid																											
Aquatic warbler																											
Common midwife toad																											
Northern pintail																											
Northern shoveler																											
Eurasian teal																											
Garganey																											
Meadow pipit																											
Great egret																											
Southwestern water vole																											
Short eared owl																											
Tufted duck																											
Eurasian bittern																											
Common toad																											
Cetti’s warbler																											
Western marsh harrier																											
Southern damselfly																											
Corncrake																											
Tundra swan																											
Little egret																											
Natterjack toad																											
European tree frog																											
Alpine newt																											
Large white faced darter																											
Black tailed godwit																											
Palmate newt																											
Smooth newt																											
Savi’s warbler																											
Red kite																											

Name of Site: Marais Vernier et Vallée de la Risle maritime Ramsar (Fish)																												
Distance to Proposed Development: 90 km																												
Features	**Likely Effects of the Proposed Development**																											
	Increased SSC			Physical Injury			Invasive species			Pollution events			Noise and vibration			Visual Disturbance			EMF			Temperature changes			In combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Western yellow wagtail																												
Bechstein's bat																												
Eurasian curlew																												
Common parsley frog																												
Pool frog																												
Marsh frog																												
Great cormorant																												
Eurasian spoonbill																												
European golden plover																												
Ninespine stickleback																												
Water rail																												
Agile frog																												
Common frog																												
Fire salamander																												
Whinchat																												
Yellow-winged darter																												
Common shelduck																												
Northern crested newt																												
Northern lapwing																												
Narrow mouthed whorl snail																												

Evidence supporting conclusions:

a. Twaite shad, sea lamprey (and transformers), river lamprey (and transformers), brown trout (and smolts) and salmon (and smolts) are tolerant of naturally high levels of SSC given their riverine migration and are able to swim through or navigate round areas of elevated SSC in the marine environment. Therefore, no LSE as a result of increased SSC during construction, operation and decommissioning can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.2, Tables 7.2, 7.4 and 7.6).

b. Twaite shad, sea lamprey, river lamprey, brown trout and salmon are highly mobile and able to avoid collisions with installation and maintenance vessels and infrastructure. Therefore, no LSE as a result of physical injury can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.2, Tables 7.2, 7.4 and 7.6).

c. Invasive species such as parasites or migratory fish species introduced as a result of construction, operation and decommissioning will not harm twaite shad, sea lamprey, river lamprey, brown trout and salmon given that there is no evidence to suggest that these types of species are introduced via biofouling or ballast water. Therefore, no LSE as a result of invasive species can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.2, Table 7.2 and 7.4 and 7.6).

d. Potential for hydrocarbon and/or chemical pollution events exists, therefore LSE cannot be ruled out (HRA Report (APP-491, Rev 002) Sections 7.2.2 and 9.1.3, Tables 7.2, 7.4, 7.6 and 9.1, and Ramsar Integrity Matrix 4 below).

e. Twaite shad are hearing specialists due to the coupling of the ear with the swim bladder. Although TTS may occur if an individual is within 160 m of trenching equipment it is considered as this species is highly mobile and generally pelagic that they will move away before an impact occurs. River lamprey, sea lamprey, brown trout and salmon are hearing generalists with potential

underwater noise emissions from the construction, operation and decommissioning of the Proposed Development falling below the levels expected to produce mortality, mortal injury or recoverable injury. Therefore, no LSE as a result of noise and vibration can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.2, Tables 7.2, 7.4 and 7.6).

f. Twaite shad, brown trout and salmon will be accustomed to vessel traffic and will navigate round or under installation, maintenance and decommissioning vessels. Therefore, no LSE as a result of visual disturbance can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.2, Tables 7.2, 7.4 and 7.6).

g. Twaite shad, brown trout and salmon are pelagic and generally use the zone close to the sea surface for migration so will not come into contact with EMF during operation of the Proposed Development. In addition, salmon show a lack of behavioural response to EMF and shad do not possess ampullary organs instead relying on sight or sensory organs to locate prey. River and sea lamprey use both the pelagic and benthic zones for migration and may therefore come into contact with weak EMF from the Proposed Development however no responses to electromagnetic fields have been recorded for this species. Therefore, no LSE as a result of EMF can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.2, Tables 7.3, 7.5 and 7.7).

h. Twaite shad, brown trout and salmon are pelagic and generally use the zone close to the sea surface for migration so will not come into contact with any temperature changes during operation of the Proposed Development. Sea lamprey and river lamprey are highly mobile and not dependent on the seabed and will not come into contact with any temperature changes at seabed surface. Therefore, no LSE as a result of temperature changes can be concluded (HRA Report (APP-491, Rev 002) Section 7.2.2, Tables 7.3, 7.5 and 7.7).

i. There is negligible potential for the Proposed Development to contribute to any potential in combination effects on twaite shad, sea lamprey, river lamprey and salmon with the exception of pollution events. Therefore, LSE cannot be ruled out for this effect in combination (HRA Report (APP-491, Rev 002) Section 8.2.2 and 9.1.3, Table 9.1 and Ramsar Integrity Matrix 4 below).

j. European eel's primary migratory route is to and from the Sargasso Sea in the western Atlantic. Accordingly, these fish will primarily be travelling away from the Proposed Development and will not be affected by any impacts resulting from the Proposed Development. European smelt, although migratory, are highly coastal and estuarine and are therefore will not be affected by any impacts resulting from the Proposed Development. No LSE can be concluded for these features.

HRA Ramsar Screening Matrix 7A: Alderney West Coast and Burhou Islands Ramsar (Marine Ornithology)

Name of Site: Alderney West Coast and Burhou Islands Ramsar (Marine Ornithology)

Distance to Proposed Development: 142.0 km

Features	**Likely Effects of the Proposed Development (Alone)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Gannet (B)	**×a**	**×a**	**×a**	**×c**	**×c**	**×c**	**×d**	**×d**	**×d**	**×e**	**×e**	**×e**	**✓f**	**✓f**	**✓f**	**✓g**	**✓g**	**✓g**
Storm petrel (B)	**×a**	**×a**	**×a**	**×c**	**×c**	**×c**	**×d**	**×d**	**×d**	**×e**	**×e**	**×e**	**✓f**	**✓f**	**✓f**	**✓g**	**✓g**	**✓g**
Shag (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Cormorant (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Kittiwake (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Great black-backed gull (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Herring gull (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Lesser black-backed gull (B)	**×a**	**×a**	**×a**	**×c**	**×c**	**×c**	**×d**	**×d**	**×d**	**×e**	**×e**	**×e**	**✓f**	**✓f**	**✓f**	**✓g**	**✓g**	**✓g**
Guillemot (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Razorbill (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Puffin (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**

Evidence supporting conclusions:

a. Given that these features range widely and are not considered to be vulnerable to disturbance from vessel traffic and associated activities, the potential for an effect from displacement is considered to be negligible across all development phases. Therefore, no LSE applies to disturbance & displacement for these features (HRA Report (APP-491, Rev 002) Section 7.2.4, Table 7.9).

b. There is no pathway for marine works to impact these features as it is situated outside their mean-maximum foraging ranges (cormorant 25.0 km; shag 14.5 km; kittiwake 60.0 km; herring gull 61.1 km; great black-backed gull 61.1 km†; guillemot 84.2 km; razorbill 48.5 km; puffin 105.4 km; Thaxter *et al*. 2012) (HRA Report (APP-491, Rev 002) Section 6.2.5, Table 6.6).

c. Given their extremely large foraging ranges relative to the area of impact and/or plasticity in diet, the potential for an effect from changes in prey is negligible across all development phases for these features. Therefore, no LSE applies to indirect effects (HRA Report (APP-491, Rev 002) Section 7.2.4, Table 7.9).

d. Structures or devices which have the potential to pose an above water collision risk to these features will not be introduced during any development phase. Surface feeding species are not considered to be vulnerable to below water collisions. The potential for an effect is therefore considered negligible and therefore no LSE applies to collision (HRA Report (APP-491, Rev 002) Section 7.2.4, Table 7.9).

e. There is no pathway for marine works to introduce invasive non-indigenous predators (e.g. mink) to breeding colonies for these features (HRA Report (APP-491, Rev 002) Section 7.2.4, Table 7.9).

f. Unplanned oil or chemical spillages from vessels may occur during all development phases. Spills have the potential to directly affect these features when utilising the sea surface e.g. through direct oiling resulting in mortality. Therefore, LSE applies to accidental spills (HRA Report (APP-491, Rev 002) Sections 7.2.4 and 9.1.5, Tables 7.9 and 9.1).

g. Unplanned disposal of industrial or user plastic during all development phases has the potential to directly affect these features when utilising the sea surface e.g. through ingestion or entanglement resulting in mortality. Therefore, LSE applies to litter (HRA Report (APP-491, Rev 002) Section 7.2.4 and 9.1.5, Tables 7.9 and 9.1).

HRA Ramsar Screening Matrix 7B: Alderney West Coast and Burhou Islands Ramsar (Marine Ornithology – In Combination)

Name of Site: Alderney West Coast and Burhou Islands Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 142.0 km																		
Features	**Likely Effects of the Proposed Development (In Combination)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Gannet (B)	**×a**	**×a**	**×a**	**×c**	**×c**	**×c**	**×d**	**×d**	**×d**	**×e**	**×e**	**×e**	**✓f**	**✓f**	**✓f**	**✓f**	**✓f**	**✓f**
Storm petrel (B)	**×a**	**×a**	**×a**	**×c**	**×c**	**×c**	**×d**	**×d**	**×d**	**×e**	**×e**	**×e**	**✓f**	**✓f**	**✓f**	**✓f**	**✓f**	**✓f**
Shag (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Cormorant (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Kittiwake (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Great black-backed gull (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Herring gull (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Lesser black-backed gull (B)	**×a**	**×a**	**×a**	**×c**	**×c**	**×c**	**×d**	**×d**	**×d**	**×e**	**×e**	**×e**	**✓f**	**✓f**	**✓f**	**✓f**	**✓f**	**✓f**
Guillemot (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Razorbill (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**
Puffin (B)	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**	**×e**	**×e**	**×e**	**×b**	**×b**	**×b**	**×b**	**×b**	**×b**

Evidence supporting conclusions :

a. Given that these features range widely and are not considered to be vulnerable to disturbance from vessel traffic and associated activities, the potential for an in combination effect from displacement is considered to be negligible across all development phases. Therefore, no in combination LSE applies to disturbance & displacement for these features (HRA Report (APP-491, Rev 002) Section 8.2.4).

b. There is no pathway for marine works to impact these features as it is situated outside their mean-maximum foraging ranges (cormorant 25.0 km; shag 14.5 km; kittiwake 60.0 km; herring gull 61.1 km; great black-backed gull 61.1 km†; guillemot 84.2 km; razorbill 48.5 km; puffin 105.4 km; Thaxter *et al*. 2012) (HRA Report (APP-491, Rev 002) Section 8.2.4).

† In the absence of a species-specific mean-max foraging range, herring gull was used as a proxy for great black-backed gull. Herring gull was considered to be the most suitable model species, as lesser black-backed gull is a long distant migrant (unlike great black-backed gull) and is morphologically adapted to longer flights (Snow & Perrins 1998; Klaassen *et al*., 2011). The mean maximum foraging range cited for herring gull is 61.1 ± 44 km (Thaxter *et al*., 2012).

c. Given their extremely large foraging ranges relative to the area of impact and/or plasticity in diet, the potential for an in combination effect from changes in prey is negligible across all development phases for these features. Therefore, no in combination LSE applies to indirect effects (HRA Report (APP-491, Rev 002) Section 8.2.4).

d. Structures or devices which have the potential to pose an above water collision risk to these features will not be introduced during any development phase. Surface feeding species are not considered to be vulnerable to below water collisions. The potential for an in combination effect is therefore considered negligible and therefore no in combination LSE applies to collision (HRA Report (APP-491, Rev 002) Section 8.2.4).

e. There is no pathway for marine works to introduce invasive non-indigenous predators (e.g. mink) to breeding colonies for these features (HRA Report (APP-491, Rev 002) Section 8.2.4).

f. LSE applies to the Proposed Development alone. (HRA Report (APP-491, Rev 002) Sections 8.2.4 and 9.1.5, Table 9.1). Therefore, potential in combination adverse effects on site integrity are considered in the Stage 2 Integrity matrices below (See Ramsar Integrity Matrix 5A and 5B below).

Ramsar Integrity Matrices - Potential Effects

Potential effects upon the Ramsar site(s)‡ which are considered within the submitted HRA Report (APP-491, Rev 002) are provided in the table below. Effects have been grouped where appropriate for ease of presentation.

Effects considered within the integrity matrices for marine ornithology

#The information in this column relates to all phases of the project (i.e. construction, operation and decommissioning) unless otherwise stated.

Designation	Effects described in submission information#	Effects in screening matrices as
Sites identified: • Chichester and Langstone Harbour Ramsar	**Alone:** • Disturbance & displacement • Indirect effects	**Alone:** • Disturbance & displacement • Indirect effects
	In combination: • Disturbance & displacement • Indirect effects	**In combination:** • Disturbance & displacement • Indirect effects

Effects considered within the integrity matrices for onshore ecology

The information in this column relates to all phases of the project (i.e. construction, operation and decommissioning) unless otherwise stated.

Designation	Effects described in submission information#	Effects in screening matrices as
Sites identified: • Portsmouth Harbour Ramsar • Chichester and Langstone Harbour Ramsar	**Alone:** • Disturbance & displacement • Accidental spills • Litter	**Alone:** • Disturbance & displacement • Accidental spills • Litter
	In combination: • Disturbance & displacement • Accidental spills • Litter	**In combination:** • Disturbance & displacement • Indirect effects • Litter

‡ As defined in Advice Note 10.

Effects considered within the integrity matrices for fish

#The information in this column relates to all phases of the project (i.e. construction, operation and decommissioning) unless otherwise stated.

Designation	Effects described in submission information#	Effects in screening matrices as
Sites identified: • Marais Vernier et Vallée de la Risle maritime Ramsar	**Alone:** • Pollution	**Alone:** • Pollution
	In combination: • Pollution	**In combination:** • Pollution

Effects considered within the integrity matrices for marine mammals

#The information in this column relates to all phases of the project (i.e. construction, operation and decommissioning) unless otherwise stated.

Designation	Effects described in submission information#	Effects in integrity matrices as
Sites identified: • Baie de Somme Ramsar	• Pollution	• Pollution

STAGE 2: RAMSAR INTEGRITY MATRICES

The Ramsar sites for which a LSE has been identified are as follows:

- Portsmouth Harbour Ramsar
- Chichester and Langstone Harbour Ramsar
- Alderney West Coast and Burhou Islands Ramsar
- Baie de Somme Ramsar
- Marais Vernier et Vallée de la Risle maritime Ramsar

Evidence for the conclusions reached in integrity is detailed within the footnotes to the matrices below.

Matrix Key:

✓ = Adverse effect on site integrity **cannot** be excluded
✕ = Adverse effect on site integrity **can** be excluded

C = construction
O = operation (and repair/maintenance)
D = decommissioning

B = breeding
W = wintering/non-breeding
P = passage

Where effects are not applicable to a particular feature they are greyed out.

HRA Ramsar Integrity Matrix 1A: Portsmouth Harbour Ramsar (Onshore Ecology)

Name of Site: Portsmouth Harbour Ramsar (Onshore Ecology)																					
Distance to Proposed Development: 4.9 km																					
Features	**Adverse Effect on Integrity from the Proposed Development (Alone)**																				
	Disturbance & displacement			Visual disturbance			Light pollution			Indirect effects			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose	**✕a**		**✕a**													**✓b**	**✓b**	**✓b**	**✓c**	**✓c**	**✓c**

Evidence supporting conclusions:

a. Effects of the construction stage on Chichester and Langstone Harbour Ramsar and the dark-bellied brent goose feature will be avoided by restricting works within the winter season, defined as October to March (the period when dark-bellied brent goose arrive from their breeding grounds (Snow and Perrins, 1998). A detailed overview of the working restrictions were provided in Chapter 16: Onshore Ecology and Appendix 16.14: Winter Working Restriction for Features of Chichester & Langstone Harbours SPA and then subject to revisions following consultation with Natural England which are captured in the updated Outline Onshore Construction Environmental Monitoring Plan (OOCEMP; APP-505 Rev002). Adoption of Principle 1 (construction works cannot take place in SWBGS) will offset direct effects on those SWBGS sites that lie within the Order Limits (and functionally linked to the Ramsar site) as detailed above (as these sites will not be subject to works in the winter period when they are used by SPA birds). Adoption of Principle 6 includes the consideration of both construction noise from trenching / road saw activities and HDD. Trenching / road saw noise at 69dbAmax leads to overlap of varying extents, with fourteen SWBGS sites. Construction work at twelve SWBGS sites is restricted during October – March on this basis. In accordance with the requirements of the OOCEMP, screening at least 2 m high around the perimeter of the HDD compounds is required for the purpose of noise mitigation. With the exception of HDD-3 and HDD-6, HDD works will not impact SWBGS following the application of screening which will prevent any noise effects of over 69 dB reaching SWBGS sites. HDD-3 noise levels will not extend beyond the site compound and therefore only impact hardstanding habitat and not effecting the integrity of the SWBGS. Noise levels from HDD-6 marginally overlap with the P23A SWBGS. However, as the HDD compound lies within the SWBGS, it is already subject to Principle 1 so that winter work (October to March inclusive) is restricted. Therefore, there is no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

b. Routine mitigation measures of standard best practice in terms of pollution prevention measures (see Onshore Outline Construction Environmental Management Plan ('CEMP') (APP-505 Rev002)) will make the likelihood of these events occurring highly unlikely and therefore not resulting in an adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.5, Tables 10.8 and 10.10).

c. Routine mitigation measures of standard best practice in terms of waste management (see Onshore Outline CEMP; APP-505 Rev002) will make the likelihood of these events occurring highly unlikely and therefore not resulting in an adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.5, Tables 10.8 and 10.10).

HRA Ramsar Integrity Matrix 1B: Portsmouth Harbour Ramsar (Onshore Ecology – In Combination)

Name of Site: Portsmouth Harbour Ramsar (Onshore Ecology – In Combination)																					
Distance to Proposed Development: 4.9 km																					
Features	**Adverse Effect on Integrity from the Proposed Development (In Combination)**																				
	Disturbance & displacement			Visual disturbance			Light pollution			Indirect effects			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose	**✕a**		**✕a**													**✓b**	**✓b**	**✓b**	**✓c**	**✓c**	**✓c**

Evidence supporting conclusions:

a. Effects of the construction stage on Chichester and Langstone Harbour Ramsar and the dark-bellied brent goose feature will be avoided by restricting works within the winter season, defined as October to March (the period when dark-bellied brent goose arrive from their breeding grounds (Snow and Perrins, 1998). A detailed overview of the working restrictions were provided in Chapter 16: Onshore Ecology and Appendix 16.14: Winter Working Restriction for Features of Chichester & Langstone Harbours SPA and then subject to revisions following consultation with Natural England which are captured in the updated Outline Onshore Construction Environmental Monitoring Plan (OOCEMP; APP-505). Adoption of Principle 1 (construction works cannot take place in SWBGS) will offset direct effects on those SWBGS sites that lie within the Order Limits (and are functionally linked to the Ramsar site) as detailed above (as these sites will not be subject to works in the winter period when they are used by SPA birds). Adoption of Principle 6 includes the consideration of both construction noise from trenching / road saw activities and HDD. Trenching / road saw noise at 69dbAmax leads to overlap of varying extents, with fourteen SWBGS sites. Construction work at twelve SWBGS sites is restricted during October – March on this basis. In accordance with the requirements of the OOCEMP, screening at least 2 m high around the perimeter of the HDD compounds is required for the purpose of noise mitigation. With the exception of HDD-3 and HDD-6, HDD works will not impact SWBGS following the application of screening which will prevent any noise effects of over 69 dB reaching SWBGS sites. HDD-3 noise levels will not extend beyond the site compound and therefore only impact hardstanding habitat and not effecting the integrity of the SWBGS. Noise levels from HDD-6 marginally overlap with the P23A SWBGS. However, as the HDD compound lies within the SWBGS, it is already subject to Principle 1 so that winter work (October to March inclusive) is restricted. Potential effects resulting from the limited plans or projects which have temporal and spatial overlap with the Proposed Development (Appendices 16.15 and 16.16 of the ES) are considered to be localised and temporary. The North Portsea Island Coastal Flood Defence Scheme, Phase 4B - Coastline Between Milton Common and Kendall's Wharf Eastern Road (19/01368/FUL) includes a full winter working restriction (October – March) so will not disturb dark-bellied brent goose. Therefore, there is no in combination adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

b. Routine mitigation measures of standard best practice in terms of pollution prevention measures (see Onshore Outline CEMP) will make the likelihood of these events occurring highly unlikely. Similar best practice measures are employed for the other plans and projects identified which could contribute to in combination effects. When this effect is considered in combination with potential effects resulting from other relevant plans or projects (Table 5 of Appendix 3) it is concluded that there is no potential for adverse effects on site integrity in combination with other projects and plans (HRA Report (APP-491, Rev 002) Section 10.5, Tables 10.8 and 10.10).

c. Routine mitigation measures of standard best practice in terms of waste management (Onshore Outline CEMP) will make the likelihood of these events occurring highly unlikely. Similar best practice measures are employed for the other plans and projects identified which could contribute to in combination effects. When this effect is considered in combination with potential effects resulting from other relevant plans or projects (Table 5 of Appendix 3) it is concluded that there is no potential for adverse effects on site integrity in combination with other projects and plans (HRA Report (APP-491, Rev 002) Section 10.5, Tables 10.8 and 10.10).

HRA Ramsar Integrity Matrix 2A: Chichester and Langstone Harbours Ramsar (Marine Ornithology)

Name of Site: Chichester and Langstone Harbours Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 0.1 km																		
Features	**Adverse Effect on Integrity from the Proposed Development (Alone)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		
Shelduck																		
Ringed plover																		
Common redshank																		
Grey plover																		
Little tern	**×c**	**×c**	**×c**	**×b**	**×b**	**×b**							**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Black-tailed godwit																		
Dunlin																		
Waterfowl Assemblage																		

Evidence supporting conclusions:

a. Routine mitigation measures of standard best practice in terms of waste management, pollution prevention measures and strict navigational protocols will prevent these events occurring and therefore there is no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Table 10.1 and 10.3).

b. Where the cable corridor crosses Langstone Harbour, HDD will be used. The exit point is expected to be onshore, thus an increase in SSC and any resultant smothering and/or reduced dissolved oxygen ('DO') is not predicted to affect key prey species present in the water column at Langstone Harbour. Outside of Langstone Harbour, the permanent loss of fish, shellfish and benthic habitat as a result of non-burial cable protection is not predicted to adversely affect key prey species since these measures will be limited in spatial extent. Therefore, there is no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.1 and 10.3).

c. HDD works in Langstone Harbour will occur *c.*4 km from the closest breeding colony on Baker's Island, with little terns often foraging within 1 km of their nest site. Noise and visual disturbance associated with construction and repair/maintenance works will not be noticeable above baseline levels of disturbance within Langstone Harbour. Whilst considered unlikely, should little terns be temporarily disturbed from foraging habitat in the vicinity of the landfall within Langstone Harbour, other equivalent shallow water foraging sites are present within their maximum foraging range. Therefore, there is no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Table 10.1 and 10.3).

HRA Ramsar Integrity Matrix 2B: Chichester and Langstone Harbours Ramsar (Marine Ornithology – In Combination)

Name of Site: Chichester and Langstone Harbours Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 0.1 km																		
Features	**Adverse Effect on Integrity from the Proposed Development (In Combination)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose																		
Shelduck																		
Ringed plover																		
Common redshank																		
Grey plover																		
Little tern	**×c**	**×c**	**×c**	**×b**	**×b**	**×b**							**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Black-tailed godwit																		
Dunlin																		
Waterfowl Assemblage																		

Evidence supporting conclusions:

a. Routine mitigation measures of standard best practice in terms of waste management, pollution prevention measures and strict navigational protocols will prevent these events occurring and therefore there will be no adverse effect on site integrity. Similar best practice measures are employed for the other plans and projects identified which could contribute to in combination effects. When this effect is considered in combination with potential effects resulting from other relevant plans or projects (Table 4 of Appendix 3, APP-503) it is concluded that there is no potential for adverse effects on site integrity in combination with other projects and plans (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.1 and 10.3).

b. Where the cable corridor crosses Langstone Harbour, HDD will be used. The exit point is expected to be onshore, thus an increase in SSC and any resultant smothering and/or reduced dissolved oxygen ('DO') is not predicted to affect key prey species present in the water column at Langstone Harbour. Outside of Langstone Harbour, the permanent loss of fish, shellfish and benthic habitat as a result of non-burial cable protection is not predicted to adversely affect key prey species since these measures will be limited in spatial extent (0.7 km^2 in total). When this effect is considered in combination with potential effects resulting from other relevant plans or projects (Table 4 of Appendix 3, APP-503) it is concluded that there is no potential for adverse effects on site integrity in combination with other projects and plans (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.1 and 10.3).

c. HDD works in Langstone Harbour will occur *c.*4 km from the closest breeding colony on Baker's Island, with little terns often foraging within 1 km of their nest site. Little terns are known to breed and forage within Chichester and Langstone Harbours despite baseline levels of anthropogenic noise and visual disturbance. Disturbance associated with construction and repair/maintenance works will not be noticeable above baseline levels of disturbance within Langstone Harbour. Whilst considered unlikely, should little terns be temporarily disturbed from foraging habitat in the vicinity of the landfall within Langstone Harbour, other equivalent shallow water foraging sites are present within their maximum foraging range. Therefore, there is no adverse effect from disturbance and displacement. When this effect is considered in combination with potential effects resulting from other relevant plans or projects (Table 4 of Appendix 3, APP-503) it is concluded that there is no potential for adverse effects on site integrity in combination with other projects and plans (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.1 and 10.3).

HRA Ramsar Integrity Matrix 2C: Chichester and Langstone Harbours Ramsar (Onshore Ecology)

Name of Site: Chichester and Langstone Harbours Ramsar (Onshore Ecology)

Distance to Proposed Development: 0.1 km

Features	**Adverse Effect on Integrity from the Proposed Development (Alone)**																				
	Disturbance & displacement			Visual disturbance			Light pollution			Indirect effects			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose	**×a**		**×a**													**×c**	**×c**	**×c**	**×d**	**×c**	**×d**
Shelduck	**×b**		**×b**													**×c**	**×c**	**×c**	**×d**	**×c**	**×d**
Ringed plover																**×c**	**×c**	**×c**	**×d**	**×c**	**×d**
Common redshank	**×b**		**×b**													**×c**	**×c**	**×c**	**×d**	**×c**	**×d**
Grey plover	**×b**		**×b**													**×c**	**×c**	**×c**	**×d**	**×c**	**×d**
Little tern																**×c**	**×c**	**×c**	**×d**	**×c**	**×d**
Black-tailed godwit	**×b**		**×b**													**×c**	**×c**	**×c**	**×d**	**×c**	**×d**
Dunlin																**×c**	**×c**	**×c**	**×d**	**×c**	**×d**
Waterfowl Assemblage	**×a**		**×a**													**×c**	**×c**	**×c**	**×d**	**×c**	**×d**

Evidence supporting conclusions:

a. Effects of the construction stage on Chichester and Langstone Harbour SPA and the dark-bellied brent goose and the waterfowl assemblage features will be avoided by restricting works within the winter season, defined as October to March (the period when dark-bellied brent goose arrive from their breeding grounds (Snow and Perrins, 1998). A detailed overview of the working restrictions were provided in Chapter 16: Onshore Ecology and Appendix 16.14: Winter Working Restriction for Features of Chichester & Langstone Harbours SPA (APP-422) and then subject to revisions following consultation with Natural England which are captured in the updated Outline Onshore Construction Environmental Monitoring Plan (OOCEMP; APP-505 Rev002). Adoption of Principle 1 (construction works cannot take place in SWBGS) will offset direct effects on those SWBGS sites that lie within the Order Limits as detailed above (as these sites will not be subject to works in the winter period when they are used by SPA birds). Adoption of Principle 6 includes the consideration of both construction noise from trenching / road saw activities and HDD. Trenching / road saw noise at 69dbAmax leads to overlap of varying extents, with fourteen SWBGS sites. Construction work at twelve SWBGS sites is restricted during October – March on this basis. In accordance with the requirements of the OOCEMP, screening at least 2 m high around the perimeter of the HDD compounds is required for the purpose of noise mitigation. With the exception of HDD-3 and HDD-6, HDD works will not impact SWBGS following the application of screening which will prevent any noise effects of over 69 dB reaching SWBGS sites. HDD-3 noise levels will not extend beyond the site compound and therefore only impact hardstanding habitat and not effecting the integrity of the SWBGS. Noise levels from HDD-6 marginally overlap with the P23A SWBGS. However, as the HDD compound lies within the SWBGS, it is already subject to Principle 1 so that winter work (October to March inclusive) is restricted. Therefore, there is no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

b. Effects of the construction stage on Chichester and Langstone Harbour SPA and its waterbird features will be avoided by restricting works within the winter season, defined as October to March (the period when Ramsar features arrive from their breeding grounds (Snow and Perrins, 1998). Adoption of the Principle 6 which states that wherever possible, percussive piling or works with heavy machinery (i.e. plant resulting in a noise level in excess of 69dbAmax – measured at the sensitive receptor) should be avoided during the bird overwintering period has been undertaken with regards

to trenching / road saw and HDD works. All species were found to be restricted to intertidal habitat during baseline surveys of the Proposed Development. Noise effects from both trenching / road saw and HDD works overlaps at 69dbAmax is extremely limited with regards to intertidal habitat of the Ramsar site. Trenching / road saw construction is restricted along Eastern Road because of overlap with SWBGS sites so this section will also not provide any disturbance to adjacent intertidal habitat. The only other section of the route that is restricted by Principle 6 is the section of the Onshore Cable Route from Milton Locks north to the P23B SWBGS Therefore, there is no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

c. Routine mitigation measures of standard best practice in terms of pollution prevention measures (see Onshore Outline Construction Environmental Management Plan ('CEMP') (document reference 6.9)) will prevent these events occurring and therefore anther will be no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

d. Routine mitigation measures of standard best practice in terms of waste management (see Onshore Outline CEMP) will prevent these events occurring and there will be no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

HRA Ramsar Integrity Matrix 2D: Chichester and Langstone Harbours Ramsar (Onshore Ecology – In Combination)

Name of Site: Chichester and Langstone Harbours Ramsar (Onshore Ecology)

Distance to Proposed Development: 0.1 km

Features	**Adverse Effect on Integrity from the Proposed Development (In Combination)**																				
	Disturbance & displacement			Visual disturbance			Light pollution			Indirect effects			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Dark-bellied brent goose	**×a**		**×a**													**×c**	**×c**	**×c**	**×d**	**×d**	**×d**
Shelduck	**×b**		**×b**													**×c**	**×c**	**×c**	**×d**	**×d**	**×d**
Ringed plover																**×c**	**×c**	**×c**	**×d**	**×d**	**×d**
Common redshank	**×b**		**×b**													**×c**	**×c**	**×c**	**×d**	**×d**	**×d**
Grey plover	**×b**		**×b**													**×c**	**×c**	**×c**	**×d**	**×d**	**×d**
Little tern																**×c**	**×c**	**×c**	**×d**	**×d**	**×d**
Black-tailed godwit	**×b**		**×b**													**×c**	**×c**	**×c**	**×d**	**×d**	**×d**
Dunlin																**×c**	**×c**	**×c**	**×d**	**×d**	**×d**
Waterfowl Assemblage	**×a**		**×a**													**×c**	**×c**	**×c**	**×d**	**×d**	**×d**

Evidence supporting conclusions:

a. No construction works will occur in SWBGS sites that lie within the Proposed Developments Order Limits during the winter period October – March, while works that have the potential to produce noise impacts of over 69dbAmax in either SWBGS or the Ramsar site will be restricted during October - March. Potential effects resulting from the limited plans or projects which have temporal and spatial overlap with the Proposed Development (Table 5 within Appendix 3 of the HRA Report APP-503, Rev 002) are considered to be localised and temporary. The North Portsea Island Coastal Flood Defence Scheme, Phase 4B - Coastline Between Milton Common and Kendall's Wharf Eastern Road (19/01368/FUL) includes a full winter working restriction (October – March) so will not disturb dark-bellied brent goose or other Ramsar features. Therefore, there is no in combination adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

b. Effects of the construction stage on Chichester and Langstone Harbour SPA and its waterbird features will be avoided by restricting works within the winter season, defined as October to March (the period when SPA birds arrive from their breeding grounds (Snow and Perrins, 1998). Adoption of the Principle 6 which states that wherever possible, percussive piling or works with heavy machinery (i.e. plant resulting in a noise level in excess of 69dbAmax – measured at the sensitive receptor) should be avoided during the bird overwintering period has been undertaken with regards to trenching / road saw and HDD works. All species were found to be restricted to intertidal habitat during baseline surveys of the Proposed Development. Noise effects from both trenching / road saw and HDD works overlaps at 69dbAmax is extremely limited with regards to intertidal habitat of the Ramsar site. Trenching / road saw construction is restricted along Eastern Road because of overlap with SWBGS sites so this section will also not provide any disturbance to adjacent intertidal habitat. The only other section of the route that is restricted by Principle 6 is the section of the Onshore Cable Route from Milton Locks north to the P23B SWBGS Potential effects resulting from the limited plans or projects which have temporal and spatial overlap with the Proposed Development (Table 5

within Appendix 3 of the HRA Report APP-503, Rev 002) are considered to be localised and temporary. The North Portsea Island Coastal Flood Defence Scheme, Phase 4B - Coastline Between Milton Common and Kendall's Wharf Eastern Road (19/01368/FUL) includes a full winter working restriction (October – March) so will not disturb features of the Ramsar site. Therefore, there is no in combination adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

c. Routine mitigation measures of standard best practice in terms of pollution prevention measures (see Onshore Outline CEMP) will prevent these events occurring. Similar best practice measures are employed for the other plans and projects identified which could contribute to in combination effects. Therefore, no in combination adverse effect is predicted (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

d. Routine mitigation measures of standard best practice in terms of waste management (Onshore Outline CEMP) will prevent these events occurring. Similar best practice measures are employed for the other plans and projects identified which could contribute to in combination effects. Therefore, no in combination adverse effect is predicted (HRA Report (APP-491, Rev 002) Section 10.3, Tables 10.2 and 10.4).

HRA Ramsar Integrity Matrix 3: Baie de Somme Ramsar (Marine Mammals)

Name of Site: Baie de Somme Ramsar (Marine Mammals)																		
Distance to Proposed Development: 87 km																		
Features	**Adverse Effect on Integrity from the Proposed Development**																	
	Auditory injury			*Disturbance*			*Collision*			*Indirect effects*			*Pollution*			*In combination effects*		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Grey seal													**×a**	**×a**	**×a**	**×b**	**×b**	**×b**
Harbour seal													**×a**	**×a**	**×a**	**×b**	**×b**	**×b**

Evidence supporting conclusions:

a. Adoption of routine best practice management measures will ensure that the risk of pollution events (including litter) is minimised as far as is practicable, and as such there is no potential for adverse effects on integrity. These measures will be agreed through production of a Marine Outline Construction Environmental Management Plan (CEMP) and associated Marine Pollution Contingency Plan (MPCP). Therefore, there is no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.17.4, Table 10.38).

b. Considering the very small and localised potential effects resulting from the Proposed Development, their temporary nature, and the fact that any other activities which may result in in combination effects are likely to be similar or lesser in extent and magnitude, it is considered that there is no potential for adverse effect on site integrity in combination with other relevant plans and projects (HRA Report (APP-491, Rev 002) Section 10.17.4, Table 10.38).

HRA Ramsar Integrity Matrix 4: Marais Vernier et Vallée de la Risle maritime Ramsar (Fish)

Name of Site: Marais Vernier et Vallée de la Risle maritime Ramsar (Fish)																											
Distance to Proposed Development: 90 km																											
Features	**Adverse Effect on Integrity from the Proposed Development**																										
	Increased SSC			Physical Injury			Invasive species			Pollution events			Noise and vibration			Visual Disturbance			EMF			Temperature changes			In combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Twaite shad										**×a**	**×a**	**×a**													**×b**	**×b**	**×b**
Sea lamprey										**×a**	**×a**	**×a**													**×b**	**×b**	**×b**
River lamprey										**×a**	**×a**	**×a**													**×b**	**×b**	**×b**
Atlantic salmon										**×a**	**×a**	**×a**													**×b**	**×b**	**×b**

Name of Site: Marais Vernier et Vallée de la Risle maritime Ramsar (Fish)

Distance to Proposed Development: 90 km

Features	**Adverse Effect on Integrity from the Proposed Development**																										
	Increased SSC			Physical Injury			Invasive species			Pollution events			Noise and vibration			Visual Disturbance			EMF			Temperature changes			In combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Brown trout										**×a**	**×a**	**×a**													**×b**	**×b**	**×b**
European eel																											
European smelt																											
Lesser sandeel																											
European bass																											
Thinlip mullet																											
European flounder																											
Common goby																											
Sand goby																											
European sprat																											
Common bream																											
Common barbel																											
Common bleak																											
Silver bream																											
European bullhead																											
Pike																											
Three spined stickleback																											
Common dace																											
European perch																											
Common minnow																											
European bitterling																											
Common roach																											
Rudd																											
Common chub																											
Tench																											
Loose flowered orchid																											
Anacamptis palustris																											
Early marsh orchid																											
Aquatic warbler																											
Common midwife toad																											
Northern pintail																											
Northern shoveler																											
Eurasian teal																											
Garganey																											
Meadow pipit																											
Great egret																											

Name of Site: Marais Vernier et Vallée de la Risle maritime Ramsar (Fish)

Distance to Proposed Development: 90 km

Features	**Adverse Effect on Integrity from the Proposed Development**																										
	Increased SSC			Physical Injury			Invasive species			Pollution events			Noise and vibration			Visual Disturbance			EMF			Temperature changes			In combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Southwestern water vole																											
Short eared owl																											
Tufted duck																											
Eurasian bittern																											
Common toad																											
Cetti's warbler																											
Western marsh harrier																											
Southern damselfly																											
Corncrake																											
Tundra swan																											
Little egret																											
Natterjack toad																											
European tree frog																											
Alpine newt																											
Large white faced darter																											
Black tailed godwit																											
Palmate newt																											
Smooth newt																											
Savi's warbler																											
Red kite																											
Western yellow wagtail																											
Bechstein's bat																											
Eurasian curlew																											
Common parsley frog																											
Pool frog																											
Marsh frog																											
Great cormorant																											
Eurasian spoonbill																											
European golden plover																											
Ninespine stickleback																											
Water rail																											
Agile frog																											
Common frog																											
Fire salamander																											
Whinchat																											
Yellow-winged darter																											

Name of Site: Marais Vernier et Vallée de la Risle maritime Ramsar (Fish)																											
Distance to Proposed Development: 90 km																											
Features	**Adverse Effect on Integrity from the Proposed Development**																										
	Increased SSC			Physical Injury			Invasive species			Pollution events			Noise and vibration			Visual Disturbance			EMF			Temperature changes			In combination effects		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Common shelduck																											
Northern crested newt																											
Northern lapwing																											
Narrow mouthed whorl snail																											

Evidence supporting conclusions:

a. Adoption of routine best practice management measures will ensure that the risk of pollution events (including litter) is minimised as far as is practicable, and as such there is no potential for adverse effects on integrity. These measures will be agreed through production of a Construction Environmental Management Plan (CEMP) and associated Marine Pollution Contingency Plan (MPCP). Therefore, there is no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.21, Table 10.51).

b. Similar best practice measures are employed for the other plans and projects identified which could contribute to in combination effects. When pollution effects are considered in combination with potential effects resulting from other relevant plans or projects (Table 2 of Appendix 3, APP-503, Rev 002) it is considered that there is no potential for adverse effects on site integrity in combination with other projects and plans.(HRA Report (APP-491, Rev 002) Section 10.21, Table 10.51).

HRA Ramsar Integrity Matrix 5A: Alderney West Coast and Burhou Islands Ramsar (Marine Ornithology)

Name of Site: Alderney West Coast and Burhou Islands Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 142.0 km																		
Features	**Adverse Effect on Integrity from the Proposed Development (Alone)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Gannet (B)													**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Storm petrel (B)													**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Shag (B)																		
Cormorant (B)																		
Kittiwake (B)																		
Lesser black-backed gull (B)													**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Herring gull (B)																		
Great black-backed gull (B)																		
Guillemot (B)																		
Razorbill (B)																		
Puffin (B)																		

Evidence supporting conclusions:

a. Routine mitigation measures of standard best practice in terms of waste management, pollution prevention measures and strict navigational protocols will prevent these events occurring and therefore there is no adverse effect on site integrity (HRA Report (APP-491, Rev 002) Section 10.9, Tables 10.17 and 10.18).

HRA Ramsar Integrity Matrix 5B: Alderney West Coast and Burhou Islands Ramsar (Marine Ornithology – In Combination)

Name of Site: Alderney West Coast and Burhou Islands Ramsar (Marine Ornithology)																		
Distance to Proposed Development: 142.0 km																		
Features	**Adverse Effect on Integrity from the Proposed Development (In Combination)**																	
	Disturbance & displacement			Indirect effects			Collision			INIS			Accidental spills			Litter		
	C	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Gannet (B)													**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Storm petrel (B)													**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Shag (B)																		
Cormorant (B)																		
Kittiwake (B)																		
Lesser black-backed gull (B)													**×a**	**×a**	**×a**	**×a**	**×a**	**×a**
Herring gull (B)																		
Great black-backed gull (B)																		
Guillemot (B)																		
Razorbill (B)																		
Puffin (B)																		

Evidence supporting conclusions:

a. Routine mitigation measures of standard best practice in terms of waste management, pollution prevention measures and strict navigational protocols will prevent these events occurring and therefore there will be no adverse effect on site integrity. Similar best practice measures are employed for the other plans and projects identified which could contribute to in combination effects. When these effects are considered in combination with potential effects resulting from other relevant plans or projects (Table 4 of Appendix 3, APP-503) it is concluded that there is no potential for adverse effects on site integrity in combination with other projects and plans (HRA Report (APP-491, Rev 002) Section 10.9, Tables 10.17 and 10.18).