Liverpool Cruise Terminal

Information to inform a Habitat Regulations Assessment (HRA) Appropriate Assessment

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Comments:	Addressing Natural England consultation responses			

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1. Introduction

Background

1.1. Waterman Infrastructure & Environment Ltd ('Waterman') was commissioned by Liverpool City Council ('LCC') to carry out a Habitat Regulations Assessment ('HRA') Screening Report in relation to LCC's proposals to construct a permanent cruise terminal facility (the 'Development') at Princes Parade, Liverpool (the 'Site'). Further details of the Development can be found in section 2 of this report. The HRA Screening Report (ref WIE12464-100-10-4-1-HRA) was published in June 2018 in support of LCC's application for planning permission in respect of the Development.

1.2. The HRA Screening Report identified *'possible impacts from dismantling, construction and operation from conversion of existing terminal facilities to the proposed new terminal on Liverpool Bay SPA feature great cormorant*' but concluded that '*with the mitigation proposed for great cormorant*[1] *resting and roosting areas there would be no likely significant impacts'*.

1.3. In Spring 2018, the Court of Justice of the European Union ('CJEU') gave its ruling in the People Over Wind case, which provided a new interpretation of when and how mitigation measures should be considered in an HRA. In departing from previous decisions, the CJEU held that measures designed specifically to avoid or reduce likely significant effects should not be evaluated at the screening stage but reserved for the appropriate assessment.

1.4. In August 2018, the Mersey Docks and Harbour Company ('MDHC') applied to the Marine Management Organisation ('MMO') for a Harbour Revision Order ('HRO') in respect of the Development. The statutory objection/representation period in relation to the HRO application ran from 10 August 2018 to 21 September 2018. Natural England ('NE'), as a statutory consultee, were consulted about the application by the MMO. In their response to the consultation[2], Natural England stated:

- *In summary, Natural England advises that there is likely significant effect, therefore a requirement for appropriate assessment, and as it stands insufficient information within the application documents to conclude that the proposed works, as described in the Harbour Revision Order, will not have an adverse effect on the internationally designated sites. This is due to uncertainty of the mitigation measures required (particularly for cormorants).*
- *Whilst Natural England concurs with the overall conclusion that the application will result in likely significant effect (i.e. for cormorant) we advise that the assessment currently does not provide enough information and/or certainty to justify the assessment conclusion. Where there is a likelihood of significant effects (excluding any measures intended to avoid or reduce harmful effects on the European Site), or there are uncertainties, a competent authority should undertake an Appropriate Assessment in order to fully assess the implications of the proposal in view of the conservation objectives for the European sites in question. Natural England therefore advises that an Appropriate Assessment should now be undertaken.*
- *Natural England highlights the recent ruling made by the Court of Justice of the European Union (the CJEU) on the interpretation of the Habitats Directive in the case of People Over Wind and Sweetman vs Coillte Teoranta (ref: C 323/17). The case relates to the treatment of mitigation measures at the screening stage of a HRA when deciding whether an appropriate assessment of a plan/project is required. The Court's Ruling goes against established practice in the UK that mitigation measures can, to a certain degree, be taken into account at the screening stage. As a result, Natural England advises that any "embedded" mitigation relating to protected sites under the Habitat Regulations 2017 Regulation 63 (1) should no longer be considered at the screening*

[1] For the rest of this report, this species will be referred to as 'cormorant' in line with NE advice.
[2] DC10147 The Proposed Mersey Docks and Harbour Company (Liverpool Cruise Terminal Extension) Harbour Revision Order Location: Princes Jetty, Princes Dock Liverpool

stage, but taken forward and considered at the appropriate assessment stage to inform a decision as to whether no adverse effect on site integrity can be ascertained. In light of the recent case law, any reliance on measures intended to avoid or reduce harmful effects at the likely significant stage is vulnerable to legal challenge.

- *Mitigation. We advise that consideration of appropriate mitigation measures for the overall scheme should be provided as part of the application for the HRO. Whist we acknowledge detailed methodologies may be provided later through planning and marine licence applications, we advise that sufficient detail and commitment is required to justify and support conclusions of an appropriate assessment to demonstrate that there will be no adverse effect on site integrity and therefore no further progression through the Habitats Regulations tests will be required.*
- *In combination and cumulative assessment: Wirral Waters Scheme. We disagree with the comments that state that there is little biodiversity interest within the Wirral Waters site and that the ecological receptors are not significantly affected by the proposed (Wirral Waters) works (EAD 15 pg. 25) One of the key species identified at outline planning permission stage for which mitigation would be required was cormorant. Furthermore, since the outline permission was granted a colony of breeding common terns have become established in East Float dock. Natural England has been providing advice on the schemes coming forward and has highlighted that mitigation measures (for cormorants and common terns) will be required to avoid adverse effect on site integrity.*
- *Uncertainties remain relating to effects that may become significant when considered in combination with other plans or projects. ….consideration also needs to be given to the in combination effects with other plans and projects (if it can be determined that the project itself would not result in likely significant effect).*
- *The in combination assessment needs to assess whether there are any other plans and projects in the vicinity which have the same effect as this development i.e. habitat loss and displacement. We advise that as part of any in combination assessment you consider all schemes which may impact on the interest features of designated sites. This could include plans or projects from neighbouring Local Planning Authorities and the MMO.*
- *We acknowledge that Port related activities have been included, however there is limited evidence to demonstrate what is meant by these and how they have been considered in combination. The recent application for the Twelve Quays Terminal at Birkenhead could also be included within the in combination assessment.*

1.5. This HRA has therefore been updated to reflect comments received from NE in response to the HRO consultation, including NE's request that an Appropriate Assessment be undertaken. This HRA supersedes the versions of the HRA submitted with the November 2017 ES (entitled 'Information to Inform a Habitats Regulations Assessment (HRA) Screening Report: Assessment of Likely Significant Effects (ALSE), November 2017') and the ES Addendum (first issue, June 2018) (entitled 'Information to Inform a Habitats Regulations Assessment (HRA) Screening Report: Assessment of Likely Significant Effects (ALSE), June 2018') in their entirety.

Habitats Regulations Assessment of Projects, Natura 2000 and European Sites

1.6. Natura 2000 is the cornerstone of European nature conservation policy; it is an EU-wide network of Special Protection Areas ('SPA') classified under the 1979 Birds Directive and Special Areas of Conservation (SAC) designated under the 1992 Habitats Directive. Together, the network comprises

over 25,500 sites and safeguards the most valuable and threatened habitats and species across Europe; it represents the largest, coordinated network of protected areas in the world.

1.7. In the UK, the individual sites are more commonly referred to as 'European sites' which, according to UK Government policy[3], also comprise 'Wetlands of International Importance', or Ramsar sites. Around 8.6% of the UK land area forms part of this network including, locally, sites such as Liverpool Bay SPA, Mersey Narrows and North Wirral Foreshore SPA and Ramsar, the Mersey Estuary SPA and Ramsar and the Dee Estuary SPA and Ramsar sites.

1.8. Importantly, HRA employs the precautionary principle and Regulation 63 of the Habitats Regulations 2017 (SI 2017/1012) (the 'Regulations') ensures that where a project is '*likely to have a significant effect'* ('LSE'), it can only be approved if it can be ascertained that it '*will not adversely affect the integrity of the European site*'.

1.9. To enable this decision to be made, the Regulations employ a series of mandatory tests outlined in Fig 1 (derived from Circular 06/05[4]) which must be followed. In practical terms however, experience gained from implementation of the process since their inception in 1994 has encouraged the adoption of additional filters at the outset to explore if the project even needs to be subject to HRA at all. This more practical approach is described in Fig 2 where many of the component steps are given expression. It is the process described in Fig 2 that is followed in this HRA.

3 ODPM Circular 06/2005 Government Circular R: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System (16 August 2005)

4 Circular 06/05: Biodiversity and Geological Conservation – Statutory Obligations and Their Impact Within the Planning System. ISBN 9780117539518

Figure 1: Consideration of development proposals affecting European sites

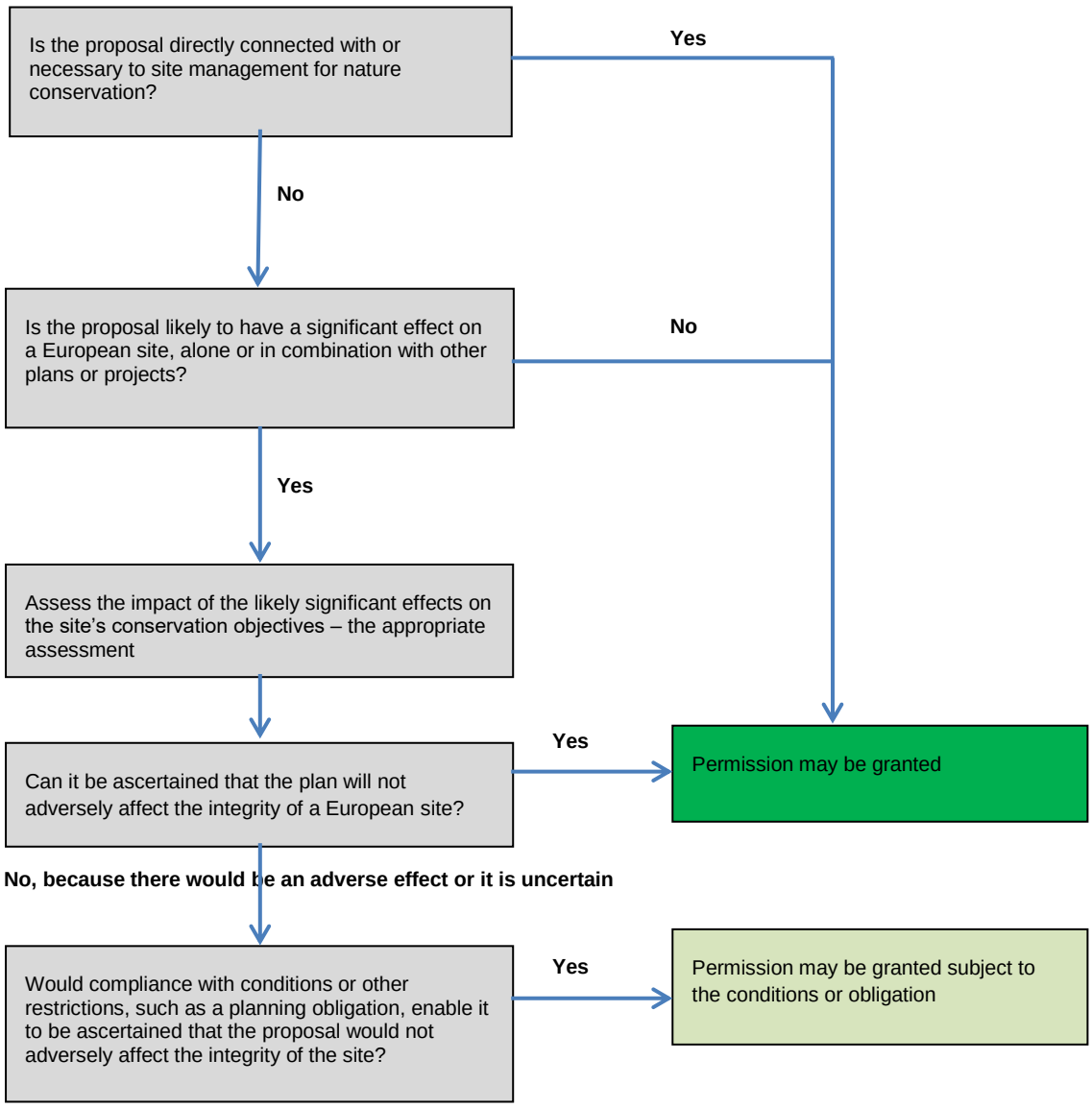
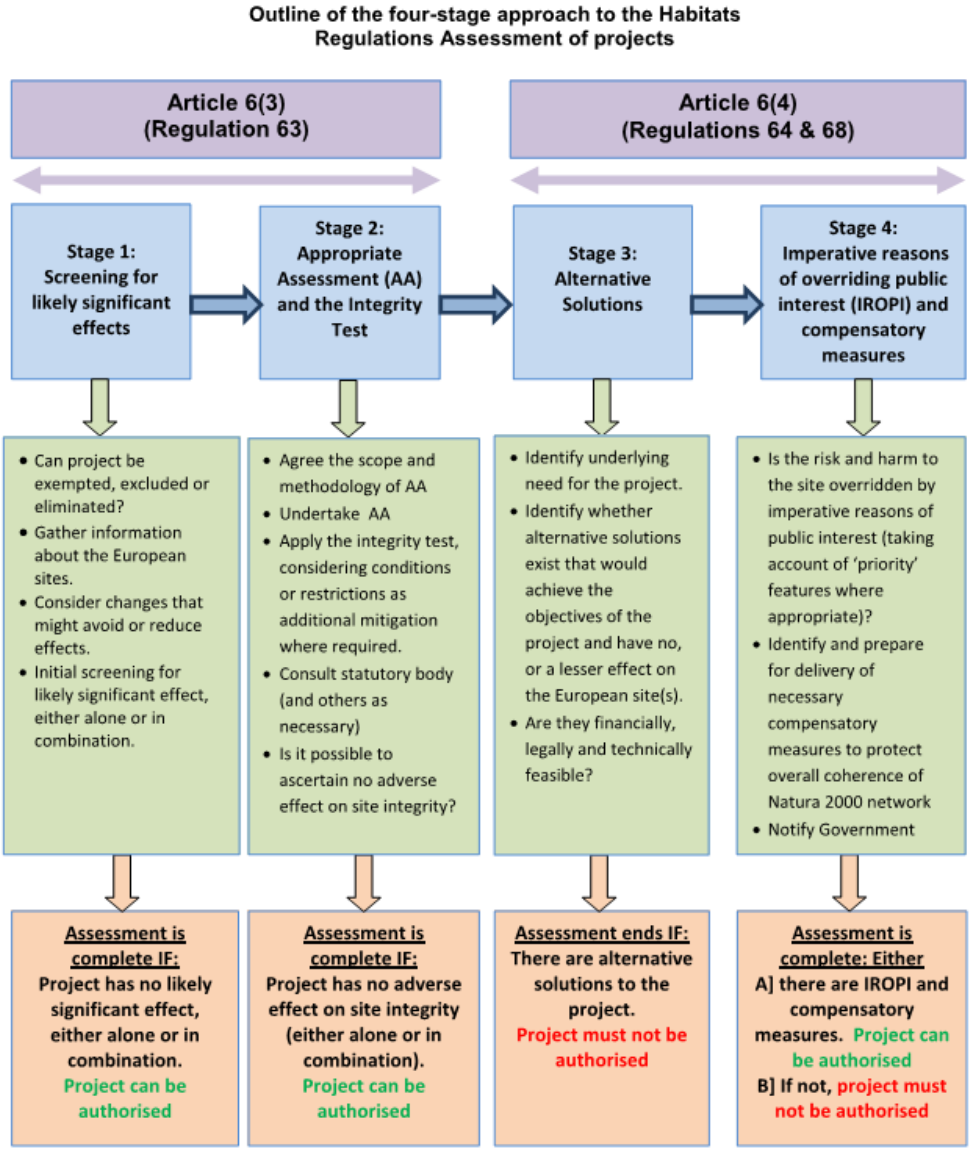


Figure 2: Outline of the four stage approach to the assessment of projects under the Habitats Regulations[1]



1.10. So, for example, the initial test adopted in this HRA (in section 2) firstly explores if the project can be excluded from the HRA simply because it is considered that it could not have any conceivable effect on a European site before exploring whether the project is actually necessary for the management of a European site (in section 2 of this HRA).

1.11. If the project cannot be ruled out at this stage, the competent authority (i.e. the Council) must then identify whether the project is *'… likely to have a significant effect on a European Site … either alone or in combination with other plans or projects'* and with or without mitigation. If significant effects are found to be absent or can be avoided, the project may be adopted without further scrutiny.

1.12. An *in-combination* assessment is required only where an impact is identified which is so small that *alone*, its effects would not be significant but, when combined with other minor effects on the same feature from other plans or projects, the combined 'residual effects' become significant. Together, these first few steps of Stage 1 (in Fig 2 – shown for plans but equally applicable for projects) are often referred to as '*screening*'.

1.13. In order to carry out this screening exercise, this HRA relies heavily on the Habitats Regulations Assessment Handbook. This draws on best practice and case law at home and across the EU to identify over 180 principles that inform how HRA should be carried out. Subscribers to the Handbook include Natural England, the Environment Agency and the Planning Inspectorate which ensures that key decision-makers utilise the approach shown in Fig 2. In addition, the design and layout of the HRA has been influenced by a number of HRAs from over the years.

1.14. Three principles are particularly relevant here:

- *… irrespective of the normal English meaning of 'likely', in this statutory context a 'likely significant effect' is a possible significant effect; one whose occurrence cannot be excluded on the basis of objective information';*
- *A significant effect is any effect that would undermine the conservation objectives for a European site …;*
- *'Objective', in this context, means clear verifiable fact rather than subjective opinion. … There should be credible evidence to show that there is a real rather than a hypothetical risk of effects that could undermine the site's conservation objectives. Any serious possibility of a risk that the conservation objectives might be undermined should trigger an 'appropriate assessment'.*

1.15. The level of scrutiny in a screening exercise is important both in terms of the level of scrutiny and the depth of the evidence base. Indeed, the third principle above highlights that the initial screening phase is not meant to be exhaustive, a point candidly described by Advocate General Sharpston in paragraphs 49 and 50 of the Sweetman case[5] when describing the levels of scrutiny to be applied to each test as follows:

> '*The threshold at the first stage* [the test for LSE] *… is thus a very low one. It operates merely as a trigger, in order to determine whether an appropriate assessment must be undertaken … The threshold at (the second)* [the appropriate assessment] *stage is noticeably higher than that laid down at the first stage. That is because the question (to use more simple terminology) is not 'should we bother to check?' (the question at the first stage) but rather 'what will happen to the site if this plan or project goes ahead …'*.

1.16. The judge in the Bagmoor Wind case[6] was similarly clear:

> '*If the absence of risk … can only be demonstrated after a detailed investigation, or expert opinion, that is an indicator that a risk exists and the authority must move from preliminary examination to appropriate assessment*'.

1.17. HRA is an iterative process enabling the early identification of potential conflicts and providing the opportunity to resolve them prior to submission/approval, perhaps by steering development away from sensitive sites or by influencing their design or scale. As both the European Court of Justice and domestic courts have shown though, there are limits to the effectiveness of undertaking a full, formal assessment during these early stages when evidence regarding ecological matters and indeed the actual allocations is often lacking.

1.18. This is where a way has to be found that whilst mindful of the need for the precautionary principle to be applied, the HRA must strive to identify only those plausible effects and not the extremely unlikely.

5 C-258/11 Sweetman reference for a preliminary ruling from the Supreme Court of Ireland .. opinion of the Advocate General 22 November 2012

6 Bagmoor Wind Limited v The Scottish Ministers Court of Sessions [2012] CSIH 93

Indeed, the Court of Appeal (re Boggis[7]) stated that there should be "*credible evidence that there was a real, rather than a hypothetical, risk"*.

1.19. As stated above, in Spring 2018, the European Court of Justice gave its ruling on the People Over Wind case which provided a new interpretation of when and how mitigation measures should be considered in an HRA. In departing from previous decisions, the Court held that measures designed specifically to avoid or reduce likely significant effects should not be evaluated at the screening stage but reserved for the appropriate assessment. The implications of this recent judgment are still to be fully understood, in circumstances where the project which is the specific subject of consideration under the Directive and Regulations itself includes measures which provide for mitigation, but for the avoidance of doubt this HRA takes full account of this ruling by considering mitigation as part of any appropriate assessment.

1.20. Some proposals will already have been considered by Liverpool City Council (as the competent authority with advice sought from Natural England) under the relevant Habitats Regulations during the Local Plan making process. Unless there are reasons for doubt, any extant HRA decisions will always be adopted in this evaluation.

1.21. This is an important point which draws on Defra guidance[8] and C12.1 of the Handbook[9] which allows competent authorities to reduce the duplication of effort by utilising earlier conclusions where there has been no material change in circumstances.

1.22. In terms of the overall need for this exercise, as its origins are firmly embedded in the European Union's Habitats Directive, the decision to leave the EU potentially casts doubt on the need for the HRA. However, UK law and policy is currently unchanged and the need for HRA remains.

1.23. Lastly, although this HRA has been prepared to assist the MMO in discharging its duties under the Regulations, the document is neither designed to, nor can it replace the formal exercise to be undertaken separately by the MMO. The MMO is the competent authority and it must decide to adopt this report or otherwise.

7 Peter Charles Boggis and Easton Bavants Conservation v Natural England and Waveney District Council, High Court of Justice Court of Appeal case C1/2009/0041/QBACF Citation No [2009] EWCA Civ. 1061 20th October 2009

8 Habitats Directive – Guidance on competent authority coordination under the Habitats Regulations, Defra (July 2012).

9 Tyldesley, D., and Chapman, C., (2013) *The Habitats Regulations Assessment Handbook,* revised July 2018 edition UK: DTA Publications Ltd

2. The Development

Overview of the Development

2.1. LCC is seeking a Marine Works Licence and MDHC is seeking a HRO to construct a new cruise liner terminal facility and supporting infrastructure (i.e. the Development) to replace the existing temporary cruise terminal at the Site (refer to **Figure 3**). The main elements of the Development comprise:

- Demolition of buildings and structures, including controlled removal of the existing Princes Jetty;
- Construction of a new landing stage and suspended deck;
- Construction of a cruise liner terminal building;
- Modification of the existing cruise liner terminal building to accommodate cruise related ancillary uses, including staff facilities and storage, on completion of the new cruise liner terminal;
- Terminal parking, pickup and drop off facilities;
- Erection of vehicular and pedestrian linkspans (linking the new terminal building and the existing pontoons); and
- Erection of passenger boarding bridges.

2.2. The buildings and structures to be demolished comprise:

- Princes Jetty: To facilitate the construction of the new terminal building, the existing Princes Jetty structure must be removed. The jetty is currently in a state of disrepair and is unsuitable for safe berthing of vessels;
- The pilot launch buildings on Pontoon D; and
- Mooring dolphins between Princes Jetty and Pontoon D.

2.3. The new terminal building would be located in the north-west corner of the Site on top of a new suspended deck structure constructed over the River Mersey. The deck would comprise reinforced concrete slabs supported on a grid of precast reinforced concrete beams that would in-turn be supported on steel tubular piles. The pile layout would be coordinated with the new terminal building so that they would support the deck and also act as foundations for the new building.

Proposed Cruise Ship Operations

2.4. There would be two types of cruise liner visit:

- Transit (or 'Port of Call') relates to cruises berthing at Liverpool Cruise Terminal to allow passengers to have a day trip ashore locally or beyond.
- Turnaround:
  - Turnaround disembarkation relates to a cruise ship berthed to allow passengers to leave the ship at the end of their cruise (and to replenish ship's stores). This generally takes place in the morning.
  - Turnaround embarkation relates to the same cruise ship remaining berthed to allow passengers to board the ship at the start of their cruise. This generally takes place in the afternoon to avoid overlapping with the disembarkation operations.

2.5. Table 1 sets out the current estimates for the number of cruise vessels predicted to visit the Development per year in 2018 (2020 is the predicated year of opening) until 2027. Currently (2017) 62 vessels use the existing cruise facility. The season would last from March to November and peak-season would be July and August. These figures have been used for the purposes of assessment within the technical chapters of this ES.

Table 1. Estimated Cruise Liner Visits 2018-2027

Year	Estimated Transit Vessels	Estimated Turnaround Vessels			Target	Estimated Total Passengers
		Medium	Large	Extra-Large	Total	
2018	36	23	1	1	61	
2019	36	24	1	1	62	
2020	37	10	19	1	67	84,000
2021	38	8	19	4	69	86,000
2022	39	8	20	4	71	110,000
2023	39	8	22	5	74	130,000
2024	40	8	24	6	78	140,000
2025	42	8	24	6	80	155,000
2026	42	8	24	6	80	160,000
2027	42	8	24	6	80	170,000

Note: medium vessel = 900 passengers, large vessel = 1500 passengers, extra large vessel = 2500 passengers

Cruise Liner Terminal Building

2.6. The Cruise Liner Terminal Building would be built on the suspended deck described above. It would be a predominantly two-storey building, expected to comprise:

- Baggage x-ray area;
- Baggage hall;
- Customs area;
- Ground floor entrance atrium and departure lounge; and
- Café at 1st floor level.

Drainage Infrastructure

2.7. It is anticipated that surface water from all the areas other than highways areas would be discharged directly to the River Mersey, via interceptors and pollution abatement controls as appropriate.

2.8. Foul water drainage would be connected to the existing public network which runs adjacent to the Site. It is not anticipated that foul water from vessels would be discharged in to the landward sewerage system.

External Lighting

2.9. The external lighting proposals would be designed in accordance with LCC's lighting policies. Detailed lighting strategies would be developed with the agreement of Peel Ports and LCC to ensure that any navigational risks are minimised or eliminated and measures to minimise obtrusive or nuisance light are incorporated.

3. Identifying the European Sites Potentially at Risk

3.1. Drawing on Stage 1 of Fig.2, before identifying potentially vulnerable sites, the Handbook (F3.2 – 3.4) first provides mechanisms that allow exploration of whether the project can be excluded, eliminated or exempted from HRA because it does not lie within the scope of HRA, could have no conceivable impact on any European Site, or is necessary for the management of a European site. As none of these apply, the next steps in Stage 1 of Fig 2 need to be pursued by identifying which European sites and which features may be vulnerable as follows.

3.2. To encourage a consistent, reliable and repeatable process, the *Handbook* (F4.4) identifies 16 generic criteria, listed below in Table 3 (columns 1 & 2), that when evaluated generates a precautionary, 'long' list of European sites in column 3 which might be affected by the project[10]. However, when considered further, (using readily available information and local knowledge) (column 4) the list of plausible threats can be refined and the list of affected sites reduced (column 5). Albeit a coarse filter, this enables the exercise to comply with the Boggis case and attempts to only consider realistic and credible threats whilst avoiding the hypothetical or extremely unlikely.

3.3. In their correspondence[11], MEAS advised that at least the following sites should be included in the ALSE assessment: proposed Liverpool Bay SPA extension, Mersey Narrows SPA/Ramsar; the Mersey Estuary SPA/Ramsar; Ribble and Alt Estuaries SPA/Ramsar; and the Dee Estuary SPA/Ramsar. In 2016 Defra consulted on a proposed SPA extension to Liverpool Bay including further inshore along the River Mersey to offer protection to foraging little gull *Hydrocoloeus minutus* (out to sea), common tern *Sterna hirundo* (breeds Mersey Narrows and North Wirral Foreshore SPA) and little tern *Sternula albifrons* (breeds Dee Estuary). This extension was fully classified as an SPA on 31st October 2017. In addition, we have added the Liverpool Bay SPA and the SACs at the Dee Estuary and Sefton Coast. Therefore, the European sites identified as potentially vulnerable to impacts from the Development comprise the following:

Table 2: European Sites Vulnerable to Effects Arising from the Cruise Ship Terminal

Vulnerable European sites (CCAP HRA)
Liverpool Bay SPA
Mersey Estuary SPA, Ramsar
Mersey Narrows and North Wirral Foreshore SPA, Ramsar
The Dee Estuary SPA, Ramsar, SAC
Ribble and Alt Estuaries SPA, Ramsar
Sefton Coast SAC

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10 This table is taken from the Handbook albeit with changes to the number and titles of columns appropriate to this HRA.
11 MEAS Development Management Advice, 06.09.17 Ref LI17 053, from Lucy Atkinson

Table 3: Potential mechanisms and the initial list of European sites that could be affected

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
1. All projects (terrestrial, coastal and marine)	Sites within the geographic area relevant to the project / Sites within which the project is wholly or partly located	Liverpool Bay SPA Mersey Estuary SPA, Ramsar Mersey Narrows and North Wirral Foreshore SPA, Ramsar The Dee Estuary SPA, Ramsar, SAC Ribble and Alt Estuaries SPA, Ramsar Sefton Coast SAC	N/A	Unchanged: Liverpool Bay SPA Mersey Estuary SPA, Ramsar Mersey Narrows and North Wirral Foreshore SPA, Ramsar The Dee Estuary SPA, Ramsar, SAC Ribble and Alt Estuaries SPA, Ramsar Sefton Coast SAC
2. Projects that could affect the aquatic environment	Sites upstream or downstream of the project location in the case of river or estuary sites	Liverpool Bay SPA Mersey Estuary SPA, Ramsar	Effects considered are those associated with the physical presence of built development and the *localised* effects on surface and ground water resources and quality resulting from changes in run-off, sedimentation, erosion etc. No development is proposed that could lead to such significant estuarine effects in the vicinity of the list of relevant European sites. Therefore, **effects on the aquatic environment are removed from further consideration.** Marine considerations are set out in 3 below. Note that the *indirect* effects of changes to wastewater disposal are assessed separately under '7d'.	Changed: None
	Open water, peatland, fen, marsh and other wetland sites with relevant hydrological links to the project, irrespective of distance from the project location	None.		
3. Projects that could affect the marine environment	Sites that could be affected by changes in water quality, currents or flows; or effects on the inter-tidal or sub-tidal areas	Liverpool Bay SPA Mersey Estuary SPA, Ramsar Mersey Narrows and North Wirral Foreshore SPA, Ramsar	Impacts from **construction** are expected on great cormorant *Phalacrocorax carbo*, a component species of the bird assemblage	Changed: Liverpool Bay SPA

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
	or the sea bed, or marine species	The Dee Estuary SPA, Ramsar, SAC Ribble and Alt Estuaries SPA, Ramsar Sefton Coast SAC	feature of Liverpool Bay SPA as a result of temporary loss of roosting/resting structures (Prince's Jetty). Construction impacts are not considered to impact upon other features of the SPA. Construction impacts will not impact other European Sites due to the distances involved being too great in relation to disturbance and the minimal changes from the scheme in relation to water quality, flows, impacts on inter-tidal or sub-tidal areas, sea bed or marine species, including the Mersey Narrows and North Wirral Foreshore SPA & Ramsar which is over 800m away at its closest point (Seacombe Ferry Terminal), where the only feature species present would be roosting/resting cormorant and these birds are over 800m distant and their roosting/resting structures will not be impacted in any way. Noise issues are addressed under 14 below. Other features of the Mersey Narrows and North Wirral Foreshore SPA will not be impacted by disturbance or any changes to water quality, flows, impacts on inter-tidal or sub-tidal areas, sea bed or marine species, because: • Winter waders like knot, bar tailed godwit and other assemblage waders would not be impacted as there are no significant impacts to inter-tidal habitat on	

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			western side of River Mersey and the closest inter-tidal habitat is over 1km away. There would be no impact when such species are feeding at low tide in winter and no impacts on any high tide roosts (distances too great and effects negligible). • Other Mersey Narrows SPA feature species are the same as for Liverpool Bay and are addressed elsewhere in this assessment. Impacts from **operational** use include potential impacts from an increase (up to 30%) in cruise liner vessels up to 2025. However, cruise liner operations are guided by strict procedures and standards such that significant impacts on water quality are considered unlikely. Potential impacts upon bird species using Liverpool Bay in relation to disturbance are addressed under 14 below. Sefton Coast SAC and the Dee Estuary SAC are not considered vulnerable to impacts related to shipping/vessels. Whilst some SPAs may be vulnerable to pollution from commercial shipping (chemical pollution, dumping of litter at sea), this is not considered to be an issue for cruise liners given their codes of	

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			conduct and methods of operation: therefore the remaining SPAs / Ramsars are considered not to be impacted.	
4. Projects that could affect the coast	Sites in the same coastal 'cell', or part of the same coastal ecosystem, or where there are interrelationships with or between different physical coastal processes	Liverpool Bay SPA Mersey Estuary SPA, Ramsar Mersey Narrows and North Wirral Foreshore SPA, Ramsar The Dee Estuary SPA, Ramsar, SAC Ribble and Alt Estuaries SPA, Ramsar Sefton Coast SAC	Dismantling, construction and operational impacts would not result in any changes to coastal processes.	Changed: None
5. Projects that could affect mobile species	Sites whose qualifying features include mobile species which may be affected by the project irrespective of the location of the project or whether the species would be in or out of the site when they might be affected	Liverpool Bay SPA Mersey Estuary SPA, Ramsar Mersey Narrows and North Wirral Foreshore SPA, Ramsar The Dee Estuary SPA, Ramsar Ribble and Alt Estuaries SPA, Ramsar	With the exception of cormorant, none of the mobile species (e.g. foraging and breeding common tern, foraging and breeding little tern, roosting little gull) relevant to European sites occur on the Development site, although common tern may forage along the adjacent River Mersey. A 30-33% increase in cruise vessels using the Mersey is not considered to impact on foraging common tern, little tern and little gulls which are not affected by ships of this size/speed and such ship movements. Natural England's Site Improvement Plan for Liverpool Bay SPA does not cite little gull, common tern or little tern as features affected by 'transportation and service corridors' (Version 3.0 dated 20.03.2015).	Changed: None

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			In general, gulls and terns are generally less affected by disturbance[12]. Impacts on cormorant are addressed in 3 above and 14 below. The 30-33% increase in cruise liner vessels will not impact upon wintering shorebirds (ducks and waders) using the SPA mudflats for feeding, nor wintering sea duck (common scoter, red breasted merganser) and red throated divers (all features of Liverpool Bay SPA): cruises generally operate outside of the winter period when wintering birds use the estuaries and coasts. Cruise liners in Liverpool operate from March through to November. Disturbance impacts are addressed in 14 below.	
6. Projects that could increase recreational pressure on European sites potentially vulnerable or sensitive to such pressure	(a) European sites within which the project would be wholly or partly located	Liverpool Bay SPA	None of the species listed in the Liverpool Bay SPA citation (red throated diver; little gull; little tern; common tern; common scoter; red-breasted merganser; and cormorant) are susceptible to recreational disturbance of the type associated with cruise liners. The main source of potential recreational disturbance from the	Changed. None

[12] Camphuysen, C.J. 1989. Beached bird surveys in the Netherlands 1915-1988; Seabird mortality in the southern North Sea since the early days of Oil Pollution. Techn. Rapport Vogelbescherming 1, Werkgroep Noordzee, Amsterdam. Williams, J.M., Tasker, M.L., Carter, I.C. & Webb, A. 1994. A method of assessing seabird vulnerability to surface pollutants. Ibis, 137, S147-S152. Furness, R.W. & Tasker, M.L. 2000. Seabird-fishery interactions: quantifying the sensitivity of seabirds to reductions in sandeel abundance, and identification of key areas for sensitive seabirds in the North Sea. Marine Ecology Progress Series. 202, 253-264. Garthe, S. & Hüppop, O. 2004. Scaling the possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology, 41, 724-734. King, S., Maclean, I. M. D., Norman, T. & Prior, A. 2009. Developing Guidance on Ornithological Cumulative Impact Assessment for Offshore Wind Farm Developers. COWRIE

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			proposed development is the 30-33% increase in vessel traffic, i.e. visual disturbance. The predicted vessel usage for future years is indicated in Table 1 with 2020 being the opening year. It is predicted that for the opening year there would be a 'worst case' of 14 cruise ships in the busiest month which is just two more cruise ships than currently use the existing terminal. In 2027, there is predicted to be a slight increase to 16 cruise ships in the busiest month. It is considered that birds in the area listed above are already habituated to regular movement of large vessels and associated visual disturbance within the Mersey Estuary. Therefore, there would be no change in recreational disturbance to foraging and breeding common and little tern, and roosting little gull using the Liverpool Bay SPA as a result of the Development as cruise ship frequencies will remain broadly the same albeit with a small, gradual annual increase.	
	(b) Such European sites within an agreed zone of influence or other reasonable and evidence-based travel distance of the project location boundaries that may be affected by local recreational or other visitor pressure generated by the project	Liverpool Bay SPA Mersey Estuary SPA, Ramsar Mersey Narrows and North Wirral Foreshore SPA, Ramsar The Dee Estuary SPA, Ramsar, SAC Ribble and Alt Estuaries SPA, Ramsar Sefton Coast SAC	There would be no increase in recreational and or visitor pressure on these sites, apart from an increase in cruise vessels (30-33%) which is addressed under 14. It is considered inconceivable that any increases in visitors coming ashore in Liverpool would increase recreational disturbance on any of these sites, given their destination	Changed: None.

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			as the City of Liverpool and its urban attractions, especially given the fact that visitors are arriving outside of the winter period and therefore would not impact wintering birds.	
	(c) Such European sites within an agreed zone of influence or other evidence-based longer travel distance of the project, which are major (regional or national) visitor attractions such as European sites which are National Nature Reserves where public visiting is promoted, sites in National Parks, coastal sites and sites in other major tourist or visitor destinations	None	N/a	Unchanged: None
7. Projects that would increase the amount of development	(a) Sites that are used for, or could be affected by, water abstraction irrespective of distance from the project	None	N/a	Unchanged
	(b) Sites used for, or could be affected by, discharge of effluent from waste water treatment works or other waste management streams serving the project, irrespective of distance from the project	Liverpool Bay SPA,	It is anticipated that surface water from the all areas other than highways areas would be discharged directly to the River Mersey, via interceptors and pollution abatement controls as appropriate. Foul water drainage would be connected to the existing public network which runs adjacent to the Site. It is not anticipated that foul water from vessels would be discharged in to the landward sewerage system.	Changed: None

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			Codes of conduct and operational standards cover release of sewage from cruise liners at sea.	
	(c) Sites that could be affected by the provision of new or extended transport or other infrastructure	None	Areas of parking associated with the proposed new cruise terminal would be within Plot 11 which is currently already used for car parking. Therefore, no change.	Unchanged: None
	(d) Sites that could be affected by increased deposition of air pollutants arising from the proposals, including emissions from significant increases in traffic	Liverpool Bay SPA.	In the absence of mitigation the contributions of cruise ship emissions and the effect of operational traffic for the Development are predicted to have a potential effect of negligible significance on local air quality at relevant receptors surrounding the Site. In addition, the proposed Development, in line with the recommendations made in the LCC Cabinet Paper (August 2017), would allow future installation of shore-side power should the cruise industry move in that direction and would have the potential to bring about air quality benefits by removing the need for cruise ships to use their engines while in port and therefore reducing pollutant emissions from the cruise ships while they are in port. No major new point source emitters of airborne pollution are proposed on the terminal site. The Development, including any associated road traffic emissions, is predicted to result in a 'negligible' impact at all of the existing sensitive air pollution receptors modelled.	Changed: None.

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			Any potential impacts to the River Mersey from construction (e.g. demolition dust) would be addressed by a CEMP. The features of the SPA, including those most relevant to the location (foraging and breeding common tern and little gull, wintering cormorant) would not be affected.	
8 Projects comprising linear developments or infrastructure	Sites within a specified distance from the centre line of the proposed route (or alternative routes), the distance may be varied for differing types of site / qualifying features and in the absence of established good practice standards, distance(s) to be agreed by the statutory nature conservation body	None	No such infrastructure proposed	Unchanged: None
9. Projects that introduce new activities or new uses into the marine, coastal or terrestrial environment	Sites considered to have qualifying features potentially vulnerable or sensitive to the effects of the new activities proposed by the project	None	No such **new** activities proposed	Unchanged: None
10. Projects that could change the nature, area, extent, intensity, density, timing or scale of existing activities or uses	Sites considered to have qualifying features potentially vulnerable or sensitive to the effects of the changes to existing activities proposed by the project	None	Addressed under 14 below.	Unchanged: None
11. Projects that could change the quantity, quality, timing, treatment or mitigation of emissions or discharges to air, water or soil	Sites considered to have qualifying features potentially vulnerable or sensitive to the changes in emissions or discharges that could arise as a result of the project, over and above those already identified	None	Addressed under 3 and 7d above.	Unchanged: None

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
12. Projects that could change the quantity, volume, timing, rate, or other characteristics of biological resources harvested, extracted or consumed	Sites whose qualifying features include the biological resources which the project may affect, or whose qualifying features depend on the biological resources which the project may affect, for example as prey species or supporting habitat or which may be disturbed by the harvesting, extraction or consumption	None	No such activities proposed	Unchanged: None
13. Projects that could change the quantity, volume, timing, rate, or other characteristics of physical resources extracted or consumed	Sites whose qualifying features rely on the non-biological resources which the project may affect, for example, as habitat or a physical environment on which habitat may develop or which may be disturbed by the extraction or consumption	None	No such activities proposed	Unchanged: None
14. Projects which could introduce or increase, or alter the timing, nature or location of disturbance to species	Sites whose qualifying features are considered to be potentially sensitive to disturbance, for example as a result of noise, activity or movement, or the presence of disturbing features that could be brought about by the project	Liverpool Bay SPA Mersey Estuary SPA, Ramsar Mersey Narrows and North Wirral Foreshore SPA, Ramsar The Dee Estuary SPA, Ramsar Ribble and Alt Estuaries SPA, Ramsar	Disturbance impacts from dismantling, construction and operation from conversion of existing terminal facilities to the proposed new terminal may impact Liverpool Bay SPA (cormorant). Whilst cormorants are acclimatised to noise and disturbance within the dockside environment, there may be some local temporary impact. Impacts from temporary loss of resting/roosting structures is addressed in 3 above. Disturbance would not impact upon other cited Liverpool Bay SPA species. Noise issues from piling are not considered to impact birds cited for	Changed: Liverpool Bay SPA

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			other European Sites, including the Mersey Narrows and North Wirral Foreshore SPA/RAMSAR. This SPA is about 850m to the west of the development site and at this distance noise from piling is reduced to 36.2dB and the ES[13] concludes that any effects would be neutral for species of wader associated with the SPA (oystercatcher, redshank, bar-tailed godwit, grey plover, knot, sanderling, dunlin and turnstone). Impacts from **operational** use include potential impacts from an increase (30-33%) in cruise liner vessels up to 2025. Significant impacts on SPA/Ramsar bird features are considered unlikely due to: • Cruise liners run from March to November, therefore there is unlikely to be any significant impact on wintering cormorant, sea duck and divers (i.e. Liverpool Bay SPA), waders and wildflowl using the sea, estuary or mudflats. • Given the deep water required for cruise vessels, there will be no impact to waterbirds using mudflats. No high tide locations are impacted by cruise vessel movements.	

13 Waterman January 2019; Liverpool Cruise Terminal, Environmental Statement Addendum (Second Issue) WIE12464-103-R-ES-Addendum-12-6-1

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			• Foraging species such as common tern, little tern and little gull are not impacted by shipping movement. • Dee Estuary SPA, Mersey Estuary SPA/Ramsar and Mersey Narrows and North Wirral Foreshore SPA/Ramsar are considered too distant from cruise vessel movements to be impacted. Seaforth Dock (part of Mersey Narrows SPA) is a high tide roost and also a breeding area for common tern: this site will not be impacted by an increase in cruise liner vessels. Neither will any breeding areas for little tern on the Dee Estuary. • In terms of light pollution, there may be an increased exposure to light pollution from an increase in vessel numbers. Lighting of the terminal building and linkspan bridge would be designed to minimise light spillage in line with the recommendations set out in the Lighting Strategy[14] for the proposed Development. None of the relevant species would be susceptible to light pollution at night essentially in the spring-autumn period (foraging little gulls and common tern active in	

14 Ramboll, 2017. Liverpool Cruise Liner Terminal – External Lighting Statement, Rev 01.

Types of project (or potential effects)	Sites to scan for and check	Initial list of potentially affected European sites	Additional context	Final list of European sites selected
			the daytime; seabirds, divers and wildfowl feeding on the mudflats not significantly affected by March to November vessel movements at high tide/night-time; breeding terns unaffected; cormorants habituated to a degree of light pollution when they roost in cities).	
15. Projects which could introduce or increase or change the timing, nature or location of light or noise pollution	Sites whose qualifying features are considered to be potentially sensitive to the effects of changes in light or noise that could be brought about by the project	None	Addressed under 14 above.	Unchanged: None
16. Projects which could introduce or increase a potential cause of mortality of species	Sites whose qualifying features are considered to be potentially sensitive to the source of new or increased mortality that could be brought about by the project.	None	No such activities proposed	Unchanged: None

3.4. The outputs of the review carried out in Table 1 rules out the possibility of any credible effects from any aspect of the project on all the relevant European Sites, with the exception of possible impacts from dismantling, construction and operation from conversion of existing terminal facilities to the proposed new terminal on Liverpool Bay SPA feature cormorant. The rationale for the assessments set out in Table 3 above are set out in Table 4 below.

Table 4: Detailed Pathway to Impact Assessment

Qualifying feature	European Site affected	Pathway to impact (with Table 3 references)	Assessment of Likely Significant Effects	Conclusion
Dismantling and construction impacts				
SPA cormorant	Liverpool Bay SPA	Impact on marine environment (Type 3). Direct: displacement of birds from feeding, roosting or nesting locations due to loss of land and / or water under the footprint of the construction works. Direct: displacement of birds from feeding, roosting or nesting locations due to noise and / or vibration. Such effects can arise from a number of activities involved in the construction process including vehicle movements, piling etc. Direct: displacement of birds from feeding,	Winter bird surveys during 2017/18[15] recorded a peak count of 12 cormorant, with the majority of these birds perched on permanent structures within the Site, including six birds perched on the Prince's Jetty. The peak count equates to 1.6% of the cormorant population of the Liverpool Bay SPA. Cormorant is not a qualifying species under Article 4.1 of the Birds Directive, rather it is cited as a component of the 'Assemblage qualification' (SPA selection stage 1.3) which comprises 69,687 individual waterbirds during the non-breeding season, of which 732 are cormorants (12 birds representing 1.6% of the Liverpool Bay SPA cormorant population). However, Liverpool Bay SPA would be judged as being significant for cormorant given it supports more than 1% of the non-breeding UK Population of 35,000[16]. Some of the structures used by cormorant to rest/roost are to be removed, e.g. demolition of the existing jetty (140 wooden posts). This would classify as loss of habitat for this species and is classified as displacement of birds from resting/roosting locations due to loss of land under the footprint of the construction works. Direct impact from noise, vibration and human presence, causing potential displacement of cormorant from resting/roosting locations is considered a minor temporary impact given the fact that cormorants are habituated to the urban environment in the Docks.	LSE cannot be ruled out

15 Liverpool Cruise Terminal. Wintering Bird Surveys. APEM January 2018 Ref P00001343.
16 JNCC The status of UK SPAs in the 2000s: the Third Review, undated.

Qualifying feature	European Site affected	Pathway to impact (with Table 3 references)	Assessment of Likely Significant Effects	Conclusion
		roosting or nesting locations due to the presence of human activity i.e. visual disturbance. Such effects can arise from a number of activities involved in the construction process including lighting, vessel movements, vehicle activity and the presence of people outside of vehicles. Direct: death or injury to birds through contamination with chemical substances i.e. pollution. Such effects can include spills or leaks of fuel, oil and chemicals and / or the reworking and translocation of previously contaminated sediments into the water environment. Indirect: displacement / disruption / removal / smothering of species that are prey (food) items for birds and / or the habitats supporting such prey species.	No impacts are considered to affect cormorants from the remaining listed indirect and direct effects, including changes to water quality from suspended solids and release of sediment chemicals: such changes would be temporary and localised and the magnitude of effect negligible given the extent of the River Mersey.	

Qualifying feature	European Site affected	Pathway to impact (with Table 3 references)	Assessment of Likely Significant Effects	Conclusion
Other SPA bird species	Liverpool Bay SPA Mersey Narrows and North Wirral Foreshore SPA/RAMSAR	As above	The impacts from dismantling and construction are not considered to affect any of the other names bird species for these Sites. Liverpool Bay species: Little gull: forage out at sea and will not be impacted by any loss of habitat or disturbance issues; Little tern: breeding and feeding area too distant to be impacted by any loss of habitat or disturbance issues; Common tern: feed in Mersey but main breeding areas at Seaforth Docks around 6km to the north. Common tern now also breed in Birkenhead Docks about 1.5km to the SW. Given the small number that forage in the vicinity of the development (5-10) and the extensive feeding area of the River Mersey, no impact is expected from loss of habitat or disturbance. Any impact from changes to water quality would be temporary and localised and the magnitude of effect negligible given the extent of the River Mersey; Red-throated diver and common scoter: citation refers to wintering birds out at sea, too distant for any impacts from loss of habitat or disturbance; Red-breasted merganser: assemblage species, winters further out to sea, no impacts from habitat loss or disturbance. Mersey Narrows and North Wirral Foreshore species (additional to the above) Non-breeding little gull and breeding common tern: impact as above. Bar-tailed godwit, oystercatcher, grey plover, sanderling, dunlin, knot, turnstone and redshank: over 800m from site and noise levels (e.g. from piling) not significant, no disturbance expected.	No LSE

Qualifying feature	European Site affected	Pathway to impact (with Table 3 references)	Assessment of Likely Significant Effects	Conclusion
Operational impacts				
Cormorant	Liverpool Bay SPA	Physical disturbance and displacement (visual), Type 14; Airborne noise and vibration Type 14;	Once operational, the main potential impacts to cormorant would be from increased ship movements and docking and associated disturbance from on-shore and docking activity. Given the small increases involved (up to four cruise ships per month in the busiest months, in summer) this is considered negligible, given that the highest cormorant numbers are in winter, when the terminal will be at its lowest use. In the absence of mitigation, cormorant may be impacted through the lack of resting/roosting structures, however given the relative lack of Cruise Terminal activity in the peak cormorant winter period, it is considered that cormorant would adapt to the new dock structures for roosting. Cormorant use both open sea and estuary habitats and will roost / rest on dock structures (mostly in winter). Any impact from disturbance is considered negligible given the acknowledged habituation of this species and other species in cities to people, e.g. '*Overall, apart from the oystercatcher roost at the Garston Docks, and the particularly high levels of disturbance associated with the Liverpool town centre docks, the majority of birds observed exhibited high levels of habituation to visual and noise disturbance at the docks. This included human visual disturbance, construction works and other dock activities, vehicle movements and boat/shipping movements*[17]*'*.	No LSE
SPA foraging common tern, little tern and little gull.	Liverpool Bay SPA	Physical disturbance and displacement (visual) from vessel movements, Type 14;	Little gulls (50+) forage out to sea in spring and will not be impacted by a slight increase in cruise liners. Little terns forage offshore close to Dee Estuary breeding colony (130 pairs Gronant Beach) and will not be impacted by a slight increase in cruise liners. Common terns breed at Seaforth Docks (180 pairs, Mersey Narrows and North Wirral Foreshore SPA) and their predicted foraging area extends north approximately to Formby, west along most of the Wirral foreshore, and into the mouth of the Mersey Estuary approximately to Rock Ferry[18]. Greatest usage of marine areas was seen closer to the colony, but common terns were recorded at count locations throughout the proposed extension into the Mersey Estuary and as far as South	No LSE.

17 Assessment of Supporting Habitat (Docks) for Use by Qualifying Features of Natura 2000 Sites in the Liverpool City Region. Ornithology Report. Ref 4157.005. Aug 2015. TEP for Merseyside Environmental Advisory Service.

18 JNCC Departmental Brief: Liverpool Bay potential SPA. Advice to Welsh and UK Government, March 2016

Qualifying feature	European Site affected	Pathway to impact (with Table 3 references)	Assessment of Likely Significant Effects	Conclusion
			Ferry Quay (south of the Development Site). Only small numbers of common terns were found to forage upriver in the vicinity of the Development Site (5-10 around Prince's Dock). Given the existing high numbers of vessels using the Mersey and Liverpool Docks, the inevitable conclusion is that common tern foraging is not impacted by shipping. In this context, an increase in 30-33% of cruise liners is not considered to have any impact on foraging common tern within the River Mersey and out to Liverpool Bay. No impacts from small increase in light pollution from additional vessels or terminal building (no impact to birds at night).	
SPA/Ramsar wintering birds	Liverpool Bay SPA (common scoter, red throated diver,: red breasted merganser, cormorant). Mersey Narrows SPA/Ramsar: bar-tailed godwit, knot, redshank, sanderling, turnstone, dunlin, grey plover, oystercatcher, cormorant. Mersey Estuary SPA/Ramsar: golden plover, redshank, dunlin, pintail, shelduck, teal, wigeon, curlew, grey plover, great crested grebe and lapwing. Ribble and Alt Estuaries SPA, Ramsar: bar-tailed godwit, Bewick's swan, whooper swan, golden plover, ringed plover, sanderling, black-tailed godwit, dunlin, grey	.Physical disturbance and displacement (visual) from vessel movements, Type 14;	Impacts to wintering birds (red throated diver, red breasted merganser , cormorant and common scoter) on the open sea is negligible given small increase in vessel movements, area for displacement and use of existing routes. Impacts to all other species negligible given they feed on estuary mudflats (not impacted by vessel movements in deep water), cruise vessels operate in the spring / summer months (not in winter) and no high tide roosts would be affected. No impacts from small increase in light pollution from additional vessels or terminal building (vessels operating outside crucial winter period; no impact to birds at night).	No LSE

Qualifying feature	European Site affected	Pathway to impact (with Table 3 references)	Assessment of Likely Significant Effects	Conclusion
	plover, knot, oystercatcher, pink-footed goose, pintail, redshank, shelduck, teal and wigeon. Dee Estuary SPA, Ramsar: bar-tailed godwit, black tailed godwit, curlew, dunlin, grey plover, knot, oystercatcher, pintail, redshank, shelduck and teal.			
SPA/Ramsar passage birds	Mersey Narrows SPA/Ramsar: knot, redshank, turnstone. Mersey Estuary SPA/Ramsar: ringed plover. Dee Estuary SPA, Ramsar: sandwich tern, redshank.	Physical disturbance and displacement (visual) from vessel movements, Type 14;	Impacts to wader species (knot, redshank, turnstone, ringed plover and redshank) is negligible given they feed on estuary mudflats (not impacted by vessel movements in deep water) and no high tide roosts would be affected. No impacts from small increase in light pollution from additional vessels or terminal building (vessels operating outside crucial winter period; no impact to birds at night). Impacts to passage sandwich terns is negligible given passage birds rest on exposed sandbanks (not impacted by vessels in deep water) and no impact when birds foraging.	No LSE
Breeding tern species	Mersey Narrows SPA/Ramsar: common tern Dee Estuary SPA/Ramsar: common and little terns Ribble and Alt Estuary SPA/Ramsar: common tern	Physical disturbance and displacement (visual) from vessel movements, Type 14;	No impact to breeding sites from vessel movements. Closest is Seaforth Dock – no impact on this breeding colony. No impacts from small increase in light pollution from additional vessels or terminal building (no impact to birds at night).	No LSE
Foraging terns and gulls, wintering and	As above	Water quality impacts either directly from new development at cruise terminal, or from	Discharges from cruise terminal controlled and pollution interceptors employed for surface water run off: no impact. Cruise liner discharges carefully controlled through existing standards: no impacts.	No LSE

Qualifying feature	European Site affected	Pathway to impact (with Table 3 references)	Assessment of Likely Significant Effects	Conclusion
passage waterbirds and terns		operations (vessel movements) (Type 3 and 7b effects).		
Foraging terns and gulls, wintering and passage waterbirds and terns	As above	Air pollution impacts (Type 7d effect).	Emissions from additional vessels are predicted to have a potential effect of negligible significance on local air quality at relevant receptors surrounding the Site. No major new point source emitters of airborne pollution are proposed on the terminal site. The Development, including road traffic emissions, is predicted to result in a 'negligible' impact all of the existing sensitive air pollution receptors modelled. Any potential impacts to the River Mersey from construction (e.g. demolition dust) would be addressed by a CEMP. The features of the Liverpool Bay SPA, including cormorant would not be affected.	No LSE
Foraging terns and gulls, wintering and passage waterbirds and terns	As above	Recreational disturbance (Type 6 a and 6b)	The operational use is not expected to increase recreational disturbance from tourists arriving in Liverpool.	No LSE

Screening Conclusions and Next Steps

3.9. The overall conclusion is that, at the screening stage, LSEs could not be ruled out in relation to dismantling/construction impacts of loss of roosting/resting habitat and a degree of temporary disturbance for cormorant, an assemblage species for the Liverpool Bay SPA. All other potential impacts were screened out of further scrutiny within the HRA.

3.10. An appropriate assessment is now required that will assess whether it can be ascertained that an adverse effect on the integrity of the European sites can be ruled out. Drawing on the recent People Over Wind ruling, this will explore if the addition of mitigation measures can avoid a negative outcome.

4. Appropriate Assessment and Integrity Test

4.1. The initial screening assessment has identified that likely significant effects cannot be ruled out **alone** in relation to dismantling/construction impacts of loss of roosting habitat for cormorant, an assemblage species for the Liverpool Bay SPA.

4.2. The role of the appropriate assessment is to identify whether it can be ascertained that the proposed development (alone or in combination with other plans and projects) 'will not adversely affect the integrity of the European site'. In line with the recent People Over Wind ruling it will also explore if mitigation can be applied that would allow a positive conclusion to be drawn.

4.3. The Handbook[19] states (E.11):

The work undertaken at the screening stage will form a valuable start to the appropriate assessment. In some cases no further information may be needed, or available, and in other cases it may not be feasible to obtain any further information. However, the appropriate assessment is likely to be a more detailed study of the implications of the project for the European Site(s) potentially affected.

4.4. **Table 5** below summarises the potential impact and the conservation objectives for Liverpool Bay SPA. The following section assesses the impact in relation to mitigation measures included within the Development.

Table 5. Subject of Appropriate Assessment and SPA Conservation Objectives

European site	Potentially vulnerable features identified during screening	Conservation objectives
Liverpool Bay SPA	Cormorant (assemblage species).	The Conservation Advice Package for the Liverpool Bay SPA has not yet been updated following the extension of the site. The overarching conservation objective of the Liverpool Bay SPA is to ensure that the integrity of the site is maintained or restored as appropriate. For each of the qualifying features there are three key conservation objectives: • The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term. • There should be sufficient habitat, of sufficient quality, to support the population in the long term. • Factors affecting the population or its foraging habitat should be under appropriate control. There is an additional objective for little tern: The distribution of the population should be being maintained, or where appropriate increasing.

4.5. The screening exercise has concluded that a likely significant effect cannot be ruled out alone for impact on cormorant, an SPA assemblage species. This is because of concern that:

- Loss of existing Prince's Jetty which is be used by cormorant for roosting/resting; and
- Localised temporary disturbance from construction works.

4.6. This impact and mitigation is addressed below.

[19] Tyldesley, D., and Chapman, C., (2013) The Habitats Regulations Assessment Handbook, revised July 2018 edition UK: DTA Publications Ltd

Survey results

4.7. The previous section confirmed that the Development would only have potential LSE in relation to cormorant from loss of habitat during dismantling and construction.

4.8. Winter bird surveys during 2017/18[20] recorded a peak count of 12 cormorant, with the majority of these birds perched on permanent structures within the Site, including six birds perched on the Prince's Jetty. The peak count equates to 1.6% of the cormorant population of the Liverpool Bay SPA. Cormorant is not a qualifying species under Article 4.1 of the Birds Directive, rather it is cited as a component of the 'Assemblage qualification' (SPA selection stage 1.3) which comprises 69,687 individual waterbirds during the non-breeding season, of which 732 are cormorants (12 birds representing 1.6% of the Liverpool Bay SPA cormorant population). However, Liverpool Bay SPA would be judged as being significant for cormorant given it supports more than 1% of the non-breeding UK Population of 35,000.

Impacts to cormorants in absence of mitigation

4.9. Some of the structures used by cormorant to rest/roost are to be removed, e.g. demolition of the existing jetty (140 wooden posts). This would classify as loss of habitat for this species and is classified as displacement of birds from resting/roosting locations due to loss of land under the footprint of the construction works. Construction may also cause localised disturbance to cormorants resting on structures.

4.10. No impacts are considered to affect cormorants from other listed indirect and direct effects, including changes to water quality from suspended solids and release of sediment chemicals: such changes would be temporary and localised and the magnitude of effect negligible given the extent of the River Mersey.

Scheme mitigation

4.11. The previous section confirmed that the Development would only have potential LSE in relation to cormorant from loss of habitat and disturbance during dismantling and construction.

4.12. To mitigate for any *permanent* potential impact, the scheme design accommodates resting/roosting cormorant by including the following provision:

- Incorporation of horizontal suspended deck braces (**Appendix C**) in the new dock structure which would be suitable for cormorant to rest/roost upon.
- The applicant will provide a permanent floating pontoon in Princes Half Tide Dock for cormorant to rest/roost upon. Any cormorant relocated and/or disturbed could use this new structure for resting/roosting.

4.13. To mitigate for the *temporary* loss of roosting/resting structures and disturbance, whilst the new terminal is under construction, the proposal includes

- The installation of a permanent floating pontoon in Princes Half Tide Dock for cormorant to rest/roost upon. This would be installed prior to the wooden jetties being dismantled. Any cormorant relocated and/or disturbed could use this new structure for resting/roosting.

Design of permanent floating pontoon

4.14. The design of the permanent floating pontoon is set out in the Cormorant Technical Note presented in **Appendix D**. Cormorant regularly use such pontoons for resting/roosting in Liverpool and other urban centres – see photograph below of birds using a similar structure in the centre of Bristol in docks outside the MShed (landing stage for passenger ferry).

[20] Liverpool Cruise Terminal Wintering Bird Surveys Final Report APEM Ref P00001343 January 2018

Photograph 1. Cormorants in the busy centre of Bristol

Assessment of the effects on Site integrity

4.15. Cormorant are not a qualifying species for the SPA, rather they are part of the waterbird species assemblage. The overarching conservation objective of the Liverpool Bay SPA is to ensure that the integrity of the site is maintained or restored as appropriate. For each of the qualifying features there are three key conservation objectives. We address each below in relation to the waterbird species assemblage of which cormorant is a part.

4.16. ***The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term*.** There is evidence that cormorant numbers are increasing in the Mersey as a result of improved water quality and fish stocks. For example, the Mersey Estuary Conservation Group[21] state:

> *'Numbers of cormorants have increased in our local area of the upper Mersey Estuary at Frodsham / Pickerings Pasture during the last 15 years, presumably because of the number of species and increasing numbers of fish now being recorded in the Mersey. The increase in fish numbers has occurred with the removal, from the river, of much of the industrial pollution which had blighted the area for so many years'.*

4.17. Therefore, given that permanent mitigation will retain appropriate resting and roosting places (ensuring the lasting preservation of one of the constitutive characteristics of the Liverpool Bay SPA that is connected to the presence of cormorant), there are no projected impacts on water quality and fish stocks and the cormorant population is considered stable/increasing on the River Mersey, then favourable conservation status is preserved.

4.18. ***There should be sufficient habitat, of sufficient quality, to support the population in the long term.*** Only a very small part of the SPA habitat suitable for cormorant will be affected and the Development is not expected to impact on other suitable habitat for cormorant within the SPA. The potential impact relates to loss of winter roosting/resting structures – one component of cormorant habitat. A maximum of 12 cormorant were present during the winter of late 2017/18, with up to 6 birds perched on Prince's Jetty. The replacement of the jetty with horizontal suspended deck braces as part of the scheme design, suitable for up to 20 cormorant to rest upon, together with the provision of a permanent pontoon in Princes Half Tide Dock, provides more than adequate mitigation. In addition, it is highly likely that cormorant would roost/rest on other structures within the terminal site. Given cormorant are present mostly in winter, when the terminal is less busy, they are likely to rest/roost upon various walls, structures, vessels and buildings. Given that the existing roosting/resting structures are only a small component of

[21] www.merseyestuary.org/cormorants-on-the-upper-mersey-estuary.html#

the suitable cormorant habitat and that permanent measures are proposed to replace them, the site (Liverpool SPA) will be preserved at favourable conservation status.

4.19. ***Factors affecting the population or its foraging habitat should be under appropriate control.*** As stated above, the population of cormorant is increasing on the Mersey. Foraging habitat consists of the river itself where cormorants are increasing in numbers in winter. Given the size of the Liverpool Bay SPA, it is inconceivable that any surface water run off from the development site would impact the water quality of the SPA and impact cormorant fishing or foraging habitat. The Development is not impacting cormorant foraging habitat and therefore site integrity is not impacted.

4.20. Therefore, we conclude that there will be no impact on SPA site integrity, i.e. there will be no lasting or irreplaceable loss of whole or part of the priority natural habitat (i.e. the Liverpool Bay SPA) from the Development.

4.21. Given the small number of cormorant recorded at the Site, it is considered that the above permanent measures would adequately mitigate for an LSE to cormorant. With the inclusion of these measures, there would therefore be no LSE on European Sites.

Additional Consultation Response

4.22. In their consultation response (21st February 2018; ref: 233344), Natural England suggested the HRA address:

> '*Consideration of appropriate mitigation measures for example, but not restricted to: timing restrictions to reduce disturbance to wintering birds and appropriate piling methodology'*.

4.23. It is not considered appropriate to introduce timing restrictions for the cruise terminal activity in relation to cruise vessels as these will be operational between March and November – generally outside of the wintering bird period. It is noted that the cruise terminal building may be used for other purposes outside of this period, but the impact of such uses in winter is not considered to impact on wintering bird populations, given the above mitigation.

4.24. In terms of 'appropriate piling methodology', this is discussed in detail in Appendix 6.1a of the ES Addendum (fourth issue). This work is subject to a Construction Environmental Management Plan (CEMP); a Framework CEMP is presented as Appendix 6.2a of the ES Addendum (fourth issue). A soft-start piling approach will be implemented in order to reduce potential adverse effects to fish and marine mammals. This involves gradually increasing the force of piling, thereby steadily increasing the sound power levels generated over a period of time. This would alert individuals within the area, without exposing them to more intense sound power levels, and provide an opportunity for them to move away from the noise source. This technique is recommended as best practice by the Joint Nature Conservation Committee for pile driving operations[22] and is considered appropriate for the proposed development.

4.25. During demolition the piles from the existing Princes Jetty will be removed (for the purposes of assessment it has been assumed extraction would be by vibro-extraction although other methods could be deployed such as 'jacking out' or mechanical pulling). The piles for the jetty would be installed using rotary drilling which is less noisy and vibration-inducing than percussive piling.

4.26. In addition, as noise generating pile removal and drilling activity would be limited during each working day and would not occur for extended periods (at least 12 hours) each night, there would be extensive windows of no pile extraction works or drilling activity.

4.27. No significant impacts to SPA/RAMSAR bird species are considered likely from piling: the species most likely to be in the vicinity would be cormorant (if piling occurs in winter) and common tern (if piling occurs

22 Joint Nature Conservation Committee (JNCC). (2010). Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise.

in spring-autumn). Given the habituation of cormorant to noise and disturbance, the expanse of the River Mersey in terms of relocation for fishing/roosting and the localised temporary nature of the works, no impacts are envisaged. Therefore, the piling methodology is considered appropriate and no further mitigation for this aspect is recommended.

5. In-Combination Effects

5.1. The Handbook[23] includes (Section C8), Figure C.8.1 '*Stages 1 and 2: An approach to the in-combination assessment'*. Where it has been ascertained, via Appropriate Assessment that a project would not have an adverse effect on site integrity 'alone' (see para 4.20 above), but could have some adverse effect in combination with other proposed developments, then an Appropriate Assessment of effects in combination should be triggered. However, this Appropriate Assessment of in combination effects should be restricted to other adverse effects (other than the LSE of cormorant roosting/resting features) i.e. those effects in Table 3 which are not considered significant impacts from this Development alone.

5.2. The following schemes have been identified by the Environmental Statement (ES) as possibly resulting in in-combination effects:

- Isle of Man Landing Stage;
- Liverpool City Centre Connectivity Phase 2 Northern Link Road.
- Various Wirral Waters schemes approved 2010: ITC (OUT/11/00645 permission March 2012), Wirral Waters West, Wirral Waters East Float and Wirral Waters Northbank East.
- Liverpool Waters (10O/2424) – approved July 2013.
- Twelve Quays Terminal, Birkenhead, new fixed bridge – approved October 2018 (APP/18/00555).
- The Hive, William Jessop Way (17F/0456) – approved subject to S106.
- The Lexington, William Jessop Way (16F/1370) – permission granted Sep 2016.
- William Jessop House (15F/0560) – registered March 2015.
- Ovatus 1, Leeds Street (17F/0042) – permission granted April 2017.
- Infinity, Leeds Street (17F/0340) – application submitted Feb 2017.
- 30-36 Pall Mall (16F/2634) – application submitted Nov 2016.
- North Point, 70-90 Pall Mall (14F/2543) – on site, completion spring/summer 2018.
- Land to west of Waterloo Road Plot C04 and C06 Central Docks Liverpool Waters (17F/1628) – registered Sept 2017.
- Vacant Land William Jessop Way Liverpool (17F/0913) – approved subject to S106.
- Liverpool Cruise Liner Hotel (19F/1038) – application submitted January 2019.
- Port related activities.
- Liverpool Local Plan.

5.3. **Table 3** above identifies other 'insignificant' adverse effects when the proposed Development is considered alone. **Table 6** below considers these in-combination with relevant projects from the list above. Of the other above schemes, only the Phase 2 Northern Link Road, Wirral Waters sites, Liverpool Waters, Twelve Quays and Isle of Man Landing Stage border the Mersey Estuary and are addressed below. For the remaining schemes, it is considered there are no pathways to impact that could combine with residual or other impacts from the Cruise Liner Terminal Development that could result in impacts to the integrity of the Liverpool Bay SPA site integrity.

5.4. It has generally been assumed that construction activities on the Site and at the in combination schemes would occur simultaneously. However, particularly in the case of outline planning consents, this is unlikely to actually occur.

[23] Tyldesley, D., and Chapman, C., (2013) The Habitats Regulations Assessment Handbook, revised July 2018 edition UK: DTA Publications Ltd

Table 6: Assessment of Potential In-Combination Effects

Type of potential effect	Detail	In combination effects	Conclusion
3. Operational impacts affecting marine environment	Increase in number of vessels impacting water quality/pollution	No other expected increases in vessels from above projects, Isle of Man project expects vessel frequency to remain about the same.	No in combination impact on site integrity.
5. Projects affecting mobile species	Increase in number of vessels affecting foraging terns and gulls or wintering ducks and divers	No other expected increases in vessels from above projects, Isle of Man project expects vessel frequency to remain about the same.	No in combination impact on site integrity.
6. Recreational pressure.	Increase in number of vessels or land based visitors affecting foraging terns and gulls or wintering ducks and divers	No other expected increases in vessels from above projects, Isle of Man project expects vessel frequency to remain about the same. Impacts from land based visitors from Cruise Terminal not likely to increase an recreational disturbance to SPA species as visitors will target Liverpool City centre terrestrial areas.	No in combination impact on site integrity.
7. Projects that would increase the amount of development	Impacts from surface water drainage. Impacts on air quality.	Surface water drainage from Cruise Terminal subject to pollution abatement controls and unlikely to produce significant cumulative impact when taken with other projects. Water quality in the Mersey improving. No major new point source emitters of airborne pollution are proposed on the terminal site. The Development, including any associated road traffic emissions, is predicted to result in a 'negligible' impact at all of the existing sensitive air pollution receptors modelled. Therefore, in-combination effects inconceivable. Any potential impacts to the River Mersey from construction (e.g. demolition dust) would be	No in combination impact on site integrity.

		addressed by a CEMP. The features of the SPA, including those most relevant to the location (foraging common tern and little gull, wintering cormorant) would not be affected. Again, in-combination effects inconceivable. Good practice via CEMPs ensuring that water quality in River Mersey improving, despite continued development.	
14. Disturbance	Construction disturbance from piling. Operational disturbance from increase in number of vessels/visitors.	No significant impacts to SPA bird species are considered likely from Cruise Terminal piling: the species most likely to be in the vicinity would be cormorant (if piling occurs in winter) and common tern (if piling occurs in spring-autumn). Given the habituation of cormorant to noise and disturbance, the expanse of the River Mersey in terms of relocation for fishing/roosting and the localised temporary nature of the works, no impacts are envisaged. Birds using the 'urban' parts of the Mersey are habituated to noise and human activity so unlikely to be any in-combination effects. LCT does not lead to in-combination effects from piling on areas of mudflats where wading birds feed in winter as these areas are too distant. No other expected increases in vessels from above projects, Isle of Man project expects vessel frequency to remain about the same.	No in combination impact on site integrity.

5.6. Further detail on the relevant schemes is set out below.

Liverpool Local Plan HRA

5.7. The draft Liverpool Local Plan HRA does not refer specifically to cormorant, but states:

'Development of ports and docks has the potential to cause disturbance to waterfowl. However, Policy EC8 does not specifically commit to port expansion, or any specific elements thereof, but simply states the general principle that development proposals relating to the port will be supported as long as they are sustainable (which implicitly includes the requirement that they do not adversely affect internationally important wildlife sites). Moreover, the policy explicitly states that any proposals must '… comply with other relevant policies in the Local Plan; include measures to address the potential environmental issues raised by expansion of the Ports, including impact on the adjacent natural … environment, and nationally and internationally important sites …'. As such, it is considered that the references in the Local Plan are sufficient to ensure that the SPA is protected'.

Northern Link Road

5.8. The Phase 2 Northern Link Road provides mitigation measures for breeding and non-breeding birds. Mitigation measures were proposed within the project ecological impact assessment (Amey 2018) and planning consent for the project, subject to conditions, was awarded in April 2018 (Ref 17F/2628). Conditions 4 and 17 contain pre-commencement sub conditions with regards to breeding and non-breeding birds which are:

> *"4. The development shall not commence until a Construction Environmental Management Plan (CEMP) describing how construction will be managed to avoid, minimise and mitigate any adverse construction effects on the environment in accordance with the provisions of the Environmental Statement has been submitted to and approved in writing by the Local Planning Authority. The CEMP must ensure that either any construction activity is timed to take place outside the bird breeding season 31st March to 31st August, or suitable noise and view reducing hoarding is located along the river wall and the West Waterloo Dock wall set back at least 2m from the edge to demarcate the boundary of the works. Furthermore. the CEMP shall provide the following details:*
>
> *III. provision of safe refuges for non-breeding birds during construction;*
>
> *VI. measures to provide resting/roosting opportunities for cormorant;*
>
> *7. The development shall not commence until an Ecological Conservation Management Plan (EcMP) has been submitted to and approved in writing by the Local Planning Authority. The EcMP should describe how construction will be managed to avoid, minimise and mitigate any adverse construction effects on the environment in accordance with the provisions of the Environmental Statement and provide the following details:*
>
> *I. Provision of safe refuges for non-breeding birds in West Waterloo Dock."*

5.9. Mitigation for this scheme was designed to provide three floating islands designed for bird species as follows: positioning two rafts in the southern end of West Waterloo dock and one at the northern extent. These floating islands would have been around 500m from the Cruise Terminal development and would therefore be used by birds that also roost/rest on the Cruise Terminal site.

Wirral Waters

5.10. Wirral Waters ITC included mitigation for birds in the form of a 'minimal bird disturbance zone' (subject to planning condition). This was partly a result of the ITC being the final part of the Wirral Waters (WW) development and so addressing displaced bird species from all WW sites.

5.11. Wirral Waters ITC ES Cumulative Assessment[24] concluded, in relation to bird species that:

> *'….. the loss of roosting features as a consequence of cumulative site preparation, earthworks and construction activities will not represent a significant effect on either individual birds, species populations or over-wintering bird assemblages providing mitigation measures are incorporated. Consequently it is considered near-certain that the cumulative effect on these species, or wider species assemblages, will be not significant. It is considered that populations of overwintering birds within the vicinity of the proposed developments will accommodate this level of cumulative effect'.*

Liverpool Waters

5.12. In terms of Liverpool Waters which includes the north of the Development site and land extending further northwards, the key receptor which is likely to experience a potential in-combination effect is the wintering water bird populations which utilise the Mersey Estuary and are mobile around the estuary. Only low numbers of water birds were found to be present at Liverpool Waters (maximum numbers 5 redshank, 15 oystercatcher and 8 cormorant) and potentially impacted by the proposed Liverpool Waters scheme. The redshank and oystercatcher are considered likely to potentially form part of the Mersey Narrows & North Wirral Foreshore pSPA / pRamsar populations. The cormorant would form part of Liverpool Bay SPA population. Liverpool Waters development included islands or floating pontoons in the northern docks for birds. These are designed for nesting birds in summer and would also serve to cater for resting/roosting birds in winter.

Twelve Quays

5.13. For the new bridge application at Twelve Quays (just over 1km to the SW), the application was approved, with conditions to adhere to a CEMP which includes ecological mitigation.

Isle of Man Ferry Terminal

5.14. The Isle of Man Landing Stage (IoMLS) development is located just to the north of Liverpool Cruise Terminal. The HRA/AA[25] produced for IoMLS concluded that a floating raft, approximately 3m x 3m should provided in Princes Half Tide Dock as permanent mitigation for potentially displaced cormorants during the construction and operation of the development. This raft is scheduled to be installed in October 2019. This forms part of a co-ordinated, strategic approach to cormorant mitigation for developments close to Prince's Half Tide Dock, including IoMLS – see below

Port related activities

5.15. Port related activities (including dredging) are not considered to impact on wintering bird numbers with birds habituated to such activity. Mersey Ports Master Plan[26] outlines a 20-year vision for growth and future developments of the Mersey Ports. It is an indicative framework and has not been subject to HRA. It is therefore not possible to determine in-combination effects.

24 Volume 1 ES West Float, Wirral Waters, International Trade Centre. Peel Land and Property (Ports) Ltd. 2011
[25] Waterman, 2019. Isle of Man Ferry Terminal, Appropriate Assessment, WIE13897-100-2-4-1-HRA-AA, October 2019
[26] Mersey Ports Master Plan, Peel 2011

C02 proposals

5.16. The C02 proposals comprise full planning consent for residential development consisting of 646 apartments (Use Class C3) and 232sqm of commercial space (Potential Use Classes A1, A3, A4, B1, D1 or D2) with associated partial dock infill of West Waterloo Dock, access, parking, servicing, soft and hard landscaping and public open space including a waterside walkway.

5.17. In combination effects have been ruled out (**Table 6** above) apart from potential in combination effects from construction of C02 scheme and Northern Relief Road in terms of noise and piling operations. The C02 HRA states:

> *However, noise and visual disturbance during the dock infilling works has the potential to temporarily displace cormorant from using habitats within the application site. This has the potential to result in minor changes in the distribution of cormorant within the SPA, which could alter the designation status of the waterbird assemblage. In the absence of mitigation, this could result in a 'likely significant effect', particularly when considered 'in-combination' with the potential effects of the northern access road and the Isle of Mann ferry terminal.*

5.18. The C02 HRA suggests four permanent floating pontoons are installed in North Salisbury Dock – to provide mitigation for C02, Isle of Man Ferry Terminal and the Northern Link Road.

5.19. However, since the issue of the C02 HRA, the situation regarding strategic cormorant mitigation has moved on and a co-ordinated, strategic approach to cormorant mitigation for developments close to Prince's Half Tide Dock, including C02, has been developed – see below.

A strategic approach to cormorant mitigation

5.20. In their response dated 18th March 2019[27], Natural England (NE) stated:

> *We are highly encouraged that development teams from a number of projects in the area are working together to provide a combined mitigation pontoon. We have advised that a strategic approach to mitigation would be the most beneficial approach to ensure impacts arising from the number of developments is considered, therefore allowing for more certainty on deliverability of mitigation within a holistic manner. We advise that a strategic mitigation strategy should be provided and ideally in advance of projects coming forward so that the strategy can be agreed and in place, therefore allowing a smooth process through the planning stages.*

5.21. In response to NE's advice, Peel, the site owners and holders of the outline permission have agreed to co-ordinate a strategic approach to cormorant mitigation for Liverpool Cruise Terminal, Isle of Man Ferry Terminal, Northern Relief Road and C02. A new permanent pontoon facility will be provided in Princes Half Tide Dock – see **Figure 4** below.

[27] NE ref 269611

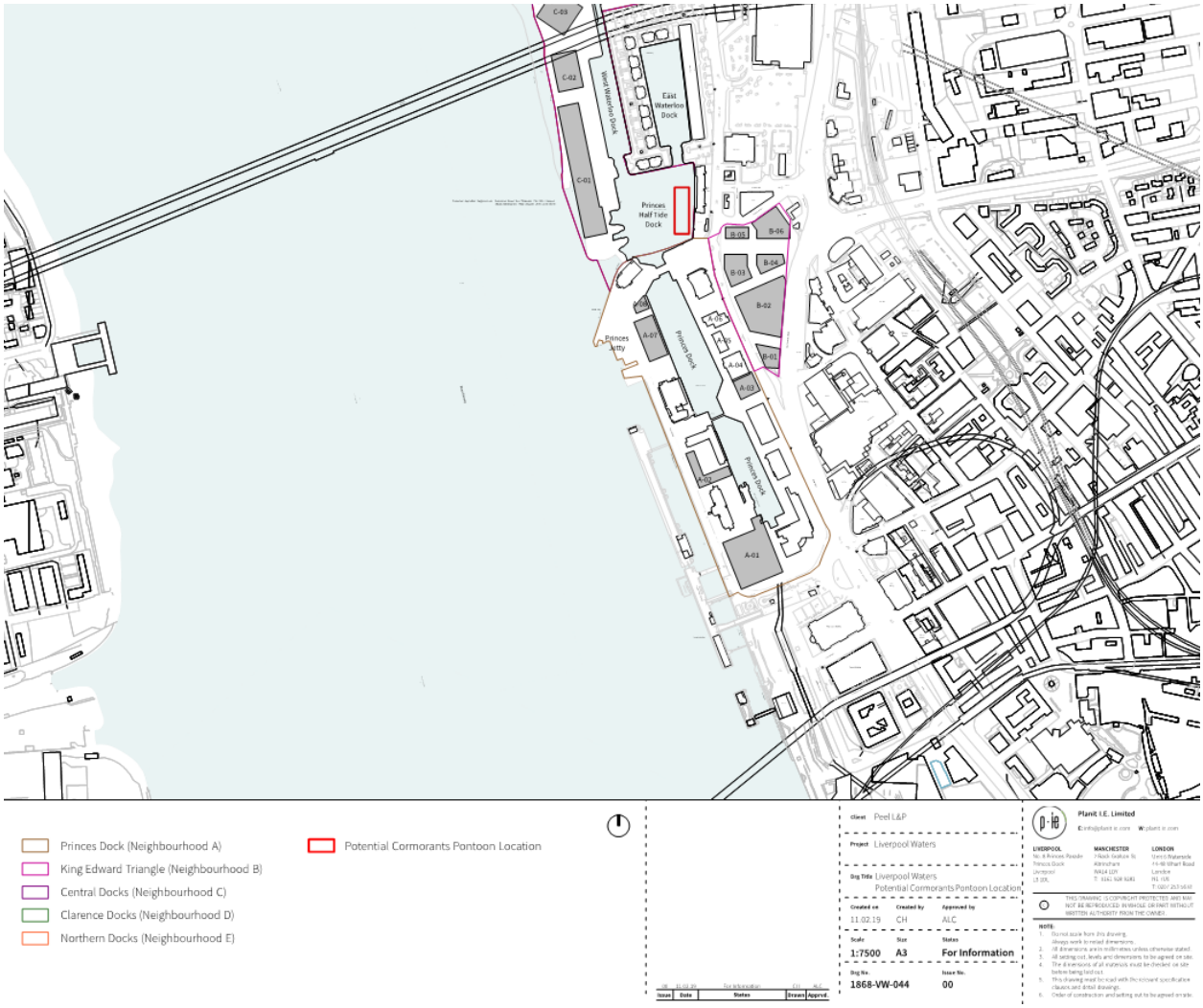

Figure 4: Proposed Mitigation Pontoon Location

5.22. This would comprise up to four individual pontoons (comprising mitigation for the various individual schemes) locked together to provide a larger mitigation resource. The design for the pontoon is as set out in **Appendix D** and the pontoon could be expanded in area as necessary as and when the other nearby schemes are commenced.

5.23. Peel, in association with the individual developers, would oversee Annual Monitoring of the pontoon facility in terms of winter bird monitoring surveys. The facility would be subject to an Adaptive Management Plan (AMP) which would set out any additional actions required for successful mitigation, plus management or maintenance require and respond to additional developments and mitigation measures that may come forward within the vicinity. The monitoring bird survey data would also be inputted into the AMP and acted upon where appropriate. Approval of the AMP is sought from NE. Refer to **Appendix E**: Adaptive Management Plan and **Appendix F**: Liverpool Waters Strategic Ecological Mitigation Plan

In-combination conclusion

5.24. Given the issues and assessment set out in **Table 6** above, it is not considered that there would be an adverse impact on site integrity from in-combination effects.

6. Overall Appropriate Assessment Conclusion

6.1. This HRA Appropriate Assessment has assessed the proposed Liverpool Cruise Ship Terminal Development in terms of any potential impact upon the integrity of relevant European Wildlife Sites and concluded that with the mitigation proposed for cormorant resting and roosting areas there would be no impact upon site integrity, either alone or in combination.

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APPENDICES

A. Descriptions of European Sites

Mersey Narrows & North Wirral Foreshore SPA/Ramsar site is 2,079 ha in extent and within 1 km of the Development. It is a marine / coastal wetland with a mixture of intertidal sands / mudflats and saltmarsh as well as manmade coastal brackish / saline lagoons, coastal freshwater lagoons and intertidal marshes. Its bird interest features are non-breeding little gull, breeding common tern, wintering knot and bar-tailed godwit, which occur at levels of European importance. In addition, the site regularly supports 20,000 or more waterbirds, including cormorant, oystercatcher, grey plover, sanderling, dunlin and redshank at nationally important levels during winter.

Liverpool Bay SPA is 252,757.73 ha in extent and the River Mersey section is immediately adjacent to the Development. It is a marine site best described as a sea inlet spanning the coastline from the north west of England and north Wales out into the Irish Sea and was recently extended for feeding terns and gulls to include coastal waters in the Mersey Estuary and intertidal waters in the Dee Estuary. Its bird interest features are red-throated diver (non breeding, winter), little gull (passage/non breeding), common tern (breeding), little tern (breeding) and common scoter (non breeding/winter). It is also recognised for its internationally important assemblage of birds, which are made up mostly of the same non breeding/winter/passage species above plus an additional two species present in numbers exceeding 1% of the GB total: red-breasted merganser *Mergus serrator* and cormorant *Phalacrocorax carbo*.

Mersey Estuary SPA/Ramsar is 5,023 ha in extent and 3.3 km (south east) from the Development. It is a marine / coastal wetland with large areas of saltmarsh and extensive intertidal sands / mudflats. Its bird interest features golden plover, dunlin, pintail, redshank, shelduck during the non-breeding (winter) season and redshank and ringed plover during passage periods (spring / autumn seasons). It is also recognised as a wetland of international importance, by regularly supporting at least 20,000 waterfowl, including curlew, black-tailed godwit, lapwing, grey plover, wigeon, great crested grebe, redshank, dunlin, pintail, teal, shelduck and golden plover.

Dee Estuary SAC, 4.2km (north west) from the Development. The Dee Estuary is designated due to the notable habitats present such as the mudflats / sandflats which are not covered by sea water at low tide, lagoons and the fauna and flora they in turn support.

Dee Estuary SPA/Ramsar, 13.2km to the west of the Development. The Dee is a large funnel shaped sheltered estuary and is one of the top five estuaries in the UK for wintering and passage waterfowl populations. The Dee Estuary supports internationally important numbers of waterfowl and waders, including breeding common and little terns, passage sandwich tern and redshank and large numbers of overwintering waders and ducks.

Sefton Coast SAC, 6.7km to the north of the Development. The site is of special interest for intertidal mud and sandflats, embryonic shifting dunes, mobile dunes, dunes with creeping willow *Salix arenaria*, humid dune slacks, fixed dunes, dune grasslands and dune heath. Small areas of saltmarsh are also present. Its assemblages of vascular and non-vascular plants, the nationally rare grey hair grass *Corynephorus canescens*, nationally scarce liverwort *Petalophyllum ralfsii* and nationally rare moss *Bryum neodamense*, are also of special interest. The site is of special interest for its populations of internationally important wintering waterfowl and its nationally and, in some cases, internationally important populations of individual waders. Its populations of sand lizard *Lacerta agilis*, natterjack toad *Bufo calamita* and great crested newt *Triturus cristatus* are also of special interest, along with the populations of the Red Data Book species, sandhill rustic moth *Luperina nickerlii gueneei*.

Ribble and Alt Estuaries SPA, Ramsar, 6.4km to the north of the Development. The Ribble and Alt Estuaries lies on the coast of Lancashire and Merseyside. It comprises two estuaries, of which the Ribble Estuary is the larger, together with an extensive area of sandy foreshore along the Sefton Coast. It forms part of the chain of western SPAs that fringe the Irish Sea. There is considerable interchange in the movements of wintering birds between this site and Morecambe Bay, the Mersey Estuary, the Dee Estuary and Martin Mere. The site consists of extensive sand- and mud-flats and, particularly in the Ribble Estuary, large areas of saltmarsh. There are also areas of coastal grazing marsh located behind the sea embankments. The intertidal flats are rich in invertebrates, on which waders and some of the wildfowl feed. The larger expanses of saltmarsh and areas of coastal grazing marsh support breeding birds during the summer, including large concentrations of gulls and terns.

B. Historic Trends and Current Pressures for European sites

Liverpool Bay SPA/Ramsar

The main existing environmental pressures on Liverpool Bay SPA/Ramsar comprise:

- disturbance of sediment releasing legacy heavy metal pollution (lead, cadmium, arsenic and other poisons) that is bound into the sediment;
- pollution via rivers and drains by both treated sewerage and untreated runoff containing inorganic chemicals and organic compounds from everyday domestic products;
- pollution via commercial shipping by chemical or noise pollution and the dumping of litter at sea;
- damage of marine benthic habitat directly from fishing methods;
- damage of marine benthic habitat directly or indirectly from aggregate extraction;
- 'coastal squeeze' from land reclamation and coastal flood defences and from erosion and sea level rise;
- loss or damage of marine benthic habitat directly and indirectly (through changed sedimentation/deposition patterns) as a result of navigational dredging in order to accommodate large vessels – e.g. into the ports of Liverpool;
- harm to wildlife (especially birds) or habitat loss due to increasing proposals/demand for offshore wind turbines; and
- pollution, direct kills, litter or loss of habitat as a result of water-based recreation and related development along the foreshore.

Dee Estuary SPA, Ramsar, SAC

The main environmental pressures on the Dee Estuary SPA/Ramsar/SAC comprise:

- overgrazing of ungrazed/little grazed saltmarsh;
- certain recreational activities in sensitive areas at sensitive times such as shell fishing and dog walking;
- water quality threats from ex-industrial usage and agriculture;
- physical loss and alteration of coastal processes due to navigational dredging;
- 'coastal squeeze' from land reclamation and coastal flood defences and drainage used in order to develop coastal land, and from sea level rise;
- introduction of non-native species; and
- risk of excessive abstraction resulting in a decrease in freshwater flows into the estuary, reducing drinking and bathing habitat for birds and increasing the salinity in localised areas.

Mersey Estuary SPA/Ramsar

The main current environmental pressures upon the Mersey Estuary SPA and Ramsar site are considered to be:

- disturbance of sediment releasing legacy heavy metal pollution;

- pollution via rivers and drains by both treated sewerage and untreated runoff containing inorganic chemicals and organic compounds from everyday domestic products;
- pollution via commercial shipping by chemical pollution and the dumping of litter at sea;
- 'coastal squeeze' and physical loss from land reclamation and coastal flood defences and drainage used in order to develop coastal land, and from sea level rise;
- loss or physical damage of marine benthic habitat directly and indirectly (through changed sedimentation/deposition patterns) as a result of navigational or aggregate dredging;
- disturbance to birds from increased recreational pressure (e.g. boat or other recreational activity) and wildfowling;
- introduction of non-native species; and
- selective removal of species (e.g. bait digging, wildfowl, fishing)37

The Mersey Narrows and North Wirral Foreshore SPA/Ramsar

Due to its location at the mouth of the Mersey Estuary and in the Liverpool Bay, this site has been subject to the same changes as described for the Mersey Estuary SPA and Ramsar site, in particular water quality improvements since the 1960s (especially since 1985), and increases in agricultural effluent pollution during this same period. Some of the main current environmental pressures relevant to the nature conservation objectives of the Mersey Narrows and North Wirral Foreshore pSPA / pRamsar site are:

- disturbance of sediment releasing legacy heavy metal pollution (lead, cadmium, arsenic and other poisons) that is bound into the sediment;
- pollution via rivers and drains by both treated sewerage and untreated runoff containing inorganic chemicals and organic compounds from everyday domestic products, which 'may combine together in ways that make it difficult to predict their ultimate effect of the marine environment… Some may remain indefinitely in the seawater, the seabed, or the flesh, fat and oil of sea creatures';
- pollution via commercial shipping by chemical or noise pollution and the dumping of litter at sea;
- damage of marine benthic habitat directly from fishing methods;
- damage of marine benthic habitat along the North Wirral Foreshore directly or indirectly from aggregate extraction, particularly anywhere that dredging may be altering erosion/deposition patterns;
- 'coastal squeeze' (a type of coastal habitat loss) from land reclamation and coastal flood defences and drainage used in order to farm or develop coastal land, and from sea level rise;
- loss or damage of marine benthic habitat directly and indirectly (through changed sedimentation/deposition patterns) as a result of navigational dredging in order to accommodate large vessels – e.g. into the ports of Liverpool;
- harm to wildlife (especially birds) or habitat loss due to increasing proposals/demand for offshore wind turbines; and
- pollution, direct kills, litter, disturbance or loss of habitat as a result of water-based recreation or other recreation activity and related development along the foreshore (Wildlife Trust, 2006);
- introduction of non-native species and translocation; and

- selective removal of species (e.g. bait digging, wildfowl, fishing) (Wildlife Trust, 2006 and Marine Biological Association, 2006).

The Mersey Estuary does have a high load of nutrients mainly from diffuse sources, with levels for phosphate and nitrogen decreasing from point sources. However, recent modelling has shown that due to the natural turbidity of the water, there is only a low risk of excessive algal growth. Given the close hydrological linkage between the Mersey Estuary and the North Wirral Foreshore, this is likely to hold true for this pSPA/pRamsar site.

Ribble and Alt Estuaries SPA, Ramsar

The main environmental pressures relevant to the Ribble and Alt Estuaries SPA/Ramsar comprise:

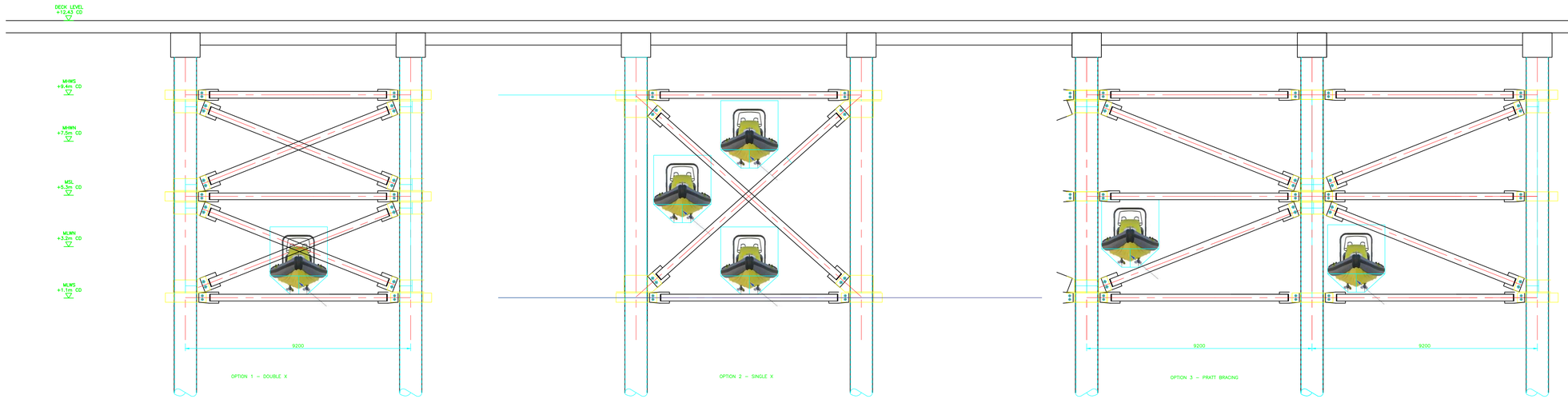
- loss or damage of habitat as a result of increasing off-shore exploration and production activity associated with oil and natural gas;
- over-grazing of the saltmarshes by cattle-farming;
- heavy metal pollution (lead, cadmium, arsenic and other poisons) from either industry or disturbance of sediment (legacy pollution bound into the sediment);
- pollution via rivers by agricultural effluent flowing off fields;
- pollution via rivers and drains by both treated sewerage and untreated runoff containing inorganic chemicals and organic compounds from everyday domestic products;
- damage of marine benthic habitat directly from fishing methods;
- damage of marine benthic habitat directly or indirectly from aggregate extraction;
- ‘coastal squeeze’ from land reclamation and coastal flood defences and drainage used in order to farm or develop coastal land, and from sea level rise;
- harm to wildlife (especially birds) or habitat loss due to increasing proposals/demand for offshore wind turbines;
- pollution, direct kills, litter, disturbance or loss of habitat as a result of water-based recreation or other recreation activity and related development along the foreshore;
- selective removal of species (e.g. bait digging, wildfowl, fishing;
- interruption of dune accretion processes leading to over-stabilisation of dunes;
- spread of rank grasses and scrub, partly caused by a decline in rabbit-grazing, further reducing suitable habitat;
- losses to development, forestry and recreational uses have reduced the area of available habitat;
- fragmentation of habitat leading to isolation of sensitive populations;
- creation of permanent water bodies in the dunes creating conditions for predators of natterjack toads and inappropriate management causing loss of low vegetation structure and open ground used by natterjacks;
- water abstraction, conifers and scrub lower the water table locally and reduces the number of natterjack pools.

Sefton Coast SAC

The environmental issues relating to Sefton Coast SAC comprise:

- the need to reduce the fragmentation of habitats, and the impact of fragmentation, to provide stepping stones for the movement of species;
- the need to counter negative changes to low-nutrient habitats resulting from atmospheric nutrient deposition;
- the need to manage the continuing coastal erosion at Formby Point which leads to a squeeze on habitats;
- the need to consider the potential impact of climate change on shorelines, wetlands and dunes;
- the need to manage abstraction from the underlying aquifer for sources such as golf courses. The aquifer is critical to some features of the site, such as the humid dune slacks and the great crested newts;
- to manage recreational pressures and direct disturbance to qualifying habitats;
- the need to develop and maintain management practices which sustain the conservation value of the area; and
- the need to avoid loss of great crested newt habitat, and habitats being further fragmented by distance or barriers.

C. Horizontal deck brace design



Notes

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS ARE MILLIMETRES U.N.O.
3. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.

Rev	Description	Date	By / Chk	App

RAMBOLL

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SUSPENDED DECK BRACING OPTIONS

Project No:	Scale (@A1):	Drawn:	Date:
		EL	21/02/18

Drawing No:	Rev:
MR-SK-001	

21/02/2018 12:19:30

D. Cormorant Technical Note – Ecological Conservation Management Plan

Waterman Infrastructure & Environment Limited
Merchants House, Wapping Road, Bristol, BS1 4RW
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Liverpool Cruise Terminal

Technical Note – Cormorant Mitigation

Date: Date: October 2019

Client Name: Liverpool City Council

Document Reference: WIE12464-100-TN-14-2-2

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

Issue	Prepared by	Checked & Approved by
	Niall Machin	Gavin Spowage
Second Issue	Associate Director	Associate Director

1. Introduction

1.1. The shadow Habitat Regulations Assessment (HRA ref WIE12464-100-11-2-3-AA, Waterman January 2019) for the Liverpool Cruise Terminal proposed ecological mitigation for cormorant *Phalacrocorax carbo* in the form of a floating pontoon structure. MEAS and Natural England have advised that the floating pontoon should be a permanent structure. This is secured by a planning condition.

1.2. Small numbers of cormorant (up to 12) were recorded using on-site dockside structures in 2017 winter ornithological surveys. As the scheme will result in the loss of structures, particularly Princes Jetty, used by roosting/resting cormorant during construction, a floating pontoon for roosting/resting cormorant will be installed. To ensure the loss of the jetty is fully mitigated, the floating pontoon will be a permanent installation. The new jetty will also provide cormorant resting/roosting locations.

1.3. This Note sets out further detail on the design and location of the floating pontoon and sits as part of the strategic approach to cormorant mitigation in the wider Liverpool Waters vicinity of which the Cruise Terminal is part.

1.4. A strategic approach to cormorant mitigation within the overall Liverpool Waters area is being coordinated by Arup on behalf of Peel Land & Property (Ports) Ltd. The provisions within this Technical Note are covered by and conform with the overarching strategic approach.

1.5. This Technical Note constitutes an Ecological Conservation Management Plan (ECMP) for cormorants for the Liverpool Cruise Terminal development.

2. Pontoon design and location

Design

2.1. Floating platforms are used by wintering and other bird species, including cormorant, as night time roosts and daytime resting areas. Cormorants utilising such structures have become a feature of many of the UK's urban areas where large bodies of water occur.

2.2. A schematic design is shown as **Figure 1**. This is designed to enable a single 3m by 3m pontoon to be initially delivered by the neighbouring Isle of Man Ferry Terminal scheme in October 2019, with additional pontoons being added to form a larger structure as other nearby developments, including the Liverpool Cruise Terminal come forward.

Individual 3m by 3m pontoon design

2.3. Refer to **Annex A** for proposed pontoon design.

Larger joint pontoon design

2.4. It is known that a larger pontoon resource is required to jointly deliver cormorant mitigation for the Isle of Man Ferry Terminal, Liverpool Cruise Terminal, Northern Relief Road and, potentially, the C02 project. **Figure 1** therefore shows how four 3m by 3m blocks can form one single larger pontoon unit. The final design may instead be a square 6m by 6m arrangement.

2.5. Whilst each individual scheme is expected to deliver appropriate mitigation for roosting/resting cormorant displacement, there is a degree of 'double counting' of the birds involved. In particular, the Isle of Man Ferry Terminal, Northern Relief Road and C02 developments will impact more or less the same group of cormorants that currently rest/roost around West Waterloo Dock/Princes Dock and the dockside structures. The cormorants using land impacted by Liverpool Cruise Terminal just to the south would also interact with the West Waterloo/Princes Dock birds.

2.6. Therefore, it is appropriate for the individual developers to deliver a structure which could support around 15-20 roosting/resting cormorant. The design in **Figure 1** would accommodate upwards of 20 cormorants. It has been agreed that the relevant developers (Liverpool City Council, Isle of Man Government Department of Infrastructure, and Peel Land & Property (Ports) Ltd) will jointly provide this four-pontoon solution. However, a single 3m by 3m pontoon described in **Annex A** has been installed by the Isle of Man Government under marine licence L/2019/00239/1, to meet the requirements of condition 5.2.9 of that licence in advance of the other three pontoons (which can then be attached to the single pontoon when they are installed), as the project timescales for the Isle of Man scheme required the pontoon to be installed and in situ by 17th October 2019 at the latest. That pontoon was installed on 16th October 2019. The date of installation of the second 3m x 3m pontoon for the Liverpool Cruise Terminal is currently unknown.

Maintenance and Monitoring

2.7. The design will have an estimated life of at least 12 years with minimal maintenance. Minimal management is required – just removal of bird droppings once per year (off site, not into the Dock).

2.8. The current pontoon and all subsequent pontoons, including the pontoon installed for the Liverpool Cruise Terminal development, will be subject to an Adaptive Management Plan and annual winter bird surveys. An Adaptive Management Plan has been drafted by Waterman (ref: WIE12464-100-17-2-3) and forms an Appendix to the Liverpool Cruise Terminal CEMP document. The effectiveness of the mitigation (i.e. the pontoon) will be reviewed annually and action taken to ensure appropriate habitat for cormorant is maintained.

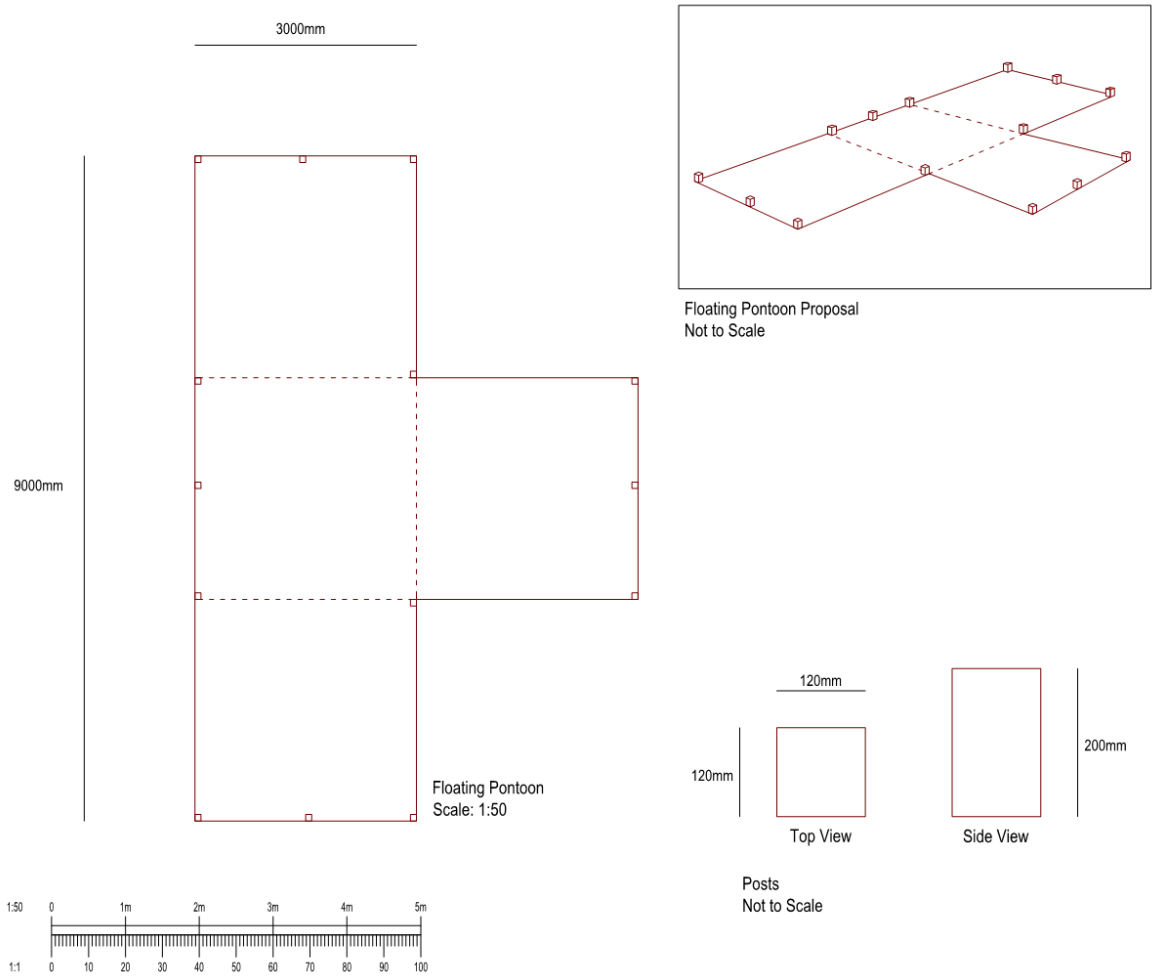

Figure 1: Proposed Cormorant Pontoon Design

Location

2.9. The floating pontoon(s) would be located in the eastern part of Princes Half Tide Dock, see **Figure 2**.

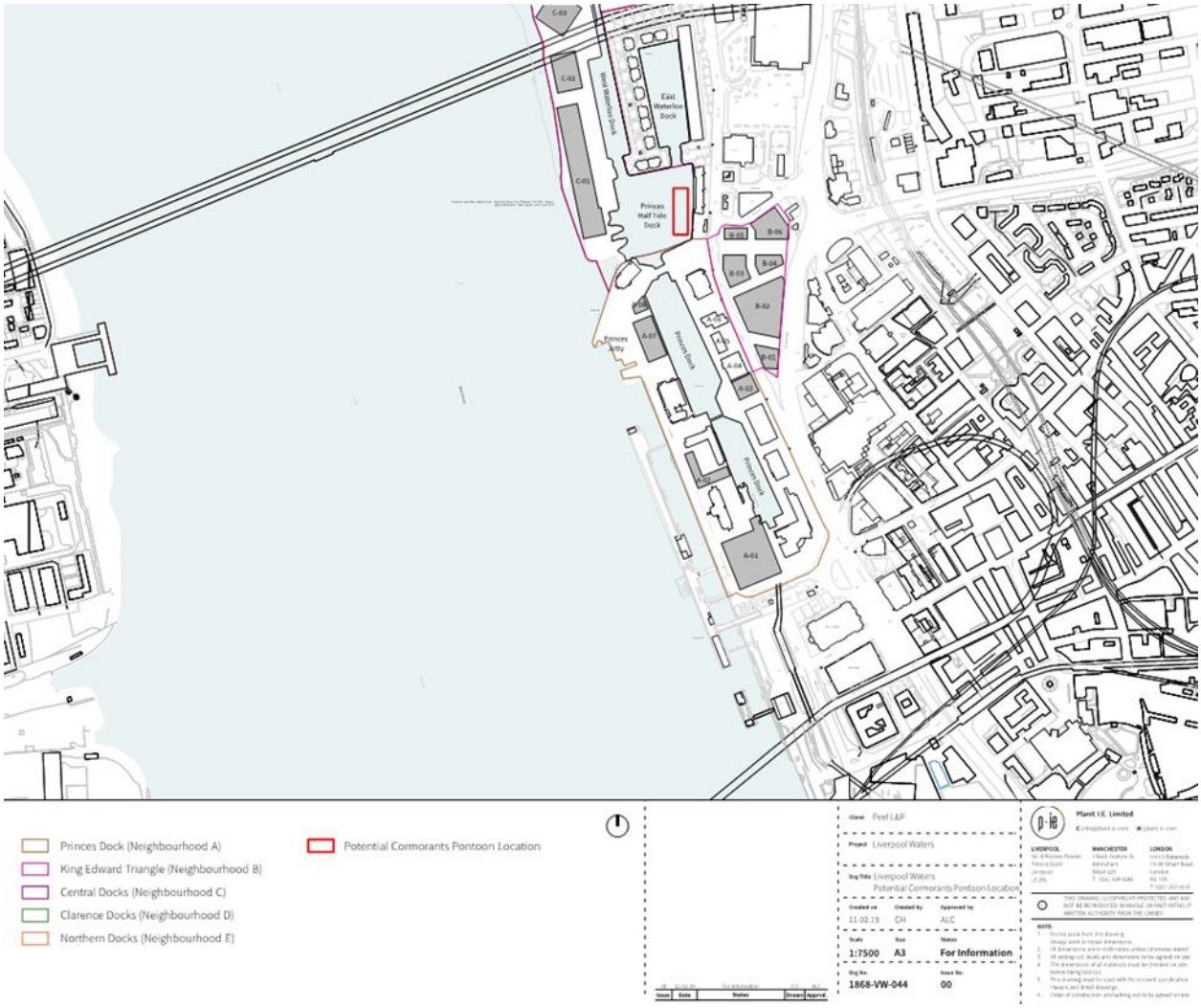

Figure 2: Proposed Cormorant Pontoon Location

3. Strategic approach

3.1. In their comments dated 18th March 2019 relating to the shadow HRA report submitted in support of the planning application for the nearby Isle of Man Ferry Terminal proposed development (ref: 18F/3231), Natural England (NE) stated:

We are highly encouraged that development teams from a number of projects in the area are working together to provide a combined mitigation pontoon. We have advised that a strategic approach to mitigation would be the most beneficial approach to ensure impacts arising from the number of developments is considered, therefore allowing for more certainty on deliverability of mitigation within a holistic manner. We advise that a strategic mitigation strategy should be provided and ideally in advance of projects coming forward so that the strategy can be agreed and in place, therefore allowing a smooth process through the planning stages.

3.2. In response to NE's advice, Peel, the site owners and holders of the outline permission for the Liverpool Waters Masterplan have agreed to co-ordinate a strategic approach to cormorant mitigation for Liverpool Cruise Terminal (LCT), Isle of Man Ferry Terminal (IoM), Northern Link Road (NLR)

and C02. Peel have identified a new permanent pontoon facility to be provided in Princes Half Tide Dock – see **Figure 2** above.

3.3. The final large joint pontoon structure would comprise 4 interlocking units forming a single structure of sufficient size and design to deliver the mitigation for the IoM, LCT, NLR and C02 schemes, i.e. catering for at least 20 cormorants.

3.4. Peel, in association with the individual developers, will oversee the Annual Monitoring of the pontoon facility in terms of winter bird monitoring surveys. The facility will be subject to an Adaptive Management Plan (AMP) which sets out any additional actions required for successful mitigation, e.g. responding to the monitoring in terms of adaptations that may be required to the structure to make it more suitable for cormorant. The AMP will also address management or maintenance requirements and respond to further additions/additional structural elements/habitats should other schemes come forward in the vicinity that require ecological mitigation of this sort.

3.5. The strategic approach to cormorant mitigation within the overall Liverpool Waters area, including the AMP for the cormorant pontoons, is being coordinated by Arup on behalf of Peel Land & Property (Ports) Ltd. The provisions within this Technical Note are covered by and conform with the overarching strategic approach.

ANNEX A

Cormorant Pontoon – Design Basis Statement and Method Statement

REPORT

IOM Ferry Terminal – Bird Pontoon

Design Basis Statement

Client: Sisk

Reference: PB8850-RHD-ZZ-XX-RP-Z-0001

Status: Draft/P02

Date: 30 July 2019

Royal HaskoningDHV

Enhancing Society Together

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Document title:	IOM Ferry Terminal – Bird Pontoon
Document short title:	Design Basis Statement
Reference:	PB8850-RHD-ZZ-XX-RP-Z-0001
Status:	P02/Draft
Date:	30 July 2019
Project name:	IOM Ferry Terminal
Project number:	PB8550
Author(s):	Stephen Salmon
Drafted by:	Stephen Salmon
Checked by:	Mike Primrose
Date / initials:	26/07/2019
Approved by:	Alistair Reid
Date / initials:	26/07/2019

Classification
Project Related

Disclaimer

Table of Contents

1 Introduction

The scope of the design comprises 1 No. 3 x 3m pontoon for bird roosting including Cormorants for a 12-year design life. The pontoon will be located in Princes Half-Tide Dock, Liverpool.

The overall design is based on an adaptation of an existing RSPB design, as outlined in the RSPB Design and Management of Rafts notes, by forming the lower section in steel with upper section remaining as per the standard design. The RSPB design notes are included in Appendix A.

2 Key Parameters

2.1 Geometry

The habitat pontoon will be made of 1 No. 3 x 3m unit. The design includes a capability for the addition of further pontoons, linked by shackles.

The freeboard will be approximately 250 to 300mm excluding wind induced heeling effects and maintenance personnel.

The pontoon will be moored in position using chains to anchor blocks installed on the dock bed. This anchoring system will allow movement under wind loading. Given the open water nature of the dock this is not anticipated to present any significant issues.

2.2 Wind

Wind velocities have been extracted from another project undertaken in the area and are listed in Table 1.

Return Period	10minute at +10m	Wind speed at sea level so 30sec gust
1 in 1yrs	20.8	22.8
1 in 10yrs	24.7	27.1
1 in 50yrs	28.5	31.2

Table 1 – Design wind velocities

The loads reported are based on a 250mm freeboard.

2.3 Water Levels

Normal dock water level is around +9.8mCD, the published seabed level in the dock is +0.2mCD giving a water depth of 9.6m.

The existing seabed level is understood to be significantly higher than the above published level, prior to construction the seabed level will be confirmed by hydrographic survey. The anchor assemblies e.g. length and diameter of chains, expected movements, etc. will then be adjusted to suit the seabed level.

The existing seabed level in the dock is not known. Should this be different to that assumed above the chain lengths and reported movements will require recalculating.

2.4 Seabed Composition

The seabed material in the dock is assumed to comprise soft, cohesive material i.e. deposited mud and silt. This is considered suitable for the use of anchor blocks.

2.5 Wave climate

There is no significant wave loading assumed as the dock is enclosed with a limited fetch for locally generated wind waves.

2.6 Live loads

A uniformly distributed load of 0.40kPA and point load of 1.00kN has been assumed. This matches the recommend guidance provided in BS EN 1991-1 Table 6.10 for a Category H roof i.e. not accessible except for normal maintenance and repair.

Ad additional load case of 3 No. persons (equivalent to 0.75kN each) on one side has also been assumed. This allows for 3 maintenance personnel or other unauthorised access.

Cormorants have been proposed as the primary users of the pontoon accessing it by flying. These birds have typical body masses of up to 5.0kg. Consequently, they are not anticipated to have any significant impact on the freeboard or stability of the pontoon. By inspection their live loading is lower than that assumed in the design.

3 Results

To achieve an initial 250-300mm freeboard with all the timber and gravel in-situ 762mm diameter tubes filled with polystyrene is required. The polystyrene will reduce the risk of the pontoon sinking should the tubes be perforated.

These tanks are to act as support for the decking with additional angles to support the planking. The tubes will be sealed with square end plates that will allow welding to the square frame that holds the deck in place.

Diagonal bracing will be attached to the end plates to secure the floatation tanks.

The freeboard and trim of the pontoon is adjustable via the addition and positioning of steel plates on the deck (these will be gravel covered). Freeboard corrections will be achieved by adding the plates at the centre of the pontoon. Trim corrections will be made by adding plates to the edges of the pontoon.

It should be noted that any reductions in freeboard beyond the assumed 250-300mm will have a disproportionate effect on reserve buoyancy due to the tube shape.

3.1 Stability

Full live load
Max total load =0,40kN/m^2 x 3m x 3m = 3.60kN

With this load the freeboard will reduce by 30mm.

With the UDL loading on one side only the heel will be in the region of 1.0° Therefore the unit is deemed stable for the expected use.

Additional point loads
Max total load = 3 x 0.75kN = 2.25kN

With this load the freeboard will reduce by 20mm.

With this loading on one side only the heel will be in the region of 1.2° Therefore the unit is deemed stable for the expected use.

3.2 Anchorage

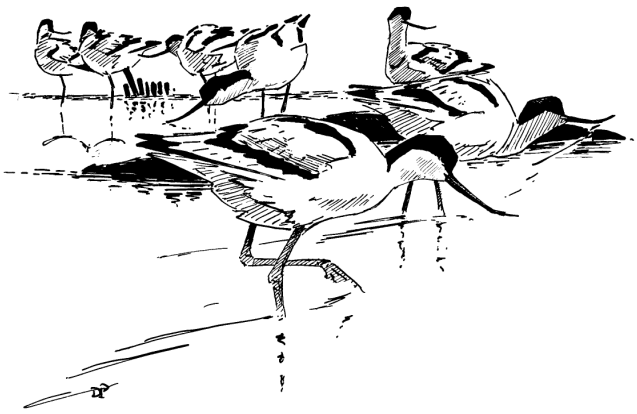
The anchor assemblies comprise catenary chains attached to sinkers positioned on the seabed. Using a 12.0m length 25kg/m catenary chain the anchor sinkers need to have a submerged weight of 250kg. This is equivalent to a dry concrete mass of 420kg or 280kg of steel.

4 Designers Risk Assessment

No.	Risk	Impact	Mitigation	Residual Risk
1	Floating structure that, though designed for wild life, will occasionally be accessed by people	Instability could result in operative having an unplanned entry to the water.	• Structure designed to have good stability will little tilt when unevenly loaded. • Operatives to wear life jackets when accessing the pontoons. • Operatives to be given adequate training/instruction as to safe working practice. • Hand railing will not be installed as that would negatively impact the purpose of the structure.	Typical risks of working near water. Suitable procedures need to be in place.
2	Floating structure is within an active area	Significant movement of the pontoons could risk other structures within the basin	• Movement kept below reasonable limit for design winds from 1:50year event • Supports on each side to take full wind load therefore there will be share capacity in the perpendicular anchors that will give appropriate safety factor.	Under extreme conditions the anchor blocks could be dragged a short distance on the seabed and may require repositioning
3	Corrosion of floatation tanks	Corrosion could eventually result in a hole in a take that would result in its loss of buoyancy	• Tanks filled with expanding foam such as even with a hole water will not be able to fill the tanks.	Significant areas of corrosion could allow the foam to be damaged and lost. An appropriate inspection regime is recommended
4	Lifting	The pontoon will have to be transferred into the water by lifting on slings.	• Structure kept to minimum weight • Tanks integral part of structure so slings under tanks during lifting not anticipated to put undue stresses into pontoon.	Typical risks of lifting large object into water. Suitable method statements would need to be produced

Appendix A – RSPB Design and Management of Rafts Note

a million voices for nature



Design of management of rafts

Rafts are a useful way of providing island habitat in areas of deep or fluctuating water levels. Their purpose is to improve breeding success by providing areas safe from flooding, disturbance or predation. Rafts are unlikely to attract terrestrial predators and so are useful where islands would be too close to shore for safety. They also provide wildfowl with loafing spots and are often used as resting places by various bird species during the winter.

Main factors to consider when making a raft

There are many conflicting requirements when constructing a nesting raft.

- The ability to float, preferably with the deck just above the water line.
- The ability to rise and fall easily with the water over the maximum flood range.
- Stability, so that the raft is not tipped or spun by current, waves or wind.
- A dry, sheltered nest site, which does not attract the attention of crows or other avian predators. The nest area must be high enough not to be swamped by storm waves.
- Means of access and some protection from waves and current for young birds.
- Harmonious blending with the surroundings if possible.
- Practical factors e.g. water not excessively deep, lake shore accessible by vehicle, for bringing in boat, raft and materials, and for regular maintenance checks.
- On SSSIs, formal consent may be required from NE, SNH or CCW.

Construction

Although rafts vary in character and design, some basic considerations apply to each.

1. Timber rafts tend to absorb water and sink, although pine or other light wood floats better than heavy timber. In most cases, additional floats must be used if the raft is to last for more than one season.

2. **Flotation blocks**: Small rafts can be floated with plastic 4.5 litre containers. Slightly larger rafts will stay afloat with 22 litre plastic drums. Rafts in the range of 1.2 - 1.8 m in dimension require closed cell polystyrene blocks, polystyrene scraps, airtight metal drums (including old oil drums). Polystyrene is easily held in place and can be adjusted to achieve right buoyancy. It should be packed into strong polythene to prevent it from breaking up and littering the environment. Metal drums need to be weighted so that they do not float too high. The flotation blocks must be thoroughly cleaned before they are brought to the site to prevent pollution. Annual checks and maintenance is important to ensure that the raft remains secure and firm, and that the flotation devices are not disintegrating or leaking.

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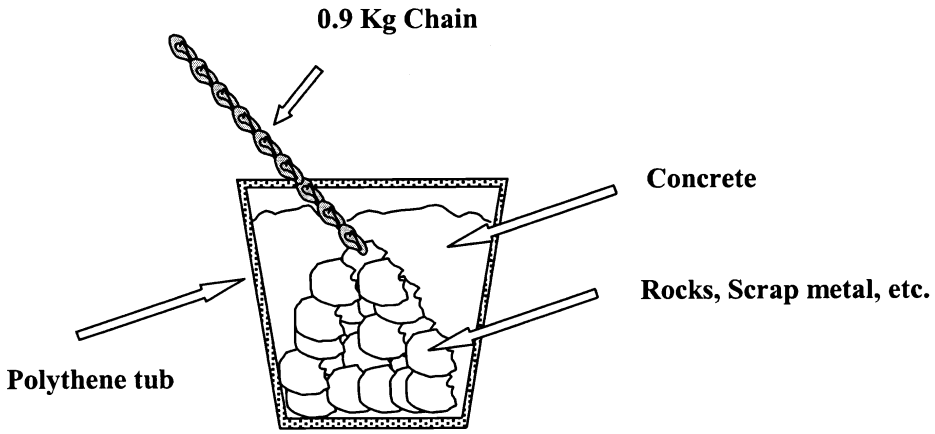
3. **Anchors:** Two anchors are better than one and should be attached to opposite corners of the raft to keep it from swinging in the wind. Anchor to the bottom, not to the shore, to prevent vandalism and to keep rats or weasels from getting to the raft.
    a. Anchors can be made from breeze blocks, concrete blocks etc. The wire anchor rope should be tied to a short section of chain or to an eye bolt; for large rafts use 19 mm circumference flexible steel wire rope with a 4 ton breaking strain to ensure that the mooring is secure. An anchor weighing about 50 kg is suitable for most rafts. It can be made in a large polythene garden tub half filled with scrap metal or rocks. Wrap one end of an appropriate length of chain around the scrap and fill the tub with concrete. Once the concrete has set, the anchor can be turned out of the mould and the chain bolted to the raft. Three thickness of heavy gauge (24mm) polypropylene rope can be used instead to save money, especially if the raft is in deep water. Where strong winds or currents are likely, several 50kg anchors may be needed to securely hold a 3m x 2m turned raft.



    b. Where one large anchor is too cumbersome to manage, a smaller (e.g. 9 litre) container can be used as a mould and concrete sinkers can be cast with holes through their centres. One sinker can be fastened to the end of the wire and others can be threaded on and allowed to slide to the bottom before fixing the other end of the wire to the raft.

4. Where more than three rafts are to be moored in a string there should be some additional anchor points from the middle rafts to keep the string from sagging before a strong wind and dragging the main moorings.

5. Various nest boxes and duckling ramps can be added to the raft superstructure depending on the species of birds that the raft is intended for. Duck baskets should be at least 1.2 m apart and facing away from each other. They should be tilted slightly upwards at the front and lined with dead grass or some wood shavings. Baskets should be positioned in early January and left until early September, when they should be taken up, cleaned of nesting material and stored under cover.

Species specifications:

1. Wader and tern nesting rafts, in most cases, should be bare of vegetation and covered with a material attractive to the intended nesting species.
2. Wildfowl rafts require more vegetation. Rushes, reeds or small willows are suitable, planted either around the edges or over the deck of the raft leaving pathways to the nest box or central clearing. Plants survive best on raft designs with an open mesh or slatted platform just above the water

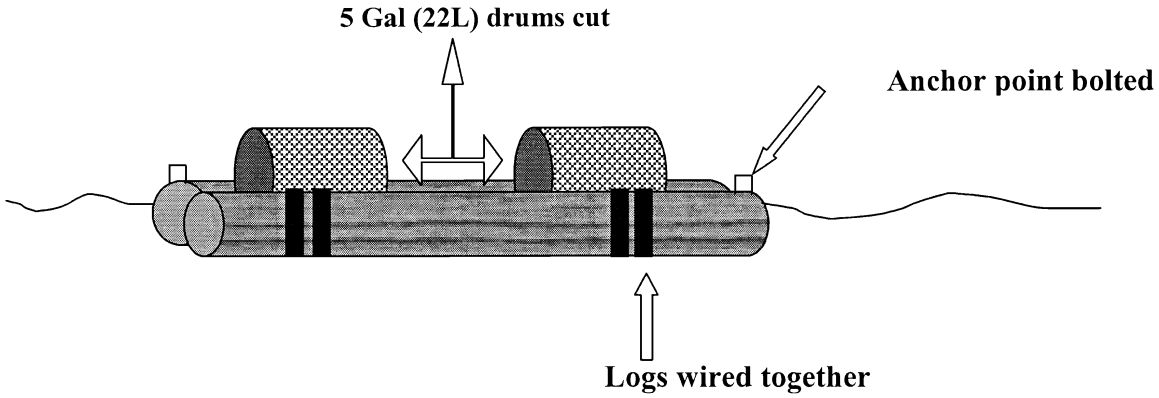
line, covered with moisture-holding mulch in which the plants can root and through which they can reach the water.

Some raft models

The area and water characteristics determine the best design for a raft. Some of the designs used on RSPB reserves are described below as a guide.

Simple log or telegraph pole rafts

Logs from nearby felling operations or used GPO poles are often available free and can be used to provide the basis both for simple rafts and more elaborate designs. Without any additional support, the timbers eventually sink low in the water and sprout a floating garden, which should prove to be attractive to nesting wildfowl if the raft is sited in a calm area.



The standard raft

This raft is made of pressure treated (do not use CCA treated) softwood and is 3 meters square. Design includes chick shelters, a re-entry ramp and an optional security fence. Buoyancy is provided by two high-density polystyrene blocks. Raft is anchored to concrete blocks by a chain attached to a marker buoy. It is covered with gravel and rocks, and any plant growth is removed each winter.

Raft platform:
Mainframe: 100x200mm timber, bolted together in each corner through overlapping ends (two upper, two lower), one top inset 150mm to allow for re-entry ramp. Deck 25x150mm planking, laid on and nailed (75mm galvanized nails) to lower mainframe timbers. Sub frame 50x75mm runners to support flotation and strengthen deck, nailed (150mm nails); main flotation holders/deck support 50x100mm runners; sides 25x150mm planking, nailed flush with top of upper mainframe timbers along the lower sides to hold in gravel etc, and flush with the bottom of the mainframe timbers along the upper sides to hold the flotation devices in place.

Buoyancy:
Blocks of 380x600x2700mm high density polystyrene foam, painted (optional) with BP Aquaseal 44 bituminous paint (as suitable for use inside cold water tanks) to water seal and strengthen the polystyrene; two optional straps per float block, 1,420mm strips of polystyrene webbing (or 50mm chair webbing as a temporary measure, eg during launching) with eyelet holes for nailing to frame. Once in the water, the weight of the raft is sufficient to hold the polystyrene in place without any additional fixings, even in extreme conditions.

Mooring:
Mooring ring bolted through center of mainframe timber (bolt fixed with two nuts so that it can swivel freely), connected preferably to a chain or a 20mm diameter hawser-lay polypropylene rope (which will not rot, but can be chafed), with hard eyes and shackles each end. Tether a 30-inch circumference marker buoy to the raft end of the chain or rope with a length of polypropylene rope to allow the raft to be detached, without having to pull up or lose the anchor.

Anchor:
Multiple small weights (up to $1m^3$ concrete as a total) for ease of transport. Four buckets 250mm high by 300mm diameter of concrete, eyebolt set in centre; weights connected in pairs by shackles to 300mm lengths of chain; fixed to mooring by placing two pairs of weights together with the connecting chains forming a cross, and attaching the mooring rope shackle to the point where the chains cross. Exposed sites where wind and waves are strong may require more anchor weights.

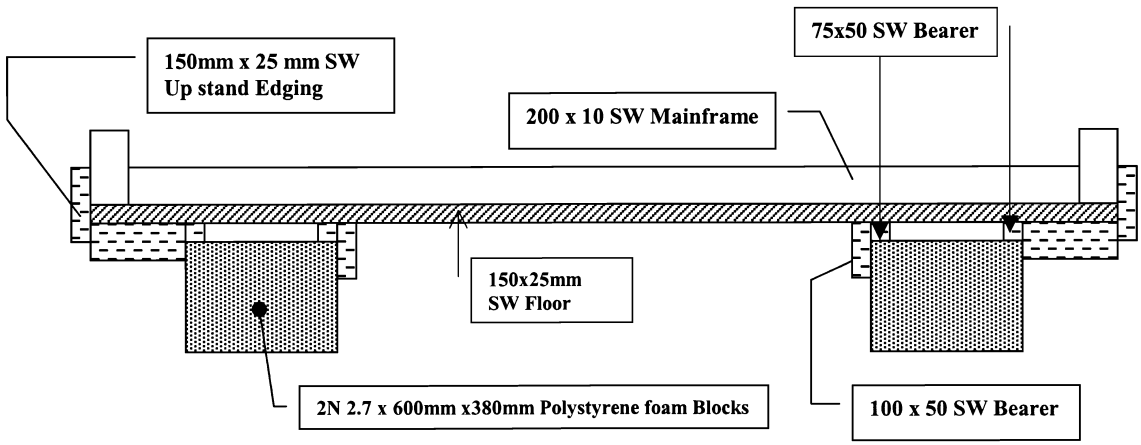
Shelters (to protect from rain):
These comprise 1m long 25x150mm planks located in opposite corners, nailed flat onto end of upper mainframe timber, side plank and 50x75mm end block.

Gravel covering:
Preferably of 15mm-25mm gravel with larger pieces and rocks to provide shelter, and give sufficient weight to push running board down to water level.

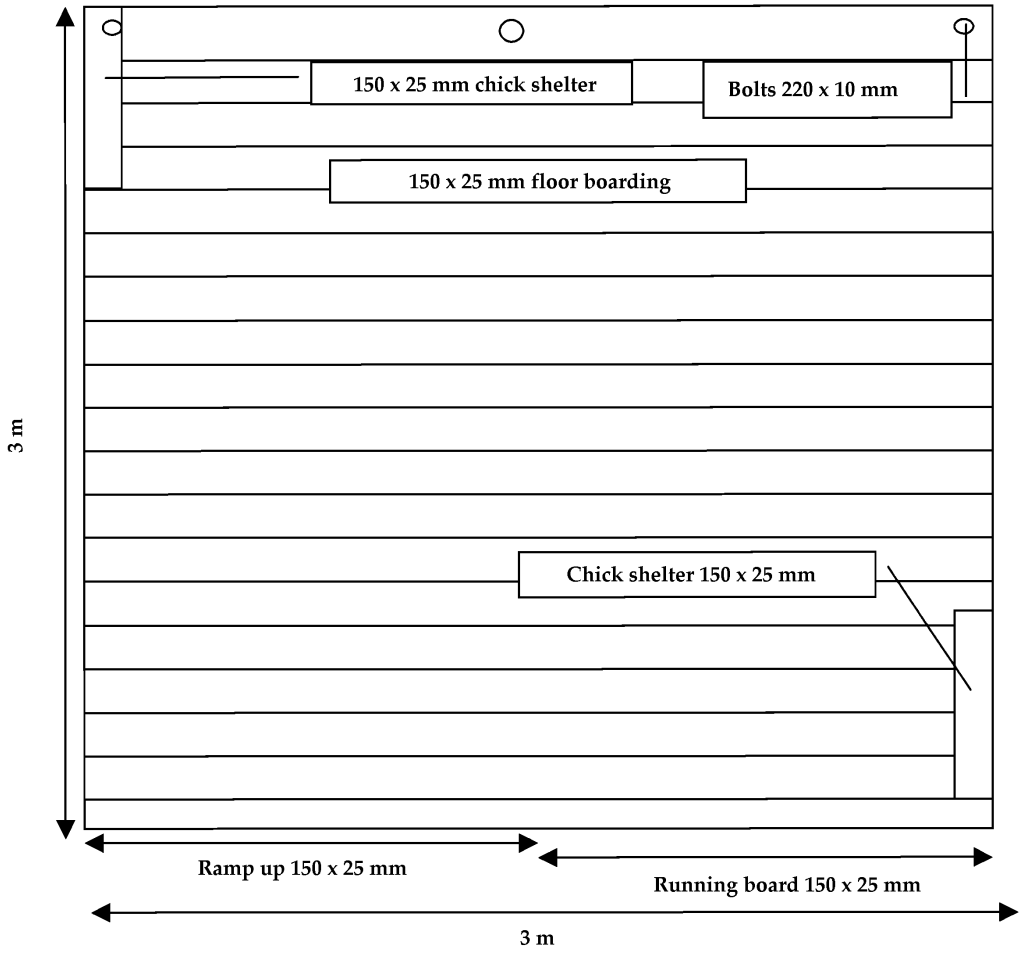
Re- entry system (for chicks falling overboard):
These are located on opposite (lee) side of raft to the mooring ring: running board 3m, 25x150mm plank nailed to bottom of the two lower mainframes. Ramp (1.5m, 25x150mm plank) sloping up to top corner of mainframe, supported by up stand, nailed. Block gap under raft behind ramp with 25x150mm skirt plank.

Optional removable security fence:
These comprise four frames 230mm by 0.3m, made from 50x50mm planks covered with 25mm chicken wire, bolted along each side and fixed at top corners.

Side view



View from above

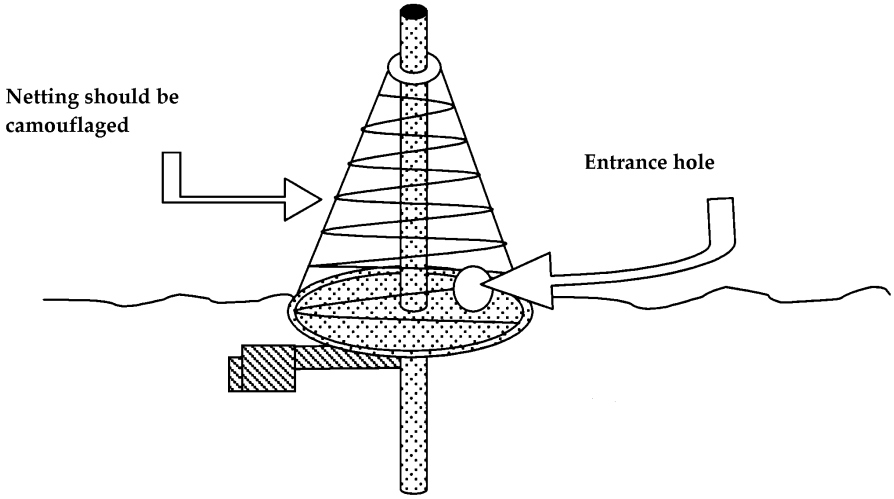


A floating wildfowl nest for use on rivers

This design, successfully used on the Ray, near Oxford, is intended to overcome the problems posed by strong currents, which make it difficult for wildfowl to nest successfully on rivers. Chick survival is best where the floating nest is sited on a quiet backwater with gently sloping banks so that, when a chick leaves the nest, it can get to the shore and climb out despite the current.

1. Drive a suitable length of 50mm diameter steel pipe into the riverbed to provide an anchor pole on which the floating nest can rise and fall with changes in water level.
2. Cut out a circular platform from marine plywood and cut a hole in its centre so that it fits over the anchor pipe.
3. Screw three boards to the circular plywood piece, so that they form an equilateral triangle to make a frame underneath the platform for the floats.
4. Strap three 4.5 litre plastic or metal tins to the triangular frame, one each side. If metal tins are used, they should be well painted with bitumen paint and coated inside with a spoonful of old engine oil before capping.
5. Attach three metal struts, evenly spaced, to the edge of the platform, joined at the upper end to a ring that fits over the anchor pipe. This upper ring, with the hole in the platform, forms the bearing on which the nest rises and falls on the pipe.

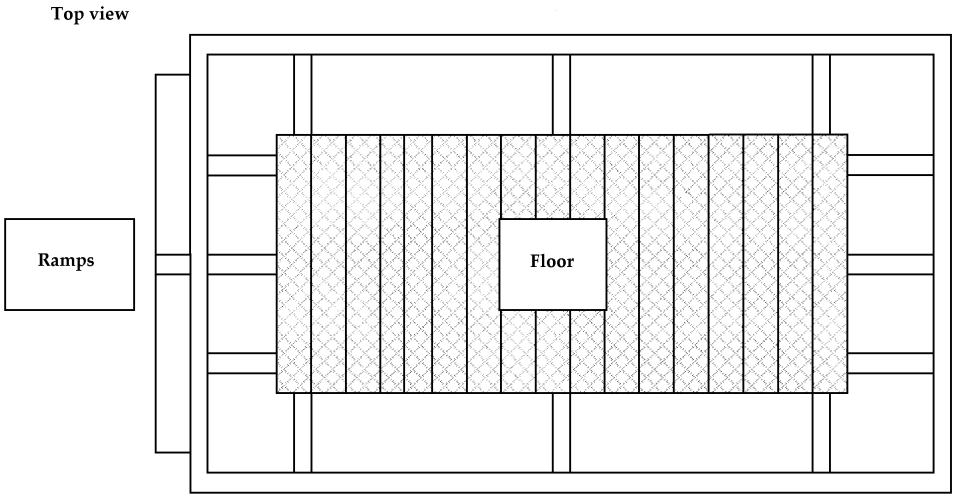
6. Fasten a conical covering of light but firm netting around the outside of the strut assembly, and use vegetation to provide some shelter. Leave a 150 mm diameter entrance on one side.
7. Slide the platform down over the pipe. If it tends to spin in the current, attach a rudder to the floats to keep it properly orientated. The entrance hole should be arranged to face the nearest bank.



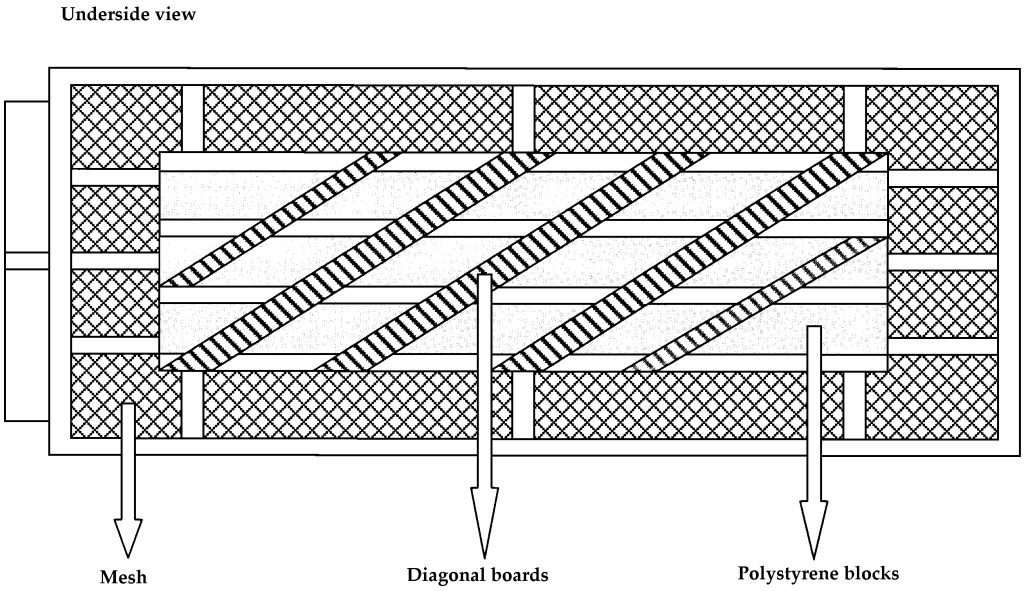
A square raft

This design is popular and has proved to be highly effective and weatherproof. Similar structures are in use in many reserves.

a. Construct a framework of 25 x 150mm boards or similar. Nail the flooring across the top of the frame leaving the margins open to take vegetation and nail duckling ramps to one end of the raft. Use galvanized nails since they do not rust.



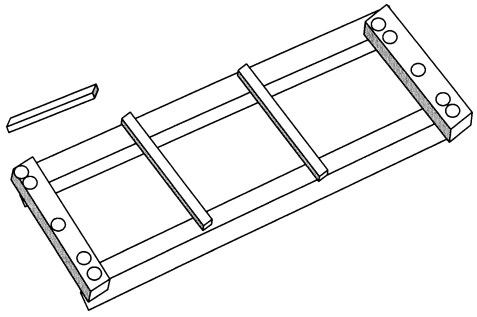
b. Turn the raft over. Staple close-mesh galvanized wire netting across the bottom of the raft, leaving the central part free to hold the flotation blocks.
c. Place 150mm thick polystyrene blocks in the uncovered centre of the frame. Hold the polystyrene in place with diagonal boards nailed across the frame.



d. Turn the raft right way up. Cut out blocks of rush, willow etc. to fit into the margins of the frame. Fit anchor bolts to two opposite corners. Fix a nesting box or basket if required. You can cover the raft with some gravel. Finally, tow the raft into the position and anchor it firmly.

A heavier variation:

The raft described below is very successful when attracting terns to nest. Bare shingle is required for the nesting, but a completely exposed raft results in high chick mortality. At about one week old, tern chicks leap overboard at the slightest disturbance. This can be prevented by providing them with small shelters to hide underneath.



1. Drill the sleepers as indicated in the diagram, using a brace and a bit, and bolt them together with eight 250mm coach bolts. Drill and fix anchor bolts in the end sleepers.
2. Drill and bolt the cross members to the side sleepers. These are required to make a rigid structure and to resist the upward pressure of the floats.
3. Nail the side battens into position; these help hold the shingle in place.
4. There are two ways to floor the raft. One is to trap plastic-coated chain link fencing, covered in heavy-duty polythene, under the cross braces. Staple the fencing firmly to the sleepers. Alternatively, nail old garage doors or other suitable sturdy timber to the cross members and spread the flooring with a layer of concrete to help keep the shingle in place.
5. Float the raft. Unless you have mechanical help, placing approximately 0.8 cubic metres of polystyrene blocks under the raft for flotation will require a number of water-hardy volunteers.
6. The amount of polystyrene needed varies with the weight of the raft so trials are necessary. Provide some extra flotation to compensate for the shingle, which is added afterwards. The polystyrene stays in place between the sleepers due to its buoyancy and should not need fastening.
7. Spread a layer of shingle over the flooring.
8. Fix ramps or walls to the rafts sides, place a shelter on it, tow it into position and anchor it by means of bolts in the end sleepers.

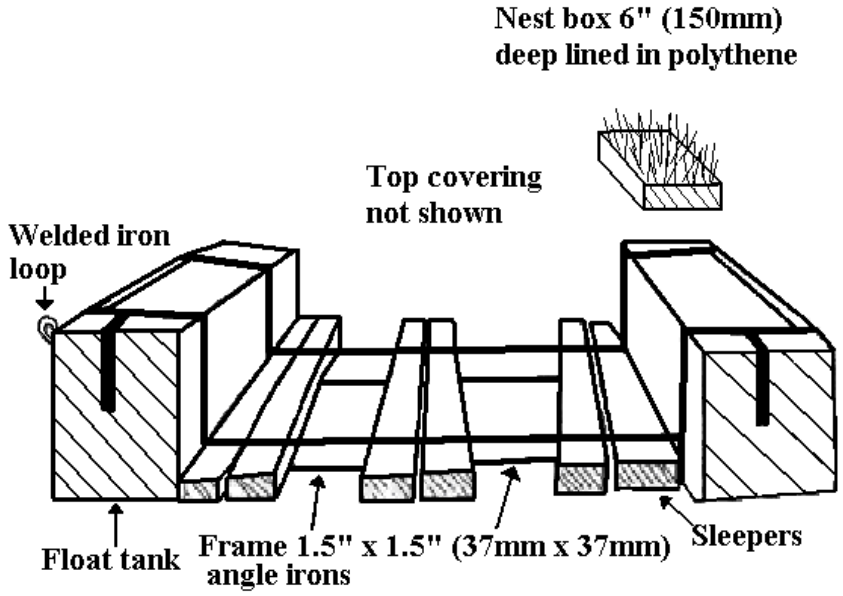
Welded Rafts

These two models were designed for the specific needs of a particular area. They require a great deal of skills and therefore are only suitable if none of the previous ones can be used. The designs shown have proved to have an estimated life of at least 12 years with minimal maintenance. These types depend on availability of suitable welding equipment and skills, and sheet-metal float tanks used by gravel companies for ferrying electrical equipment around wet pits.

Type A
Weld together three float tanks and attach a rim of logs with welded metal straps. To moor the raft, fix a wire anchor rope to a 50 kg scrap iron or concrete anchor. This simple but strong raft gives a surface area of 6.7 square metres. It successfully attracts ducks and geese, but has two disadvantages. It is so buoyant that the nest floats at least a foot above the water so that, unless a ramp is attached to help them, once the chicks leave the raft they cannot return. Soil ultimately dries out or is dislodged and must be replaced at intervals along with fresh vegetation.

Type B
This rather elaborate design features a semi-flexible welded frame, which makes the raft very durable in exposed conditions. The float tanks are the same size as in the previous design; the sleepers are topped with a grid that holds nesting cover.

Construction:
- Weld the frame together and to the float tanks. Weld two anchor bolts to opposite corners.
- Manoeuvre the completed frame into the water.
- Slide the sleepers into position. Leave gaps between the pairs of sleepers so that plant roots can reach the water.
- Cover the top of the frame's central section with narrow-mesh galvanized metal.
- Fix the nesting boxes on top of the floats
- Cover the mesh with mulch or soil and suitable plants. Plant up the nesting boxes.
- Tow the raft into position and anchor from the anchor bolts.



REPORT

IOM Ferry Terminal – Bird Pontoon

Method Statement

Client: Sisk

Reference: PB8850-RHD-ZZ-XX-RP-Z-0002

Status: Draft/P02

Date: 30 July 2019

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Document title:	IOM Ferry Terminal – Bird Pontoon
Document short title:	Method Statement
Reference:	PB8850-RHD-ZZ-XX-RP-Z-0002
Status:	P02/Draft
Date:	30 July 2019
Project name:	IOM Ferry Terminal
Project number:	PB8850
Author(s):	Mike Primrose
Drafted by:	Mike Primrose
Checked by:	Ben Hughes
Date / initials:	25/07/2019
Approved by:	Alistair Reid
Date / initials:	26/07/2019

Classification
Project Related

Disclaimer

Table of Contents

1 Introduction

This method statement relates to the installation of 1 No. floating pontoon in Princes Half-Tide Dock. The pontoon will form part of the Isle of Man Ferry Terminal scheme and wider Liverpool Waters Strategic Ecological Mitigation Plan.

1.1 Site Location

The site is located on the East side of Princes Half-Tide Dock is shown in Photo 1.

Photo 1 – Princes Half-Tide Dock site

The pontoon is to be moored clear of the navigation channel for the Liverpool Canal Link that extends across the West side of the dock. There is therefore no risk to navigation.

2 Pontoon and Anchor Assemblies

The pontoon will comprise a below water level welded steel frame with an above water timber covering (pressure but not CCA treated softwood timber). The design is an adaptation of ‘the standard raft’ described in RSPB document Design and Management of Rafts.

The anchor assemblies comprise steel sinkers and standard anchor chains.

All the above components will be fabricated off-site.

The topside of the pontoon will be covered in a layer of washed gravel.

3 Installation

3.1 Off-Site Fabrication

The pontoon and anchor assemblies will be fabricated off-site and transported to Princes Half Tide Dock by road.

3.2 Survey

A hydrographic survey of the dock will be undertaken to confirm the seabed level which will then allow the final mooring locations to be confirmed. In particular the water depth will allow the sinker positions and weights to be confirmed.

3.3 Lifting into the Dock

The pontoon will be lifted into the dock by a small mobile crane or HIAB, located alongside one of the quay walls.

3.4 Means of Access

A safe means of access between the pontoon and quay will be set up. Operatives working on the pontoon will also wear correct Personal Protective Equipment (PPE) which will include self-inflating life preservers at all times.

3.5 Gravel Placement

The gravel covering to the pontoon topside will be placed by hand and raked level. All gravel will be pre-washed to minimise dust.

3.6 Anchor Assembly Installation

The anchor assemblies will be attached to floatation bags and then be lifted into the dock by the mobile crane or HIAB.

A small craft will then tow each of the anchor assemblies to the anchor locations and release the sinkers. The floatation bags will remain attached to the free end of the mooring chains.

3.7 Mooring into Final Location

The completed pontoon ill then be towed to the final location by a small craft. Each of the free anchor chains will then be attached to the pontoon and the floatation bags removed and retained.

4 Maintenance

The annual maintenance of the pontoon topside is envisaged to be undertaken in-situ. Access to the pontoon will be via a small boat. The pontoon design allows for the maintenance access in terms of flotation and stability.

The anchor assemblies are not envisaged to require maintenance in the 12-year design life.

5 Decommissioning

The decommissioning of the pontoon is envisaged to be undertaken after a period of 12 years.

The pontoon will be disconnected, temporarily positioned against a quay wall and a safe means of access installed using the previously described procedure.

The gravel covering of the topside will be removed by hand and disposed of off-site.

The pontoon will then be disconnected from any further pontoons, if installed, prior to being lifted from the dock by small mobile crane or HIAB.

The pontoon will be then be disposed of off-site with transportation by road.

There are two possibilities envisaged with regards to removal of the anchor assemblies.

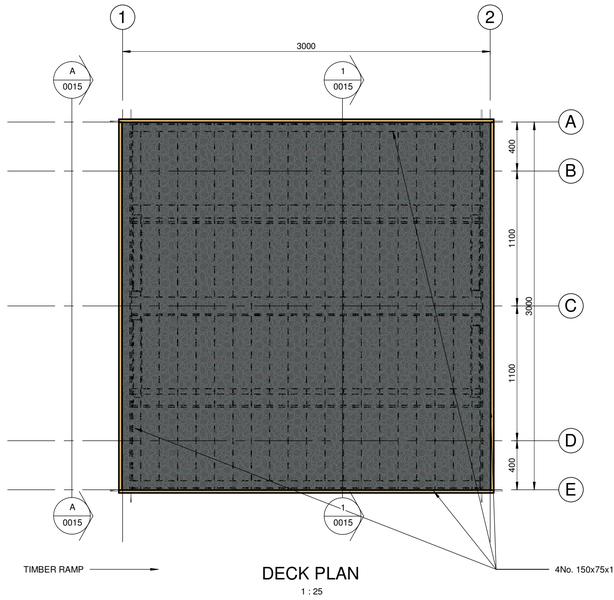
1. The sinkers on the seabed may have embedded into what is assumed to be a soft mud / silt material. If this is the case it is proposed to cut the chains at seabed level. This would leave the sinkers in place as they pose no risk to navigation or to the environment. This will also mitigate the need for any air-lifting or dredging works that would otherwise be required to extract the sinkers.

2. In the event the sinkers remain on the seabed or to a shallow embedment, it is proposed they will be lifted by floatation bag, be towed to near one of the quay walls and be lifted by small mobile crane or HIAB.

In either option the removed elements of the anchor assemblies will be then disposed be of off-site with transportation by road.

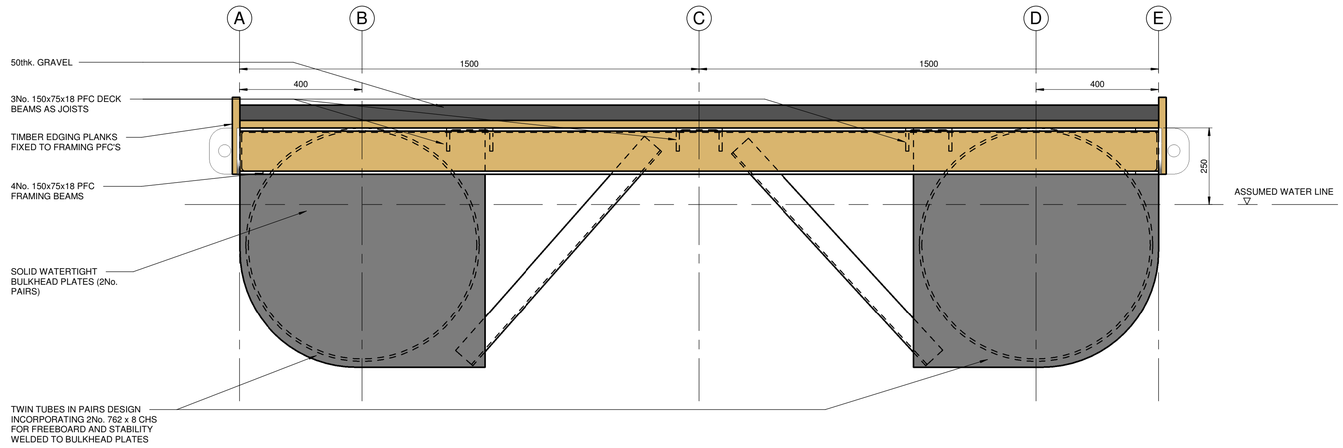
The works in the dock will be undertaken using a diving contractor operating from a quay side.

PB8850-RHD-XX-XX-DR-C-0015



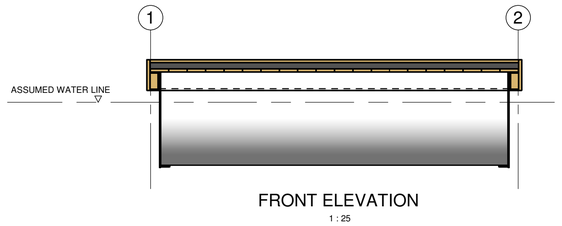
DECK PLAN

1 : 25



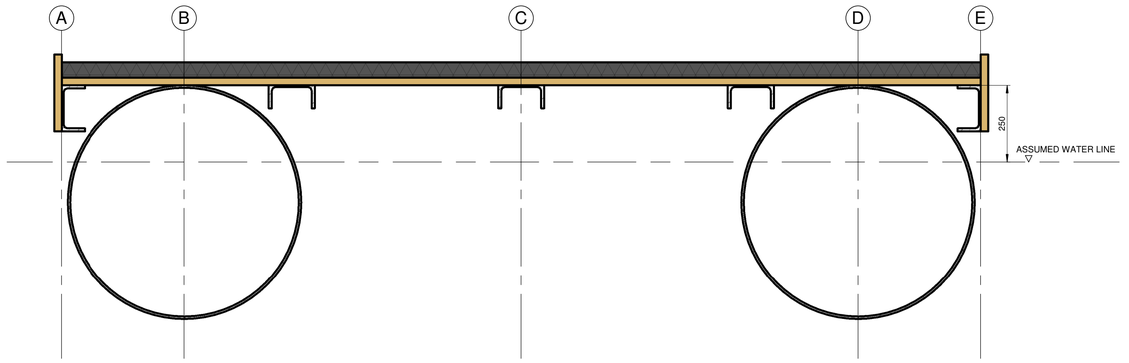
VIEW ON A

1 : 10



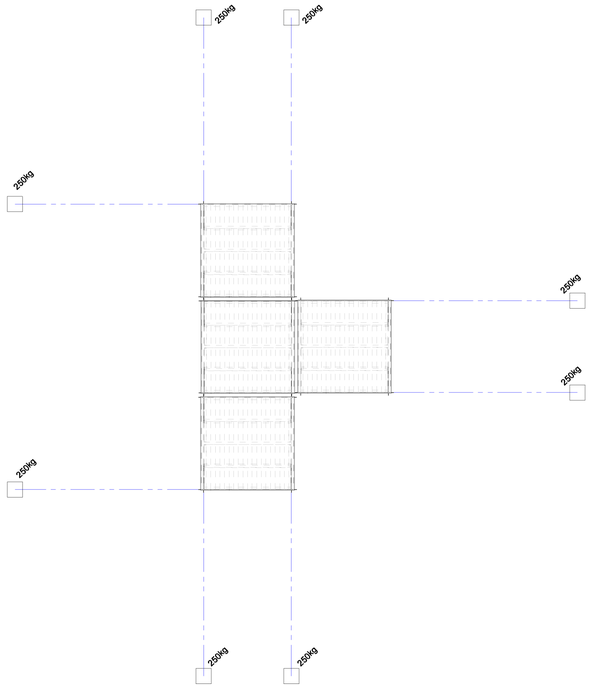
FRONT ELEVATION

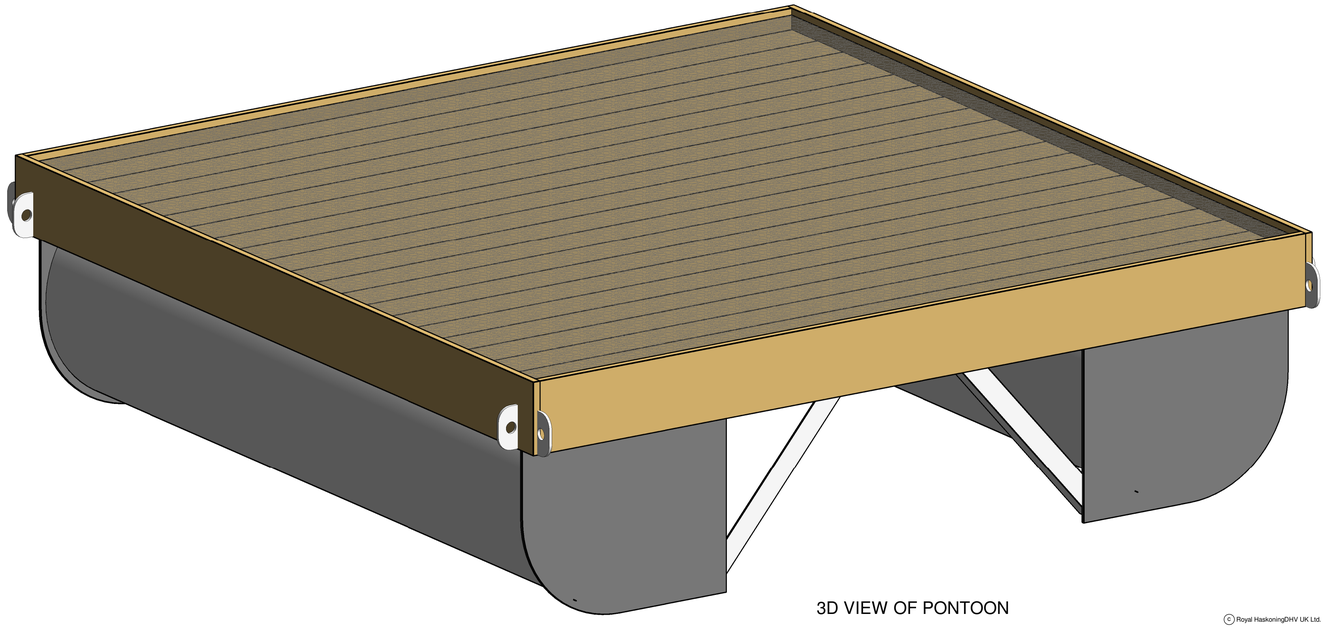
1 : 25



SECTION B-B

1 : 10





3D VIEW OF PONTOON

NOTES

1. THIS DRAWING SHOWS A CONCEPTUAL GENERAL ARRANGEMENT FOR THE PROPOSED COMPENSATORY HABITAT PONTOON.
2. ALL DIMENSION IN MILLIMETERS
3. STEEL S2 75 WITH C5-M DURABILITY HIGH COATING TO BS EN 12944.
4. TUBES TO BE FILLED WITH CUT POLYSTYRENE BLOCKS
5. 8No. ANCHOR BLOCKS AND CHAINS TBC BASED ON FINAL WATER DEPTH.
6. ALL WELDS TO BE 6mm FILLET WELDS.
7. GRAVEL TO BE NOMINALLY 50THK. 20mm SINGLE SIZED PRE-WASHED.

REV	DATE	DESCRIPTION	DRW	CHK	APR
P1.0	12.07.2019	FIRST ISSUE	DD	MP	AR

REVISIONS

CLIENT

BUILDERS SISK CONTRACTORS Established 1859

PROJECT

ISLE OF MAN FERRY TERMINAL

TITLE

PONTOON GENERAL ARRANGEMENT

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Enhancing Society Together

DRAWN	CHECKED	APPROVED
DD	MP	AR
DATE	SCALE AT A1	REF.
07/10/19	As indicated	

DRAWING No.	SUITABILITY	REVISION
PB8850-RHD-XX-XX-DR-C-0015	S3	P1.0

E. Adaptive Management Plan (Cormorants)

Liverpool Waters/Docks

Ecology Adaptive Management Plan (Cormorants)

October 2019

Waterman Infrastructure & Environment Limited
Second Floor, South Central, 11 Peter Street, Manchester, M2 5QR, United Kingdom
www.watermangroup.com

Client Name: Liverpool City Council
Document Reference: WIE12464-100-17-2-3
Project Number: WIE12464-100

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

Issue	Date	Prepared by	Checked by	Approved by
First	July 2019	Niall Machin Associate Director	Gavin Spowage Associate Director	Gavin Spowage Associate Director
Comments		Incorporates conclusions of meeting with Peel, Arup and LCC on 2nd July to agree strategic approach to cormorant mitigation.		
Second	August 2019	Gavin Spowage Associate Director	John Hughes Regional Director	John Hughes Regional Director
Comments		Incorporates monitoring methodology from Arup		
Third	October 2019	Gavin Spowage Associate Director	John Hughes Regional Director	John Hughes Regional Director
Comments		Incorporates Natural England's consultation comments		

Disclaimer

This report has been prepared by Waterman Infrastructure & Environment Limited, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

Contents

1. Introduction

1.1. This Adaptive Management Plan has been produced in response to Natural England's responses to recent planning applications affecting Liverpool Docks, notably the new **Liverpool Cruise Terminal** and the **Isle of Man Ferry Terminal**.

1.2. Waterman Infrastructure & Environment Ltd (Waterman) was commissioned by Liverpool City Council (LCC) and the Isle of Man Government Department of Infrastructure to prepare ecological advice in relation to both the construction of the new Liverpool Cruise Terminal and the Isle of Man Ferry Terminal.

1.3. For the Liverpool Cruise Terminal, this Plan supports the discharge of planning condition 8 (planning application ref: 17O/3230) in relation to minimising the adverse impacts on the population of cormorants *Phalacrocorax carbo* a component species of the bird assemblage feature of Liverpool Bay Special Protection Area (SPA). In relation to Planning Condition 8 and the cormorant Ecological Conservation Management Plan (ECMP), Natural England (NE) have recommended (letter dated 30th May 2019, ref 19DIS/0919) that an Adaptive Management Plan (AMP) is provided:

> *" to set out how monitoring will be undertaken, what additional actions may be required in order to deliver successful mitigation (e.g. movement of the pontoon), and also to consider the long term validity of the mitigation"*

1.4. For the Isle of Man Ferry Terminal, the provision of an Adaptive Management Plan (AMP) has been requested to discharge Planning Condition 26 (planning application Ref: 18F/3231) and the Marine Licence condition 5.2.10 (Marine Licence application Ref: L/2019/00239/1):

> Planning Condition 26 - "*No development shall commence until an Ecological Conservation Management Plan (ECMP) has been submitted to and approved in writing by the Local Planning Authority. The ECMP (…) should (…) include the following details: (..) ii) The provision of an Adaptive Management Plan (AMP) setting out the arrangements for monitoring the usage and effectiveness of the proposed mitigation and arrangements for ensuring any adaptations reasonably necessary to improve the success of the mitigation measures with respect to cormorants will be provided;*
>
> Marine Licence condition 5.2.10 - *"An Adaptive Management Plan (AMP) relating to the Cormorant Mitigation Plan (CMP) must be submitted to MMO prior to the commencement of any activity included with this licence. The AMP must ensure that appropriate monitoring, review and adaptation of the mitigation measures described in the CMP will be provided. This must be submitted at least 6 weeks before the scheduled installation of the pontoon detailed in condition 5.2.9. Monitoring reports must be provided to MMO at the intervals as determined within any agreed AMP.*

1.5. Waterman have produced plans for a permanent floating pontoon to provide roosting/resting opportunity for cormorant: this will be located in Princes Half Tide Dock and be sufficiently large as to provide mitigation for a number of schemes in the docks including Liverpool Cruise Terminal, Isle of Man Ferry Terminal, the Northern Link Road and, potentially, the C02 proposals.

1.6. The design and location details for the floating pontoon are set out in the respective Technical Notes for each of the schemes (WIE12464-100-TN-14-2-2 for Liverpool Cruise Terminal and WIE13897-100-TN-10-2-1 for the Isle of Man Ferry Terminal).

1.7. A strategic approach to cormorant mitigation within the overall Liverpool Waters area is being

coordinated by Arup on behalf of Peel Land & Property (Ports) Ltd. The provisions within this Adaptive Management Plan are covered by and conform with the overarching strategic approach.

1.8. Adaptive Management Plans are tools for improving resource management by learning from outcomes ('learning by doing'), usually through a partnership of stakeholders. This Plan is supported by the following organisations:

- Liverpool City Council
- Natural England
- Merseyside Environmental Advisory Service (MEAS)
- Peel Land & Property (Ports) Ltd
- Isle of Man Government Department of Infrastructure

1.9. The objective of this AMP is to ensure that the proposed cormorant specific mitigation remains valid, appropriate and compliant with the Habitat Regulations throughout the lifetime of the development. The AMP enables co-ordinated, appropriate and timely actions to be implemented in response to potential issues that may arise from other relevant, adjacent developments. This AMP will form part of a strategic and more collective approach to mitigation in the wider area that will be adopted in the long term, as part of other developments that may impact upon the designated sites and their interest features in the vicinity.

2. Cormorant Monitoring Approach

2.1. The pontoons are considered suitable to provide roosting habitat for cormorant in the non-breeding season. Other species, such as herring, lesser-black-backed and black-headed gulls and oystercatcher will use a wide range of roosts and the pontoons also provide suitable habitat for these species.

2.2. In order to determine if and how cormorants are using the new pontoon facility a 5 year programme of annual monitoring will be undertaken. All surveys would be undertaken by an experienced ornithologist and would be coordinated by Arup on behalf of Peel Land & Property (Ports) Ltd. The surveys will be completed as part of Arup / Peel's programme of ecological monitoring of the wider Liverpool Waters site. **However, for the first year, the monitoring would be specific to the mitigation pontoon itself (with any additional data and evidence from the wider survey work used to support the monitoring).**

2.3. The previous bird survey data collected will be used as a baseline to identify if numbers have declined and if any there have been any negative impacts on the populations using the site.

2.4. The monitoring methodology will include four visits per month between September and March inclusive, two during high tide and two during low tide to monitor bird numbers using the rafts and the site. A suitable vantage point will be selected which is safe for the surveyor due to active construction being undertaken on the site, but also allows for a clear sight on the rafts and the wider site area. Both high and low tide surveys will start two and a quarter hours before high/low tide and end a quarter of an hour after high/low tide (i.e. duration of 2.5 hours). Paired visits (high and low tide) will be undertaken on the same day where possible (or if not, consecutive days) during daylight hours.

2.5. Table 1 details the peak numbers (peak number of individuals recorded at one time, seen together) of cormorants using the site over seven months (four surveys per month) during autumn/winter. This shows that only low numbers of individuals are using the area, with a peak count of 14 birds on the 15th November high tide count.

Table 1: Peak cormorant numbers recorded at the Isle of Man Ferry Terminal site during winter and passage 2017-2018[1]

Date	Sept 17	Oct 17	Nov 17	Dec 17	Jan 18	Feb 18	Mar 18
No. of cormorant	4	6	14	4	6	3	4

2.6. The trigger point for the rafts to be revised or relocated will be where the bird monitoring shows that there is a decrease in numbers utilising the rafts or surrounding area. Peak monthly counts for the Site noted an average of just under 6 individuals using the Site. The lowest peak count in any month was three individuals recorded using the Site (in Feb).

2.7. The high and low tide counts covering 28 visits recorded zero cormorants on-site on 3 occasions (2 high and 1 low tide), and only 1 bird on another 4 occasions (2 high and 2 low tide). The lowest sequence was three consecutive visits when six cormorant used the Site (occurred on four occasions).

2.8. The trigger point for initial action of further investigation will be if **no cormorants are using the**

[1] AECOM Isle of Man Ferry Winter Bird Survey March 2018

pontoon in any one month. This is a simple and clear trigger and has been endorsed by Natural England.

2.9. In terms of initial action following the trigger point, the ecologists will make an assessment of likely contributory factors, which would involve (but not be restricted to);

- Studying weather patterns (e.g. has adverse or unseasonable weather impacted numbers?);
- Making a visual inspection of surrounding land and land uses (and making inquiries of relevant authorities) to ascertain if any activities are occurring, or have recently occurred, that may have displaced cormorant (e.g. canoeing, boating, fireworks, dock repair works, building development etc);
- Consulting the local ornithological groups to ascertain if additional information is available on cormorant numbers locally on the River Mersey (increasing or decreasing).

2.10. Where the trigger point occurs, monthly monitoring for the following month will be increased to 6 visits per month to help better understand trends and the causes of the reduction and what further action, if any, may be required.

2.11. Depending on the outcome of action set out in paragraphs 2.09-2.10 above, the project ecologists may also notify LCC where they consider that changes to the rafts may be required (e.g. size, design, location) and also subsequently input into a specification to procure a contractor to make such changes.

2.12. Success of the monitoring programme will be identified where the monthly peak count averages six or more cormorants using the rafts and site during September to March period: this will be assessed by the project ecologists, acting on behalf of the Isle of Man Government Department of Infrastructure and LCC, at the end of the first year of monitoring results to assess the success of the pontoon mitigation (see also 2.20 below). As part of the first year review, we will also undertake a review of annual peak means against the baseline to check there is no downward trend, e.g. if the birds are present but in dwindling numbers.

2.13. Where rafts require relocation as part of the AMP this will be implemented and maintained by Liverpool City Council in collaboration with other interested parties (e.g. Peel; Isle of Man Government Department of Infrastructure), and an amended monitoring period will re-start from when the rafts are moved. Other measures of success would include: target species using the pontoons and not being disturbed e.g. by boat traffic or other human activity; no non-target species recorded to be using the pontoons (e.g. Canada geese); and structural success in terms of the pontoons remaining in place and not having failed e.g. sinking etc.

2.14. Where pontoons or posts are deemed to have failed or require additional maintenance, repair or replacement will be carried out preferably during late winter or early spring before birds start to nest and wintering bird activity is low. Where deemed necessary through monitoring, additional mitigation may be installed, or locations may need to be changed to maximise the effectiveness.

2.15. The results of the 5-year monitoring programme would be written up in an annual report for the client and shared with Natural England and other relevant stakeholders. The annual report would make recommendations about the success of the pontoon in terms of its intended cormorant mitigation role.

2.16. Monitoring of the physical condition of the pontoons will also be undertaken, most likely at the same time as the ornithological surveys. The floating pontoon design is expected to have a

minimum estimated life of 12 years with minimal maintenance. As per RSPB guidance, yearly maintenance of the floating pontoons will be carried out. Resurfacing of the floating islands will be necessary if they are to remain attractive for birds every year. It will also be vital to remove the excess of droppings which can build up over the course of the year.

2.17. Where pontoons are deemed to have failed or require additional maintenance, repair or replacement will be carried out preferably during late winter or early spring before birds start to nest and wintering bird activity is low. Where deemed necessary through monitoring, additional mitigation may be installed, or locations may need to be changed to maximise the effectiveness.

2.18. Further adaptive measures may also be required to minimise disturbance, for example through control of boat traffic.

Programme

2.19. Arup have proposed within their Liverpool Waters Strategic Ecological Mitigation Plan (LW SEMP) Interim Note that the monitoring of the cormorant mitigation pontoons will be included within the annual surveys being undertaken across the entire LW scheme (as included within the LW Neighbourhood Ecological and Biodiversity Strategies (NEBS)). This will include monitoring for wintering/passage birds including high water and low water surveys and also monitoring for breeding birds (e.g. ringed plover, little ringed plover, lapwing) and foraging common tern. The NEBS produced for Central Docks in July 2019 (provided in **Appendix A**) outlines the surveys that will be completed including, duration, timing and methodology.

2.20. However, as stated in para 2.2 above, specific monitoring of the cormorant mitigation pontoon itself would be carried out in Year 1. At the end of Year 1, the monitoring approach and data would be reviewed in terms of the approach to Years 2-5 and how this fits with the wider strategic monitoring and action detailed within the future Liverpool Waters Strategic Environmental Management Plan (SEMP).

2.21. Section 2 of the Central Docks NEBS sets out specific methodologies for the following surveys:

- Section 2.2: Breeding birds, including specifically little ringed plover and black redstart;
- Section 2.3: Wintering and passage bird surveys, including cormorant; and
- Section 2.4: Common tern surveys.

3. Review of Projects

3.1. In tandem with the annual bird surveys, a review of planning applications which may impact upon the docks and cormorant ecology would be undertaken.

3.2. This would include reviewing scheme mitigation plans and reviewing whether the cormorant mitigation installed to date requires any alteration.

4. Adapting the Mitigation

4.1. The Adaptive Management Plan table of issues and responses, set out below, would be maintained. Data from the annual bird surveys and the planning application reviews would be fed into this table and appropriate remedial measures identified and implemented.

4.2. Implementation measures may involve a range of clients/stakeholders, including those signed up to this Plan.

Table 1: Adaptive Management Plan

Issue	Evidence	Remedial action	Timetable	Responsibility
Describe issue, e.g. damaged pontoon side	*Describe evidence, cite source, e.g. winter bird survey (date)*	*e.g. repairs required*	*Date*	*E.g. Liverpool City Council*

4.3. The Adaptive Management Plan will be issued to Natural England on an annual basis for review and approval.

Appendices

Appendix A: Central Docks Neighbourhood Ecological and Biodiversity Strategy

Peel Land & Property (Ports) Ltd.

Central Docks Condition 16

Neighbourhood Ecological and Biodiversity Strategy

0-15-08

Issue | 23 July 2019

Job number 266384-00

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ARUP

Document verification

ARUP

Job title		Central Docks Condition 16			**Job number** 266384-00
Document title		Neighbourhood Ecological and Biodiversity Strategy			**File reference**
Document ref		0-15-08			
Revision	**Date**	**Filename**	Central Docks NEBS.docx		
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			Prepared by	Checked by	Approved by
		Name	Amy Martin/Joseph Shepherdson	Rory Canavan	Rory Canavan
		Signature			
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			Prepared by	Checked by	Approved by
		Name	Amy Martin	N/A	N/A
		Signature			
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			Prepared by	Checked by	Approved by
		Name	Amy Martin	N/A	N/A
		Signature			
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			Prepared by	Checked by	Approved by
		Name	Amy Martin	N/A	N/A
		Signature			
				Issue Document verification with document	✓

Contents

Executive Summary

Outline consent for the Liverpool Waters Scheme was granted in June 2013, subject to a total of 77 planning conditions. Condition 16 of the Liverpool Waters Outline Consent (10O/2424) states:

"*Prior to the submission of the first application for any reserved matters approval in each respective neighbourhood, an Ecological & Biodiversity Strategy based on the Principal Application Documents and Detailed Neighbourhood Masterplan that relates to that particular neighbourhood and has regard to the wider application site shall be submitted to and approved in writing by the Local Planning Authority. The strategy shall summarise the means of safeguarding all protected species of relevance and supporting habitats during construction and operation within the respective neighbourhood including consideration of pathways to protected European sites by the following measures:*

i. *The means, method and timeframe for carrying out updated bird surveys and impact assessments for bats and migratory and/or over wintering birds;*
ii. *The methodology and timeframe for carrying out (seasonal) monitoring of fish and other water species within the dock system;*
iii. *Working practices to address phasing of construction, construction vehicles, routing and speed limits during removal of existing buildings, vegetation and other suitable breeding habitats;*
iv. *Details of habitat creation;*
v. *Design of buildings and spaces in terms of layout, design, materials and lighting to avoid creating barriers to bird migration and aviation and reduce risk of bird strikes particularly in relation to tall buildings;*
vi. *Means and methodology for the monitoring and management of water quality within the dock system which shall inform mitigation to safeguard fish and other water species, including the aeration of dock water spaces;*
vii. *Methods for controlling leisure boat activity within the dock system;*
viii. *Methods for controlling gulls and pigeons roosting on buildings;*
ix. *Mechanisms for monitoring and reviewing the effectiveness of agreed ecological and biodiversity mitigation against identified targets and means for enhancing mitigation where those targets are not met; and*

Mechanisms to ensure protection of Sefton Coast SAC (Seaforth Docks to Formby Point) from recreational disturbance overseen by the Liverpool Waters Coordination Panel in accordance with Schedule 6 of this permission."

This document presents the Neighbourhood Ecological and Biodiversity Strategy for the Central Docks Neighbourhood (Neighbourhood C). The strategy relates to the Central Docks Neighbourhood and has regard to the wider Liverpool Waters application site. The strategy summarises the means of safeguarding all protected species of relevance and supporting habitats during construction and operation

within the respective neighbourhood. This includes consideration of impact pathways to European designated sites.

The strategy is intended to provide guidance in relation to ecology and biodiversity for all reserved matters applications within the neighbourhood and addresses Condition 16.

1 Introduction

1.1 Background

This strategy has been produced to discharge a planning condition under Part C of the Liverpool Waters (LW) scheme (Planning Application reference: 10O/2424). The LW scheme, which secured outline consent on the 19th of June 2013, covers an area of 60 hectares of former dockland located along Liverpool's Waterfront. The project will provide a mixed-use development of up to 1,691,100 sqm. The outline planning consent is split into multiple parts:

- **Part A-** Overall Development Quantum and Parameters
- **Part B-** Time Limits
- **Part C-** Information to be submitted prior to the submission of applications for reserved matters approval
- **Part D-** Details to be provided with Reserved Matters Applications
- **Part E-** Compliance Conditions

Across parts A to E there are a total of 76 conditions within the outline consent (originally 77, see s96a section for further details). 16 of these are pre-commencement conditions which therefore require discharging prior to any submission of detailed reserved matters applications (i.e. a specific development plot). These conditions are listed within Part C of the outline consent.

In June 2018, these 16 conditions were discharged for Princes Dock (Neighbourhood A) to allow for reserved matters applications to come forward for development in this neighbourhood alone. Each condition required a strategy to be produced which provided high level information on how specific requirements would be met.

To progress development within Central Docks (Neighbourhood C), Peel Land and Property are seeking to discharge these 16 pre-reserved matters conditions for this neighbourhood. The following strategy sets out the information required to discharge a pre-reserved matters condition for Central Docks, Liverpool Waters.

1.2 Consultees

Where relevant, advisory or statutory consultees have been engaged with during the production of the strategy. Additionally, liaison has taken place across all conditions between other sub-consultants to ensure each condition conforms to all other relevant conditions.

1.3 Standalone Applications

There have been several consents for developments within Central Docks. These developments have come forward as standalone applications and although measures have been considered to ensure general conformity with the outline

consent, they have not directly followed the LW process. Due to the definition of "committed development" only the standalone applications which have commenced on site can be considered and referenced within the condition strategy. For clarity these are:

- C04 – C06 (17F/1628)
- Northern Link Road (17F/2628)

Developments which have been determined but have not commenced:

- Isle of Man (18F/3231)

Developments which are currently being determined for planning are:

- C02 (18F/3247)
- District Heating Network, Phase 1 Part 2 (19F/0079)

As these applications have not been granted consent, they only hold limited weight and are not classed as committed development. Where relevant, these have been considered within the strategy but reference to the original outline consented plots for these emerging developments is still made where needed.

1.4 Part D Conditions

The following strategy has been produced to discharge Part C conditions, as such, it sets a high-level strategy for the Central Docks Neighbourhood. Further detail will be provided through the discharge of Part D conditions '*Details to be provided with Reserved Matters Applications*'. Therefore, Part C conditions will establish the strategy, and Part D conditions will provide further details when reserved matters applications come forward.

1.5 S96a Amendment Application (18NM/2766)

In November 2018, a non-material amendment was consented for the Liverpool Waters Outline Consent. The amendments included:

1. Liverpool Waters Parameter Plan Report (November 2011) to Liverpool Waters Parameter Plan Report (October 2018), where changes within the document include:
    - PP003 Phasing Plan
    - PP004 Development Parcels
    - PP005 Development Plots
    - PP006 Building Heights
    - Illustrative Masterplan
2. **The wording of Condition 3:**

The development hereby approved shall only be implemented in general conformity with the following submitted application documents (The Principal Application Documents):

- Updated Planning Application form (November 2011);
- Statement of Key Development Principles (November 2011);
- LW Parameter Plan Report (incorporating Parameter Plans) (October 2018)
- Design and Access Statement (November 2011);
- Building Characterisation & Precedent Study (November 2011) ("BCPS");
- Public Realm Characterisation & Precedent Study (November 2011) "(PRCPS)";
- Conservation Management Plan for the Protection, Conservation and
- Preservation of Heritage Assets (November 2011);
- Liverpool Waters Indicative Masterplan (October 2011)

Received by the Local Planning Authority on the 8th & 16th December 2011 & October 2018.

3. The wording of condition 71:

No more than 27.24% (460,000sqm) of the entire total consented development floorspace set within the LWOPP shall be erected within Neighbourhoods A, B and C, and no development shall commence in Neighbourhoods D and E, until the Transport Assessment (November 2011) submitted and hereby approved with the application has been reviewed, updated and agreed by the Local Planning Authority in writing and identified measures have been secured to undertake the highway works and public transport enhancements identified as necessary within that updated Transport Assessment in a phased manner in relation to the development as a whole and in accordance with the Highway and Public Transport Enhancement Strategy referred to in Condition 19 and the monitoring and review and enhancement arrangements referred to in Schedule 3 of this permission.

4. The removal of condition 75 of the LW Outline Planning permission

5. The wording of Schedule 3:

The Highway & Public Transport Enhancement Strategy monitoring and review mechanisms referred to in Condition 10 and required in advance of any development in neighbourhoods D and E and anymore development floorspace greater than 27.2% (460,000sqm) of the entire total consented development floorspace within Neighbourhoods A, B and C (or 2021, whichever the earlier) shall identify the range, methodology, format and timetable of travel monitoring. The results of the monitoring shall be submitted annually to the Local Planning Authority commencing concurrently with submission to the Local Planning

Authority of the first Detailed Neighbourhood Masterplan for neighbourhood B, C D or E required by Condition 11.

6. **The wording of Schedule 5:**

- The Pontoon and Princes Jetty shall be provided in conjunction with the development plots set out in the approved Princes Dock Neighbourhood Masterplan (May 2018).
- Central Park shall be commenced at the same time as the start of any construction work to provide buildings in any of development Parcels 3a, 3b, 3c, 3d and 3f.
- Bath Gate will be commenced and completed in conjunction with plot A05 (Plaza 1821).

Where relevant, the strategy will refer to the above amendments.

1.6 Section 96a Amendment Application (April 2019)

An additional non-material amendment has been submitted to Liverpool City Council (application currently pending decision). The amendments include:

1. Liverpool Waters Parameter Plan Report (October 2018) to Liverpool Waters Parameter Plan Report (April 2019), where changes within the document include:
    - PP005 Development Plots
    - PP006 Building Heights
    - PP007 Access and Movement
    - Illustrative Masterplan
2. **The wording of Condition 3:**

The development hereby approved shall only be implemented in general conformity with the following submitted application documents (The Principal Application Documents):

- Updated Planning Application form (November 2011);
- Statement of Key Development Principles (November 2011);
- LW Parameter Plan Report (incorporating Parameter Plans) (April 2019)
- Design and Access Statement (November 2011);
- Building Characterisation & Precedent Study (November 2011) ("BCPS");
- Public Realm Characterisation & Precedent Study (November 2011) "(PRCPS)";
- Conservation Management Plan for the Protection, Conservation and

- Preservation of Heritage Assets (November 2011);
- Liverpool Waters Indicative Masterplan (October 2011)

Received by the Local Planning Authority on the 8th & 16th December 2011, October 2018 and April 2019.

1.7 Site and Scheme Description

1.7.1 Liverpool Waters

Liverpool Waters is a major project involving the regeneration of 60ha of redundant docks in the heart of the city of Liverpool on the eastern bank of the River Mersey. The development is over 2km in length; extending from Princes Dock in the south to Bramley Moore Dock in the north. Virtually the entire Liverpool Waters site comprises reclaimed land which was created to form docks commencing in the late 18th century. Over a third of the Liverpool Waters site consists of docks with open water. By the early 21st century all of the docks were redundant by virtue of the changing nature of the shipping industry.

The Liverpool Waters joint vision (Peel and Liverpool City Council) involves regenerating the historic dockland site to create a world-class, high-quality, mixed-use waterfront quarter in central Liverpool that will allow for substantial growth of the city's economy. The aspirational scheme will create a unique sense of place, taking advantage of the site's cultural heritage and integrating it with exciting and sustainable new development.

The principal proposed land uses at Liverpool Waters will be commercial offices and other business uses, residential development and tourism-related uses. More specifically this includes:

- Residential (about 9000 dwellings)
- Business space, mainly offices.
- Hotel and conference facilities.
- Buildings for assembly and leisure.
- Restaurants, cafes, pubs and wine bars.
- Comparison (non-food) shops serving local needs.
- Community institutions (clinics, health centres, nurseries, schools and places of worship).
- Offices and services in local shopping centres.
- Convenience (food) shops.
- Parking.
- A cruise-liner terminal and an energy centre.
- Servicing.

1.7.2 Central Docks

The Central Docks Neighbourhood will provide a new dynamic urban focus around public open space and the Leeds-Liverpool Canal extension. It is intended to be the business, entertainment and leisure fulcrum of the Liverpool Waters

scheme. There will be significant changes in the south of the neighbourhood including the new Isle of Man Ferry Terminal and cultural buildings. Central Docks is the location of the secondary tall buildings cluster and will also have a new public open space – Central Park. The plots identified for development within the masterplan for the Central Docks Neighbourhood are shown on Figure 1.1.

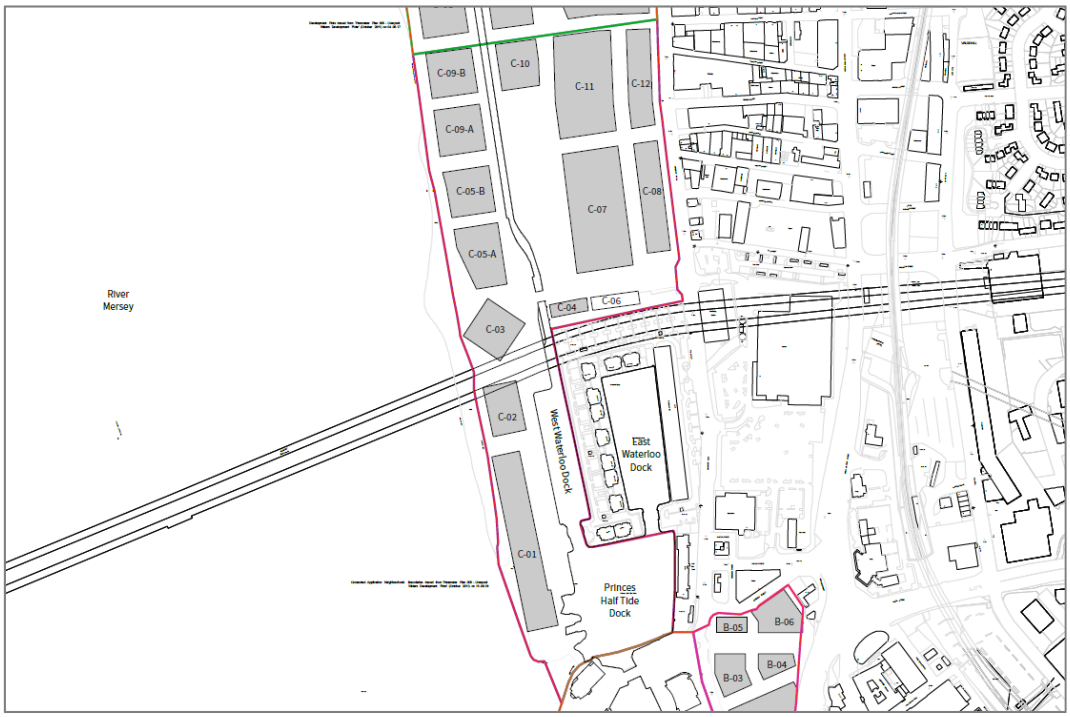

Figure 1.1: Central Docks Development Plots (C-01 to C-12). Image taken from Parameter Plan 005 Liverpool Waters Development Plots. Drg. No. 1868-VW-005 (Planit I.E. Limited, 2018).

Development within Central Docks (Neighbourhood C; Phase 2 of Liverpool Waters) is anticipated to take place over a period of 16 years between 2020 and 2036.[1] The amount of each proposed land use within the Central Docks Neighbourhood was designed to reflect firstly, the character and location of the neighbourhood, secondly the balance considered reasonable between the primary land uses (residential/business/tourism) and finally a reasonable balance of shops, services and other supporting land uses (Table 1.1).

Table 1.1: Proposed land uses at Central Docks.

Proposed Land Use	**Central Docks Neighbourhood**
Residential	2,900 units
Office/Business	165,900 m^2
Hotel/Conference	35,300 m^2
Assembly/Leisure	30,700 m^2
Restaurants/Cafes	11,900 m^2

[1] Planit I. E. Limited (2018) Parameter Plan 003 Liverpool Waters Phasing Plan. Drg No. 1868-VW-013.

Proposed Land Use	Central Docks Neighbourhood
Pubs/Bars	12,600 m^2
Local Shops – Non-food	8,700 m^2
Community	600 m^2
Local Services	2,600 m^2
Local Shops – Food	4,200 m^2
Parking	180,400 m^2
Servicing	17,500 m^2
Cruise Terminal/Other	16,600 m^2

1.8 Part C - Condition 16

Condition 16 of the Liverpool Waters Outline Consent (10O/2424) states that prior to the submission of the first application for any reserved matters approval in each respective neighbourhood, an Ecological & Biodiversity Strategy based on the Principal Application Documents and Detailed Neighbourhood Masterplan that relates to that particular neighbourhood and has regard to the wider application site shall be submitted to and approved in writing by the Local Planning Authority. The strategy shall summarise the means of safeguarding all protected species of relevance and supporting habitats during construction and operation within the respective neighbourhood including consideration of pathways to protected European sites.

Ove Arup & Partners Ltd. (Arup) have been commissioned by Peel Land and Property (Ports) to address Condition 16 by producing the Neighbourhood Ecological and Biodiversity Strategy (NEBS) for Neighbourhood C (Central Dock). Condition 16 consists of ten points which are addressed within the NEBS (Table 1.2).

Table 1.2: Relevant section of the NEBS which address the ten points of Condition 16 of the Liverpool Waters Outline Consent.

Condition 16		Relevant section within NEBS
i.	The means, method and timeframe for carrying out updated bird surveys and impact assessments for bats and migratory and/or over wintering birds.	2.1 to 2.5
ii.	The methodology and timeframe for carrying out (seasonal) monitoring of fish and other water species within the dock system.	2.6
iii.	Working practices to address phasing of construction, construction vehicles, routing and speed limits during removal of existing buildings, vegetation and other suitable breeding habitats.	4.1
iv.	Details of habitat creation.	5
v.	Design of buildings and spaces in terms of layout, design, materials and lighting to avoid creating barriers to bird migration	3.1

Condition 16		Relevant section within NEBS
	and aviation and reduce risk of bird strikes particularly in relation to tall buildings.	
vi.	Means and methodology for the monitoring and management of water quality within the dock system which shall inform mitigation to safeguard fish and other water species, including the aeration of dock water spaces.	2.7
vii.	Methods for controlling leisure boat activity within the dock system.	3.3
viii.	Methods for controlling gulls and pigeons roosting on buildings.	3.2
ix.	Mechanisms for monitoring and reviewing the effectiveness of agreed ecological and biodiversity mitigation against identified targets and means for enhancing mitigation where those targets are not met.	6
x.	Mechanisms to ensure protection of Sefton Coast SAC (Seaforth Docks to Formby Point) from recreational disturbance overseen by the Liverpool Waters Coordination Panel in accordance with Schedule 6 of this permission.	3.4

The NEBS will set out a strategy for the Central Docks Neighbourhood based on the results and mitigation measures included in the Liverpool Waters Environmental Statement (ES) produced for the Outline Consent (WYG, 2011a).[2] It was intended that the mitigation measures would apply to the overall Liverpool Waters development area and therefore are split across each of the neighbourhoods:

- Neighbourhood A – Princes Dock.
- Neighbourhood B – King Edward Triangle.
- Neighbourhood C – Central Docks.
- Neighbourhood D – Clarence Docks.
- Neighbourhood E – Northern Docks.

This Central Docks NEBS will therefore outline methodologies for carrying out updated surveys and the mitigation measures that should be included with the Neighbourhood. A NEBS has already been produced for Princes Dock (Neighbourhood A) (WYG, 2018).[3] This sets out measures for the Princes Dock Neighbourhood however for efficiencies and practicality, also includes measures (e.g. biennial passage/wintering bird surveys) which should be undertaken across the entire Liverpool Waters site as opposed to in isolation at the different neighbourhoods. The Central Docks NEBS therefore incorporates these measures to align with the Princes Dock NEBS, in addition to specific measures for Neighbourhood C. By adopting this joined up methodology there is an opportunity for a strategic approach to be adopted in which the mitigation measures and biodiversity enhancements for the Central Docks Neighbourhood

[2] WYG (2011a) Liverpool Waters Environmental Statement.
[3] WYG (2018) Princes Dock Condition 16 Neighbourhood Ecological and Biodiversity Strategy.

can be considered strategically in respect of ensuring maximum biodiversity benefits across the whole Liverpool Waters scheme.

Part D of the Outline Consent (details to be provided with reserved matters applications) includes Condition 34 – Ecological & Biodiversity Statement (EBS). This states that prior to the commencement of development within any neighbourhood, the approval in writing of the Local Planning Authority (LPA) must be obtained to a detailed EBS based on the NEBS explaining how the specific scheme in that neighbourhood or part neighbourhood will provide for the protection and enhancement of protected species and supporting habitats, including the provision of new and replacement habitats by means of the following:

i. provision of detailed and quantitative surveys to be able to assess in detail any potential impacts of the development upon bats and migratory and/or over-wintering birds;
ii. mitigation to safeguard fish and other water species;
iii. details of habitat creation;
iv. siting and design of replacement roosting sites within Nelson Dock for displaced winter water birds (specifically cormorants);
v. provision and management of new/compensatory habitats;
vi. the design of buildings and spaces based on the Detailed Neighbourhood Masterplan for the land;
vii. for development involving the Hydraulic Engine House, Victoria Clock Tower or the office and workshop buildings south of Collingwood Dock, detailed internal bat surveys;
viii. measures to control leisure boat activity and behaviour within the dock system to minimise disturbance of wildlife within the docks;
ix. measures to discourage gulls and pigeons from nesting/roosting on buildings; and
x. mitigation for any areas affected by invasive, non-native plants and noxious weeds.

The Central Docks NEBS will therefore outline the methodologies, measures and options to allow for the production of detailed plot-specific EBSs for each reserved matters application in order for Condition 34 of the outline consent to be discharged.

1.9 Liverpool Waters Sustainability Principles

Peel Land and Property (Ports) Ltd. (Peel L&P) support the United Nations Sustainable Development Goals (SDGs) and their vision is to encourage the creation of highly sustainable, future-proofed developments (Peel L&P, 2019).[4] Peel L&P have prioritised the four SDGs that are most relevant to their business activities:

- SDG 8 – decent work and economic growth.

[4] Peel Land & Property (Ports) Ltd. (2019). Sustainability 5 Year Business Plan.

- SDG 11 – sustainable cities and communities.
- SDG 12 – responsible consumption and production.
- SDG 15 – life on land.

Based on these SDGs, seven sustainability principles have been developed by Peel L&P. Three of these principles are considered most relevant to this NEBS:

- Principle 3: *Develop highly sustainable and smart built environments* – minimum standards will be BREEAM Very good for commercial buildings and Home Quality Mark for residential buildings. All building development shall achieve a BREEAM Communities rating of excellent.
- Principle 5: *Put more back into the natural environment than is taken out* – ensuring that the development delivers a net gain for biodiversity and natural capital, protects existing habitats and provides benefits for people and wildlife.
- Principle 6: *Support the health and wellbeing of communities by creating beautiful, functional and well-used green public realm* – green infrastructure will be used to cool the microclimate and benefit local air quality, biodiversity and water management as well as to provide character and connectivity for people throughout the neighbourhoods.

2 Update Surveys and Impact Assessments

2.1 Preliminary Ecological Appraisal

Due to the time elapsed between the original ecological surveys and production of the ES for Liverpool Waters, each plot-specific reserved matters application should include a Preliminary Ecological Appraisal (PEA). The PEA should identify key ecological constraints, design options, requirements for further surveys and mitigation measures within each plot. These should subsequently be detailed within the plot-specific EBS.

The PEA should be undertaken in accordance with CIEEM guidelines (CIEEM, 2017).[5] With regards to habitats and vegetation, a PEA should follow the Phase 1 Habitat survey guidelines as set out by the Joint Nature Conservation Committee (JNCC, 2010).[6] The PEA should also conform to the mandatory British Standard BS42020:2013 Biodiversity Code of Practice for Planning & Development.

2.2 Breeding Birds

Thirty-nine breeding bird species were recorded during the initial survey work completed in 2009 for the Liverpool Waters Outline Application.[7] Of these 39 species, 16 were considered to be holding territory on site and nine species were confirmed to have successfully bred within the site boundary. The key species recorded to be holding territory within Liverpool Waters were black redstart *Phoenicurus ochruros*, lapwing *Vanellus vanellus*, skylark *Alauda arvensis*, starling *Sturnus vulgaris*, linnet *Linaria cannabina*, mallard *Anas platyrhynchos*, ringed plover *Charadrius hiaticula*, and swallow *Hirundo rustica*. Species recorded within the Central Docks Neighbourhood in 2009 included lapwing, skylark, linnet and ringed plover. A singing male black redstart was recorded approximately 150m to the north east of Central Docks. Little ringed plover *Charadrius dubius* were not recorded during the breeding bird surveys undertaken in 2009; however they had previously been recorded breeding within the Liverpool Waters site and the habitat remains suitable.

Species specific breeding bird surveys should therefore be undertaken in the Central Docks Neighbourhood. The focus of the surveys should be on Schedule 1 species which are considered to be likely breeding on site. It will be possible to assess all breeding species on site (including those listed above) by undertaking five visits (mid-April – end of June) following the Common Bird Census methodology. In addition to recording the Schedule 1 species, this method would also record species such as skylark, lapwing, linnet, ringed plover and meadow pipit *Anthus pratensis*. For efficiency, and in line with a strategic approach,

[5] CIEEM (2017). Guidelines for Preliminary Ecological Appraisal, 2nd edition. Winchester: Chartered Institute of Ecology and Environmental Management.
[6] JNCC (2010). Handbook for Phase 1 Habitat survey - a technique for environmental audit. Peterborough: Joint Nature Conservancy Council.
[7] WYG (2009). *Liverpool Waters Breeding Bird Survey Report*. Appendix 7.6 of the Liverpool Waters ES (2011).

surveys for breeding bird species should be undertaken across the entire Liverpool Waters site, thereby providing data for applications within all neighbourhoods.

2.2.1 Little Ringed Plover

Annual surveys should be undertaken in the year prior to construction and during the subsequent four years of development at the Central Docks Neighbourhood. The surveys will look to identify whether little ringed plover *Charadrius dubius,* have colonised the vacant plots for nesting and foraging. Ringed plover have previously been recorded breeding within the site; the surveys for little ringed plover should therefore also target ringed plover. The survey data should inform the construction mitigation strategies of the development in Central Docks with the aim of preventing disturbance to little ringed plover and ringed plover nest sites.

The surveys should be undertaken by a suitably qualified ecologist and follow the methodology described below. Following the first five years of monitoring, the requirement for continued breeding plover surveys should be reviewed. If appropriate, the frequency of surveys should be reduced to biennial surveys throughout the development of the Liverpool Waters site.

Methodology

The methodology for the little ringed plover survey should be based on the 2007 British Trust for Ornithology (BTO) Breeding Plover Survey (Burton & Conway, 2008).[8] The survey should comprise a transect survey along a pre-defined route around the Central Docks Neighbourhood. The survey should be undertaken between 08:30 and 18:00 and note any little ringed plover (and ringed plover) heard singing, calling, and those identified visually. In addition, any nests observed should be recorded to estimate the number of breeding pairs. Three survey visits should be undertaken between 15 April and 15 July. To reduce bias on the survey data, the transect route should be walked in the alternative direction for each survey. Appropriate field maps should be annotated to show the location of any little ringed plover that are heard or seen; the standard two letter BTO species and activity codes should be used on all surveys (BTO, 2019).[9]

Timing/Weather Conditions

- The survey should consist of at least three visits with one visit between 15 April to 15 May, one visit between 15 May to 15 June, and the third visit between 15 June and 15 July.
- Surveys should be undertaken between 08:30 and 18:00 and last for the duration of time it takes to comprehensively complete the transect route.
- Surveys will avoid poor weather.

[8] Burton, N. H. K. and Conway, G. J. (2008). *Assessing population of breeding ringed plovers in the UK between 1984 and 2007.* Report to the Joint Nature Conservation Committee. BTO Research Report No. 503. Thetford: British Trust for Ornithology (BTO).
[9] BTO (2019). Standard naming and coding of species and subspecies regularly found in Britain and Ireland. Available at https://www.bto.org/about-birds/birdfacts/british-list

Impact Assessment

A breeding plover impact assessment should be undertaken for each new reserved matters application in the Central Dock Neighbourhood, using data collected on the surveys. The impact assessment should be included in the plot specific EBS for submission to the LPA.

The breeding plover impact assessment should follow the same assessment methodology prescribed in the Liverpool Waters ES,[2] and should cover remediation, construction and operational phases of the development. Should the assessment identify that significant impacts on little ringed plover are likely for a particular development, appropriate mitigation measures should be identified. Mitigation measures may include the incorporation of working windows or buffer zones to restrict the impact of potentially disturbing activities on little ringed plover (and ringed plover). In addition, there may be a requirement to provide alternative nesting habitat, where possible.

2.2.2 Black Redstart

As per the NEBS for Princes Dock, annual surveys for black redstart, should be undertaken in the year prior to construction and during the subsequent four years of development at the Central Docks Neighbourhood. The surveys should set out to identify whether black redstart have colonised the existing buildings and/or are using any of the vacant plots for foraging. The survey data should inform the construction mitigation strategies for the new buildings with the aim of preventing disturbance to new black redstart nest sites. The surveys should be undertaken by a suitably qualified ecologist. The methodology for undertaking the survey should closely follow that outlined in Bird Monitoring Methods (Gilbert *et al*., 1998);[10] this may need to be modified slightly to ensure it is site specific. Following the first five years of monitoring, the requirement for continued black redstart surveys should be reviewed. If appropriate, the frequency of surveys should be reduced to biennial surveys throughout the development of the Liverpool Waters site.

Methodology

As identified in the NEBS for Princes Dock, the survey should comprise a transect survey along a pre-defined route around the Central Docks Neighbourhood. Surveys should be undertaken at dawn, and will note any black redstart heard singing, calling, and those identified visually. Five survey visits should be undertaken between mid-April and the end of June. To reduce the bias on the survey data, the transect route should be walked in the alternative direction for each survey. Appropriate field maps should be annotated to show the location of any black redstart that are heard or seen; the standard two letter BTO species and activity codes should be used on all surveys.[9]

[10] Gilbert, G., Gibbons, D. W., and Evans, J. (1998). *Bird Monitoring Methods – a Manual of Techniques for Key UK Species*. RSPB.

Timing/Weather Conditions

- The surveys should consist of a least five fortnightly visits from mid-April to the end of June.
- Surveys should commence early morning (in the hours after sunrise) and last for the duration of time it takes to comprehensively complete the transect route.
- Surveys will avoid cold, wet and windy conditions.

Impact Assessment

As per the NEBS for Princes Dock,[3] a black redstart impact assessment should be undertaken for each new reserved matters application in the Central Docks Neighbourhood, using data collected on the surveys. The impact assessment should be included in the plot-specific EBS for submission to the LPA.

In line with the NEBS for Princes Dock, the black redstart impact assessment should follow the same assessment methodology as set out in the Liverpool Waters ES,[2] and should cover remediation, construction and operational phases of the development. Should the assessment identify that significant impacts on black redstart are likely for a particular development, appropriate mitigation measures should be identified. Mitigation measures may include the incorporation of working windows or buffer zones to restrict the impact of potentially disturbing activities on black redstart. In addition, there may be a requirement to provide alternative nesting habitat.

2.3 Passage/Wintering Birds

2.3.1 Wintering Bird Surveys

Wintering bird surveys should be undertaken in the year prior to construction and during the subsequent four years of development within the Central Docks Neighbourhood; this data will highlight if there is a need to revise mitigation strategies in relation to disturbance of wintering bird roosts. For efficiency and in line with a strategic approach, surveys for passage/wintering species should be undertaken across the entire Liverpool Waters site, thereby providing data for applications within all neighbourhoods. The surveys should be undertaken by suitably qualified ecologists following the methodology described below.

Following the first five years of monitoring, the requirement for continued annual wintering bird and passage surveys should be reviewed; a decision as to the required survey effort should be made based on the results. If appropriate, wintering and passage bird surveys should be reduced to biennial; data from biennial surveys should inform reserved matters application in the docks that are yet to be developed. Based on the review, fully developed neighbourhoods may be excluded from future survey efforts; therefore, reducing the scope of surveys as the neighbourhoods are developed.

Methodology

The survey methodology proposed is based on the BTO's Wetland Bird Survey (WeBS) (BTO, 2017[11]) however utilises a transect rather than dividing the site into blocks. Surveys should consist of a transect with predefined vantage points in each waterfront neighbourhood. The transects should be undertaken by two suitably qualified ecologists. Appropriate field maps should be annotated to show the bird species, high band, flight line and direction; the standard two letter BTO species and activity codes should be used on all surveys.

Target species for wintering bird and passage surveys should comprise waders, wildfowl, gulls & terns, cormorant, grey heron and raptors. All other species, including BoCC Red and Amber list passerines (song birds) should be recorded as incidental species. Surveys should be written up as a factual report; highlighting flight lines, key roosting locations, and any potential breeding activity of target species (early March onwards) within the Liverpool Waters scheme.

Timing/Weather Conditions

- High water surveys should be undertaken between September and March (inclusive) and comprise a minimum four-hour watch period per survey.
- In line with the NEBS produced for Princes Dock, high water surveys should be undertaken during the four hours preceding high tide.
- Low water surveys should be undertaken between September and March (inclusive) and comprise of a minimum four-hour period per survey.
- Low water surveys should be undertaken during the two hours preceding low water and two hours after.
- Surveys should be undertaken in a range of weather conditions, although times of restricted visibility and particularly harsh weather will be avoided.

Impact Assessment

The Liverpool Waters ES identified the presence of a small roost for oystercatcher *Haematopus ostralegus*, and redshank *Tringa totanus*, in Waterloo Dock.[2] Redshank and oystercatcher are components of the water bird assemblage (non-breeding) of the Mersey Narrows and North Wirral Foreshore Special Protection Area (SPA). The potential loss of this roost should be assessed in the context of the European site to determine whether this would result in a likely significant impact.

In line with the NEBS for Princes Dock, an impact assessment for water birds should be undertaken for each new reserved matters application in the Central Dock Neighbourhood, using data collected on the surveys. The impact assessment should be included in the plot specific EBS for submission to the LPA.

In accordance with the NEBS for Princes Dock, the water bird impact assessment should cover remediation, construction and operational phases of the development. It should follow the same assessment methodology as set out in the

[11] BTO (2017). *Wetland Bird Survey – Survey Methods, Analysis & Interpretation*. Thetford: BTO.

Liverpool Waters Ecology and Nature Conservation ES chapter and should include a Habitats Regulations Assessment (HRA) of Likely Significant Effect (LSE) for each of the Natura 2000 sites that may be affected by the development. Assessments should include all of the following sites, in addition to any proposed, new or extensions to current sites which may be designated subsequently:

- Liverpool Bay SPA;
- The Mersey Narrows and North Wirral Foreshore SPA/Ramsar;
- Mersey Estuary SPA/Ramsar;
- Ribble & Alt Estuaries SPA/Ramsar;
- Sefton Coast Special Area of Conservation (SAC);
- The Dee Estuary Ramsar;
- Dee Estuary SPA;
- Dee Estuary SAC; and
- Martin Mere SPA and Ramsar.

As with the NEBS for Princes Dock, the impact assessment should reference the most recent surveys, the baseline bird report for Liverpool Waters, the subsequent monthly update reports produced by WYG between October 2013 and April 2014, and the TEP assessment of the docks for qualifying features of Natura 2000 sites (TEP, 2015).[12] Impact assessments should also utilise any additional data and evidence available from standalone applications. Should the assessment identify that significant impacts on water birds are likely for a particular development, appropriate mitigation measures should be identified. Mitigation measures may include the incorporation of working windows or buffer zones to restrict the impact of potentially disturbing activities on water birds. In addition, there may be a requirement to provide alternative roosting habitat. Any mitigation proposed should be in accordance with the Liverpool Waters Strategic Ecological Mitigation Plan (SEMP) which is currently being developed at the time of writing this NEBS.[13]

2.4 Foraging Common Tern

2.4.1 Common Tern Survey

Surveys for foraging common tern *Sterna hirundo,* should take place in the Central Docks Neighbourhood in the year prior to construction and during the subsequent four years following development of the neighbourhood. The surveys should be undertaken by a suitably qualified ecologist and should follow the methodology described below. Following the first five years of monitoring, the requirement for continued surveys should be reviewed on the basis of the survey results and, if appropriate, the frequency of the surveys reduced.

[12] TEP (2015). Assessment of Supporting Habitat (Docks) for Use by Qualifying Features of Natura 2000 Sites in the Liverpool City Region. Available at http://www.meas.org.uk/media/5279/4157005-assessment-of-supporting-habitat-liverpool-docks-excl-drawings-aug-2015.pdf

[13] Arup (2019) Liverpool Waters Strategic Ecological Mitigation Plan – Interim Note.

Methodology

There is no standard methodology available for foraging common tern within Bird Monitoring Methods.[10] Similar to the Princes Dock NEBS,[3] the following shore-based survey approach is proposed to assess foraging common tern. This approach was outlined in Parson *et al.* (2015)[14] and was designed for little tern *Sternula albifrons*. Surveys for common tern foraging should be carried out by four surveyors, one located in each of the waterfront neighbourhoods. Surveys should be carried out from a vantage point which allows observation of the docks and coastal strip along the Mersey. Appropriate field maps should be annotated to show the flight lines of observed common terns, including their height, direction and foraging activity. The survey should also record breeding behaviour as observed.

Survey results should be written up as a factual report, highlighting flight lines, key foraging locations and any breeding locations for common tern within the Liverpool Waters Scheme and adjacent coastal strip.

Timing/Weather Conditions

- A total of 30 hours of survey effort should be completed between April and August (inclusive).
- Survey effort should be evenly spread across the five-month survey period and comprise approximately two-hour watches, with three watches completed in each month.
- The surveys should be undertaken under a variety of tidal states and times of day to reduce sampling bias.
- The surveys should be undertaken in a range of weather conditions, although times of restricted visibility and particularly harsh weather will be avoided.

Impact Assessment

An impact assessment for common tern should be undertaken for each new reserved matters application in the Central Dock Neighbourhood; the reserved matters applications should incorporate the data recorded within the surveys and any other data collected from standalone applications. The impact assessment should be included in the plot specific EBS for submission to the LPA.

The impact assessment for common tern should cover remediation, construction and operational phases of the development and should include a HRA for Liverpool Bay SPA and Mersey Narrows and North Wirral Foreshore SPA. Impact assessments should reference the baseline reports for Liverpool Waters, in addition to the monthly update reports produced by WYG between October 2013 and April 2014. The impact assessments should also reference the TEP study

[14] Parsons, M., Lawson, J., Lewis, M., Lawrence, R. & Kuepfer, A. (2015). Quantifying foraging areas of little tern around its breeding colony SPA during chick-rearing – JNCC Report No. 548. Available at http://jncc.defra.gov.uk/pdf/Report_548_web.pdf

assessment of supporting Habitat (Docks) for Use by Qualifying Features of Natura 2000 Sites in the Liverpool City Region.[12]

2.5 Bats

Bat activity transect surveys were undertaken at Liverpool Waters by WYG in 2009.[15] Observed levels of bat activity were considered to be low with only 1-2 common pipistrelle bats recorded during each of the three visits undertaken. No bats were recorded within Central Docks and no buildings within Central Docks were recorded to have suitability for roosting bats. The waterfront dock basins were noted to be particularly exposed to the prevailing winds along the River Mersey and the habitats sparse of vegetation. It was concluded that the habitat was of poor suitability for foraging bats.

2.5.1 Preliminary Bat Roost Assessment

Very few buildings remain within Central Docks however there are some industrial units located to the west of Waterloo Road (approximate grid reference SJ33609151). Where a reserved matters application proposes demolition of any existing structures, a bat roost suitability assessment should be undertaken to determine presence/likely absence of roosting bats and to assess the potential of the structure to be used for roosting. This should be carried out by a suitably qualified ecologist in line with current guidance (Collins, 2016).[16] Structures should be searched for signs of bat presence including:

- bat droppings;
- scratch and grease marks;
- live or dead bats; and
- noises of bats calling from within the roost.

In addition, features searched for on structures should include:

- missing mortar; and
- any cracks or gaps at least 10mm in size.

Following this inspection, the structure should be assigned a level of suitability to support roosting bats at different times of year: high, moderate, low or negligible. If the structure is identified to have suitability for roosting bats, further surveys may be required.

Timing/Weather Conditions

Bat roost suitability assessments may be undertaken at any time of year under any weather conditions, providing the weather conditions do not affect the ecologist's

[15] WYG (2009). *Liverpool Waters Bat Survey Report*. Appendix 7.5 of the Liverpool Waters ES (2011).
[16] Collins, J. (ed) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust: London.

ability to carry out the survey effectively and safely e.g. not during heavy rain or high winds.

2.5.2 Bat Activity Surveys

Structures confirmed as roosts during the preliminary bat roost assessment, or those assessed as having low, moderate or high bat roost suitability may require further activity surveys to determine the presence/likely absence of bats and characterise roosts (identify species, numbers, access points, timing of use etc.). Surveys should take the form of dusk emergence/dawn re-entry surveys and should be undertaken following current guidance.[16]

Dusk emergence/dawn re-entry surveys involve ecologists visiting at dusk or dawn to listen/record and watch for bats emerging or returning to roosts. The number and timing of visits required depends on the suitability of the structure being surveyed:

- Confirmed/High – three separate survey visits required between May and September with at least two visits in May to August. At least one dusk emergence and one dawn re-entry survey, the third visit may be either dusk or dawn.
- Moderate – two separate surveys (one dusk emergence and one dawn re-entry) required between May and September with at least two visits in May to August.
- Low – One dusk emergence or dawn re-entry survey required between May and August.

Timing/Weather Conditions

Surveys should be taken between May and August/September (see above). The sunset temperature must be above 10°C and no rain or strong winds.

2.5.3 Bat Impact Assessment

Any reserved matters applications which affect structures with potential to be used by roosting bats should include an impact assessment within the plot-specific Ecological and Biodiversity Statement. If any significant impacts during remediation, construction or operation are considered likely, then appropriate mitigation should be identified. This may include application for a bat mitigation licence from Natural England if any roosts and to be disturbed or destroyed.

2.6 Aquatic Species

Surveys for aquatic species were not undertaken within the dock system as part of the survey work undertaken to inform the ES (WYG, 2011).[2] As stated in the Princes Dock NEBS,[3] an initial baseline assessment should therefore be undertaken within the Central Dock system prior to the start of construction. An ongoing programme of monitoring should then be undertaken annually throughout

the development. The surveys should follow the same methodology as included within the Princes Dock NEBS (Table 2.1).

Table 2.1: Methodology for carrying out monitoring of fish and other water species within the dock system.

Survey	Methodology
Baseline	
Phytoplankton survey	Appropriate UKAS accredited methodology.
Fish survey – hydroacoustic and netting	Duncan, A. and Kubecka, J. (1993). *Hydroacoustic methods of fish surveys*. National Rivers Authority R&D Note 196. Fyke net surveys.
Benthic macroinvertebrate survey of dock floor	Samples to be collected using a suitable grab. Samples to be taken from Princes Half Tide Dock, West Waterloo Dock, and the linear waterway to the north of West Waterloo Dock. Minimum of 18 sampling sites. Also, baited traps to be used at a minimum of nine locations to quantitatively sample mobile species. Samples to be processed following Worsfold & Hall (2010).[17]
Benthic invertebrate survey of dock walls	Wall scrape samples to be taken following Worsfold (1998).[18]
Monitoring	
Annual surveys to monitor benthic invertebrates, algae, phytoplankton and zooplankton species.	As above for baseline surveys, unless subsequent improvement to accepted methodologies during development lifespan.
Annual fish survey if low fish population is identified during baseline to monitor improvements. Otherwise no further monitoring except in exceptional circumstances e.g. pollution incident.	As above for baseline surveys, unless subsequent improvement to accepted methodologies during development lifespan.

2.6.1 Invasive Non-Native Species

Marine Invasive Non-Native Species (INNS) such as the tunicate *Styela clava*, are known to be present within the docks in Liverpool (Davis et al., 2007).[19] There is high potential for other marine non-native species to be present in the docks, spread both by natural vectors or via vessels and their ballast/bilge water. If any INNS are recorded within Central Docks during the initial baseline or any subsequent monitoring, an appropriate method statement or management plan

[17] Worsfold, T.M. & Hall, D.J. (2010) *Guidelines for processing marine microbenthic invertebrate samples: a Processing Requirements Protocol: Version 1.0, June 2010.* Unicomarine Report. Available at http://www.nmbaqcs.org/media/1175/nmbaqc-inv-prp-v10-june2010.pdf
[18] Worsfold, T.M. (1998). *Sampling of cryptofauna from natural turfs (flora or fauna) on hard substrata. Version 1 of 26 March 1998*. In: Biological monitoring of marine Special Areas of Conservation: a handbook of methods for detecting change. Part 2. Procedural guidelines, ed. By K. Hiscock. Peterborough: Joint Nature Conservation Committee.
[19] Davis, Martin H., Lützen, Jørgen and Davis, Mary E (2007). *The spread of Styela clava Herdman, 1882 (Tunicata, Ascidiacea) in European waters.* Aquatic Invasions (2007) Volume 2, Issue 4: 378-390

should be implemented during construction to avoid promoting the spread of these species. Method statements or management plans should also be considered in relation to operational requirements, for example should there be a change in usage or activities within Central Docks waters post-development.

2.7 Water Quality

2.7.1 Monitoring

Part vi. Of Condition 16 requires details of the means and methodology for the monitoring and management of water quality within the dock system. This should inform mitigation to safeguard fish and other water species, including the aeration of dock water spaces. The surveys should follow the same methodology as included within the Princes Dock NEBS (Table 2.1).

An initial baseline characterisation survey of the dock system should be undertaken prior to the start of construction. This should include:

- Water quality sampling at several locations within Princes Half Tide Dock, West Waterloo Dock and the waterway to the north of West Waterloo Dock. Parameters to include dissolved oxygen, pH, conductivity, salinity, biochemical oxygen demand, ammonia, nutrients, heavy metals and organics likely to include poly-aromatic hydrocarbons and TBT.
- Sediment quality sampling for sediment oxygen demand, metals, pH and redox potential.
- Bathymetric survey for sediment depth.

An ongoing monitoring programme should be implemented during construction to monitor the above parameters including biochemical oxygen demand, ammonia and nutrients. This should be completed monthly in the first instance however the frequency may reduce over time, depending on the results.

Reports on water quality monitoring should be provided to the Environment Agency, MEAS and The Canal & River Trust. The Principal Contractor should rectify any issues identified during monitoring and implement measures to prevent further impacts arising.

2.7.2 Management Plan

As included in the NEBS for Princes Dock (WYG, 2018[3]), an appropriate water quality management plan should be developed and implemented by the Principal Contractor during the development of Central Docks. This should be produced following the results of the initial baseline assessment and will likely include measures such drainage system investigation to identify pollution risk and/or aeration of dock spaces.

3 Mitigation Through Scheme Design

3.1 Bird Strike Mitigation

Central Docks is the location of the secondary tall buildings cluster with five high-rise (>45m) buildings to be developed. Despite this, previous surveys within Liverpool Waters have found that the majority of birds follow either the River Mersey or the dock system rather than the land which has been allocated for development.[12,20] Nevertheless, the development of the tall buildings cluster within Central Docks has the potential to increase the risk of bird strike.

Measures to reduce the risk of bird strike should be designed into all tall buildings within Central Docks, particularly those with large areas of reflective glass on the northern and southern aspects. This should incorporate day and night time mitigation measures and should be incorporated into the plot-specific EBS required for each reserved matters application under Part D, Condition 34 of the Liverpool Waters outline consent. As is included in the Princes Dock NEBS (WYG, 2018[3]), all reserved matters applications for buildings over five storeys high, or where there are low existing light levels, should consider the requirement for a lighting plan. The design of any ancillary structures of high-risk buildings should also consider the requirement of similar mitigation.

Potential mitigation measures to reduce bird strike which may be included at Central Docks include (US Fish and Wildlife Service, 2016[21]):

- Reducing strikes with glass:
    - Patterning
    - Fritting
    - UV Patterned Glass
    - Screens
    - Netting (mesh size <1.3cm)
    - Architectural features e.g. overhangs, awnings and louvres
- Lighting plan to reduce lighting during bird migration periods (mid-August to mid-November and March to mid-May):
    - Avoid unnecessary lighting including perimeter lighting.
    - Operating lights to be designed so that light levels (brightness) are as low as possible.

[20] Vantage point surveys undertaken by WYG in 2009/2010, 2013/2014.
[21] US Fish and Wildlife Service (2016). *Reducing bird collisions with buildings and building glass best practices*. Falls Church, Virginia: Division of Migratory Bird Management. Available at https://www.fws.gov/migratorybirds/pdf/management/reducingbirdcollisionswithbuildings.pdf

  - Consider use of motion sensors in public areas (where health & safety considerations allow).
  - No upward lighting – lights to be fitted with hoods or louvres to avoid lighting skywards.
  - Height of lighting columns to be reduced/limited to reduce spillage.
  - Building occupants to be made aware of measures to reduce risk of bird strike e.g. use of shades/blinds and turning off lights when not in use.

- Landscaping design should:
  - avoid creating linear features which may funnel birds towards glass features;
  - consider pedestrian and vehicle approaches to buildings to avoid potential for flushing of birds e.g. from trees or shrubs towards glass buildings; and
  - avoid placement of interior planting in close proximity to windows to avoid creating the impression of continuing vegetation.

3.2 Control of Gulls and Pigeons

All buildings within the Central Docks Neighbourhood should incorporate measures to dissuade nesting and roosting of gulls and feral pigeons, appropriate to the design and function of the building. Each reserved matters application should include details of consideration with designed-in measures to be prioritised over additional measures such as spikes, wires or netting. Applicants should consider the implications of installing such measures in also reducing the availability of habitat for other key bird species including cormorant *Phalacrocorax carbo*. Any measures installed must also have regard to appropriate licensing requirements in respect to the protection of breeding birds under the Wildlife and Countryside Act 1981 (as amended).

Suitable designed-in measures include:

- Minimise flat roofs or replace with pitched roofs (over 25 degrees).
- Where flat roofs are required consider incorporation of roof gardens so human disturbance may deter nesting. Additional dissuasion measures may be required in certain locations.
- Avoid interruptions in the roof plane, e.g. skylights, or utilise additional dissuasion measures.
- Avoid roof overhangs with ledges below or incorporate a minimum ledge slope of 45 degrees or additional dissuasion measures.

Additional dissuasion measures which may be considered include:

- Spikes – can be effective on ledges if spaced appropriately however if used on roofs requires complete covering and therefore there is an associated visual impact.
- Wires – may be aligned in parallel rows on flat roofs or ledges to dissuade roosting (ineffective against nesting). Preferable over netting as avoids snagging of other bird species and may be less visually intrusive).
- Netting – requires careful consideration due to potential negative visual impact; difficulty to correctly install and maintain; and potential for individuals to become snagged due to inappropriate mesh size.
- Effective management of litter and waste – avoid accumulations and consider nuisance bird species in design of street furniture, e.g. litter bins.

It is not recommended that measures such as plastic bird of prey decoys, noise emitting devices or wind-driven moving structures are utilised as they are less effective and may have a negative impact on local nesting species, in particular peregrine *Falco peregrinus*.

Additional mitigation measures may be required for priority bird species which will also be deterred by the methods outlined above. All reserved matters applications should consider appropriate inclusion of integrated roosting features for species such as cormorant.

3.3 Control of Leisure Boat Activity

Due to the location of the Central Docks Neighbourhood within close proximity to sites designated for significant water bird populations, the impact of increased boat traffic should be considered within the environmental assessment and Habitats Regulations Assessment accompanying each reserved matters application. The assessments should incorporate survey/monitoring data of SPA species in order to ensure the appropriateness of mitigation measures.

Boats currently access Princes Half Tide Dock, West Waterloo Dock and the waterway to the north of West Waterloo Dock via the Liverpool Canal Dock link. This is accessed from the north from the Liverpool to Bootle stretch of the canal via Stanley Dock.

Impacts from increased boat traffic will require appropriate mitigation to ensure impacts on SPA qualifying species utilising the docks (e.g. cormorant) are avoided. In addition increased boat traffic has the potential to undermine the effectiveness of mitigation measures such as floating pontoons.

Measures to limit boat activity may include restricting traffic in certain seasons or to certain times of the day or year. Additionally, the implementation of a lane or one-way system may help to control traffic.

3.4 Recreational Disturbance

Point x. of Condition 16 requires '*mechanisms to ensure protection of Sefton Coast SAC (Seaforth Docks to Formby Point) from recreational disturbance*

overseen by the Liverpool Waters Coordination Panel in accordance with Schedule 6 of this permission'.

It is proposed that 2,900 residential units will be created within the Central Docks Neighbourhood. There is the potential that residents may travel to Sefton Coast SAC (approximately 5.9km to the north), Ribble and Alt Estuaries SPA/Ramsar (approximately 5.3km to the north) and Mersey Narrows and North Wirral Foreshore SPA/Ramsar (0.9km to the west across the River Mersey) for recreational purposes. This may affect the designated sites either alone, or in-combination with other developments.

A public open space will be created within the Central Docks Neighbourhood – Central Park. It is envisaged that this will be used for recreation which may reduce visits to the European sites. Recreational disturbance effects at Sefton Coast SAC were screened out within the Liverpool Waters HRA (WYG, 2011b)[22] as *"the primary movements of end users will be contained within the footprint of the development and its immediate surrounds."* However, since the Liverpool Waters outline consent was granted, a number of statutory designations have changed (e.g. Mersey Narrows and North Wirral Foreshore SPA and Liverpool Bay SPA). There is also further evidence and understanding of the impacts of visitor pressure on the designated sites (Natural England, 2015).[23]

Recreational pressure, including vehicular access and dog-fouling, is recognised in the formal statutory European Site Conservation Advice Packages for Sefton Coast SAC (Natural England, 2019[24]) which can be assessed as a Medium-High risk to qualifying features of the European site. Recreational pressure is also highlighted in the draft Liverpool Local Plans HRA as a Likely Significant Effect (LSE) (AECOM, 2017).[25] Public access/disturbance is confirmed as an issue in the Site Improvement Plans for Ribble and Alt Estuaries SPA, Sefton Coast SAC and Mersey Narrows and North Wirral Foreshore SPA.

All reserved matters applications for plots within Central Docks should include consideration of recreational pressure within HRA for Sefton Coast SAC, Ribble and Alt Estuaries SPA, Mersey Narrows and North Wirral Foreshore SPA. All future applications should ensure that they provide sufficient information to satisfy further tests of the Habitat Regulations (as required).

All developments should include a commitment to adhering to the objectives of the Visitor Management Strategy (VMS) which is currently being considered to provide a strategic approach to mitigation across the Liverpool City Region (LCR). The Liverpool City Region has commissioned a wider strategic approach to visitor and recreation pressure management; this is to be referred to as the 'Liverpool City Region European Sites Recreational Mitigation and Avoidance

[22] WYG (2011b). Liverpool Waters Habitats Regulations Assessment Screening Report for Proposed Liverpool Waters Scheme. Liverpool: WYG.
[23] Natural England (2015). *Mersey Narrows and North Wirral Foreshore Sites of Special Scientific Interest - Investigation into the impacts of Recreational Disturbance on Bird Declines*. Natural England Commissioned Report NECR201.
[24] Natural England (2019). *European Site Conservation Objectives: Draft Supplementary advice on conserving and restoring site features. Sefton Coast Special Area of Conservation (SAC) Site Code: UK0013076.* York: Natural England.
[25] AECOM (2017). *Liverpool Local Plan Habitats Regulations Assessment*. Liverpool: AECOM.

Strategy'. This work may help inform the delivery of visitor and recreation mitigation to protect European Sites within the City Region. This work is currently ongoing and no firm proposals have been proposed or agreed.

As stated in the NEBS for Princes Dock (WYG, 2018), reserved matters applications which come forward prior to the adoption of the LCR Mitigation and Avoidance Strategy should consider how recreational pressure will be assessed (and potentially mitigated for) as a result of the development. Condition 34 of Part D of the outline consent will ensure that the developer provides sufficient information to assess potential impacts through further surveys and HRA. More certainty over what mitigation (if any) would be required will be able to be provided at this stage. Applicants should include additional mitigation/preventative measures capable of being incorporated into the proposals and/or scheme design that will avoid and/or mitigate recreational pressures on the European sites and any functionally linked habitat. There should be a clear distinction within the reserved matters application documents (e.g. EBS) between those parts of the development which are essential features/characteristics, and those which are proposed as mitigation/preventative measures designed to protect European sites.

Examples of mitigation/preventative measures that may be included (as appropriate to the development of plots):

xi. Design and management of additional public open space outside the proposed development boundary to encourage use away from the European sites (e.g. Central Park).

xii. Restrictions on the number of apartments allowed to keep dogs.

xiii. Provision of information in sales packs, informing residents of the presence and importance of the European sites, and how they can help protect them including an outline 'responsible user code.'

xiv. Contributions to develop a visitor/householder 'responsible coast user code' including encouragement of visits to non-sensitive locations.

xv. Contributions to improving and/or managing access to and/or within the internationally important nature sites including financial contributions.

xvi. Contributions to increase recreation management including location-specific interventions e.g. wardening, signage, path management and habitat management, including financial contributions.

xvii. Contributions to non-sensitive locations in order improve sites to provide greater visitor enjoyment in order to reduce visits to European sites.

Any mitigation proposed should be in accordance with the Liverpool Waters SEMP.[26]

[26] Arup (2019) Liverpool Waters Strategic Ecological Mitigation Plan – Interim Note.

4 Construction Phase Mitigation

4.1 Construction Working Practices

4.1.1 Removal of Existing Buildings and Vegetation

The existing buildings, structures, hardstanding and ephemeral vegetation within the Central Docks Neighbourhood offer suitable nesting habitat for birds. Consequently, projects should demonstrate that breeding birds have been considered in their planning application. To limit disturbance to nesting birds, it is recommended that intrusive works such as vegetation clearance and demolition works are undertaken outside of the bird nesting season (March-August), where possible.

Where it is not possible to undertake intrusive works outside of the nesting season, a suitably qualified Ecological Clerk of Works (ECoW) should undertake a nesting bird check prior to the commencement of works on site. Should an active nest be identified, the ECoW should advise on a suitable species-specific working method and exclusion zone to limit disturbance and avoid damaging nests. The recommended working method may vary depending on the species and the nature of planned works.

4.1.2 Construction Vehicles, Routes and Speed Limits

As a precautionary measure, construction should be undertaken outside of the bird nesting season (March – August inclusive). Where this is not possible, an ECoW will be required to undertake a nesting bird check to ensure nests will not be damaged as vehicles move across the site. As per the NEBS for Princes Dock, vehicle routes and speed limits may need to account for nests.[3] The EcOW should advise the appropriate distance for vehicle traffic to keep from nests.

Wintering bird surveys were undertaken across the entire Liverpool Waters site during the 2018-2019 season (October to March). The reporting of the surveys was not yet published at the time of writing this NEBS, however cormorant, shelduck *Tadorna tadorna*, ringed plover *Charadrius hiaticula*, and oystercatcher have been recorded on site, among other common species. The numbers of cormorant recorded on site is considered to represent a significant proportion of the SPA population (i.e. >1%). Construction vehicle routes and speed limits should therefore be developed based on the data collected during the 2018/2019 surveys along with data collected previously across Liverpool Waters and for standalone applications. Any mitigation should be outlined in detail in the Construction Environmental Management Plan (CEMP) for the individual reserved matters through Condition 39 of the Liverpool Waters outline consent. Any mitigation proposed should be in accordance with the Liverpool Waters SEMP.[26]

The Liverpool Waters ES identified the presence of a small roost for oystercatcher and redshank in West Waterloo Dock. A restricted speed limit should therefore be stipulated for construction vehicles moving around this dock and should be

included within the CEMP. The ECoW may also recommend a speed limit during the nesting bird season (March – August inclusive).

4.1.3 Protection of Roost Sites of Wintering/Passage Birds

In 2011, WYG identified no significant aggregations of water birds associated with the Central Docks Neighbourhood; although, surveys by Arup in the 2018/2019 wintering season, have recorded SPA qualifying species such as cormorant on site.

Consequently, any developments in the Central Docks Neighbourhood, and elsewhere in the Liverpool Waters Scheme, which have the potential to result in increased water bird disturbance should consider, within its supporting environmental assessment and associated HRA, the impact of disturbance on features of all designated sites.

Disturbance pathways through the development of plots within the Central Docks Neighbourhood are likely to be associated with increased noise and visual effects and disturbance to available habitat for roosting and foraging. Impacts resulting from disturbance and interruption of flight paths and shading from buildings should also be considered. Mitigation should be identified through the updated impact assessment and/or the HRA. Any mitigation deemed necessary should be in accordance with the Liverpool Waters SEMP.[26] It should be outlined in detail in the CEMP for the individual reserved matters through Condition 39 of the Liverpool Waters outline consent.

Noise Disturbance Mitigation

Individual developments in the Central Docks Neighbourhood will require piling; this activity has the potential to extend the noise disturbance outside of the Central Docks Neighbourhood and may have potential effects on water birds using other docks within the vicinity. Therefore, effects on water bird roosting and foraging will be extended outside of the Central Docks Neighbourhood and will cover the entirety of the Liverpool Waters Scheme. For each development where piling is required, mitigation should be identified and implemented where appropriate. Any mitigation proposed should be in accordance Liverpool Waters SEMP.[26]

Noise disturbance mitigation measures should be included within the CEMP to reduce the effect of noise disturbance on birds. For Central Docks, these may include the following:

- Adherence to the guidelines set out in The Code of Practice for Noise and Vibration Control on Construction and Open Sites, 2009 and subsequent updates.
- The use of rotary piling method.
- Selection of quietest working equipment available.
- Positioning equipment behind physical carriers, i.e. temporary hoarding.
- Provision of lined and sealed acoustic covers for noisy equipment.
- Directing noise emissions away from plant, including exhausts or engines away from sensitive locations.

- Ensuring that regularly maintained and appropriately silenced equipment is used.
- Maintaining a no idling policy.

It is therefore recommended that the above guidance is followed for each development requiring piling; however, a noise impact assessment should still be undertaken for reserved matters applications through Condition 47 of the Liverpool Waters outline consent to determine whether additional mitigation, such as restrictions on the time of year i.e. a working window, is required.

An in-combination assessment should be undertaken within any HRA coming forward for reserved matters applications. This should consider the impacts of noise disturbance (amongst other impacts) from additional developments within the site, therefore looking at the cumulative and in-combination impacts, which may require additional or adapted mitigation.

Visual Disturbance Mitigation

Developments around West Waterloo Dock and Princes Half Tide Dock will require screening in relation to water birds. In both docks, screening should only be placed at ground level, this will block sight lines to the busiest area of the construction sites (i.e. where most operative and vehicle movements are likely to be concentrated). The developments should also be screened to prevent windblown litter entering the docks.

5 Habitat Creation

5.1 Bird Nesting/Roosting Features and Foraging Habitat

In accordance with the Sustainability Principles described in Section 1.9, developments should be striving towards biodiversity enhancement and net gain. Wherever possible, any opportunity to develop ecological connectivity within the neighbourhood and the wider Liverpool Waters scheme should be considered. To enhance the ecological value of the Central Docks Neighbourhood, buildings within the neighbourhood should incorporate features for the following bird species.

5.1.1 Black Redstart

During the breeding bird surveys undertaken in 2009 one singing black redstart was recorded singing south of Stanley Dock (WYG, 2009).[27] In 2015 and 2016, WYG undertook peregrine surveys close to Stanley Dock (north of Central Docks) and also recorded black redstart. To create a cohesive enhancement plan across the Liverpool Waters Scheme, as per the NEBS for Princes Dock, it is recommended buildings within the Central Docks Neighbourhood consider the inclusion of a green roof specifically designed for black redstart, where appropriate and viable.

Green Roof

Although the term green roof is used throughout this NEBS, roof habitat designed specifically for black redstart should contain a high proportion of sparsely vegetated areas which is more typical of brown roofs.

Green roofs should incorporate the following specification:

- relatively small areas of very sparsely vegetated rubble or rocky terrain incorporating hibernacula for invertebrates;
- still or slow-moving water; and
- nearby nest boxes.

An ornithologist should be involved in the design process to ensure specific ecological requirements for black redstart are met through the design process. Developments should also consider the compatibility of green roofs with the need to exclude gulls and pigeons as outlined in Section 3.2.

Detailed guidance on green roofs is provided by the greater London Authority (GLA) publication, Living Roofs and Roofs (GLA, 2008).[28] Guidance on creating

[27] WYG (2009). *Liverpool Waters Breeding Bird Survey Report*. Liverpool: WYG. Included as Appendix 7.6 of the Liverpool Waters ES.
[28] Greater London Authority (2008). Living Roofs and Walls Technical Report: Supporting London Plan Policy. GLA, London.

habitat specifically for black redstart is also detailed in the guidance produced by the Greater Manchester Biodiversity Project (GMBP, 2008).[29]

Nest Boxes

In addition to providing green roofs, nest boxes specifically designed for black redstart are also recommended. Suitable next boxes include:

- Schwegler 2HW (externally fixed); and
- Schwegler 1HE (integrated).

Due to the presence of peregrine falcon within the area, consideration should be required as to which plots will be most suitable for black redstart nest boxes. A suitably qualified ecologist should advise on the installation of nest boxes within each plot during production of the EBS.

5.1.2 Peregrine

Peregrine falcon thrive in urban environments due to their capacity to hunt a diverse range of species. It is not considered appropriate to incorporate nest boxes for black redstart (prey) and peregrine falcon (predator) in the same area. Consequently, consideration may be required as to which plots will be most suitable for peregrine nest boxes. A suitably qualified ecologist should advise on the installation of nest boxes within each plot during production of the EBS. Dixon & Drewitt (2012) provides further guidance on the provision of artificial nest sites for peregrine on built structures.[30]

5.1.3 Swallows and Swifts

The Central Docks Neighbourhood should also consider the inclusion of swallow and/or swift boxes in buildings to the north of the Kingsway Tunnel. Where provided, it is recommended that a minimum of three boxes should be considered to be installed per building, to replicate a colonial nesting situation. Any boxes installed should be sited at least 5m above ground, with clear adjacent airspace so birds can access them in high-speed direct flight. A suitably qualified ecologist should advise on the installation of nest boxes. It may be necessary to utilise a lure whereby calls of nesting swifts may be played to attract individuals and increase the likelihood of establishing a colony.

5.1.4 Replacement Roosting Habitat for Water Birds

As per the NEBS for Princes Dock, it is acknowledged that Condition 34 of the planning decision notice for the Liverpool Waters development specifies that replacement roosting sites are only required for Nelson Dock; due to the relatively high number of roosting cormorants, recorded by WYG in the Liverpool Waters

[29] Greater Manchester Biodiversity Project (GMBP) (2008). *Make Room for Black Redstarts: A species action plan for Greater Manchester*. GMBP: UK.
[30] Dixon, N and Drewitt, E. (2012). *A 15-year study of the diet of urban-nesting Peregrines.* Devon Birds.

Wintering and Passage Bird Report (WYG, 2011c).[31] Replacement habitat for roosting water birds was not proposed for the docks in the Central Docks Neighbourhood. However, due to the findings of more recent surveys which have recorded significant numbers of cormorant,[12] and the extension of Liverpool Bay SPA which now includes cormorant as a qualifying species, the requirement for mitigation will need to be revised.

The specification for suitable water bird habitat should be based on the results of the first annual passage and wintering bird survey and foraging common tern survey. Based on the information collected during the 2018/2019 wintering bird surveys, SPA species such as cormorant have been recorded within the site. Appropriate mitigation such as floating pontoons will therefore be required. The results of the surveys will be used alongside other data to produce a Liverpool Waters Strategic Ecological Mitigation Plan (SEMP) which will examine data in the context of extant and likely reserved matters applications across the entire Liverpool Waters Scheme, and identify areas where mitigation is needed.[26] The SEMP will be submitted to the LPA for approval. In line with the NEBS for Princes Dock, it is proposed that all of the mitigation features specified are delivered in areas managed by the landowner.

A cohesive approach across all neighbourhoods is required for this type of mitigation; reserved matters applications elsewhere within the Liverpool Waters scheme may result in significant impacts on water bird habitats, which cannot be mitigated for locally, therefore, mitigation may need to be implemented within adjacent neighbourhoods to maximise the overall effectiveness. However, mitigation measures should also be submitted as part of reserved matters applications and approved and discharged through Condition 34 of the outline consent for each detailed plot when additional surveys are undertaken to provide further information. Any mitigation proposed should be in accordance with Liverpool Waters SEMP.[26]

5.2 Bat Roosting Features

Although no bat roosts or buildings with bat roost suitability were identified within Central Docks during the surveys undertaken (WYG, 2009),[15] there is an opportunity to enhance the site for bats through the installation of artificial roosting features. Central Docks may be considered to be the neighbourhood with the most potential to be utilised by bats in the future due to the proposed Central Park which should provide suitable foraging habitat.

A total of nine bat boxes should therefore be installed on buildings in proximity to Central Park. Two bat boxes should be installed onto the southern facing aspect of the building on Plot C-10, where possible. It is recommended that the boxes are positioned on the southern face of the building, above 4m height. It is recommended that bat boxes are to be considered to be integrated into the walls for longevity, however they may also be fixed to the external walls.

[31] WYG (2011c). *Liverpool Waters Wintering and Spring Passage Bird Survey Report*. Liverpool: WYG.

The additional bat boxes should be positioned on the buildings on Plots C-05-A, C-05-B, C-09-A, C-09-B, C-07 and/or C-11, where possible. The boxes should be positioned south-west through to south-east where possible, however the western aspects of the buildings along the River Mersey should be avoided due to exposure to the prevailing weather.

The details of locations and types of boxes should be included within the plot-specific EBS to be provided as part of the reserved matters applications.

5.3 Landscape Planting

Public open space is proposed at Central Park along with additional areas of planting within the majority of development plots. Landscaping design should be detailed within the plot-specific reserved matters applications. Landscaping should include native species which attract invertebrates and therefore provide a food resource for bats. This includes native nectaring species; alternatively, suitable high nectaring non-native species may be considered to augment native species planting.

5.3.1 Tree Planting

Tree planting in areas of public open space should aim to create potential green corridors through the neighbourhood for bats and breeding birds, whilst avoiding funnelling birds towards reflective glass surfaces (Section 3.1). The landscaping within individual plots should tie in to corridors created in the public open space and develop a green network of potential wildlife corridors throughout the development. The habitats developed within each neighbourhood should also seek to link into adjacent neighbourhoods to maximise corridors and increase permeability throughout the entire Liverpool Waters scheme.

Where possible the planting interval for trees should be such that the canopies of adjacent trees are within at least 5m of one another when mature or the spaces between the trees should be bridged by suitable planting for bats. As stated in Princes Dock NEBS (WYG, 2018), it is recommended that the priority (broad) habitat ‘Broadleaved mixed and yew woodland’’ which is listed in the Natural Character Area (NCA) profile for Merseyside Conurbation (Natural England, 2013) is referenced as the basis of tree planting schemes. Suitable species include wild cherry *Prunus avium*, alder *Alnus glutinosa*, Blackthorn *Prunus spinosa*, elder *Sambucus nigra*, goat willow *Salix caprea*, hawthorn *Crataegus monogyna*, oak *Quercus* sp., field maple *Acer campestre*, silver birch *Betula pendula*, hazel *Coryllus avellana* and rowan *Sorbus aucuparia.*

5.3.2 Additional Shrub and Herbaceous Planting

The planting mix should attract a range of invertebrate species and provide an important foraging resource for breeding birds and bats. The formulated planting mix should encompass a range of sequential flowering and fruiting species which provide foraging resources for site fauna at different times of year.

Landscaping of public open space and within individual plots should include additional areas of shrub and herbaceous planting, including both annuals and herbaceous perennials. The planting mix should aim to attract a range of invertebrate species and support pollinator species.

Although native species are preferred, non-native plants, provided they are not invasive, can assist in providing nectar sources throughout the year. Examples of such species are listed in the Royal Horticultural Society (RHS) publication Plants for Pollinators – Garden Plants (RHS, 2011).[32]

[32] RHS (2011). Plants for Pollinators – Garden Plants. Available at https://www.rhs.org.uk/science/pdf/conservation-and-biodiversity/wildlife/plants-for-pollinators-garden-plants.pdf

6 Post-Construction Monitoring and Management

Details of post-construction monitoring and management should be specified within the EBS for each plot and submitted with the reserved matters application. An outline of what should be included within the Central Docks Neighbourhood is provided below.

6.1 Aquatic Monitoring

The results of the construction phase monitoring detailed in Sections 2.6 and 2.7 should be used by the applicant/developer to inform the monitoring programme required during the operational phase for aquatic species (including invasive non-native species) and water quality. The requirements of the ongoing monitoring should be discussed and agreed with Natural England, MEAS, the Environment Agency and Canal and Rivers Trust prior to completion of construction.

6.2 Ecological Mitigation

6.2.1 Bird Strike Mitigation

Routine Management

The bird strike prevention measures should be part of the fabric/fixtures/fittings of the building therefore should require little management outside of that covered by routine building maintenance. Management of any installed features should follow the manufacturer's recommendations.

Monitoring

Bird strike monitoring should be carried out in the first year after construction by owners/occupants of any buildings over five storeys high. This should take the form of monitoring surveys and occupant reports.

Monitoring of bird strike fatalities involves a systematic search for carcasses of birds which have collided with the building. Most bird strike collisions occur in the morning between 7am and 11am although they can happen at any time. Scavengers such as gulls, crows, cats and foxes learn where collisions happen frequently therefore it is important to survey regularly and as close as possible to peak collision time. It is proposed in the Princes Dock NEBS (WYG, 2018)[3] that monitoring surveys should be undertaken based on the methodology set out in the American Bird Conservancy (ABC) advice note (2015).[33] This is also proposed for Central Docks as set out below:

- Representatives should be chosen from each building to carry out the monitoring, for example a member of maintenance staff.

[33] ABC (2015). *Monitoring buildings for bird collisions*. Virginia: American Bird Conservancy.

- The monitoring period should be 12 months, where possible, to include one winter and one spring migration.
- Monitoring should take place on three days per week, between 8am and 10am.

Monitoring staff should initially be trained in conducting searches by a suitably qualified ecologist who may also be on hand to assist with subsequent identification of carcasses, e.g. by emailed photographs. The monitoring route should be devised during the training and should include every façade with windows, including along green roofs, and if possible, setbacks and other roof terraces. A map of the monitoring route should be created for reference, and the route should be subdivided into segments, with each change in façade structure and orientation assigned a segment number.

At the designated times, monitoring staff should conduct a careful search, looking within 10m of the building, with a special emphasis on landscape planting and other objects such as street furniture, as injured birds may seek shelter near those objects. After each segment, staff should record the date, time, number of birds found, their species and their status (dead, alive, or injured). If possible, photographs and specimens should be collected. It is important to record the search, even if no birds are found as this may be used as evidence for the effectiveness of installed mitigation.

All building occupants should be informed of the monitoring, so that their own efforts do no complicate the data e.g. maintenance staff should be instructed not to sweep up any carcasses when they are not engaged in monitoring.

The monitoring strategy and data collected should be continually reviewed in consultation with the ecologist to determine whether any adjustments to the methodology or mitigation are required. This should take place initially after 3 months and then quarterly until the end of the 12-month monitoring period. A monitoring report should be produced by the ecologist at the end of the monitoring period to summarise the findings and include any further enhancements of mitigation and monitoring, as required.

A system should also be set up whereby building occupants are encouraged to report any bird strikes. This should be included in the Welcome Pack for owners/tenants and supported by posters displayed on information boards to alert occupants to the risk of bird strike and the routine monitoring programme. Any occupant reports should be reviewed and included within the results of the monitoring report.

Remedial Management

The monitoring report should examine the locations of bird strikes in relation to mitigation features. Where relevant, areas of the building which may be more prone to bird strike should be highlighted and if appropriate further mitigation should be recommended. The monitoring report should be discussed with the building owner and additional monitoring undertaken if required. If additional mitigation is installed, then a further 12-month round of monitoring should take place to assess its effectiveness.

6.3 Control of Gulls and Pigeons

Routine Management

Ideally, issues with gulls/pigeons should be designed out without the need for additional control/dissuasion measures. However, if installed appropriately, little management should be required on control/dissuasion measures outside of that covered by routine building maintenance. Management of any installed features should follow the manufacturer's recommendations.

Monitoring

Monitoring for breeding is proposed where control/dissuasion measures are installed on buildings. A representative from the building should be chosen to carry out the monitoring following training by a suitably qualified ecologist. Searches should be undertaken at least twice per year, during May and June for the lifetime of the building. All potential nesting surfaces, such as ledges, flat roofs and roof terraces, should be inspected from the ground, with binoculars, and from within the buildings, where access allows. The locations of any gull or pigeon nests should be recorded on a map.

Remedial Management

Where significant numbers of nesting gulls and pigeons (more than two gull or five pigeon nests) are recorded, then the building owner should consult an appropriate contractor to identify suitable additional measures to dissuade/exclude birds during the following breeding season. Any additional exclusion measures should be installed by a suitably qualified contractor.

6.4 Habitat Creation

Where appropriate, buildings within the Central Docks Neighbourhood, should consider the incorporation of the following habitat creation measures:

- green roofs and black redstart nest boxes;
- swallow boxes;
- peregrine boxes;
- bat boxes; and
- landscape planting for bats and invertebrates.

As per the NEBS for Princes Dock,[3] routine management, appropriate monitoring and provisions for remedial management are set out below. Where mitigation for water birds is provided on the basis of the passage and wintering bird surveys, these should also be included within the monitoring programme. Monitoring and remedial management measures will be dependent on the type(s) of mitigation features implemented. Further details on the requirements of monitoring of mitigation measures should be provided with reserved matters applications and should be provided to the LPA for approval prior to installation. An Adaptive Management Plan should be produced with any SPA bird mitigation package developed. This is to ensure appropriate monitoring is undertaken and the mitigation is adapted if required to ensure the best success possible for SPA birds.

Any mitigation, management and monitoring proposed should be in accordance with the Liverpool Waters SEMP.[26]

6.4.1 Green/Brown Roofs and Black Redstart Boxes

Routine Management

Once fully established, green roofs designed specifically for black redstart require limited management. Occasional weeding may be required, should robust species establish.

Monitoring

Green roofs should be inspected twice per year to ensure they continue to meet the original specification. Inspections should be made by a suitably qualified landscape contractor and/or an ecologist. It should be ensured the roofs remain sparsely vegetated with an exposed substrate, e.g. rubble or rocky terrain.

The black redstart nest boxes should be inspected annually to ensure they remain fit for purpose. Inspections should be made from the ground using binoculars outside of the bird nesting season (September – February); where unable to ascertain the condition of nesting boxes, a closer inspection should be undertaken using an appropriate access system (September – February).

Following the completion of a green roof, two black redstart surveys should be undertaken in accordance with the survey methodology outlined in Section 2.2.2, in addition, a roof level survey should be undertaken (following the below methodology). To make efficiencies by avoiding the duplication of survey effort, the data collected during the biennial black redstart surveys should be used for monitoring; this is only possible where a full breeding season has passed between completion of the green roof and the survey. The second survey should be carried out five years after the completion of the green roof.

The roof level survey should comprise a two-hour vantage point survey, with the aim of observing whether black redstart are utilising the green roof for foraging and/or nesting. The roof level survey should be completed following the ground-level survey or independently, depending on whether data from the biennial surveys are used for the ground-level element.

Remedial Management

As per the NEBS for Princes Dock, remedial management of any created green roof features would be dependent on the system chosen; management would likely be limited to re-establishing flora which has failed. If required, maintenance of the green roof would be undertaken by a suitably experienced contractor. Any nest boxes which are deemed to have failed should be replaced between September and February (inclusive).

6.4.2 Swallow Boxes

Routine Management

Once erected, swallow boxes should not require any routine management.

Monitoring

The condition of swallow nest boxes should be inspected from the ground using binoculars, approximately every five years.

Remedial Management

Any nest boxes which are deemed to have failed structurally, should be replaced between September and February, using an appropriate access system.

6.4.3 Bat Boxes

Routine Management

Once erected, bat boxes should not require any routine management.

Monitoring

Bat boxes should be monitored by a suitably licensed bat worker in years two, five and ten post-installation. The monitoring survey may be done from a Mobile Elevation Work Platform (MEWP) or similar, where possible, in order to inspect the boxes for signs of use. Where this is not possible activity surveys (dusk emergence/dawn re-entry) may be required to assess presence/likely absence of bats.

Remedial Management

If any bat boxes are recorded to have failed, or require maintenance/cleaning, this should be undertaken under the supervision of a licensed bat worker between November and February (inclusive).

6.4.4 Landscape Planting

Routine Management

A Landscape Management Plan (LMP) should be produced for each plot-specific reserved matters application and should cross-reference the plot-specific EBS. Routine management will likely comprise weeding, pruning and replanting as appropriate to the species mix and layout/design.

Monitoring

Landscape planting should be assessed annually during maintenance visits to determine the success/establishment of planting and whether it meets the original specification.

Remedial Management

The overall aim should be as set out in Section 5.3, to provide a scheme that is beneficial to bats and invertebrates. The initial requirement for remedial management should be determined by the Landscape Architect and set out in the LMP. This should be reviewed by the landscape contractor during their annual inspections. If significant remedial management is required, an ecologist should be consulted to ensure that proposed replacement is appropriate.

7 Summary

7.1 Pre-Construction/Construction Phase Surveys and Impact Assessment – Condition 16: Parts i, ii and vi

7.1.1 Birds

- Annual surveys for breeding little ringed plover, breeding black redstart, passage/wintering birds and foraging common tern should be undertaken in the year prior to construction and during the subsequent four years of development at the Central Dock Neighbourhood. Following the first five years of monitoring, the requirement for continued surveys should be reviewed.
- The results of the bird surveys should be used to produce updated impact assessments for each reserved matters application, to be submitted to the LPA through an Ecological and Biodiversity Statement.

7.1.2 Bats

- Where a reserved matters application proposes demolition of any existing structures, a bat roost suitability assessment should be undertaken.
- Structures confirmed as roosts during the preliminary bat roost assessment, or those assessed as having low, moderate or high bat roost suitability may require further activity surveys to determine the presence/likely absence of bats and characterise roosts.
- Any reserved matters applications which affect structures with potential to be used by roosting bats should include an impact assessment within the plot-specific EBS. If any significant construction or operational impacts are considered likely, then appropriate mitigation should be developed.

7.1.3 Aquatic Species

- Initial baseline characterisation surveys should be undertaken for phytoplankton, fish, benthic macro-invertebrates and benthic invertebrates.
- Annual surveys (spring and autumn) should be undertaken to monitor benthic invertebrates, plus surveys for algae, phytoplankton and zooplankton species.
- If the baseline survey indicates a low fish population is present, surveys should be undertaken to monitor improvements.
- If the surveys identify marine INNS, methodologies should be developed to avoid them being spread because of works within the docks.

7.1.4 Water Quality

- Initial baseline characterisation survey of the dock system is to be undertaken prior to the start of construction to include water quality

sampling, sediment quality sampling and bathymetric survey for sediment depth.
- Ongoing monitoring to be undertaken during construction to monitor the above parameters including biochemical oxygen demand, ammonia and nutrients.
- Appropriate water quality management plan to be developed and implemented by the Principal Contractor during development.

7.2 Mitigation Through Scheme Design – Condition 16: Parts v, vii, viii & x

7.2.1 Bird Strike Mitigation

- The design of tall buildings within the Central Docks Neighbourhood, particularly those with significant quantities of reflective glass, should incorporate measures to mitigate the risk of bird strike.
- Plot-specific details of measures to reduce bird strike should be included within the EBS for each reserved matters application.

7.2.2 Control of Gulls and Pigeons

- All buildings must incorporate measures to dissuade nesting and roosting of gulls and feral pigeons, appropriate to the design and function of the building.
- Each reserved matters application should include details of consideration with designed-in measures to be prioritised over additional measures such as spikes, wires or netting. This should be detailed within the plot-specific EBS.

7.2.3 Control of Leisure Boat Activity

- Any development which has potential to result in increased boat traffic should consider the impact of the increased boat traffic on features of designated sites.
- Bird populations at Central Docks should be monitored on an annual basis. The surveys should be used to develop a leisure boat activity mitigation strategy, where required.

7.2.4 Recreational Distrubance

- All reserved matters applications should include HRA information for all Natura 2000 sites which may be impacted by the proposed scheme, including through recreational disturbance.
- All developments should include a commitment to adhere to the objectives of relevant Visitor Management Strategies (VMS).
- Reserved matters applications which come forward prior to the adoption of the VMS should consider how recreational pressure will be assessed (and potentially mitigated for) for the development.

7.3 Construction Phase Mitigation – Condition 16: Part iii

7.3.1 Removal of Existing Buildings and Vegetation

- The removal of existing buildings, structures, hardstanding and ephemeral vegetation should be undertaken outside of the breeding bird season, where practicable.
- Where this is not practicable, a suitably qualified ECoW should conduct a check for nesting birds prior to commencement of works.

7.3.2 Construction Vehicles, Routes and Speed Limits

- Construction vehicle routing and speed limits should take account of nesting birds (advised by ECoW) and SPA birds.
- A speed limit should be implemented on vehicles travelling adjacent to West Waterloo Dock due to the potential for roosting redshank and oystercatcher.

7.3.3 Roost Sites of Wintering Birds and Passage

- Any development which has the potential to result in increased disturbance of water bird roosting sites should consider the impacts on features of all designated sites.
- Bird populations should be monitored on an annual basis; a scheme-wide mitigation strategy should be developed.
- For each development where piling is required, appropriate mitigation should be identified and implemented, where appropriate.
- Measures to reduce the impacts of noise disturbance during construction should be included within a CEMP.
- Visual disturbance mitigation should be installed for the developments around West Waterloo and Half Princes Dock.

7.4 Habitat Creation – Condition 16: Part iv

7.4.1 Black Redstart

- Buildings within Central Docks should consider the inclusion of a green roof designed for black redstart.
- Where green roofs are provided, black redstart nest boxes should also be included on the same building.
- Additional mitigation options for black redstart should also be considered to include brown walls and a mosaic of green/brown roofs and walls.

7.4.2 Peregrine

- Due to the potential for conflict between black redstart and peregrine, consideration may be required as to which plots will be most suitable for peregrine nest boxes.

7.4.3 Swallows and Swifts

- The inclusion of swallow and/or swift nest boxes should be considered on buildings, where appropriate. Where provided, a minimum of three boxes should be installed per building.

7.4.4 Replacement Roosting Habitat for Water Birds

- Due to the findings of more recent surveys which recorded 12 cormorant in Princes Half Tide Dock and the extension of Liverpool Bay SPA which now includes cormorant as a qualifying species, the requirement for mitigation may need to be revised within Central Docks.
- The specification for suitable water bird habitat should be based on the results of all surveys undertaken to date across Liverpool waters including standalone applications.
- The results of the surveys will be used alongside other data to produce a Liverpool Waters Strategic Ecological Mitigation Plan (SEMP). A cohesive approach across all neighbourhoods is required for this type of mitigation.

7.4.5 Bat Roosting Features

- A total of nine bat boxes are to be installed on buildings in proximity to Central Park. Two bat boxes should be installed on the southern-facing aspect of the building on Plot C-10.
- The additional bat boxes should be positioned on the buildings on Plots C-05-A, C-05-B, C-09-A, C-09-B, C-07 and/or C-11.
- The specific details of locations and types of boxes should be included within the plot-specific EBS to be provided as part of the reserved matters applications.

7.4.6 Landscape Planting

- Landscaping design should be detailed within the plot-specific reserved matters applications.
- Landscaping should include native species which attract invertebrates and therefore provide a foraging resource for bats. This includes native nectaring species; alternatively, suitable non-native species may be considered to augment native species planting.
- Tree planting in areas of public open space should aim to create potential green corridors through the neighbourhood for bats and breeding birds, whilst avoiding funnelling birds towards reflective glass surfaces.

- Habitats to be developed within individual plots should link to the wider neighbourhood which in turn should seek to link into the other neighbourhoods of Liverpool Waters.

7.5 Post-Construction Monitoring and Management – Condition 16: Part ix

7.5.1 Aquatic Monitoring

- The results of the construction phase monitoring should inform the monitoring programme required during the operational phase.

7.5.2 Bird Strike Mitigation

- Bird strike prevention measures should be integrated into buildings where possible, consequently this should form part of routine building maintenance.
- Bird strike monitoring should be carried out in the first year after construction by owners/occupants of any buildings over five storeys high. This should take the form of monitoring surveys and occupant reports.
- The monitoring strategy and data collected should be continually reviewed in consultation with the ecologist to determine whether any adjustments to the methodology or mitigation are required.

7.5.3 Control of Gulls and Pigeons

- Issues with gulls/pigeons should ideally be designed out without the need for additional control/dissuasion measures. However, if installed appropriately, little management should be required outside of routine building maintenance.
- Monitoring is proposed where control/dissuasion measures are installed: at least twice per year during the lifetime of the building.
- Any additional exclusion measures required as a result of the monitoring should be installed by a suitably qualified contractor.

7.5.4 Green/Brown Roofs and Black Redstart Boxes

- Where provided, green roofs should be inspected at least twice per year to determine whether they continue to meet their original specification.
- Black redstart nest boxes should be inspected annually between September and February (inclusive). Any nest boxes that have failed structurally should be replaced.
- Two black redstart surveys should be undertaken on the completion of the green roof. The surveys should comprise a ground level survey and a roof level survey.
- In order to maximise efficiencies by avoiding the duplication of survey effort, the data collected during the biennial black redstart surveys should

be used for monitoring. However this is only possible where a full breeding season has passed between completion of the green roof and the survey. The second survey should be carried out five years after the completion of the green roof.

7.5.5 Swallow and Swift Boxes

- Where provided, swallow and swift boxes should be inspected every five years.
- Any nest boxes that have failed structurally should be replaced between September and February.

7.5.6 Bat Boxes

- No routine management should be required.
- Bat boxes should be monitored by a suitably licensed bat worker in years two, five and ten post-installation.
- If any bat boxes are recorded to have failed, or require maintenance/cleaning, this should be undertaken under the supervision of a licensed bat worker between November and February.

7.5.7 Landscape Planting

- Landscape Management Plan (LMP) to be produced for each reserved matters application, cross-referencing to the plot-specific EBS.
- Landscape planting should be assessed annually during maintenance visits.
- If significant remedial management is required, an ecologist should be consulted to ensure that proposed replacement is appropriate.

This document provides guidance to be used in relation to ecology and biodiversity for all reserved matters applications within the Central Docks Neighbourhood. The document addresses all parts of Condition 16 and therefore should discharge this condition.

Appendix B: Approval correspondence

From:	Yeomans, Amanda <Amanda.Yeomans@naturalengland.org.uk>
Sent:	20 October 2019 12:37
To:	Gaskell-Burnup, Melissa
Cc:	Jones, Peter; Lara Russo; Gavin Spowage; Leigh, Angela
Subject:	IoM discharge of Conditions- NE final advice
Attachments:	294701 MMO IoM discharge of conditions 18102019.pdf; RE: Isle of Man Ferry Terminal (9/DIS1988).

Dear Melissa,

cc. Peter Jones for awareness- NE will provide you a separate letter for completeness.

Please see attached Natural England's final advice in respect to the AMP for the Isle of Man Ferry Terminal. We have advised one minor amendment to the trigger point for further investigation and this has been accepted by the consultants (email chain attached for info). We provide the advice attached on the basis that the amendment will be completed and a final version of the AMP circulated. Please let me know if I need to upload this onto MCMS, however I can only see a consultation for the VR and not the discharge of conditions now.

We welcome all the work and commitment shown by the consultants on the AMP and ensuring that appropriate measures are in place and look forward to seeing the outcome of the mitigation and monitoring.

Apologies for the time taken in providing you this final advice, this has been due to time out of the office over the past week. If you need anything further please don't hesitate to get in touch.

Kind regards, Amanda

Amanda Yeomans

Senior Specialist, Ports, Estuaries & Tidal Lagoons / Senior Adviser Cheshire to Lancashire Coast & Marine

Strategy Implementation

Strategy to Delivery Team

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Please note my week is split between two roles with my usual working pattern as follows:

Monday to Wednesday *- Senior Specialist, Ports, Estuaries*

Thursday, Friday*- Senior Adviser Cheshire to Lancashire*

www.gov.uk/natural-england

We are here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

In an effort to reduce Natural England's carbon footprint, I will, wherever possible, avoid travelling to meetings and attend via audio, video or web conferencing.

Date: 18 October 2019
Our ref: 294701
Your ref: MLA/2018/00536/1

Customer Services
Hornbeam House
Crewe Business Park
Electra Way
Crewe
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CW1 6GJ

T 0300 060 3900

Melissa Gaskell-Burnup
Marine Management Organisation (MMO)

BY WESBITE ONLY

Dear Melissa,

Consultation: *Consultation 5*. Isle of Man Ferry Terminal - Discharge of Condition 5.2.10- *Revised documents*
Location: Princes Half Tide Dock, Liverpool Waters, Liverpool

Thank you for your consultation on the discharge of condition 5.2.10 under Marine Licence reference L/2019/00239/2 for the development of the Isle of Man Ferry Terminal. The advice contained within this letter refers to the updated Adaptive Management Plan (AMP) (version 5 dated October 2019). Natural England received this document via email direct from Waterman Infrastructure & Environment Limited on 10 October 2019.

Natural England previously provided advice to the MMO and additional comments direct to Waterman Infrastructure & Environment Limited ('Watermans') to assist with the production of a revised version of the AMP. The updated version of the AMP has taken into consideration Natural England's most recent comments and advice dated 7 October 2019 (provided to MMO and LPA via email on 10 October 2019).

We would firstly like to welcome and acknowledge the additional work and time commitment that the applicants have undertaken to update the AMP in ensuring that appropriate detail has been provided.

In our opinion the document clearly demonstrates a commitment to undertake monitoring for the mitigation measures through the first year of the development, in the absence of an agreed wider strategic mitigation plan. Further review and monitoring will then be picked up through a future agreed strategic approach as part of the Liverpool Waters Strategic Ecological Management Plan. Natural England will provide further advice to the Local Planning Authority (LPA) and the landowners on the SEMP in due course.

The AMP provides set trigger points at which an action will be required. These resulting actions are presented so that there is a clear mechanism for further investigation and potential re-design/movement considerations. Natural England further advise that for simplicity the trigger point for initial action of further investigation should be if no cormorants are using the pontoon in any one month, this is a simple measure that can be quickly identified. We have provided this comment directly to Watermans via email on 18 October and received confirmation that this approach would be adopted. Therefore, the advice within this letter is based on a further amendment to section 2.8 being completed and a final version of the AMP circulated to the regulators (and Natural England).

We appreciate that the purpose of the AMP is to set out adaptive measures and therefore will rely on the outcome of the monitoring undertaken to determine the particular actions required and this is recognised within the document. We advise that if a trigger point is encountered during the monitoring, that the relevant authorities are notified (i.e. MMO/LPA) and Natural England can offer further advice.

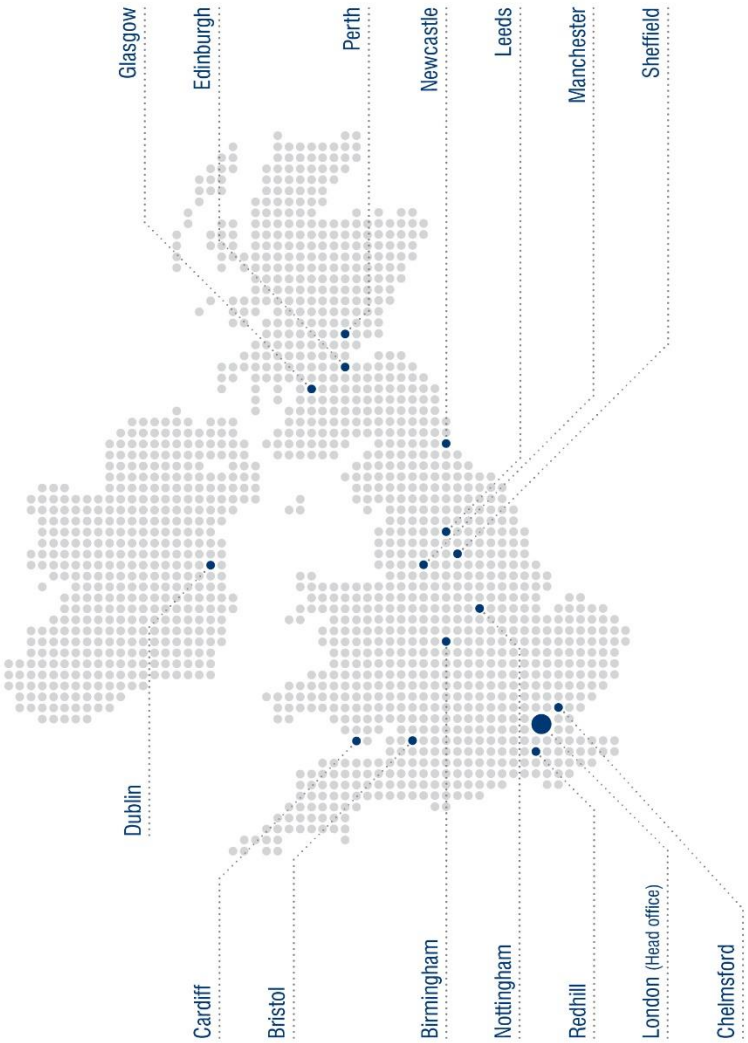
Overall the document provides a clear framework for monitoring the mitigation measures implemented at the Isle of Man Ferry development, in our opinion the document provides the level of detail required at this time, therefore we are content should the MMO discharge condition 5.2.10 on the Marine Licence.

If you have any queries relating to the advice in this letter please contact me on the details below.

Yours sincerely

Amanda Yeomans
Senior Specialist / Senior Adviser Coast and Marine
Cheshire to Lancashire Area Team
Amanda.Yeomans@naturalengland.org.uk

UK and Ireland Office Locations



F. Liverpool Waters Strategic Ecological Mitigation Plan (SEMP) – Interim; Arup, July 2019

Technical Note

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Project title	Liverpool Waters	Job number	266384-00
cc	Philip Jones Ian Ford Paul Grover	File reference	0-15-08
Prepared by	Amy Martin Joseph Shepherdson	Date	5 July 2019
Subject	Liverpool Waters Strategic Ecological Mitigation Plan – DRAFT Interim Note V3		

1 Introduction

Ove Arup & Partners Ltd. (Arup) were commissioned by Peel Land & Property (Ports) Ltd. in May 2019 to produce a Strategic Ecological Mitigation Plan for Liverpool Waters (LW). The LW scheme, which secured outline consent (10O/2424) on 19 June 2013, covers an area of 60 hectares of former dockland located along Liverpool's Waterfront.

In their response to standalone applications and the first reserved matters application under the Liverpool Waters outline consent (18RM/1554), Merseyside Environmental Advisory Service (MEAS) and Natural England (NE) have requested that an overarching strategic mitigation plan should be developed to cover all the neighbourhoods within LW. Arup arranged a meeting 23 April 2019 with NE, MEAS, Peel and Liverpool City Council (LCC) to agree a proportional and beneficial approach for producing a strategic mitigation plan for Liverpool Waters.

The aim of this interim note is to provide outline summary details of the strategic mitigation that, following consultation and further surveys for breeding birds and common tern (to be completed in August 2019), will be further detailed within the Liverpool Waters Strategic Ecological Mitigation Plan (LW SEMP). The LW SEMP is an opportunity to provide clear direction to developments coming forward to ease the planning process for future applications. The LW SEMP will be based on survey data collected across Liverpool Waters and will take the form of a comprehensive written document with associated drawings. It will include:

- *Visual and noise disturbance mitigation measures for SPA birds during remediation, construction and operation.*
- *Replacement roosting habitat (temporary and permanent) for SPA birds, particularly cormorant.*
- *Mitigation for potential recreational disturbance at European sites.*
- *Monitoring Requirements and Adaptive Management Plan.*

The SEMP provides an opportunity for each application to demonstrate how they comply giving more certainty in gaining permissions for their proposals. This will also ensure developments are HRA compliant and working towards a holistic approach within the overarching Liverpool Waters scheme

2 Natura 2000 Sites

The LW scheme is located in proximity to a number of designated and Natura 2000 sites:

- Liverpool Bay SPA;
- The Mersey Narrows and North Wirral Foreshore SPA/Ramsar;
- Mersey Estuary SPA/Ramsar;
- Ribble & Alt Estuaries SPA/Ramsar;
- Sefton Coast Special Area of Conservation (SAC);
- The Dee Estuary Ramsar;
- Dee Estuary SPA;
- Dee Estuary SAC; and
- Martin Mere SPA and Ramsar.

The SPA and Ramsar sites are designated for their wintering, passage and breeding waterbird assemblages. The SACs are designated for coastal/estuarine habitats including mudflats, dunes, and saltmarsh. Further detail on the designations is provided as Appendix A of this interim note.

3 Ornithology

It was identified during production of the EIA for the LW outline consent (10O/2424) that the docks and waterfront areas within the LW site may provide supporting functional habitat (feeding and roosting) for birds from the above internationally important sites. Ornithological surveys were therefore undertaken and have been supplemented by further surveys as part of the discharge of conditions for the LW outline consent, and for standalone applications within the LW scheme. Surveys which have been undertaken to date include:

- WYG (2009) – Breeding and Wintering Bird Surveys undertaken for Liverpool Waters Outline Application Environmental Statement.
- TEP (2015). Assessment of Supporting Habitat (Docks) for Use by Qualifying Features of Natura 2000 Sites in the Liverpool City Region.
- AECOM (2018). Isle of Man Ferry Terminal Wintering Bird Surveys.
- APEM (2018). Liverpool Cruise Terminal Wintering Bird Surveys.
- AMEY (2018). LCCC P2 – Northern Link Road Wintering Bird Survey Report.
- APEM (2018). LCCC P2 – Northern Link Road Breeding Bird Survey Report.
- Arup (2019). Liverpool Waters Passage and Wintering Bird Surveys.

In addition, surveys are currently underway in 2019 for breeding birds and foraging common tern across the LW site.

During the surveys undertaken to date, several species which are either qualifying species of the SPA/Ramsar sites or component species of the overall assemblage, have been recorded utilising habitats within the LW site. During the 2018/2019 surveys undertaken by Arup, eight species recorded on site were listed as qualifying species on the citation of nearby statutory designated sites; redshank *Tringa totanus*, oystercatcher *Haematopus ostralegus*, red-breasted merganser *Mergus serrator*, turnstone *Arenaria interpres,* cormorant *Phalacrocorax carbo*, shelduck *Tadorna tadorna*, ringed plover *Charadrius hiaticula*, and lesser black-backed gull *Larus fuscus*.

Significant numbers of the Liverpool Bay SPA population of cormorant have been recorded during the surveys. In 2018/2019 the peak count of cormorant was 33 which represents 4.5% of the SPA population (732 individuals). In addition, two red breasted merganser were recorded which represents approximately 1.5% of the Liverpool Bay SPA population (132 individuals).

Fifty-six shelduck were recorded at low water in March 2019, this represents >1% of the Mersey Estuary SPA and Ribble & Alt Estuaries SPA populations.

Potentially significant numbers of ringed plover were recorded on site over winter 2018/2019. Ringed plover is listed (on passage) on the Mersey Estuary SPA and Ribble & Alt Estuaries SPA. However, ringed plover has also been recorded breeding within the Central Docks area in 2019 along with lapwing which are listed on the assemblage of Mersey Estuary SPA.[1]

Lesser black-backed gull (breeding) is listed as a qualifying species on Ribble & Alt Estuaries SPA and have been recorded breeding within the site; however further survey results are required from the 2019 breeding bird surveys to determine if this constitutes a significant number of the SPA population.

To date, during the 2019 surveys, foraging common tern *Sterna hirundo*, (listed during breeding season on Mersey Narrows & North Wirral Foreshore SPA/Ramsar and Dee Estuary SPA/Ramsar) have been recorded out in the River Mersey but not utilising habitats in proximity to the Liverpool Waters site.

3.1 Potential Impacts

Due to the presence of significant numbers of SPA bird species at Liverpool Waters, there is the potential for negative impacts through the development of the scheme. These impacts would be generated through visual and noise/vibration disturbance which may cause displacement of individuals. There will also be a loss of habitat for roosting and breeding birds through demolition/removal of existing structures and loss of brownfield habitat.

3.2 Strategic Mitigation

3.2.1 Construction Related Disturbance

A Construction Environmental Management Plan (CEMP) will be required for each development within Liverpool Waters. As a minimum this will include:

[1] Email Communication from RSK/ADAS who are currently undertaking breeding bird surveys at Liverpool Waters (June 2019).

- Dust management plan detailing the measures to mitigate the indirect impacts of dust created during site preparation and construction.
- Measures to reduce visual and noise impacts including installation of hoarding prior to construction. This will include all areas located adjacent to sensitive ecological areas: the River Mersey and the open dock waters, e.g. Princes Dock, West Waterloo Dock, Princes Half Tide Dock, East Waterloo Dock, Salisbury Dock, Nelson Dock, Trafalgar Dock, Collingwood Dock and Bramley Moore Dock. Works adjacent to Leeds Liverpool Canal will also incorporate the use of hoarding. Screening should only be placed at ground level, this will block sight lines to the busiest area of the construction sites (i.e. where most operative and vehicle movements are likely to be concentrated). The developments will also be screened to prevent windblown litter entering the docks.
- Vehicle routing and speed limits.
- Construction activities will be limited to the daytime with no night working to reduce the use of lighting. Any task lighting required during this time will be directed away from the River Mersey, dock waters and canal, and will be switched off overnight if possible.
- Lighting plan detailing any areas which may be impacted and measures proposed to mitigate.
- Surface water run-off and potential siltation and/or pollution of the adjacent drainage system during site preparation and extraction will be mitigated by the implementation of best practice pollution prevention measures.

Any developments that require piling will require additional mitigation measures to be included within the CEMP to reduce the effect of noise disturbance on birds. These will include the following:

- Adherence to the guidelines set out in The Code of Practice for Noise and Vibration Control on Construction and Open Sites, 2009 and subsequent updates.
- The use of rotary piling methods.
- Selection of quietest working equipment available.
- Positioning equipment behind physical carriers, i.e. temporary hoarding.
- Provision of lined and sealed acoustic covers for noisy equipment.
- Directing noise emissions away from plant, including exhausts or engines away from sensitive locations.
- Ensuring that regularly maintained and appropriately silenced equipment is used.
- Maintaining a no idling policy.

Due to the presence of breeding species on site, including ringed plover, lapwing and lesser black-backed gull, any intrusive works including site/vegetation, ground works or demolition will be undertaken outside of the bird nesting season (March-August), where possible. Where this is not possible, a suitably qualified Ecological Clerk of Works (ECoW) will undertake a nesting bird check prior to the commencement of works on site. Should an active nest be identified, the ECoW will advise on a suitable species-specific working method and exclusion zone to limit disturbance and avoid damaging nests. The recommended working method may vary depending on the species and the nature of planned works.

3.2.2 Replacement Habitat

3.2.2.1 Floating Pontoons

To compensate for the loss of roosting habitat for non-breeding species including cormorant, several permanent pontoons will be established in the following docks (Drawing 3.1):

- Sailsbury Dock – four pontoons.
- Nelson Dock – two pontoons.
- Collingwood Dock – two pontoons.
- Princes Half Tide Dock – four pontoons.

The pontoon structures will be designed by an engineer in consultation with an ecologist. Positioning rafts in clusters will enable a greater number of birds to roost in one area communally. They will include a deep gravel cover, kick boards, cormorant perches, internal compartmentalisations and chick refuges. The design of the pontoons will be based on RSPB guidance on Design and Management of Rafts (Appendix B). Pontoons will be attached to the dock floor or positioned using anchors. The latter approach will allow the pontoons to be re-located should this be required. The pontoons will be positioned to allow for minimal disturbance through construction and leisure boat traffic. Measures to limit boat activity may be required in certain locations including restricting traffic in certain seasons or to certain times of the day or year. Additionally, the implementation of a lane or one-way system may be required to help control traffic.

The pontoons are considered suitable to provide roosting habitat for cormorant in the non-breeding season. Gulls, red breasted merganser and oystercatcher will use a wide range of roosts and the pontoons also provide suitable habitat for these species. In the breeding season the pontoons will provide suitable nesting habitat for a variety of species such as lesser black-backed gull, ringed plover, lapwing shelduck and red-breasted merganser.

Prior to the installation of the permanent pontoons, three temporary pontoons have been installed within West Waterloo Dock to provide mitigation for developments in the interim (Drawing 3.1). Once the permanent pontoons are installed within Princes Half Tide Dock, consideration will be given as to whether the temporary pontoons may be relocated to provide permanent mitigation in another dock.

3.2.2.2 Roosting Posts

In addition to the pontoons four permanent posts will be installed in Trafalgar Dock (Drawing 3.1).

The design/installation of posts will be determined by the engineer in consultation with the ecologist.

The pontoons and posts will be installed within the docks a minimum of two weeks prior to construction within proximity to the dock.

It is the aim that on completion of the development, cormorant and other species will use the roof structures of new developments as roosting sites in addition to the permanent artificial roosts.

3.2.2.3 Brown Roofs

Brown roofs will be installed on buildings across Liverpool Waters to further compensate for the loss of brownfield habitat suitable for use by breeding species included on the assemblages of the Natura 2000 sites such as lapwing, ringed plover, turnstone, oystercatcher and redshank. Brown roofs have been incorporated within the Neighbourhood Ecological and Biodiversity Strategies (NEBS) for Princes Dock[2] and Central Docks[3] with the aim of replacing brownfield habitat for black redstart *Phoenicurus ochruros*. It is anticipated that this design will also provide suitable habitat with minimal human disturbance for other breeding species.

The brown roofs will consist of very sparsely vegetated rubble or rocky terrain incorporating hibernacula for invertebrates and still or slow-moving water (where possible). An ornithologist will be involved in the design process to ensure specific ecological requirements for target species are met through the design process.

It is considered that brown roofs are suitable on plots with maximum building heights up to 45m. Across each neighbourhood, this includes the approximate plot areas below:

- Northern Docks: approximately 32,470m^2.
- Clarence Dock: approximately 9,960m^2.
- Central Dock: approximately 32,090m^2.
- Princes Dock and King Edward Triangle: approximately 25,800m^2.

Based on the area of suitable plots available for installation of brown roofs, the minimum area of brown roof that will be included within each neighbourhood is below:

- Northern Docks: 1600m^2
- Clarence Dock: 500m^2
- Central Dock: 1600m^2
- Princes Dock and King Edward Triangle: 1300m^2

4 Recreational Disturbance

Recreational disturbance to internationally protected coastal sites is an issue across the Liverpool City Region. This pressure is a particular issue through in-combination effects, for example additional housing may result in additional recreational visits, and therefore increase disturbance at the coastal designated sites. Residential development is proposed across the Liverpool Waters site and therefore strategic mitigation is required to reduce the potential for impacts on Natura 2000 sites.

Recreational pressure, including vehicular access and dog-fouling, is recognised in the formal statutory European Site Conservation Advice Packages for Sefton Coast SAC (Natural England, 2019[4]) which can be assessed as a Medium-High risk to qualifying features of the European site. Recreational pressure is also highlighted in the draft Liverpool Local Plans HRA as a Likely

[2] WYG (2018). Princes Dock Condition 16 Neighbourhood Ecological and Biodiversity Strategy.
[3] Arup (2019). Central Docks Neighbourhood Ecological and Biodiversity Strategy.
[4] Natural England (2019). *European Site Conservation Objectives: Draft Supplementary advice on conserving and restoring site features. Sefton Coast Special Area of Conservation (SAC) Site Code: UK0013076.* York: Natural England.

Significant Effect (LSE) (AECOM, 2017).[5] Public access/disturbance is confirmed as an issue in the Site Improvement Plans for Ribble and Alt Estuaries SPA, Sefton Coast SAC and Mersey Narrows and North Wirral Foreshore SPA.

All reserved matters applications within LW will include consideration of recreational pressure within HRA for Sefton Coast SAC, Ribble and Alt Estuaries SPA, Mersey Narrows and North Wirral Foreshore SPA.

The Liverpool City Region (LCR) has commissioned a wider strategic approach to visitor and recreation pressure management; this is to be referred to as the 'Liverpool City Region European Sites Recreational Mitigation and Avoidance Strategy'. This work may help inform the delivery of visitor and recreation mitigation to protect European Sites within the City Region. This work is currently ongoing and no firm proposals have been proposed or agreed.

Prior to the adoption of the LCR Mitigation and Avoidance Strategy the LW SEMP will consider how recreational pressure will be assessed (and potentially mitigated for) as a result of the increase in residential properties across the whole LW development. Mitigation/preventative measures capable of being incorporated into the proposals and/or scheme design that will avoid and/or mitigate recreational pressures on the European sites and any functionally linked habitat will be set out in detail within the LW SEMP.

Examples of mitigation/preventative measures that may be included:

i. Design and management of additional public open space outside the proposed development boundary to encourage use away from the European sites.

ii. Restrictions on the number of apartments allowed to keep dogs.

iii. Provision of information in sales packs, informing residents of the presence and importance of the European sites, and how they can help protect them including an outline 'responsible user code.'

iv. Contributions to develop a visitor/householder 'responsible coast user code' including encouragement of visits to non-sensitive locations.

v. Contributions to improving and/or managing access to and/or within the internationally important nature sites including financial contributions.

vi. Contributions to increase recreation management including location-specific interventions e.g. wardening, signage, path management and habitat management, including financial contributions.

vii. Contributions to non-sensitive locations in order improve sites to provide greater visitor enjoyment in order to reduce visits to European sites.

5 Adaptive Management Plan

Annual monitoring of wintering birds, breeding birds, aquatic species and water quality will be undertaken in line with the NEBS for each neighbourhood. Monitoring of all mitigation will also be implemented and may be undertaken at the same time as other ornithological surveys.

[5] AECOM (2017). *Liverpool Local Plan Habitats Regulations Assessment*. Liverpool: AECOM.

The floating pontoon design included in Appendix B is expected to have a minimum estimated life of at least 12 years with minimal maintenance. As per RSPB guidance, yearly maintenance of the floating pontoons will be carried out. Resurfacing of the floating islands will be necessary if they are to remain attractive for birds ever year. It will also be vital to remove the excess of droppings which can build up over the course of the year.

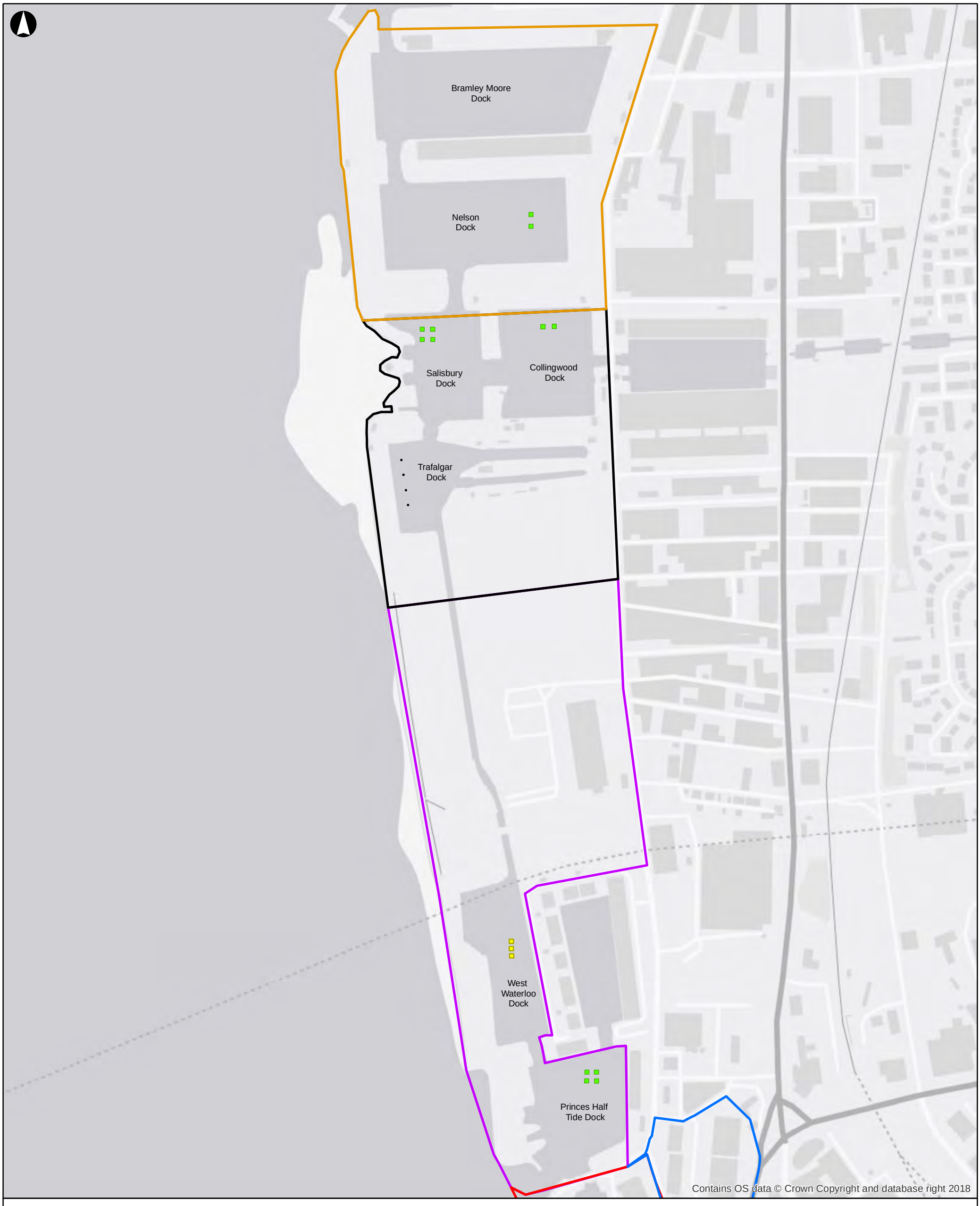
Where pontoons or posts are deemed to have failed or require additional maintenance, repair or replacement will be carried out preferably during late winter or early spring before birds start to nest and wintering bird activity is low. Where deemed necessary through monitoring, additional mitigation may be installed, or locations may need to be changed to maximise the effectiveness. Further adaptive measures may also be required to minimise disturbance, for example through boat traffic.

Further details on all mitigation, monitoring and adaptive management will be included within the LW SEMP, following consultation and agreement with relevant parties and completion of the 2019 breeding bird/foraging common tern surveys.

DOCUMENT CHECKING

	Prepared by	Checked by	Approved by
Name	Amy Martin	Rory Canavan	Rory Canavan
Signature			

A3



Legend

- Cormorant Posts
- Temporary Pontoon
- Permanent Pontoon
- King Edward Triangle
- Princes Dock
- Northern Docks
- Clarence Docks
- Central Dock

Issue	Date	By	Chkd	Appd
P2	04-07-19	JS	AM	RC

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Client
Peel Land & Property (Ports) Ltd

Job Title
Liverpool Waters

Metres
0 60 120 240

Drawing 3.1 - Liverpool Waters Strategic Ecological Mitigation Plan

Scale at A3
1:5,000

Job No	Drawing Status
266384-00	**Issue**

Drawing No	Issue
3.1	**P1**

MXD Location

Appendix A

Designated Site Information

Site	Approx. distance Liverpool Waters	Principle citations/designations
Liverpool Bay SPA	Adjacent to the west	Encompasses marine areas supporting large aggregations of wintering red-throated diver *Gavia stellata* and common scoter *Melanitta nigra* as well as important marine foraging areas of little tern *Sterna albifrons* breeding within the Dee Estuary SPA, and foraging areas of common tern *Sterna hirundo* breeding at the Mersey Narrows & North Wirral Foreshore SPA. Qualifying features: - Red-throated diver in non-breeding season. Annex 1 species – 6.89% of GB population. - Little gull *Hydrocoloeus minutus* in non-breeding season. Annex 1 species. - Common scoter in non-breeding season. Regularly occurring migratory species – 10.31% of NW European population. - Waterbird assemblage. - Little tern in breeding season. Annex 1 species – 6.84% of GB population. - Common tern breeding season. Annex 1 species – 1.80% of GB population.
Mersey Narrows & North Wirral Foreshore SPA	1km west	The Mersey Narrows and North Wirral Foreshore comprises intertidal habitats at Egremont foreshore, man-made lagoons at Seaforth Nature Reserve and extensive intertidal flats at North Wirral Foreshore. Egremont is most important as a feeding habitat for waders at low tide whilst Seaforth is primarily a high-tide roost site, as well as a nesting site for terns. The most notable feature of the site is the exceptionally high density of wintering turnstone *Arenaria interpres*. This site qualifies under **Article 4.2** of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: redshank *Tringa totanus* and turnstone. The site also qualifies under **Article 4.2** of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl.
Mersey Narrows & North Wirral Foreshore Ramsar	1km west	The site comprises intertidal habitats at Egremont foreshore on the south bank of the Mersey, man-made saline and freshwater lagoons at Seaforth on the north bank and the extensive intertidal flats at North Wirral Foreshore. Egremont is most important as a feeding habitat for waders at low tide whilst Seaforth is primarily a high tide roost site. The two areas are separated by approximately 2km and have a constant exchange of bird populations. North Wirral Foreshore supports large numbers of feeding waders at low tide and also includes important high tide roost sites. It is an area of intertidal sands and mudflats with embryonic saltmarsh. The site qualifies under Criterion 4 because it regularly supports important numbers of non-breeding little gull and common tern. The site qualifies under Criterion 5 because it regularly supports 20,000 or more waterbirds including cormorant *Phalacrocorax carbo*, oystercatcher *Haematopus ostralegus*, grey plover *Pluvialis squatarola*, sanderling *Calidris alba*, dunlin *Calidris alpina*, and redshank. The site qualifies under Criterion 6 because it regularly supports 2.4% of the *islandica* subspecies W Europe/Waddensea/Britain/Ireland (non-breeding) population of knot *Calidris canutus* and 2.7% of the *lapponica* subspecies W Europe/NW Africa (non-breeding) population of bar-tailed godwit *Limosa lapponica*.

Site	Approx. distance Liverpool Waters	Principle citations/designations
Dee Estuary SAC	2.7km north west	Annex I habitats that are a primary reason for selection of this site: • Mudflats and sandflats not covered by seawater at low tide • Salicornia and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Estuaries • Annual vegetation of drift lines • Vegetated sea cliffs of the Atlantic and Baltic coasts • Embryonic shifting dunes • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") • Fixed coastal dunes with herbaceous vegetation ("grey dunes") *Priority feature • Humid dune slacks Annex II species present as a qualifying feature, but not a primary reason for site selection: • Sea lamprey • River lamprey Petalwort
Mersey Estuary SPA	3.5km south west	This site qualifies under **Article 4.1** of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **Over winter;** Golden Plover *Pluvialis apricaria*, 3,070 individuals representing at least 1.2% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) This site also qualifies under **Article 4.2** of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **On passage;** Redshank, 3,516 individuals representing at least 2.0% of the Eastern Atlantic - wintering population (5 year peak mean, 1987-1991) Ringed Plover *Charadrius hiaticula*, 1,453 individuals representing at least 2.9% of the Europe/Northern Africa - wintering population (Count, as at 1989) **Over winter;** Dunlin, 44,300 individuals representing at least 3.2% of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean 1991/2 - 1995/6) Pintail *Anas acuta*, 2,744 individuals representing at least 4.6% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) Redshank, 4,689 individuals representing at least 3.1% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)

Site	Approx. distance Liverpool Waters	Principle citations/designations
		Shelduck *Tadorna tadorna*, 5,039 individuals representing at least 1.7% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) Teal *Anas crecca*, 11,667 individuals representing at least 2.9% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) **Assemblage qualification: A wetland of international importance.** The area qualifies under **Article 4.2** of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl. Over winter, the area regularly supports 99,467 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: curlew *Numenius arquata*, black-tailed godwit *Limosa limosa islandica*, lapwing *Vanellus vanellus*, grey plover, wigeon *Anas penelope*, great crested grebe *Podiceps cristatus*, redshank, dunlin, pintail, teal, shelduck, golden plover.
Mersey Estuary Ramsar	3.5km south west	The area qualifies under Criterion 5 because it regularly supports an assemblage of international importance with peak counts in winter of 89576 waterfowl (5 year peak mean 1998/99-2002/2003). The area qualifies under Criterion 6 (species/populations occurring at levels of international importance). <u>Qualifying species/populations</u> Species with peak counts in spring/autumn: • Common shelduck – 12676 individuals, representing an average of 4.2% of the population (5 year peak mean 1998/99-2002/3) • Black-tailed godwit – 2011 individuals, representing an average of 5.7% of the population (5 year peak mean 1998/99-2002/3) • Common redshank – 6651 individuals, representing an average of 2.6% of the population (5 year peak mean 1998/99-2002/3) Species with peak counts in winter: • Eurasian teal – 10613 individuals, representing an average of 2.6% of the population (5 year peak mean 1998/99-2002/3) • Northern pintail - 565 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/99-2002/3) • Dunlin – 48364 individuals, representing an average of 3.6% of the population (5 year peak mean 1998/99-2002/3)
Ribble & Alt Estuaries SPA	4.5km north	This site qualifies under **Article 4.1** of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season;** Common tern, 182 pairs representing at least 1.5% of the breeding population in Great Britain (Count, as at 1996) Ruff *Philomachus pugnax*, 1 pairs representing at least 9.1% of the breeding population in Great Britain (Count as at late 1980's) **Over winter;** Bar-tailed godwit, 18,958 individuals representing at least 35.8% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)

Site	Approx. distance Liverpool Waters	Principle citations/designations
		Bewick's Swan *Cygnus columbianus bewickii*, 229 individuals representing at least 3.3% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) Golden plover, 4,277 individuals representing at least 1.7% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) Whooper Swan *Cygnus cygnus,* 159 individuals representing at least 2.9% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) This site also qualifies under **Article 4.2** of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season;** Lesser black-backed gull *Larus fuscus*, 1,800 pairs representing at least 1.5% of the breeding Western Europe/Mediterranean/Western Africa population (Count, as at 1993) **On passage;** Ringed plover, 995 individuals representing at least 2.0% of the Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6) Sanderling, 6,172 individuals representing at least 6.2% of the Eastern Atlantic/Western & Southern Africa - wintering population (3 year mean May 1993 - 1995) **Over winter;** • Black-tailed godwit, 819 individuals representing at least 1.2% of the wintering Iceland - breeding population (5 year peak mean 1991/2 - 1995/6) • Dunlin, 39,952 individuals representing at least 2.9% of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean 1991/2 - 1995/6) • Grey plover, 6,073 individuals representing at least 4.0% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6) • Knot, 57,865 individuals representing at least 16.5% of the wintering North eastern Canada/Greenland/Iceland/North western Europe population (5 year peak mean 1991/2 - 1995/6) • Oystercatcher, 16,159 individuals representing at least 1.8% of the wintering Europe & Northern/Western Africa population (5 year peak mean 1991/2 - 1995/6) • Pink-footed goose *Anser brachyrhynchus*, 23,860 individuals representing at least 10.6% of the wintering Eastern Greenland/Iceland/UK population (5 year peak mean 1991/2 - 1995/6) • Pintail, 3,333 individuals representing at least 5.6% of the wintering North western Europe population (5 year peak mean 1991/2 - 1995/6) • Redshank, 2,708 individuals representing at least 1.8% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)

Site	Approx. distance Liverpool Waters	Principle citations/designations
		• Sanderling, 2,859 individuals representing at least 2.9% of the wintering Eastern Atlantic/Western & Southern Africa - wintering population (5 year peak mean 1991/2 - 1995/6) • Shelduck, 4,103 individuals representing at least 1.4% of the wintering North western Europe population (5 year peak mean 1991/2 - 1995/6) • Teal, 7,641 individuals representing at least 1.9% of the wintering North western Europe population (5 year peak mean 1991/2 - 1995/6) • Wigeon, 84,699 individuals representing at least 6.8% of the wintering Western Siberia/North western/North eastern Europe population (5 year peak mean 1991/2 - 1995/6) **Assemblage qualification: A seabird assemblage of international importance** The area qualifies under **Article 4.2** of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds. During the breeding season, the area regularly supports 29,236 individual seabirds including: black-headed gull *Larus ridibundus*, lesser black-backed gull, common tern. **Assemblage qualification: A wetland of international importance.** The area qualifies under **Article 4.2** of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl. Over winter, the area regularly supports 301,449 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: grey plover, whooper swan, golden plover, bar-tailed godwit, pink-footed goose, shelduck, wigeon, teal, Bewick's swan, oystercatcher, curlew, knot, sanderling dunlin, black-tailed godwit, redshank, cormorant, common scoter, lapwing, pintail.
Ribble & Alt Estuaries Ramsar	4.5km north	A large area including two estuaries which form part of the chain of west coast sites which fringe the Irish Sea. The site is formed by extensive sand and mudflats backed, in the north, by the saltmarsh of the Ribble Estuary and, to the south, the sand dunes of the Sefton Coast. The tidal flats and saltmarsh support internationally important populations of waterfowl in winter and the sand dunes support vegetation communities and amphibian populations of international importance. The site qualifies under **Criterion 2** supporting up to 40% of the Great Britain population of natterjack toad *Bufo calamita*. The site qualifies under **Criterion 5** because it regularly supports an assemblage of international importance with peak counts in winter of 222038 waterfowl (5 year peak mean 1998/99-2002/3). The site qualifies under **Criterion 6** (species/populations occurring at levels of international importance). <u>Qualifying species/populations</u> Species regularly supported during the breeding season: • Lesser black-backed gull - 4108 apparently occupied nests, representing an average of 2.7% of the breeding population. Species with peak counts in spring/autumn (5 year peak means 1998/9-2002/3)

Site	Approx. distance Liverpool Waters	Principle citations/designations
		• Ringed plover - 3761 individuals, representing an average of 5.1% of the population • Grey plover - 11021 individuals, representing an average of 4.4% of the population • Red knot - 42692 individuals, representing an average of 9.4% of the population • Sanderling - 7401 individuals, representing an average of 6% of the population • Dunlin - 38196 individuals, representing an average of 2.8% of the population • Black-tailed godwit - 3323 individuals, representing an average of 9.4% of the population • Common redshank - 4465 individuals, representing an average of 1.7% of the population • Lesser black-backed gull - 1747 individuals, representing an average of 2.8% of the GB population Species with peak counts in winter: • Bewick's swan - 2944 individuals, representing an average of 3.7% of the GB population • Whooper swan - 211 individuals, representing an average of 1% of the population • Pink-footed goose - 6552 individuals, representing an average of 2.7% of the population • Common shelduck - 2944 individuals, representing an average of 3.7% of the GB population • Eurasian wigeon - 69841 individuals, representing an average of 4.6% of the population • Eurasian teal - 5107 individuals, representing an average of 1.2% of the population • Northern pintail - 1497 individuals, representing an average of 2.4% of the population • Eurasian oystercatcher -18926 individuals, representing an average of 1.8% of the population • Bar-tailed godwit - 13935 individuals, representing an average of 11.6% of the population
Sefton Coast SAC	5.0km north	**Annex I habitats** that are a primary reason for selection of this site: Embryonic shifting dunes • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") • Fixed coastal dunes with herbaceous vegetation ("grey dunes") *Priority feature • Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae) • Humid dune slacks **Annex I habitats** present as a qualifying feature, but not a primary reason for selection of this site: • Atlantic decalcified fixed dunes (Calluno-Ulicetea) *Priority feature

Site	Approx. distance Liverpool Waters	Principle citations/designations
		Annex II species that are a primary reason for selection of this site: • Petalwort **Annex II species** present as a qualifying feature, but not a primary reason for site selection: • Great crested newt *Triturus cristatus*
Dee Estuary SPA	13km west	Large funnel-shaped, sheltered estuary between England and Wales that supports extensive areas of intertidal sand-flats, mud-flats and saltmarsh. Where agricultural land-claim has not occurred, the saltmarshes grade into transitional brackish and swamp vegetation on the upper shore. The site is of major importance for waterbirds. This site qualifies under **Article 4.1** of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season;** • Common tern, 277 pairs representing at least 2.3% of the breeding population in Great Britain (5 year mean 1991-95) • Little tern, 56 pairs representing at least 2.3% of the breeding population in Great Britain (RSPB, 5 year mean 1991-95) **On passage;** • Sandwich tern *Sterna sandvicensis*, 818 individuals representing at least 5.8% of the population in Great Britain (5 year mean 1991-95) **Over winter;** • Bar-tailed godwit, 1,013 individuals representing at least 1.9% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **On passage;** • Redshank, 8,451 individuals representing at least 4.8% of the Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6) **Over winter;** • Black-tailed godwit, 1,739 individuals representing at least 2.5% of the wintering Iceland - breeding population (5 year peak mean 1991/2 - 1995/6) • Curlew, 4,028 individuals representing at least 1.2% of the wintering Europe - breeding population (5 year peak mean 1991/2 - 1995/6) • Dunlin, 22,479 individuals representing at least 1.6% of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean 1991/2 - 1995/6) • Grey plover, 2,193 individuals representing at least 1.5% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6) • Knot, 21,553 individuals representing at least 6.2% of the wintering North eastern Canada/Greenland/Iceland/North western Europe population (5 year peak mean 1991/2 - 1995/6)

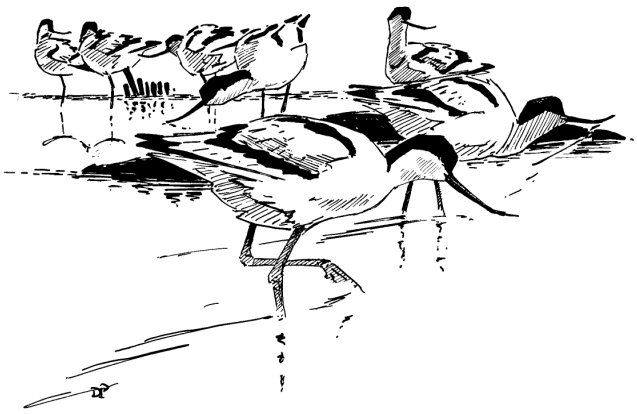
Site	Approx. distance Liverpool Waters	Principle citations/designations
		• Oystercatcher, 28,434 individuals representing at least 3.2% of the wintering Europe & Northern/Western Africa population (5 year peak mean 1991/2 - 1995/6) • Pintail, 6,498 individuals representing at least 10.8% of the wintering North western Europe population (5 year peak mean 1991/2 - 1995/6) • Redshank, 6,382 individuals representing at least 4.3% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6) Shelduck, 6,827 individuals representing at least 2.3% of the wintering North western Europe population (5 year peak mean 1991/2 - 1995/6) Teal, 5,918 individuals representing at least 1.5% of the wintering North western Europe population (5 year peak mean 1991/2 - 1995/6) **Assemblage qualification: A wetland of international importance.** The area qualifies under **Article 4.2** of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl Over winter, the area regularly supports 130,408 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: black-tailed godwit, shelduck, teal, pintail, oystercatcher, grey plover, bar-tailed godwit, dunlin, sanderling, curlew, redshank, cormorant, wigeon, mallard, lapwing and knot.
Dee Estuary Ramsar	13km west	The site qualifies under **Criterion 1** due to extensive mud and sand flats (20km by 9km) with large expanses of saltmarsh towards the head of the estuary. Habitats Directive Annex 1 features present include: • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Annual vegetation of drift lines • Vegetated sea cliffs of the Atlantic and Baltic coasts • Salicornia and other annuals colonising mud and sand • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) • Embryonic shifting dunes • Shifting dunes along the shoreline with Ammophila arenaria ("white dunes") • Fixed dunes with herbaceous vegetation ("grey dunes") • Humid dune slacks **Criterion 2** – it supports breeding colonies of the vulnerable natterjack toad *Epidalea calamita.* **Criterion 5** – Assemblages of international importance: Species with peak counts in winter: Non-breeding season regularly supports 120,726 individual waterbirds (5 year peak mean 1994/5 – 1998/9). **Criterion 6** – species/populations occurring at levels of international importance: Qualifying species/populations (5 year peak means 1994/95 – 1998/99)

Site	Approx. distance Liverpool Waters	Principle citations/designations
		Species with peak counts in spring/autumn: • Redshank - 8,795 individuals, representing an average of 5.9% of the Eastern Atlantic population Species with peak counts in winter: • Teal - 5,251 individuals, representing an average of 1.3% of the population • Shelduck - 7,725 individuals, representing an average of 2.6% of the population • Oystercatcher - 22,677 individuals, representing an average of 2.5% of the population • Curlew - 3,899 individuals, representing an average of 1.1% of the Europe population • Pintail - 5,407 individuals, representing an average of 9.0% of the population • Grey plover - 1,643 individuals, representing an average of 1.1% of the GB population • Knot - 12,394 individuals, representing an average of 3.5% of the GB population • Dunlin - 27,769 individuals, representing an average of 2.0% of the population • Black-tailed godwit - 1,747 individuals, representing an average of 2.5% of the population • Bar-tailed godwit - 1,150 individuals, representing an average of 1.2% of the Europe population • Redshank - 5,293 individuals representing an average of 3.5% Eastern Atlantic population

Appendix B

RSPB Design of Management of Rafts

RSPB a million voices for nature



Design of management of rafts

Rafts are a useful way of providing island habitat in areas of deep or fluctuating water levels. Their purpose is to improve breeding success by providing areas safe from flooding, disturbance or predation. Rafts are unlikely to attract terrestrial predators and so are useful where islands would be too close to shore for safety. They also provide wildfowl with loafing spots and are often used as resting places by various bird species during the winter.

Main factors to consider when making a raft

There are many conflicting requirements when constructing a nesting raft.

- The ability to float, preferably with the deck just above the water line.
- The ability to rise and fall easily with the water over the maximum flood range.
- Stability, so that the raft is not tipped or spun by current, waves or wind.
- A dry, sheltered nest site, which does not attract the attention of crows or other avian predators. The nest area must be high enough not to be swamped by storm waves.
- Means of access and some protection from waves and current for young birds.
- Harmonious blending with the surroundings if possible.
- Practical factors e.g. water not excessively deep, lake shore accessible by vehicle, for bringing in boat, raft and materials, and for regular maintenance checks.
- On SSSIs, formal consent may be required from NE, SNH or CCW.

Construction

Although rafts vary in character and design, some basic considerations apply to each.

1. Timber rafts tend to absorb water and sink, although pine or other light wood floats better than heavy timber. In most cases, additional floats must be used if the raft is to last for more than one season.

2. **Flotation blocks**: Small rafts can be floated with plastic 4.5 litre containers. Slightly larger rafts will stay afloat with 22 litre plastic drums. Rafts in the range of 1.2 - 1.8 m in dimension require closed cell polystyrene blocks, polystyrene scraps, airtight metal drums (including old oil drums). Polystyrene is easily held in place and can be adjusted to achieve right buoyancy. It should be packed into strong polythene to prevent it from breaking up and littering the environment. Metal drums need to be weighted so that they do not float too high. The flotation blocks must be thoroughly cleaned before they are brought to the site to prevent pollution. Annual checks and maintenance is important to ensure that the raft remains secure and firm, and that the flotation devices are not disintegrating or leaking.

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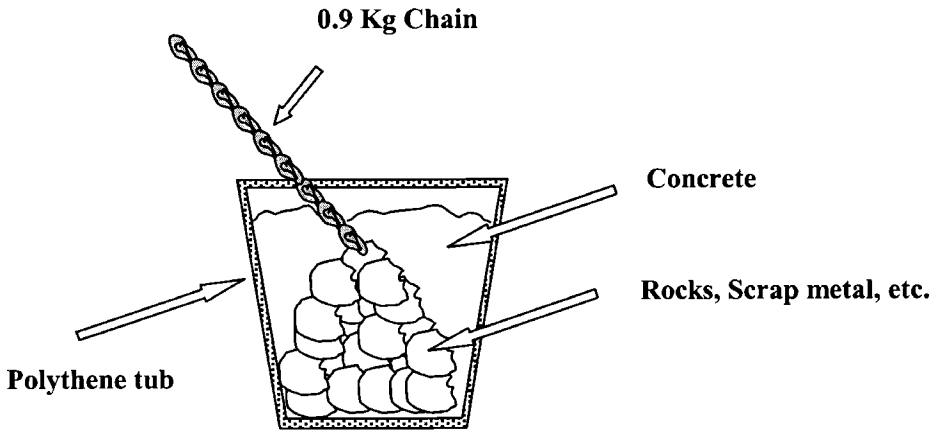
3. **Anchors:** Two anchors are better than one and should be attached to opposite corners of the raft to keep it from swinging in the wind. Anchor to the bottom, not to the shore, to prevent vandalism and to keep rats or weasels from getting to the raft.
    a. Anchors can be made from breeze blocks, concrete blocks etc. The wire anchor rope should be tied to a short section of chain or to an eye bolt; for large rafts use 19 mm circumference flexible steel wire rope with a 4 ton breaking strain to ensure that the mooring is secure. An anchor weighing about 50 kg is suitable for most rafts. It can be made in a large polythene garden tub half filled with scrap metal or rocks. Wrap one end of an appropriate length of chain around the scrap and fill the tub with concrete. Once the concrete has set, the anchor can be turned out of the mould and the chain bolted to the raft. Three thickness of heavy gauge (24mm) polypropylene rope can be used instead to save money, especially if the raft is in deep water. Where strong winds or currents are likely, several 50kg anchors may be needed to securely hold a 3m x 2m turned raft.



    b. Where one large anchor is too cumbersome to manage, a smaller (e.g. 9 litre) container can be used as a mould and concrete sinkers can be cast with holes through their centres. One sinker can be fastened to the end of the wire and others can be threaded on and allowed to slide to the bottom before fixing the other end of the wire to the raft.

4. Where more than three rafts are to be moored in a string there should be some additional anchor points from the middle rafts to keep the string from sagging before a strong wind and dragging the main moorings.

5. Various nest boxes and duckling ramps can be added to the raft superstructure depending on the species of birds that the raft is intended for. Duck baskets should be at least 1.2 m apart and facing away from each other. They should be tilted slightly upwards at the front and lined with dead grass or some wood shavings. Baskets should be positioned in early January and left until early September, when they should be taken up, cleaned of nesting material and stored under cover.

Species specifications:

1. Wader and tern nesting rafts, in most cases, should be bare of vegetation and covered with a material attractive to the intended nesting species.
2. Wildfowl rafts require more vegetation. Rushes, reeds or small willows are suitable, planted either around the edges or over the deck of the raft leaving pathways to the nest box or central clearing. Plants survive best on raft designs with an open mesh or slatted platform just above the water

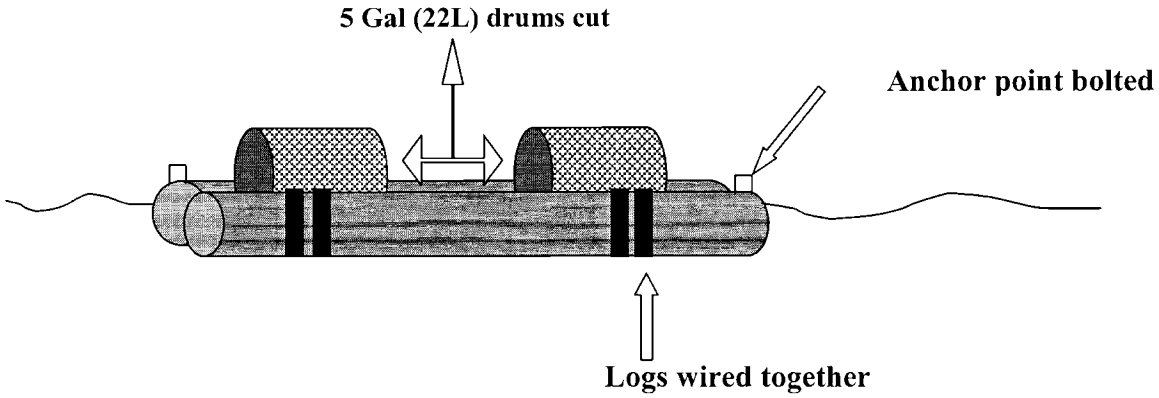
line, covered with moisture-holding mulch in which the plants can root and through which they can reach the water.

Some raft models

The area and water characteristics determine the best design for a raft. Some of the designs used on RSPB reserves are described below as a guide.

Simple log or telegraph pole rafts

Logs from nearby felling operations or used GPO poles are often available free and can be used to provide the basis both for simple rafts and more elaborate designs. Without any additional support, the timbers eventually sink low in the water and sprout a floating garden, which should prove to be attractive to nesting wildfowl if the raft is sited in a calm area.



The standard raft

This raft is made of pressure treated (do not use CCA treated) softwood and is 3 meters square. Design includes chick shelters, a re-entry ramp and an optional security fence. Buoyancy is provided by two high-density polystyrene blocks. Raft is anchored to concrete blocks by a chain attached to a marker buoy. It is covered with gravel and rocks, and any plant growth is removed each winter.

Raft platform:
Mainframe: 100x200mm timber, bolted together in each corner through overlapping ends (two upper, two lower), one top inset 150mm to allow for re-entry ramp. Deck 25x150mm planking, laid on and nailed (75mm galvanized nails) to lower mainframe timbers. Sub frame 50x75mm runners to support flotation and strengthen deck, nailed (150mm nails); main flotation holders/deck support 50x100mm runners; sides 25x150mm planking, nailed flush with top of upper mainframe timbers along the lower sides to hold in gravel etc, and flush with the bottom of the mainframe timbers along the upper sides to hold the flotation devices in place.

Buoyancy:
Blocks of 380x600x2700mm high density polystyrene foam, painted (optional) with BP Aquaseal 44 bituminous paint (as suitable for use inside cold water tanks) to water seal and strengthen the polystyrene; two optional straps per float block, 1,420mm strips of polystyrene webbing (or 50mm chair webbing as a temporary measure, eg during launching) with eyelet holes for nailing to frame. Once in the water, the weight of the raft is sufficient to hold the polystyrene in place without any additional fixings, even in extreme conditions.

Mooring:
Mooring ring bolted through center of mainframe timber (bolt fixed with two nuts so that it can swivel freely), connected preferably to a chain or a 20mm diameter hawser-lay polypropylene rope (which will not rot, but can be chafed), with hard eyes and shackles each end. Tether a 30-inch circumference marker buoy to the raft end of the chain or rope with a length of polypropylene rope to allow the raft to be detached, without having to pull up or lose the anchor.

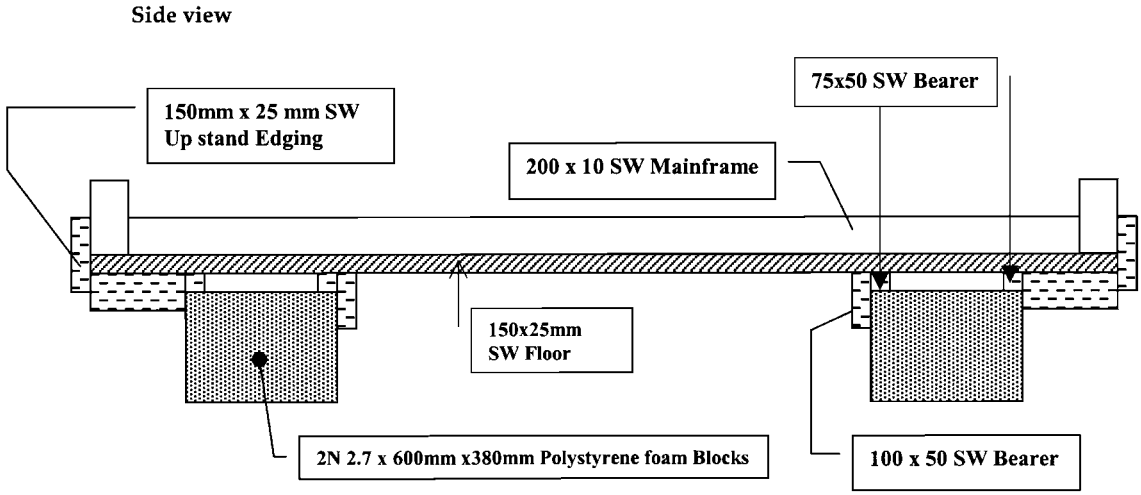
Anchor:
Multiple small weights (up to $1m^3$ concrete as a total) for ease of transport. Four buckets 250mm high by 300mm diameter of concrete, eyebolt set in centre; weights connected in pairs by shackles to 300mm lengths of chain; fixed to mooring by placing two pairs of weights together with the connecting chains forming a cross, and attaching the mooring rope shackle to the point where the chains cross. Exposed sites where wind and waves are strong may require more anchor weights.

Shelters (to protect from rain):
These comprise 1m long 25x150mm planks located in opposite corners, nailed flat onto end of upper mainframe timber, side plank and 50x75mm end block.

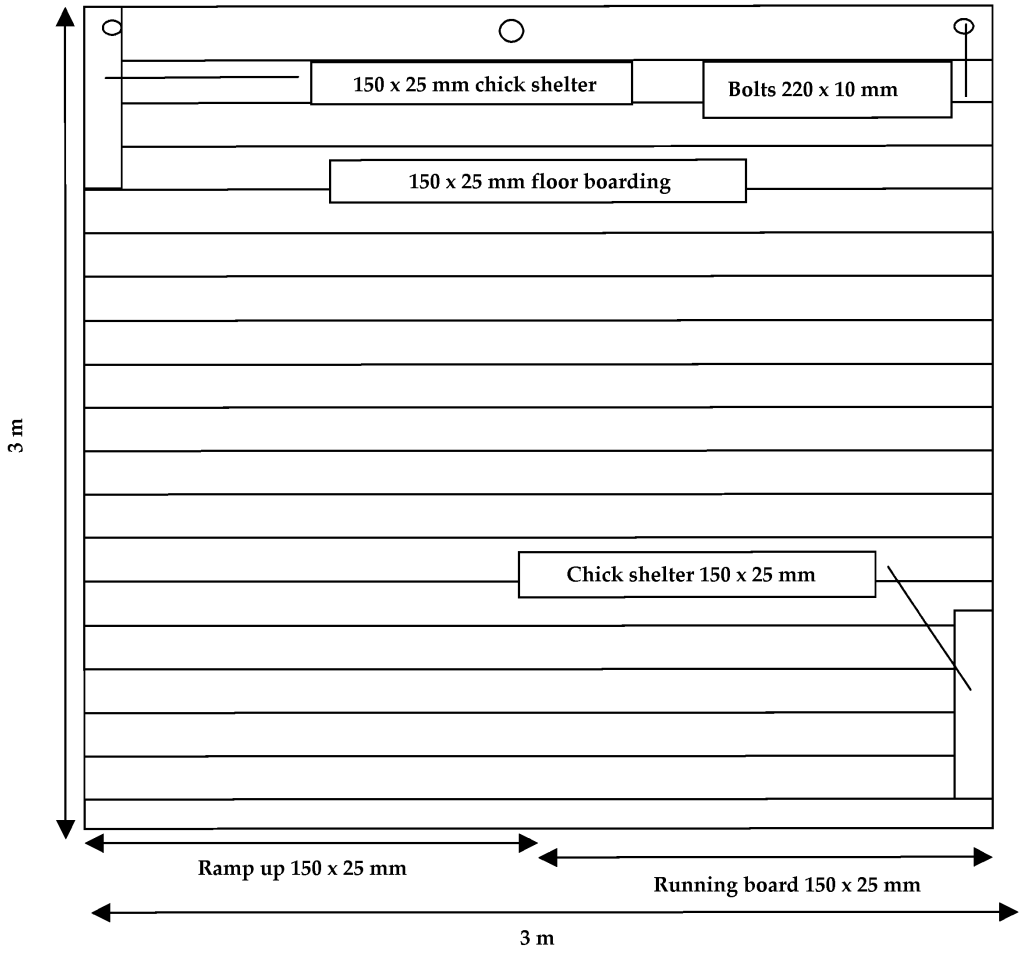
Gravel covering:
Preferably of 15mm-25mm gravel with larger pieces and rocks to provide shelter, and give sufficient weight to push running board down to water level.

Re- entry system (for chicks falling overboard):
These are located on opposite (lee) side of raft to the mooring ring: running board 3m, 25x150mm plank nailed to bottom of the two lower mainframes. Ramp (1.5m, 25x150mm plank) sloping up to top corner of mainframe, supported by up stand, nailed. Block gap under raft behind ramp with 25x150mm skirt plank.

Optional removable security fence:
These comprise four frames 230mm by 0.3m, made from 50x50mm planks covered with 25mm chicken wire, bolted along each side and fixed at top corners.



View from above

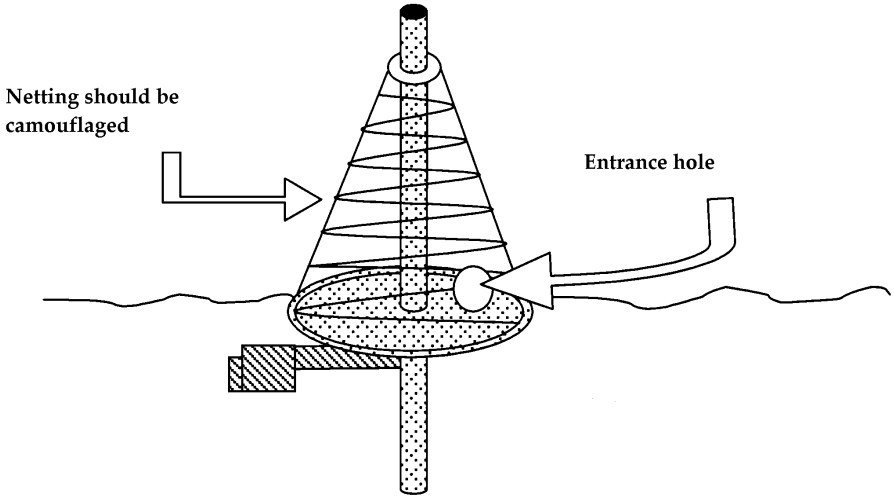


A floating wildfowl nest for use on rivers

This design, successfully used on the Ray, near Oxford, is intended to overcome the problems posed by strong currents, which make it difficult for wildfowl to nest successfully on rivers. Chick survival is best where the floating nest is sited on a quiet backwater with gently sloping banks so that, when a chick leaves the nest, it can get to the shore and climb out despite the current.

1. Drive a suitable length of 50mm diameter steel pipe into the riverbed to provide an anchor pole on which the floating nest can rise and fall with changes in water level.
2. Cut out a circular platform from marine plywood and cut a hole in its centre so that it fits over the anchor pipe.
3. Screw three boards to the circular plywood piece, so that they form an equilateral triangle to make a frame underneath the platform for the floats.
4. Strap three 4.5 litre plastic or metal tins to the triangular frame, one each side. If metal tins are used, they should be well painted with bitumen paint and coated inside with a spoonful of old engine oil before capping.
5. Attach three metal struts, evenly spaced, to the edge of the platform, joined at the upper end to a ring that fits over the anchor pipe. This upper ring, with the hole in the platform, forms the bearing on which the nest rises and falls on the pipe.

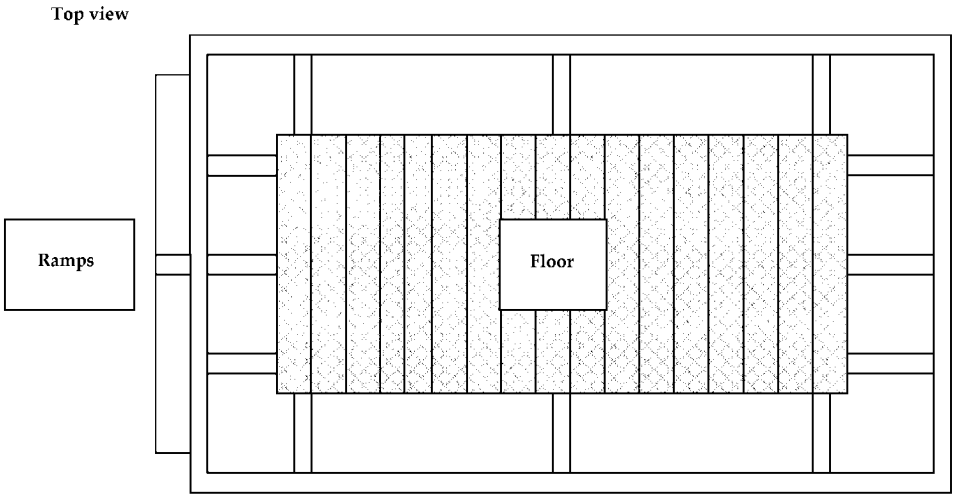
6. Fasten a conical covering of light but firm netting around the outside of the strut assembly, and use vegetation to provide some shelter. Leave a 150 mm diameter entrance on one side.
7. Slide the platform down over the pipe. If it tends to spin in the current, attach a rudder to the floats to keep it properly orientated. The entrance hole should be arranged to face the nearest bank.



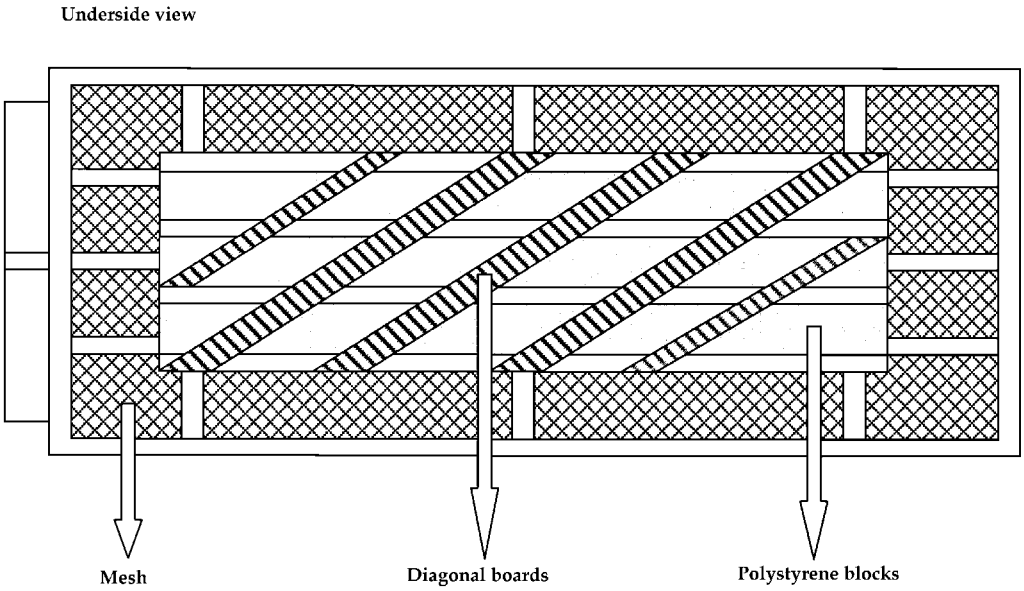
A square raft

This design is popular and has proved to be highly effective and weatherproof. Similar structures are in use in many reserves.

a. Construct a framework of 25 x 150mm boards or similar. Nail the flooring across the top of the frame leaving the margins open to take vegetation and nail duckling ramps to one end of the raft. Use galvanized nails since they do not rust.



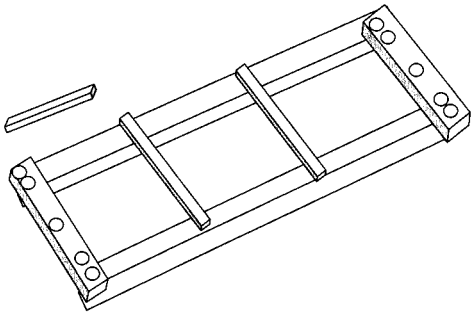
b. Turn the raft over. Staple close-mesh galvanized wire netting across the bottom of the raft, leaving the central part free to hold the flotation blocks.
c. Place 150mm thick polystyrene blocks in the uncovered centre of the frame. Hold the polystyrene in place with diagonal boards nailed across the frame.



d. Turn the raft right way up. Cut out blocks of rush, willow etc. to fit into the margins of the frame. Fit anchor bolts to two opposite corners. Fix a nesting box or basket if required. You can cover the raft with some gravel. Finally, tow the raft into the position and anchor it firmly.

A heavier variation:

The raft described below is very successful when attracting terns to nest. Bare shingle is required for the nesting, but a completely exposed raft results in high chick mortality. At about one week old, tern chicks leap overboard at the slightest disturbance. This can be prevented by providing them with small shelters to hide underneath.



1. Drill the sleepers as indicated in the diagram, using a brace and a bit, and bolt them together with eight 250mm coach bolts. Drill and fix anchor bolts in the end sleepers.
2. Drill and bolt the cross members to the side sleepers. These are required to make a rigid structure and to resist the upward pressure of the floats.
3. Nail the side battens into position; these help hold the shingle in place.
4. There are two ways to floor the raft. One is to trap plastic-coated chain link fencing, covered in heavy-duty polythene, under the cross braces. Staple the fencing firmly to the sleepers. Alternatively, nail old garage doors or other suitable sturdy timber to the cross members and spread the flooring with a layer of concrete to help keep the shingle in place.
5. Float the raft. Unless you have mechanical help, placing approximately 0.8 cubic metres of polystyrene blocks under the raft for flotation will require a number of water-hardy volunteers.
6. The amount of polystyrene needed varies with the weight of the raft so trials are necessary. Provide some extra flotation to compensate for the shingle, which is added afterwards. The polystyrene stays in place between the sleepers due to its buoyancy and should not need fastening.
7. Spread a layer of shingle over the flooring.
8. Fix ramps or walls to the rafts sides, place a shelter on it, tow it into position and anchor it by means of bolts in the end sleepers.

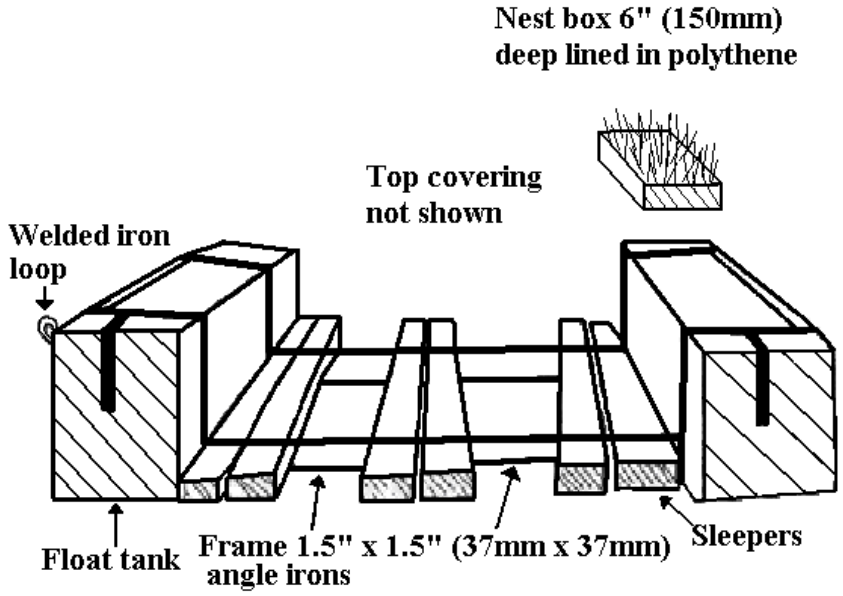
Welded Rafts

These two models were designed for the specific needs of a particular area. They require a great deal of skills and therefore are only suitable if none of the previous ones can be used. The designs shown have proved to have an estimated life of at least 12 years with minimal maintenance. These types depend on availability of suitable welding equipment and skills, and sheet-metal float tanks used by gravel companies for ferrying electrical equipment around wet pits.

Type A
Weld together three float tanks and attach a rim of logs with welded metal straps. To moor the raft, fix a wire anchor rope to a 50 kg scrap iron or concrete anchor. This simple but strong raft gives a surface area of 6.7 square metres. It successfully attracts ducks and geese, but has two disadvantages. It is so buoyant that the nest floats at least a foot above the water so that, unless a ramp is attached to help them, once the chicks leave the raft they cannot return. Soil ultimately dries out or is dislodged and must be replaced at intervals along with fresh vegetation.

Type B
This rather elaborate design features a semi-flexible welded frame, which makes the raft very durable in exposed conditions. The float tanks are the same size as in the previous design; the sleepers are topped with a grid that holds nesting cover.

Construction:
- Weld the frame together and to the float tanks. Weld two anchor bolts to opposite corners.
- Manoeuvre the completed frame into the water.
- Slide the sleepers into position. Leave gaps between the pairs of sleepers so that plant roots can reach the water.
- Cover the top of the frame's central section with narrow-mesh galvanized metal.
- Fix the nesting boxes on top of the floats
- Cover the mesh with mulch or soil and suitable plants. Plant up the nesting boxes.
- Tow the raft into position and anchor from the anchor bolts.



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