Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Appendix 25, Annex M to Deadline 1 Submission: Applicant's Responses to the Examining Authority's First Written Questions – ExQ 1.12.1

Relevant Examination Deadline: 1

Submitted by Vattenfall Wind Power Ltd

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Contents

1 Introduction

1 This note has been drafted in response to question 1.12.1 raised by ExA following Issue Specific Hearing 2 (ISH2) on 12/12/2018.

2 The question has been extracted into this supplementary note for ease of reference.

3 The Applicant notes that this subject is also addressed in the Oral summary speaking notes of ISH2.

2 ExA Question 1.12.1

4 The ExA Question 1.12.1 is repeated below and is asked of The Applicant, Port of London Authority, Estuary Services Ltd, London Pilots, London Gateway Port Ltd, Port of Tilbury London Ltd, Trinity House and the Maritime and Coastguard Agency.

Navigability of the inshore approach to NE Spit pilot station: Several Interested Parties and Other Persons at Issue Specific Hearing 2 (ISH2) raised concerns about continued prudent navigation by deep draught vessels "north-south/south-north" inshore of the proposed Thanet Extension Offshore Wind Farm. Evidence on use of the "inshore route" by large commercial vessels restricted in ability to manoeuvre ("RiAM") by reason of length, type or draught (i.e. on passage between the Dover Strait and the Princes Channel or the Fishermans Gat; to take refuge anchorage at Margate Roads or Tongue anchorages; or to transfer pilots at North East Spit or on passage between the Dover Strait and the northerly extent of the deep-water channels into the Thames at Sunk) as follows:

- ***a) what would be a reasonable maximum size of vessel by length, type or draught that is able to prudently use the inshore route at present in moderate MetOcean conditions?***
- ***b) What is an estimated existing annualised use of the inshore route by "RiAM" vessels in baseline conditions of sea-room without the Thanet Offshore Wind Farm Extension (TEOWF);***
- ***c) What would be a reasonably foreseeable annualised future use of the inshore route by "RiAM" vessels based on trend for change of vessel size using the Thames ports and anchorages as a whole in baseline conditions of sea-room without TEOWF;***
- ***d) What would be a reasonably foreseeable annualised future use of the inshore route by "RiAM" vessels as a consequence of the reduction in sea room due to the pinch-point presented between the NE Spit bank and the proposed TEOWF Red Line Boundary plus 500m proposed safety zone during construction and maintenance, with vessel size mix and volume of traffic using the Thames ports and anchorages as a whole as per baseline;***
- ***e) What would be a reasonably foreseeable annualised future use of the inshore route by "RiAM" vessels as a consequence of the reduction in sea room due to the pinch-point presented between the NE Spit bank and the proposed TEOWF Red Line Boundary plus 500m. proposed safety zone during construction and maintenance with reasonable predictions of change of traffic mix based on trend for change in vessel size and number of vessels using the Thames ports and anchorages as a whole.***

In responding to this question, please have regard to Annex 3 of MGN:543 – "Shipping Route" Template Notes and indicate whether continued use of the "inshore" channel by "RiAM" vessels is likely to be intolerable, tolerable on the basis of being ALARP (identifying the risk assessment and mitigation measures that control risk to ALARP) or broadly acceptable.

5 Before dealing with the specific questions asked under (a)-(e), it is appropriate to provide some context having regard to the introductory part of the ExA question.

6 The ExA may wish to note that the Navigation chart prepared as part of the actions from ISH2 is presented at Annex A of the ISH Actions response and presents Thanet Extension Offshore Wind Farm and the wider area in the context of vessels navigating to and from the Thames Estuary.

3 Applicants Response – Context: Depth and Draught requirements of Vessels

3.1 Charted depths

7 The first point is that the Applicant does not consider that depth limitations on navigability in the area "north-south/south-north" inshore of the proposed Thanet Extension Offshore Wind Farm" will change as a result of the extension as the Extension has no bearing on the limiting depth for vessel transiting into the Thames Estuary, such that "continued prudent navigation by deep draught vessels" as mentioned in the question is not affected by the Extension. This can be explained as follows.

8 Depths shown on a nautical chart are provided relative to Chart Datum which approximately equates to the Lowest Astronomical Tide. Therefore, these are the minimum depths of water that are expected to occur at that location.

9 To supplement the information provided on nautical charts, the PLA regularly issue a critical depths list (Ref: http://www.pla.co.uk/hydrographics/data/navinfo/critlist.pdf - most recently updated on 07-Jan-2019) to provide mariners with guidance on the minimum depth that will be expected in named areas and to inform their passage planning. on 07-Jan-2019). The PLA stated 'critical depth' for NE Spit is currently 8.6m. and the critical depths for Fishermans Gat and Princes Channel are 8.6m and 8.0m respectively. Therefore, Fishermans Gat and Princes Channel (which are outside of the study area) are considered the areas of limiting depth for vessels transiting through NE Spit on route to terminals in the Thames Estuary (rather than depth limitations in the area of NE Spit itself).

3.2 Depth of Water due to tide and Underkeel Clearance (UKC)

10 Whilst the above two paragraphs explain the minimum expected depth at Lowest Astronomical Tide, to obtain the actual depth of water at any time the height of tide needs to be added. The referenced location for tidal heights in this area is at Margate with mean high water spring tide levels (MHWS) and mean low water spring tide levels (MLWS). Associated tidal ranges are given in the table below for Ramsgate and Margate and, for example, it can be shown that at Mean High Water Springs (which occur approximately once a fortnight) the depth of water may be 5.2 and 4.8m above the depth declared on the chart (or above the declared critical depth). Section 7.1.3 of the NRA presents analysis of actual transits in relation to the varying height of tide.

Place	MHWS (m above Chart Datum)	MLWS (m above Chart Datum)	Spring Tidal Range (m)
Ramsgate	5.2	0.6	4.6
Margate	4.8	0.5	4.3

11 Underkeel clearance (UKC) requirements should also be noted which is the amount of water the mariner will plan between the keel and the sea bed during their transit and will consider the expected water levels. The PLA indicate (https://www.pla.co.uk/assets/nrawg48report.pdf) that a minimum UKC of 0.9m should be incorporated on a rising (flood) tide and a minimum of 1.4m should be incorporated on a falling (ebb) tide for vessels of between 12.5m to 13.0m draught. In practical terms, and at ISH2, the PLA state that they conservatively allow for 1.5m regardless of whether tide is rising or falling. It should be noted that Mariners may elect to incorporate additional contingency due to other factors including weather conditions, decision conservatism.

12 The maximum available depth (based on MHWS at Margate) at NE Spit is therefore 13.4m and, incorporating the 1.5m UKC, this means a theoretical maximum draught vessel of 11.9m would navigate this area.

13 The minimum available depth of water is 8.6m (same as the critical depth) and, incorporating the stated 1.5m UKC this means a theoretical maximum draught vessel of 7.1m would navigate this area when there is no height of tide.

14 Navigability in the area “north-south/south-north” inshore of the proposed Thanet Extension Offshore Wind Farm” is not limited by depth in the existing state and the Extension has no bearing on the available depth for “deep draught vessels” (i.e. the Extension does not displace vessels to shallower waters than are currently available).

3.3 ‘Vessels Restricted in their ability to manoeuvre’ and ‘Vessels constrained by draught’

15 Secondly, the Applicant wishes to clarify the definition of ‘Restricted in their Ability to Manoeuvre’ and its applicability to the assessment of the study area.

16 The following general definition comes from Rule 3 of the International Regulations for Preventing Collisions at Sea 1972, as amended:

17 Restricted in Her Ability to Manoeuvre

- The term restricted in her ability to manoeuvre means a vessel which from the nature of her work is restricted in her ability to manoeuvre as required by these rules and is therefore unable to keep out of the way of another vessel. The term vessels restricted in their ability to manoeuvre shall include but not be limited to:

- A vessel engaged in laying, servicing or picking up navigation marks, submarine cable or pipeline;
- A vessel engaged in dredging, surveying or underwater operations;
- A vessel engaged in replenishment or transferring persons, provisions or cargo whilst underway;
- A vessel engaged in the launching or recovery of aircraft;
- A vessel engaged in mine clearance operations;
- A vessel engaged in a towing operation such as severely restricts the towing vessel and her tow in their ability to deviate from their course.

18 A vessel is not strictly categorised as 'Restricted in their Ability to Manoeuvre' unless the vessel is generally engaged in defined activities.

19 However the Applicant takes the ExA question to be of wider applicability i.e. that it relates more generally to a view expressed by Interested Parties about the ability of large commercial ships to manoeuvre successfully with the Project in place. The Applicant therefore responds to the ExA questions accordingly.

20 Thirdly, the Applicant also observes that the same Regulations include the term "Constrained by Her Draught" and it is appropriate to clarify the application of this term to this case.

21 The term 'vessel constrained by her draught' means a power driven vessel which, because of her draught in relation to the available depth and width of navigable water, is severely restricted in her ability to deviate from the course she is following.

22 Some vessels will be limited by depth in the decision of whether they elect to transit a route, due to the draught of the ship in relation to the depth of water. But these vessels will not necessarily be "constrained by draught", because they are not severely restricted in their ability to deviate from the course they are following, due to the available sea room and width of navigable water.

23 It is to be noted that the available sea room and width of navigable water is significantly greater in this area than in the designated approach channels to the Port of London e.g. Fishermans Gat and Princes Channel). The Applicant does not consider vessels using the inshore route to be Constrained by Draught as vessels transiting though this area in/out and using Princes Channel and/or Fishermans Gat are limited by the depths and widths of those channels rather than in the NE Spit area inshore of the extension.

4 Applicants Response – Context: Evidence from Vessel Traffic Surveys and use of the 'inshore route' in relation to MGN543.

24 Fourthly, to provide additional context and assist with responding to the ExA's questions, a series of analytical schematics have been prepared to characterise the baseline activity. The schematics utilise the vessel traffic survey data (in accordance with MGN543) and the traffic has been split by three notable vessel activities in the study area with embedded tables analysing traffic by vessel draught, vessel length and vessel type. Volumes of traffic are tabulated on a per/24hr, 1 month (31 days) and annualised basis.

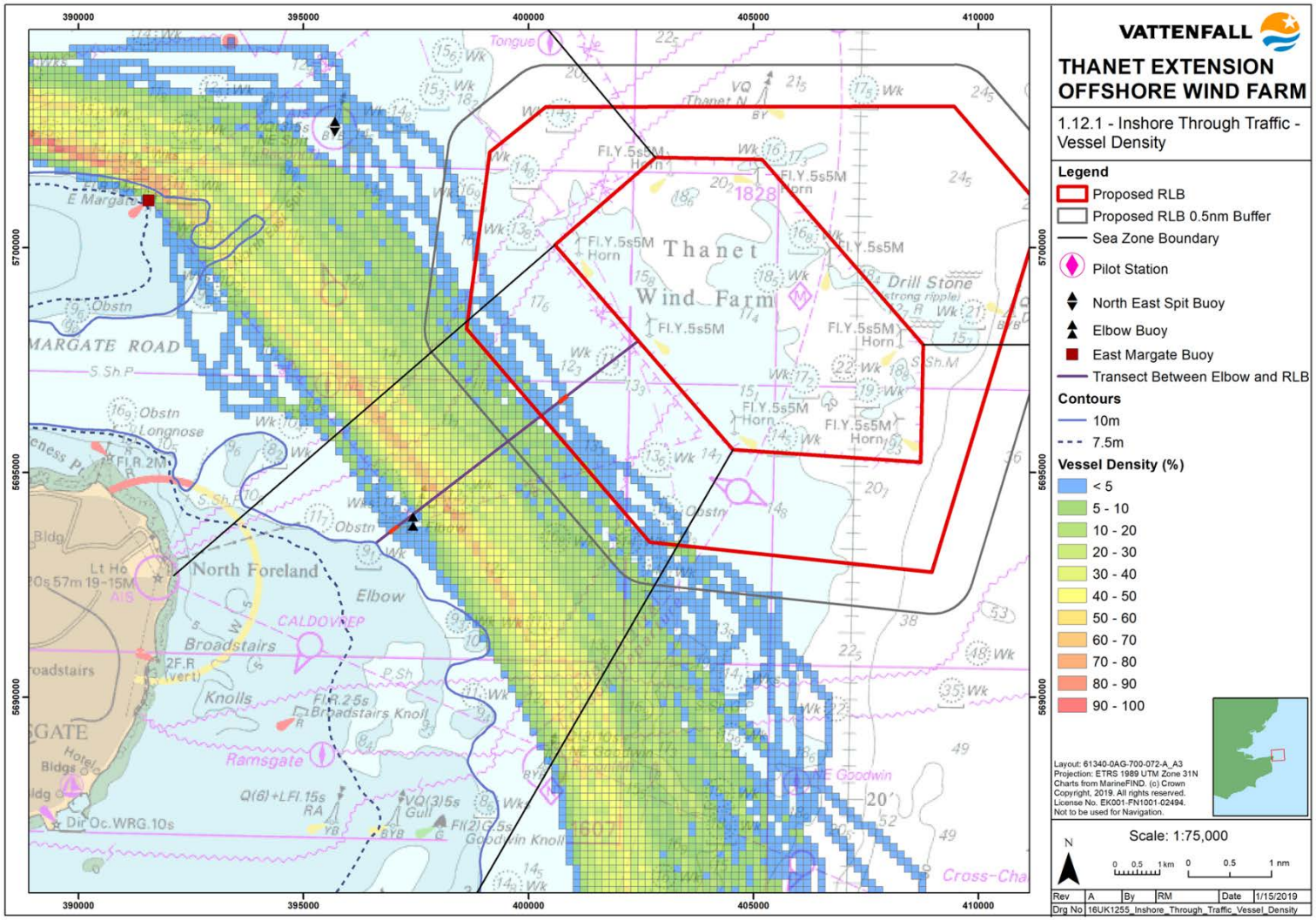
- Vessels proceeding to/from Margate Roads anchorage (from any direction)
- Vessels proceeding along the north of the wind farm (West/East and East/West) and 'dipping' into the traffic area (to transfer a pilot in vicinity of NE Spit)
- Vessels transiting through the inshore route (North/South and South/North)

25 These plots are given on pages 6-8 in Annex G to Appendix 25 of this Deadline 1 submission (Dipping traffic – draught; Dipping traffic - LOA, and Dipping traffic - type).

26 Fifthly, the Applicant also wishes to note certain features of the use of the inshore route.

27 With regards to the MGN543 Annex 3, the inshore route is not a defined channel.

28 A plot titled '1.12.1 - Inshore Through Traffic - Vessel density', shown in Figure 1.12.1 below has been developed to show the distribution of traffic transiting along the inshore route (for both directions of travel - North/South and South/North). This shows the density distribution of traffic. Noting the transect between Elbow Buoy and the wind farm. 90% of the number of transits are shown and these fall outside of the 0.5nm sea room buffer of the proposed extension in line with MGN543 guidance for the operational phase.


VATTENFALL
THANET EXTENSION OFFSHORE WIND FARM
1.12.1 - Inshore Through Traffic - Vessel Density
Legend
Proposed RLB
Proposed RLB 0.5nm Buffer
Sea Zone Boundary
Pilot Station
North East Spit Buoy
Elbow Buoy
East Margate Buoy
Transect Between Elbow and RLB
Contours
10m
7.5m
Vessel Density (%)
< 5
5 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
80 - 90
90 - 100
Thanet Wind Farm
North Foreland
Elbow
Broadstairs
Ramsgate
MARGATE ROAD
Drill Stone
Goodwin
Scale: 1:75,000
Rev A By RM Date 1/15/2019
Drg No 16UK1255_Inshore_Through_Traffic_Vessel_Density

29 Vessel passing distances to the buoyage (Elbow, E Margate and NE Spit) on the western extent amount to less than 1 cable. Although passing distances for through traffic along the eastern extent of the inshore route (i.e. the western face of the wind farm in the SW Sea Zone sector) are generally in excess of 2nm, the traffic is focussed towards the western buoyage, presumably for reasons of transit and routing efficiency rather than what is considered necessary for a safe passing distance from the existing wind farm. This is suggested by the variance in passing distances around the multiple faces of the existing wind farm, as shown in *Figure 46 Main Shipping Routes' of the Navigation Risk Assessment Application Ref 6.4.10.1.* It is noteworthy that the closest passing distances (of 400-500m) occur in the NW Sector Sea Zone from vessels dipping to take a pilot at NE Spit or proceeding to the Margate Roads anchorage. The assessment conservatively applied a 0.5nm passing distance around the wind farm although distances of less than 0.5nm could be considered.

30 Further, the buoyage (Elbow and NE Spit) is conservatively placed relative to the hazards that they are marking with a further circa 0.5nm between the buoys and the hazards that they mark (which is significantly conservative in relation to distances further within the estuary).

31 These factors ought to be taken into account when assessing available sea room.

5 Applicants Response – Q1.12.1 – (a)

32 ExA asks "***what would be a reasonable maximum size of vessel by length, type or draught that is able to prudently use the inshore route at present in moderate MetOcean conditions?"***

33 In order to answer the question of what a reasonable maximum size of vessel would be it is necessary to draw on the vessel traffic survey data presented within the NRA and ES chapter.

34 The vessel traffic survey, in accordance with MGN543, incorporates 34 days of data, split seasonally and is therefore considered to represent both moderate and fair metocean conditions. For the purposes of providing a conservative answer to the ExAQ the maximum vessel type is assumed to be utilising the inshore in moderate metocean conditions.

35 Analysis of the vessel traffic survey by draught shows that under the present situation:

- For vessels proceeding to/from the Margate Roads Anchorages (from any direction), the maximum draught vessel is 8.2m.
- For vessels proceeding along the north of the wind farm (West/East and East/West) and 'dipping' into the traffic area (to transfer a pilot in vicinity of NE Spit) the maximum draught vessel is 10.2m (1 vessel during survey period).
- For vessels transiting through the inshore route (North/South and South/North) the maximum draught vessel is 10.1m (1 vessel during survey period).

36 Analysis of the vessel traffic survey by vessel length shows that under the present situation:

- For vessels proceeding to/from the Margate Roads Anchorages (from any direction), the maximum length vessel is 184m (2 vessels between 180 and 240m during survey period).
- For vessels proceeding along the north of the wind farm (West/East and East/West) and 'dipping' into the traffic area (to transfer a pilot in vicinity of NE Spit) the maximum length vessel is 299m (4 vessels in excess of 240m length during survey period).
- For vessels transiting through the inshore route (North/South and South/North) the maximum length vessel is 299m (3 vessels in excess of 240m length during survey period).

37 Analysis of the vessel traffic survey by vessel type shows that under the present situation:

- For vessels proceeding to/from the Margate Roads Anchorages (from any direction), the most prevalent vessel type is commercial - cargo
- For vessels proceeding along the north of the wind farm (West/East and East/West) and 'dipping' into the traffic area (to transfer a pilot in vicinity of NE Spit) the most prevalent vessel type is commercial cargo.

38 For vessels transiting through the inshore route (North/South and South/North) the most prevalent vessel type is commercial cargo.

39 In conclusion, the type and reasonable maximum size of vessels currently present (in all metocean conditions) are commercial cargo vessels of length 299m and draught 10.1m.

8 Applicants Response – Q1.12.1 – (b)

40 ExA asks ***"What is an estimated existing annualised use of the inshore route by "RiAM" vessels in baseline conditions of sea-room without the Thanet Offshore Wind Farm Extension (TEOWF)"***

41 This question is answered on the assumed broader understanding of RiAM vessels set out above in Section 4.

42 The annualised use of the inshore route can be determined based on extrapolation of the vessel traffic survey data which represents the baseline usage of this route. These are provided within Figures within Annex G to Appendix 25 of this Deadline 1 submission this with the following Drawing No's presented at pages 9-11 of that document:

- Inshore Traffic - Ship Draught
- Inshore Traffic – Ship LOA
- Inshore Traffic – Ship Type

43 The below table extracts annualised use of the inshore route (inbound or outbound from the Thames estuary or Margate Roads Anchorage) by draught, based on extrapolation of the vessel traffic survey data:

Draught (m)	Per Year
0-5	590.4
5 – 7.5	912.5
7.5 – 10	483.1
10 – 12.5	10.7
Total	**1,996.8**

44 The below table extracts annualised use of the inshore route (inbound or outbound from the Thames estuary or Margate Roads Anchorage) by length, based on extrapolation of the vessel traffic survey data:

Length (m)	Per Year
0 – 50	0
50 – 90	547.5
90 - 120	815.9
120 - 180	386.5
180 – 240	214.7
240 -	32.2
Total	**1,996.8**

9 Applicants Response – Q1.12.1 – (c)

45 ExA asks ***"What would be a reasonably foreseeable annualised future use of the inshore route by "RiAM" vessels based on trend for change of vessel size using the Thames ports and anchorages as a whole in baseline conditions of sea-room without TEOWF"***

46 The Applicant anticipates that further information on traffic forecasts will be placed before the examination at Deadline 1 by PLA, PoT and London Gateway.

47 At this stage the Applicant notes that it has considered future traffic profiles within the NRA, which made reference to the utilised data, the Ports NPS (Section 3.3.4), and trends from 2000 – 2016 *(Ref Section 6 of the Navigation Risk Assessment PINS Ref APP-050/ Application Ref 6.4.10.1*). Section 6.1 noted a general decrease from approximately 550 million tonnes in 2000 to 480,000 tonnes in 2016 in the UK's major ports. More localised predictions were also considered (Section 6.2), The PLA's Thames Vision project (PLA, 2015) forecast trade growth until 2035 and concluded that inter-port trade will increase from 45 million tonnes to between 56 and 93 million tonnes per year.

48 However an increase in volume of trade does not necessarily correlate to an increase in vessels using the inshore route; and the trend towards larger (deeper draught) container vessels servicing ports such as London Gateway, is likely to, in reality, result in fewer larger vessels using the inshore route and more entering the Thames using Sunk via Black Deep in accordance with Pilotage Directions and the existing depth limitations of the Princes Channel and Fisherman's Gat.

49 The NRA concludes (Section 6.3) that predicting trade patterns over a 20-year period involves much uncertainty, however based on the data it was considered that a reduction nationally in maritime trade, would be offset by a localised increase at the Port of London, albeit with fewer but larger vessels. Despite the likely reality that overall vessel numbers may reduce due to the increase in larger draught vessels, for the purposes of the NRA a worst case 10% increase in commercial vessel activity was assumed.

10 Applicants Response – Q1.12.1 – (d)

50 ExA asks ***"What would be a reasonably foreseeable annualised future use of the inshore route by "RiAM" vessels as a consequence of the reduction in sea room due to the pinch-point presented between the NE Spit bank and the proposed TEOWF Red Line Boundary plus 500m proposed safety zone during construction and maintenance, with vessel size mix and volume of traffic using the Thames ports and anchorages as a whole as per baseline"***

51 The Applicant understands this question to require consideration of the extent to which the baseline use of the inshore route would be affected in the future by the introduction of the proposed Thanet Extension Offshore Wind Farm. However, the Applicant does not consider that the levels of baseline use would materially change, as explained further below.

52 The existing traffic profile from the vessel traffic survey demonstrates, as highlighted within the plots provided in Annex G, that vessels navigating the inshore route are limited by the constraints of navigating the Princes Chanel or the Fishermans Gat, principally relating to available depth of water, that remain unchanged by the extension.

53 It should be noted that the large majority of vessels navigating the inshore route (in excess of 90%) do not elect to transit to the north of the NE Spit Cardinal mark (that demarcates the NE Spit bank) and elect to transit as far west as the East Margate buoy. This is illustrated in Figure Inshore_Traffic_Ship_Draught presented pages 9-11 of Annex G to Appendix 25 of this Deadline 1 submission which shows only 5 of circa 190 transits routing to the north of NE Spit Cardinal buoy.

54 This emphasises that the NE Spit Bank is not a specific feature of constraint under present existing conditions (and evidences the limiting critical depth applies within Princes Chanel/Fishermans Gat as stated earlier in the response to this ExAQ). With reference to the sea room illustrated in Figure "NE Spit Sea room distances" at Annex B of ExA Actions to ISH2 presented at Appendix 28 it is seen that the distance between E Margate and the existing RLB is 4.91nm which is reduced by 0.92nm to 3.99nm for the extension RLB (or by a further 0.24nm to 3.75nm when considering the maximum extent of rolling safety zones during construction). The Applicant therefore does not consider the terminology of 'pinch point' as applicable to the NE Spit bank as this is not the narrowest section of water a vessel passes when transiting the inshore areas (which as explained above with regards to depth is the area of Princes Channel/Fishermans Gat). It should also be noted that sea room reduces significantly to the immediate north west of the study area as the width of sea room of traffic using the inshore route converges in the approaches to the designated channels of Princes Chanel and Fishermans Gat (see Figure 1.12.1 - Inshore Through Traffic - Vessel Density above) , both of which are significantly more constrained in width (and depth) due to the bathymetry either side.

55 The Applicant does not consider that the introduction of the Project would materially alter the basis upon which future traffic would use the inshore route, given that existing (and future) traffic will navigate to the western part of the inshore route close to the existing buoyage; and any reduction in sea room due to the extension would not operate to constrain those movements.

56 The 500m safety zone refers to a rolling safety zone of 500m (0.27nm) radius that will apply during construction or decommissioning of a wind turbine, or during major maintenance works. This is in effect a distance of 450m from the RLB and is shown on Annex C of ExA Actions to ISH2 presented at Appendix 28. This is an effective width restriction of less than 7% between E Margate and the RLB for the temporary condition and equates approximately to the minimum passing distance currently seen between commercial vessels and the existing wind farm (see the north west face). As such it does not represent any additional restriction over the distance a prudent mariner would leave between a vessel and the wind farm.

11 Applicants Response – Q1.12.1 – (e)

57 ExA asks ***"What would be a reasonably foreseeable annualised future use of the inshore route by "RiAM" vessels as a consequence of the reduction in sea room due to the pinch-point presented between the NE Spit bank and the proposed TEOWF Red Line Boundary plus 500m. proposed safety zone during construction and maintenance with reasonable predictions of change of traffic mix based on trend for change in vessel size and number of vessels using the Thames ports and anchorages as a whole"***

58 The Applicant understands this question to require consideration of the future use of the sea room having regard not to baseline vessel traffic but to predictions of future traffic.

59 As per response to item 'c' the Applicant considers that the trend towards larger (deeper draught) vessels servicing these ports (e.g. London Gateway) is likely to result in fewer vessels using the inshore route (although a worst case of a 10% increase has been assumed for the purposes of assessment) and that the viability of the inshore route is unaffected by the proposed Extension, for the same reasons as given above. The Applicant does not consider that reasonably predicted future traffic along the inshore route would have a substantially different movement profile to existing traffic. The Applicant also references response to Q 1.12.1(d) with regards to the 'pinch point' presenting a wider width of sea room than being used by vessels as shown on those plots and would continue to be well within the bounds of prudent navigation.

60 The Applicant will review forecast submissions by Interested Parties following submission and update its response accordingly.