

IMMINGHAM EASTERN RO-RO TERMINAL



Applicant's Review of IOT's
Navigational Risk Assessment

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1 Introduction

- 1.1.1 At Deadline 2 of the examination, both DFDS Seaways (“DFDS”) and Associated Petroleum Terminals (Immingham) Ltd (“APT”) as operators of the Immingham Oil Terminal (“IOT”) submitted what are purported to be alternative Navigational Risk Assessments (“NRA”) – alternatives to the formally prepared NRA submitted by the Applicant as part of its application for the Immingham Eastern Ro-Ro Terminal (“IERRT”) Development Consent Order (“DCO”).
- 1.1.2 Both alternative NRAs share similar traits – for reasons discussed below – but not least because the principal author of both NRAs was Nash Maritime, albeit instructed by different clients with different motives and objectives.
- 1.1.3 This report provides a review of and commentary on the IOT Operators alternative NRA (“the IOT NRA”). A review and commentary of the DFDS alternative NRA is provided as Document Reference 10.2.56.
- 1.1.4 The IOT Operators commissioned Nash Maritime to produce a document which describes itself as “Immingham Eastern Ro-Ro Terminal Navigational Risk Assessment” **[REP2-064]** (“the IOT NRA”). It is evident that it was produced sometime during August 2023 during the course of this examination as part of APT’s representations in respect of the Proposed Development.
- 1.1.5 For reasons briefly summarised below, although the document purports to be an NRA in respect of the Proposed Development, it lacks some of the most basic requirements to be an NRA as identified below. As a consequence, it is wrong to treat it as such, and as a substitute or proxy for the NRA that has been properly produced for the Proposed Development by ABPmer in relation to the DCO Application.
- 1.1.6 Although there are many points of detail that could be elaborated by way of criticism of the IOT NRA in purporting to be a NRA of the Proposed Development, this review focuses on the key points which make the IOT NRA inherently unsuitable for use as an NRA and which reveal why it does not in any way undermine the Applicant’s NRA that has already been produced and which presents a full and comprehensive NRA in respect of the Proposed Development.
- 1.1.7 The structure of this document is as follows:
- Section 1 – Introduction;
 - Section 2 – NRA Methodology;
 - Section 3 – Stakeholder Engagement;
 - Section 4 – Decision Making and the Statutory Harbour Authority;
 - Section 5 – IOT NRA; and
 - Section 6 – Conclusion.

2 NRA Methodology

- 2.1.1 This section of the document summarises the general content and methodology that is followed when undertaking NRAs.
- 2.1.2 It should be noted at the outset that there is no policy or legislation in the UK that dictates the format of an NRA to support a new development. The Port Marine Safety Code (“PMSC”) [REP1-015] sets out policy and guidance that relates to statutory harbour authorities, jetties, terminals and marinas. In so doing, however, it is not purporting to dictate the specific requirements of an NRA or risk assessment for a particular project.
- 2.1.3 As a consequence, over the years consultancies who provide NRA assistance to clients have constructed and refined their own templates, based on feedback from a range of clients.
- 2.1.4 It is unsurprising, therefore, that different consultancies may have different approaches to the format of NRAs depending upon what project is being assessed. However, individual preferences in presentation are not based upon any formal or mandated requirements. The term NRA is not a specifically defined term. Most consultancies that offer NRA services generally consider that risk assessments within NRAs are largely intended to consider the risks associated with the navigation or movement of vessels. Within that context, risk assessments within a Marine Safety Management System (“MSMS”) may cover a number of navigational risks, whilst also considering other risks to which a port might be subject that concern port and/or marine safety.
- 2.1.5 The outcomes of NRAs produced during the consenting stage of new developments are later incorporated into MSMSs for ports where they are continually reviewed (see Section 4 below).
- 2.1.6 Whilst the PMSC does not dictate the specific requirements of an NRA, when considering the guidance in the PMSC and its associated Guide to Good Practice (“GtGP”) [REP1-016], it is clear that most NRAs contain certain core elements which are included by consultancies like ABPmer, Anatec, Marico Marine and Nash Maritime.
- 2.1.7 These core elements include the following:
- Introduction and Policy review;
 - Data sources (Wind, Tide, AIS etc.);
 - Baseline assessment (existing review of navigation, usually accompanied by review of incidents and traffic in the study area);
 - Description of proposed change/development (if applicable);
 - Risk assessment approach and details (tolerability/acceptability, descriptors, matrices);
 - Hazard Logs (detailing risks with controls, causes, outcomes, usually produced as a result of HAZID workshops); and

- Discussion (of findings).
- 2.1.8 Some consultancies also consider a 'future baseline', where statistics and industry inference are taken into account to describe a potential future that may occur at the port. For example, on a macro scale across the UK, there is a common trend that the total freight by tonnage is increasing whilst the number of vessel movements is either constant or reducing as a result of the use of larger vessels and consequential reduction in the number of ships being used.
- 2.1.9 It is important to note, however, that there is no agreed standard on any of the core elements of information listed above, nor any policy or regulatory requirements as to what has to be included by way of a 'navigation baseline' in an NRA.
- 2.1.10 By way of example, there is reference in the PMSC GtGP, in paragraph 4.3.10 - "*Taking stock covers a review of: the adequacy and completeness of any established incident database or similar records;*" that historic incidents should be considered but there is no guidance or advice provided as to how this could or should be satisfied, for example by means of an incident-by-incident approach or by consideration of spatial data plots. These are matters of choice for the author of the relevant NRA, with the ultimate arbiter as to whether the NRA provides sufficient information being solely a matter for the Statutory Harbour Authority (see Section 4).
- 2.1.11 It is wrong in principle to suggest that a particular approach to presentation of data or information is correct or incorrect. This misunderstands the process that is applied to NRA and the exercise of judgment by relevant authors which is ultimately overseen by the decision of the Statutory Harbour Authority.
- 2.1.12 With a view to enhancing marine safety within a port and harbour approaches, a positive analytical approach is required, including the consideration of past events and accidents, examining potential dangers and the means of avoiding them. The process of assessment is continuous, so that new hazards and changed risks are properly identified and addressed in the MSMS (see Section 4). The aim of risk assessment is to define risks so that they can be managed.
- 2.1.13 Assessing risks to help to determine precautions can be qualitative or quantitative. Quantified risk assessment is not a requirement and may not be practicable. Risk assessments should be undertaken by competent people, especially when choosing appropriate quantitative risk assessment techniques and interpreting results.
- 2.1.14 Risk assessment techniques are fundamentally the same for large and small ports, but the execution and detail will differ considerably. A risk assessment will typically involve five broad stages, which are described in turn below:
- Problem identification, scoping and risk assessment design (data gathering)
 - Hazard Identification ("HAZID")

- Risk Analysis
 - Assessment of Existing Risk Control Measures
 - Identification of Additional or Future Risk Control Measures
- 2.1.15 **Problem identification, scoping and risk assessment design (data gathering)** – Anybody undertaking a risk assessment has to start by taking account of the organisation, its culture, policies, procedures, and priorities together with an assessment of the existing safety management structure.
- 2.1.16 Key to this part of the process is to engage with those working in and using the port. Port users affected by a particular risk should be informed and involved. It is likely to involve a structured process.
- 2.1.17 Taking account of the existing situation covers a review of the adequacy and completeness of any established incident database or similar records, as well as considering the current management procedures, including; pilotage, navigation management (LPS/VTS), hydrography, conservancy, and marine operations. Additionally, this will typically involve reviewing Marine Accident Investigation Branch (MAIB) reports and other investigative reports which make recommendations about incidents which have taken place in a harbour.
- 2.1.18 **HAZID** – This stage should involve the identification of hazards (something with the potential to cause harm, loss, or injury) that arise from the proposed project in the context of the existing navigational environment. Any list of hazards will include those already known to the port, including identification of the causes of previous incidents if known.
- 2.1.19 Within the process of hazard identification and risk assessment, ports should have due regard of the link between the port authority and terminal/vessel operators. Structured meetings or workshops need to be held during this process involving relevant marine practitioners. Port users, including groups such as Pilotage Exemption Certificate (PEC) holders, commercial operators, and tug operators is required (PMSC GtGP; [REP1-016]).
- 2.1.20 This stage should also identify the potential outcomes if the identified events were to happen (scenarios). One useful approach is to consider both the most likely and the worst credible outcomes (set against likely frequency of the event happening in each case). This approach provides a more realistic and thorough assessment of risk, which reflects reality, in that relatively very few incidents result in the worst credible outcome. On a standard 5x5 risk matrix used by many ports, these incidents score highly for outcome, but this is tempered by a low score on the frequency axis.
- 2.1.21 **Risk analysis** – The hazardous scenarios identified then need to be prioritised. A method which combines an assessment of the likelihood of a hazardous scenario and its potential consequences should be used. This will be a matter of judgement crucially informed by the relevant marine practitioners and likely to be best appraised by those with professional responsibility for managing the harbour, namely the harbourmaster and dockmaster.

- 2.1.22 The frequency of incidents can be established in part using historical data identified in the first stage of the work. It can be determined using a qualitative scale or on a “per-shipping’ movement basis, or a combination of the two. The likelihood of a hazardous incident and its potential consequences can often be determined with reference to historical data. However, it should be borne in mind that following an incident the risk of it reoccurring should have been reduced by management action. It therefore follows that any assessment of frequency and consequence is likely to rely to a certain extent upon the judgement of the assessors or others capable of making such a qualified estimate. Historical data alone will not provide a true assessment of the risk of the current operations, nor will it necessarily reveal an extremely remote event.
- 2.1.23 Risks and the impact of identified outcomes should normally be assessed against four criteria; the consequence to:
- Life (public safety);
 - The environment;
 - Port and port user operations (business, reputation etc); and
 - Port and shipping infrastructure (damage).
- 2.1.24 **Assessment of Existing Risk Control Measures** – Risk assessment necessarily includes a review of existing hazards and their associated risk control measures (embedded controls). As a result, new risk control measures (or changes/improvements to existing risk control measures) may be identified for consideration, both where there are gaps in existing procedures and where risk controls need to be enhanced. Some control measures might also be relaxed so that resources can be re-designated to meet a new priority. Care should be taken to ensure that any new hazards created as a result are themselves identified and managed. The overall risk exposure of the port organisation itself will be identified during this stage and will allow recommendations to be made to enhance safety.
- 2.1.25 **Identification of Risk Control Measures** – The aim of assessing and managing marine operations in harbours is to reduce risk as low as reasonably practicable (‘ALARP’). Judgement of risk should be undertaken on an objective basis and should not be influenced by the financial position of the authority. The degree of tolerable risk in a particular activity or environment can be balanced against the time, trouble, cost, and physical difficulty of taking measures that avoid the risk. If these are so disproportionate to the risk that it would be unreasonable for the people concerned to incur them, they are not obliged to do so. The greater the risk, the more likely it is that it is reasonable to go to very substantial expense, trouble, and invention to reduce it. Conversely, if the consequences and the extent of a risk are small, insistence on great expense would not be considered reasonable.
- 2.1.26 Risks may be identified which are intolerable. The decision as to whether risks are tolerable or intolerable sits with the appropriate authority, namely in the

case of the Applicant, the Duty Holder through the Harbour Authority and Safety Board rather than the authors of the NRA (see Section 4 for further detail). Measures must be taken to eliminate identified risks so far as is practicable. This generally requires whatever is technically possible in the light of current knowledge, which the person concerned had or ought to have had at the time. The cost, time and trouble involved are not to be taken into account in deciding what measures are possible to eliminate intolerable risk.

- 2.1.27 Where (as for the Proposed Development) none of the risks are considered intolerable with the (to be) applied controls, there is no requirement to eliminate activity or apply additional overly onerous (i.e., not reasonably practicable) controls to meet the tolerability thresholds set by the appropriate authority, the Harbour Authority and Safety Board.

3 Stakeholder Engagement

- 3.1.1 This section explains the importance of stakeholder engagement in the NRA process.
- 3.1.2 As identified in considering the methodology above, whilst there is no specific style or format that has to be adopted for a NRA, any proper NRA will necessarily involve stakeholder engagement in the risk assessment process.
- 3.1.3 That engagement concerns both the identification of relevant hazard scenarios, their frequency and consequence, and how such hazards are to be addressed.
- 3.1.4 That does not mean that all stakeholders will necessarily agree, or have to agree, with the approach adopted in a NRA, or with the judgments that are reached. Whilst one should strive for consensus, it is in fact commonplace for there to a range of different views by affected stakeholders, depending upon the nature of their interest.
- 3.1.5 Any proper NRA, however, will be based upon stakeholder engagement where that includes not only taking account of other users of the marine environment, but also critically (and as an essential component) engagement with the relevant harbourmaster and dockmaster responsible for that marine environment.
- 3.1.6 This basic requirement is fully addressed in the Applicant's NRA. A critical part of that process was the holding of HAZID workshops to support the NRA produced for the DCO at which the considerations of all users was taken into account. It is essential to involve those working in and using the port and others in the risk assessment process and in subsequent reviews, as risks affect both port users and the harbour authority alike. It is equally essential, however, to realise that the input from users through this process does not dictate, nor should it be permitted to dictate the objective assessment of risk by the SHA.
- 3.1.7 SHAs are required to identify potential hazards in light of (amongst other things) input from users, but they are also required to develop and refine procedures and defences to mitigate those risks to a level which is acceptable to the SHA bearing in mind the aspirations of users and what will often be

competing aspirations and demands of those users. It is good practice to establish channels of engagement which can be used for this purpose (such as the HAZID workshops). It is simply wrong in principle, however, to suggest that feedback from users through this process can be treated as determinative or that it should be allowed to dictate the outcome of how the SHA manages the safety of the port to what it considers to be acceptable levels.

- 3.1.8 As set out below in Section 5, and in direct contrast to the Applicant's NRA, the IOT NRA is fundamentally flawed in this respect as it has not involved essential stakeholders including the harbourmaster and dockmaster.

4 **Decision Making and the Statutory Harbour Authority**

- 4.1.1 This section explains the key aspects in managing navigational risk and the role of the Statutory Harbour Authority in controlling navigational risks within its statutory area. It is important to understand this in the wider context of the various roles and responsibilities for navigational risk on the River Humber. To assist with this, the Applicant submitted a note on the management, control, and regulation of the Port of Immingham and the River Humber to the Examination **[REP1-014]**. Within that note, the roles of the Applicant, Statutory Harbour Authority for the Port of Immingham, the Statutory Harbour Authority for the Humber Estuary, and ABP's Governance is explained.

4.2 **Existing Controls, Operations and Standards**

- 4.2.1 As set out above, any proper NRA will necessarily need to consider all potential controls and a port's established operations and relevant standards of acceptability in reaching any conclusions about proposed changes. A failure to understand the current operating environment and standards that are applicable to it will necessarily undermine the validity of any purported NRA. Again, as set out further below, the IOT NRA is also fundamentally flawed in this respect as it pays no proper regard to the existing safe operations at the Port of Immingham.

4.3 **Marine Safety Management System**

- 4.3.1 The PMSC relies upon the principle that relevant organisations will base their policies, and procedures relating to marine operations on a formal assessment of hazards and risks to their marine operations overall. They should maintain a marine safety management system (MSMS) developed from such risk assessments.
- 4.3.2 Any subsequent risk assessments deemed necessary as time goes on (either to update an existing situation or to address changes in the port's environment) are then reflected in subsequent updates to the MSMS which itself develops and evolves over time as a result of changes in (for example) trade, and port usage or physical developments. In this context. The outcomes of the NRA produced for the Proposed Development will be incorporated within the MSMS if the DCO application is approved.
- 4.3.3 Under the PMSC and consequential MSMS that is put in place, there is a critical appraisal of all routine and non-routine activities in any risk assessment work. Those involved should not just include employees, but

others including stakeholders who use the port including contractors and terminal operators.

4.4 **Statutory Harbour Authority**

- 4.4.1 It is only the relevant Statutory Harbour Authority (“SHA”) that is the relevant decision maker for the control of navigational risks within their statutory area. It is the SHA that is responsible for assessing navigational risks and therefore how they are to be assessed and managed within their area. It is therefore fundamental that it is the SHA that has to be satisfied that an appropriate NRA has been conducted for its needs. There is no power and certainly no principled basis for a third party to direct a SHA, or to seek to dictate a SHA, to as to how the SHA should discharge its own duties and responsibilities. The SHA has the overall responsibility and competency to deal with navigational safety in the ordinary running of its area.
- 4.4.2 It is evident from the very recent production of the IOT NRA (like the DFDS NRA) which the IOT Operators now claim to be their own “NRA” that the function of a NRA, the essential role of the SHA and the exclusive duty and responsibility of the SHA in decision-making is being misrepresented or misunderstood by the IOT Operators/APT and DFDS.
- 4.4.3 The NRA is an assessment that has to be considered by the SHA to assess navigational risks in the environment for which it is responsible for regulating safely. It therefore necessarily requires the SHA to make the necessary judgments about those risks, the myriad ways in which those risks can be mitigated (where considered necessary), the tolerability of risks and whether they have been reduced to ALARP as judgments for SHA after any such mitigation.
- 4.4.4 In so doing, the Statutory Harbour Authority is not only fulfilling the essential functions that are imposed on it (and no other body) by statute, but it is also fulfilling its obligation to ensure the safe operation of the port in light of the risks identified having regard to the interests of all users.
- 4.4.5 The River Humber is subject to navigation by a wide range of users from small leisure craft to very large commercial vessels, some transporting petrochemicals in tankers. This of itself creates a notional risk between the interaction of such craft navigating in the same area. The SHA will need to consider the needs and aspirations of all such users in assessing risks and managing them to what it regards to be acceptable levels in practice. The fact that users of large commercial vessels might ideally wish to see leisure craft prevented from using the spaces that it wishes to use to reduce the risks and leisure craft might seek the same in reverse does not dictate the outcome of the Statutory Harbour Authority’s NRA of such interactions.
- 4.4.6 By the same token, the River Humber is already subject to navigation by Ro-Ro vessels operating on a daily basis and seeking access to ports like Immingham in proximity to an oil facility such as that at IOT. Again, the fact that such interactions will inevitably involve residual risks, with competing commercial aspirations of users such as Ro-Ro operators and the operators of an oil terminal does not dictate the outcome of the NRA by the SHA as to

how to manage those risks to what it considers to be tolerable levels. It is the Statutory Harbour Authority that decides what is tolerable and ALARP in all circumstances.

- 4.4.7 In each of the simple examples above, there will not only be identification of relevant risks and controls and mitigation measures, but a subsequent judgment to be made what is tolerable and ALARP, but with the integrated step of assessment of the risk and means of mitigating it to a tolerable and ALARP level, having regard to the needs and aspirations of different users. Thus, taking the second example above, there is a myriad of ways of managing interaction between such marine traffic to reduce risks to what the SHA consider to be acceptable. These may include controlling or restricting use by leisure craft in areas or operations (e.g., not operating under sail, or not exceeding certain limits or not operating in certain areas when ships manoeuvring etc), or controlling or restricting use or operations by commercial traffic (e.g., not operating at certain times of tide or in certain wind conditions, requirements for use of a pilot, requirements for use of tug or tugs etc) or a combination of any that takes account of the interests of both users, rather than simply restricting one user in preference to another.
- 4.4.8 The SHA is the decision maker on what activities can occur within its respective harbour authority area. The SHA needs to be satisfied that a risk assessment conducted for those purposes is appropriate. If the SHA does not believe that a risk assessment has been conducted to a sufficient standard, it is bound to discount it. Similarly, for an external body to attempt to direct an SHA to act in a certain way would be an unacceptable interference with and impinge upon the Statutory Harbour Authority's powers and duties.
- 4.4.9 As explained below, the IOT NRA falls into the fundamental error of seeking to impose its own expressed judgments (without any actual and genuine stakeholder engagement with key bodies like the Harbour Master Humber or dockmaster and without any understanding of existing port operational standards and measures) as if it represented judgments on tolerability or ALARP which could be substituted for the views of the SHA. That is simply not the case.

5 IOT NRA

5.1 Introduction

- 5.1.1 This section provides a review of the "Immingham Eastern Ro-Ro Terminal Navigational Risk Assessment" [REP2-064] that was undertaken by Nash Maritime on behalf of the IOT Operators (i.e., the IOT NRA).
- 5.1.2 As already noted, much of the document that has now been produced as the IOT NRA contains material to which it is unnecessary to provide any direct response to as it simply reflects the presentation of data (albeit in a different format or style to that in the Applicant's NRA). It is not material which either advances the position or undermines the Applicant's NRA.
- 5.1.3 This section, therefore, concentrates on the key part of the IOT NRA as purporting to represent a different assessment of risk to that which was

presented in the Applicant's NRA (the latter which has already been considered and endorsed by the SHA and the "Duty Holder").

5.1.4 The review of IOT NRA has been undertaken in the context of the fundamental principles outlined in the preceding sections of this document. This is structured as follows:

- Stakeholder engagement;
- Assessment of tolerability;
- Selective use of methodology;
- Inappropriate use of descriptors;
- Use of risk controls; and
- Risk scoring.

5.2 Stakeholder Engagement

5.2.1 As identified above, one of the most basic requirements of any NRA is appropriate stakeholder engagement in the NRA process. The PMSC GtGP states in paragraph 4.2.6 that - *'It is essential to Involve those working in and using the port and others in the risk assessment process and subsequent reviews and development, utilising their specialist knowledge and skills'*.

5.2.2 This does not mean that every stakeholder has to agree, or that there is a requirement for consensus. Many stakeholders will often disagree and inevitably have different priorities and objectives and consider their operations to be more important than others or wish to prioritise their operations over others or seek to obtain the most favourable operating conditions for their own commercial operations. It is important, however, that genuine engagement actually takes place including with those responsible, and most experienced, for the safe operation of the marine environment including the Harbour Master Humber and the Dock Master.

5.2.3 The NRA produced for the IOT operators fails to meet this fundamental criterion and does not follow the principles of the PMSC in terms of striving for consensus. On the contrary, it fails to undertake any form of stakeholder engagement. At its most basic such engagement would be expected with the Applicant, as the port operator, but also the Harbour Master Humber, Dock Master and the various persons involved in operations such as the pilots, tug operators, VTS and, of course Stena, the proposed operator of the Proposed Development. Stena's own Masters would be responsible for navigating the particular vessels in this location for this development, even when operating under a compulsory pilotage direction, pilotage by HES pilot or under an act of self-pilotage with a pilot exemption certificate (PEC).

5.2.4 In place of this, the IOT NRA makes assumptions and presents an inherently biased perspective about such operations, with no evidence that any port stakeholder confirmed or validated their internally held opinions on risks on basic matters such as consequences or frequency. This is a fundamental flaw in the IOT NRA which renders it incapable of having any weight as an

NRA. As a consequence, the SHA is simply not in a position to take the findings of the IOT NRA into account and it would be an abrogation of its statutory obligations to do otherwise.

- 5.2.5 In an attempt to mitigate this obvious flaw, the IOT NRA at Page 55, Section 6.1.1 references the consultation undertaken by the Applicant as part of its own NRA exercise. This is both misconceived and unacceptable. Whilst clearly an acknowledgement of the defect in its adopted NRA methodology, it cannot effectively “plug” the omission by leaning on the Applicant’s NRA which involved engaging with the relevant stakeholders to understand attitudes towards risks which then formed part of that NRA. The reality is that no such engagement or consultation was undertaken by Nash Maritime to inform the IOT NRA. As a consequence, the approach it has adopted and the various judgments it has made on central issues in relation to hazard frequency, likelihood etc. are not founded in consensus nor indeed a complete understanding of the Port of Immingham.
- 5.2.6 It is clearly not acceptable to rely on attendance as a representative at a third party’s (i.e., the Applicant’s) HAZID and for the authors to reference that as “engagement” for the IOT NRA. There has been no input by the SHA or wider port stakeholders (pilots, tug masters, etc) to inform the basic judgments that the authors of the IOT NRA have purported to make which renders such judgments meaningless.

5.3 **Assessment of tolerability**

Overall approach

- 5.3.1 Fundamentally the IOT NRA fails to take into account the appropriate standard of acceptability of risk (i.e., tolerability) as set by the ABP Harbour Authority and Safety Board (HASB). Their approach is therefore not in accordance with the PMSC GtGP.
- 5.3.2 The PMSC states in section 4.3, page 33, that - ‘*A safety management system should be informed by and based upon a formal risk assessment of the port’s marine activities (routine and non-routine), a documented, structured and systematic process comprising; the identification and analysis of risks; an assessment of these risks against an appropriate standard of acceptability...*’. The HASB has determined this appropriate standard of acceptability, which has been published in the Applicants NRA.
- 5.3.3 Instead, the IOT NRA assumes or supposes a standard of acceptability for the Harbour Authority. Neither Nash Maritime nor the IOT Operators are in a position nor do they have the authority to make such an assumption. Further, neither Nash maritime nor DFDS sought to discuss or agree levels of tolerability with the SHA. The approach adopted in the IOT NRA is both inappropriate and unacceptable as it trespasses on the SHA’s statutory powers, duties and obligations. To allow one operator to set its own standards of acceptability (with all of the flaws already identified) would seriously compromise, to a fundamental degree, the SHA’s ability to discharge its duties and responsibilities to determine how best to manage safety within an area for which it is statutorily responsible.

- 5.3.4 In direct contrast the Applicant's NRA [APP-089] has evaluated risks in accordance with the thresholds set by the HASB and as such is in full alignment with the requirements of the PMSC GtGP.
- 5.3.5 More fundamentally, judgments about tolerability within the port are a matter for the SHA. It is the SHA which carries the consequences and liability of the risk, as empowered by schedule 3 of the Transport Act, 1981– Duties and Powers of ABP. A terminal operator or their consultants cannot simply state what it, subjectively, believes the tolerability of the port should be. If that were the case, then it effectively acts as an invitation for port/ terminal operators to operate in violation of what the SHA considers acceptable (i.e., tolerable).

Incorrect judgment of applied tolerability

- 5.3.6 In addition to the fact that the IOT NRA fails to take into account the appropriate standard of acceptability of risk (i.e., tolerability), there are further criticisms of their attempts to define tolerability. The IOT NRA claims that any outcome that is scored at 6 or above (on a 1 to 10 scale) has been considered as intolerable. This is an arbitrary and simplistic view of tolerability and does not apply the concept of tolerability in an appropriate way.
- 5.3.7 The guidance in using numbers for risk scoring and defining 'quantitative unacceptable limits' is to do so very carefully as they can create false confidences or uncertainties. Specifically, the MCA quote the HSE and state that: *'The HSE is careful to note that any quantitative 'unacceptable' limits must be used with great caution. The concepts used in establishing them are complex, and the quantitative predictions that might be compared against them are fraught with uncertainty. It may not be helpful to attempt to define quantitative limits, and developers should consider whether there are other ways to define what is unacceptable'*. The HSE guidance document Reducing Risks Protecting People (R2P2) notes that what is unacceptable *"...is often spelled out or implied in legislation, ACOPs, guidance, etc or reflected in what constitutes good practice"* such that there is no need to set an explicit quantitative boundary. Developers should therefore carefully justify any unacceptable limits they propose' (MGN 654, Annex 1, Annex C4).
- 5.3.8 It is considered that the score of 6 is an arbitrary figure based on different consequence and frequency descriptors and it underlines the need to avoid over-reliance on the representation of a risk outcome as a number to determine whether or not a risk is tolerable. The conclusion of the IOT NRA is that two risks are intolerable, (IOT NRA, Page 165, Annex C), specifically ID 10 (Contact (Allision) - IERRT Ro-Ro Vessel with IOT Trunkway) and ID 13 (Contact (Allision) - IERRT Ro-Ro Vessel with IOT Finger Pier).
- 5.3.9 The defect in this conclusion, however, is that the IOT NRA has not fully considered the operation of existing vessels into, and out of the Port of Immingham's lock in supporting their own rationale. They claim that the Proposed Development has risks that they define as intolerable. Yet the COMAH Assessment conducted in 2019 by IOT (see IOT NRA, Page 49, third line) states that *"major accident hazard as a result of a collision can be calculated as 1.7E-02/yr, or about one in every 60 years"*. This is a relatively high frequency for a major accident. If one were to apply the intolerability

criteria (IOT NRA, Page 59, Table 7) in the IOT NRA to such existing operations, their own conclusions drawn in the NRA would be that this risk would also be intolerable.

- 5.3.10 Explicitly, within the IOT NRA it is considered that a catastrophic consequence/ worst credible risk occurring up to every 10,000 years is intolerable. The authors of the IOT NRA, however, did not consult the SHA to determine if it also would consider this to be intolerable. It is suggested that if ports were held to a standard where they were not able to operate if there was a '*potential for many fatalities on site or potential for serious injury or fatality off site*' to occur up to every 10,000 years, then shipping trade would have to cease internationally.

5.4 **Selective use of methodology**

- 5.4.1 Within the IOT NRA, Nash Maritime seek to suggest that they are the arbiter of what elements should or should not be present within an NRA. This is despite there being no such prescriptive requirements for the contents of NRAs within the PMSC or elsewhere.

- 5.4.2 The fact that both DFDS [REP2-043] and IOT [REP2-064] NRAs are very different, and yet were written by the same consultancy provides further evidence to support the fact that there is no policy or legislation in the UK that dictates the format of an NRA. This is further exemplified in another NRA, also written by Nash Maritime and cited by DFDS in their NRA, the 'Solent Gateway NRA' which again uses a different format and methodology. It also confirms that the guidance in the PMSC and GtGP is not prescriptive as to how NRAs are to be undertaken.

Use of COMAH methodology

- 5.4.3 Notwithstanding the concerns noted above, the IOT NRA is also flawed by the inclusion of Control of Major Accident Hazard (COMAH) as part of its approach. Despite the lack of applicability, the IOT NRA is presented as an assessment using HSE (COMAH) methodology and settings for tolerability as defined by the HSE (Page 51, Section 5.2.4).

- 5.4.4 The Applicant is concerned that the IOT NRA is effectively mixing two fundamentally different policy areas and thereby confusing its adopted methodology. In simple terms, considerations concerning COMAH and the HSE's approach to assessing COMAH risks are not part of navigational risk, nor any NRA. COMAH relates to a port's terrestrial infrastructure. This is explained further below.

- 5.4.5 Within the context of the UK planning and marine licencing framework, navigation risk assessment as part of the Environmental Impact Assessment (EIA) should seek to identify, assess and if necessary, propose mitigation to ensure that the planned development does not have a significant impact on shipping and navigation receptors. It should not include societal risk use for land use planning (LUP) nor should it be used to identify COMAH hazards. That said, it can inform the societal risk assessment and inform COMAH risk and how the COMAH site operator can control and mitigate the risks, if

relevant. The NRA alone, however, cannot provide this, and it is not intended or designed to do so.

- 5.4.6 The HSE does not regulate the maritime, marine, or navigational functions of a port or its terminals. COMAH and the use of HSE societal risk applies to landside infrastructure. The use of an NRA to make decisions on COMAH and public safety hazard identification and control is, therefore, inappropriate and potentially dangerous.
- 5.4.7 It is not, therefore, considered appropriate to apply HSE/COMAH tolerances or assessment matrices for navigational assessments. Further, even terminals which themselves will be COMAH sites, should not reference the COMAH regime in their NRAs. As an example, the 'Solent Gateway NRA', cited by DFDS in their NRA [REP2-043] and also written by Nash Maritime, does not mention the COMAH Regulations, does not apply COMAH assessment criteria, and does not use COMAH based tolerances to define if risk is acceptable or not. This is despite the fact that the Solent Gateway port is itself a COMAH site. This does seem to demonstrate a conflict in the methodology adopted by the authors of the IOT NRA.
- 5.4.8 By referencing the COMAH Regulations, the IOT's NRA is simply attempting to introduce the Regulations as the appropriate standard of acceptability instead of the Port's own 'tolerability' thresholds. This is simply not correct.

Inconsistent use of data

- 5.4.9 The IOT NRA attempts to apply various data sources to determine both frequencies of incidents and their consequences as baseline inputs for their quantitative risk assessments. However, the application of the data used is both subjective and inconsistent. This is important as it forms the basis for determining risk levels against the COMAH tolerability threshold set by Nash Maritime (which, as noted above, is flawed in itself). This issue is compounded by the fact that it is difficult to use rigorous data in NRAs as there is a significant lack of it across the maritime industry as a whole.
- 5.4.10 An example of this in the IOT NRA is the use of the percentage of fatalities during a capsized vessel as a proxy for the percentage of deaths if a Ro-Ro were to have an allision. Specifically, in paragraph 316, it is assumed that 25% of the Ro-Ro Persons on Board (i.e., an average of 60.94 persons) would be fatalities (based on 23% fatality for rapid capsized events). The use of this figure as a justification for calculating worst credible scenario consequences is fundamentally flawed. It would need significantly more relevant supporting evidence in lieu of appropriate justification, which has not been provided. It is unclear from the IOT NRA whether the predicted 60.94 fatalities are due to vessel capsized, or due to a fire associated with product release from the trunkway (and perhaps some fuel from the Ro-Ro). In other words, there is no evidence to support this assumption whatsoever, and it leads to a greatly conflated outcome for the assessment.
- 5.4.11 Another example of this includes discounting incident (failure) levels for roll-on/roll-off passenger (RoPax) vessels from literature when setting the ratio of Major to Minor RoPax incidents. Nash Maritime use an incomplete

assessment of MARNIS data to establish RoPax failure rates within the study area, despite taking considerable effort to review 20 years of MAIB incident data on the Humber to identify only 8 serious incidents covering several vessel types over the 20 year period.

5.5 Inappropriate use of descriptors

Frequency descriptors

- 5.5.1 The IOT NRA attempts to present perspective-based information as fact in several areas when it is not fact but a combination of statistics and assumptions.
- 5.5.2 An example of this is where Nash Maritime has translated the likelihood descriptors used (and applied by stakeholders) within the Applicant's NRA to inform their respective risk analysis. For example, Nash Maritime, in the absence of consultation has translated frequency year bands where 'rare' has been determined to be a 1 in a million-year chance (page 56, Table 4). In doing so, the IOT NRA has invalidated data that could be transposed from the Applicant's HAZID workshops by changing the definitions of the descriptors. Nash Maritime have essentially guessed that stakeholders had a 1 in 1-million-year event in mind when they selected the associated word picture for 'rare' within the Applicants HAZID workshops. This is one example and can be applied to the other likelihood descriptors throughout (page 56, Table 4).
- 5.5.3 Moreover, the likelihood and consequence banding is not comprehensible outside rigorous statistical analysis. For example, the IOT NRA (page 56, Table 4) uses 'very unlikely' to describe 1 in 1,000,000, and 'unlikely' to describe the next band down as 1 in 10,000 to 1 in 1,000,000. These category bands are far too wide and very difficult to comprehend, and they cannot be substantiated based on available data.
- 5.5.4 As an example, the IOT NRA purports to identify two risks as intolerable at the baseline (embedded) stage. These risks are:
- ID 10, Contact (Allision) - IERRT Ro-Ro Vessel with IOT Trunkway; and
 - ID 13, Contact (Allision) - IERRT Ro-Ro Vessel with IOT Finger Pier.
- 5.5.5 For these risks, it is asserted that the worst credible scenarios would occur with a frequency of between 1 in 100 instances to 1 in 10,000 instances. This is a meaningless scale for provision of frequency with a substantial lack of granularity immediately evident. This band of probability is far too large, meaning that a high proportion of risks will fall into this band rather than being spread out to enable more informed analysis.
- 5.5.6 This is particularly concerning as the IOT NRA concludes that the appropriate 'description' for a risk that can occur up to 1 in 10,000 is 'Reasonably Likely'. This is a statistically meaningless description of such an event. It results in a misleading categorisation of the risk in plain terms in that a reader might see a high consequence risk that is 'reasonably likely' and think that there is considerable risk whereas this could be a 1 in 10,000 likelihood event, which is in fact not "reasonably likely".

Consequence descriptors

5.5.7 It is noted that the consequence descriptors are different to those used (and applied by stakeholders) within the Applicants NRA for assessing risk (IOT NRA, Page 57, Table 5). This makes comparison of risk outcomes between NRAs impossible without introducing a degree of uncertainty through interpolation. If the assessment criteria are not the same, the SHA will not be able to apply its tolerability thresholds consistently to the NRA descriptor bands and assessment outcomes by reason of the difference in terminology.

5.6 Use of risk controls

5.6.1 As identified above, the proper and correct consideration of the use of controls when assessing risk is essential for any NRA and the subsequent and consequential judgments made by the relevant SHA. Despite this, the authors of the IOT NRA have only identified three potential controls (see Appendix C of **[REP2-064]**). This is considered to be a deeply flawed and inadequate assessment and ignores the range of controls that are available, as identified by a wide range of port stakeholders recorded in the Applicant's NRA.

5.6.2 As to the three controls identified, the Applicant agrees with the principle of the inclusion of a Marine Liaison Plan control (as already identified within the Applicant's NRA **[APP-089]**). The Applicant has also addressed provision of impact protection to be implemented, at a later date, if it were to be considered necessary.

5.6.3 The Applicant does not agree with the imposition of the control that would require the relocation of the IOT finger pier. Although such a "control" would clearly eliminate a risk of an allision with the IOT finger pier – due to its absence – the SHA considers the control to be neither necessary nor a reasonably practicable control to implement. Fundamentally it has been identified through the Applicant's NRA as not being required to reduce risk to an ALARP and tolerable state (see paragraph 9.9.21 of **APP-089**).

5.6.4 The IOT NRA in this respect pays little regard to the existing situation and reality. Vessels daily enter and exit the Immingham Dock's bell mouth, with no tidal restrictions imposed on such movements even though there remains a risk of an allision with the IOT trunkway or IOT finger pier if such vessels were to lose power under similar conditions being suggested by Nash Maritime (e.g., on an ebb tide).

5.6.5 Within the IOT NRA, it is considered that this risk, or the risk of an allision with IOT infrastructure, as a 1 in 60-year event, which is actually deemed acceptable by IOT within their COMAH Assessment (2019) as the operator of the infrastructure (Section 5.2.2 IOT COMAH Safety Report: Ship Impact paragraph 179).

5.6.6 Moreover, the IOT NRA takes an unrealistic and artificially limited view of the possible controls that could be implemented to reduce the risk of an allision occurring between a Ro-Ro vessel and the IOT Finger pier or the IOT trunkway.

- 5.6.7 As outlined above, the IOT NRA only identifies three controls that could be implemented at the port to improve safety in the context of the construction and operation of the IERRT project. The Applicant's NRA considered 29 further controls that were suggested by a wide range of stakeholders at the HAZID workshops. The Applicant then identified a further seven controls that could be applied during a provisional cost benefit analysis meeting.
- 5.6.8 This highlights what is considered to be an inappropriate approach to understanding the risks and potential control measures available to the IERRT project within the IOT NRA. By failing to sufficiently identify control measures, the authors have failed to identify ways in which risks can be made tolerable and ALARP and as a consequence, have over-inflated the assessment of residual risk. This has resulted in recommendations for control measures (such as the movement of the finger pier and impact protection) that are disproportionate to the scale of risk identified even if one were (inappropriately) to impose the DFDS judgments about tolerability and ALARP for those of the SHA (something which would be an abrogation of the SHA's functions). In practice there are in fact many controls (as identified through the wider port stakeholders' engagement and identified in the Applicant's NRA) that could be applied to ensure all risks are tolerable and ALARP (as judged by the Harbour Authorities) without the need for such drastic and disproportionate solutions.
- 5.6.9 This also further emphasises the basic problem with the lack of stakeholder engagement with wider port stakeholders. No consultation with or consideration of the SHAs judgement on tolerability and ALARP means that any conclusion drawn has to be viewed as flawed as it is based upon the opinion of an Interested Party objecting in isolation. This is in direct contravention to the PMSC which states that stakeholder engagement is essential.
- 5.7 **Risk scoring**
- 5.7.1 Risk outcomes within the IOT NRA are scored and then averaged to reach an overall score as a single number which is then used in order for the authors to describe whether the risk is acceptable by reference to their own choice of scoring. This approach is oversimplistic and does not take into consideration the fact that risks can affect more than one receptor (such as people, property, planet (environment), port (business)), but also the scale of effect on these receptors can be very different.
- 5.7.2 Within the Applicant's NRA [APP-089] the review of risks has been undertaken against criteria of tolerance/acceptability across each of the receptor types. This prevents a risk that scores highly for one receptor being hidden by lower risk outcomes for other receptors by reducing the average. For example, using the approach adopted by Nash Maritime, a risk that could be considered to be intolerable to people could be masked if it scored lower for property, planet, and port.
- 5.7.3 Furthermore, the approach taken within the Applicant's NRA is consistent with the approach taken to risk assessment across Associated British Ports, which considers all four receptor types individually when evaluating port operations.

5.8 **Comparison of outcomes for risks considered intolerable by IOT**

5.8.1 This section directly compares the differences in outcomes between the Applicant's NRA and the IOT NRA. Overall, despite the many differences in approach outlined in the preceding sections, the differences in outcomes of both risk assessments are limited. The fundamental and important difference is what is considered tolerable by the IOT Operators and what is considered tolerable by the SHA. This is explained in further detail below for each of the intolerable risks identified in the DFDS and IOT NRA. A detailed comparison of each of these risks is provided in Appendix A.

5.8.2 It is important to note that the tables at Appendix A compare intolerable risks identified by DFDS and IOT Operators at the baseline/embedded stage. All three NRAs subsequently identify further controls which suitably mitigate the risks to a 'tolerable if ALARP' or 'tolerable and ALARP' state. Supplementary to this, the most significant elements to observe are; the source of the assessed risk outcomes (i.e., level of stakeholder engagement), the similarity of risk outcomes across the three assessments and, the authority/entity which has determined if the risk is tolerable (and whether they have the authority to do so).

Collision – Ro-Ro on passage to/from Immingham Eastern Ro-Ro Terminal with another vessel

5.8.3 This risk was considered 'Tolerable if ALARP' at both the Baseline and Residual risk stages (Embedded and Future) within the IOT Operators NRA. Therefore, no comparison of intolerable risk is required against the outcomes presented in the Applicant's NRA. However, it serves to highlight that, despite Nash Maritime being the author of the DFDS and IOT NRAs, a different conclusion is reached, in that the DFDS NRA considers this risk intolerable at the Baseline (Embedded) risk control stage.

Allision with Eastern Jetty

5.8.4 This risk was not assessed within the IOT Operators NRA. Again, this highlights the difference even between the DFDS and IOT NRAs despite be written by the same authors.

Allision with Finger Pier

5.8.5 This risk has been considered across each of the three NRAs. Within the context of this risk, one element that all three NRAs agree on is that the risk can be mitigated to tolerable if/and ALARP. In this regard, the only suggested further control with which the SHA fundamentally does not agree is 'moving the finger pier' as identified by NASH Maritime within the DFDS and IOT Operators NRAs. This is because the SHA already considers this risk to be tolerable based on the full range of alternative controls that can be applied to mitigate the risk. Moving the finger pier is far too onerous for it to be considered a control that fits within the definition of ALARP.

5.8.6 The other further controls identified are broadly consistent with those considered by the Applicant. The Applicant has also indicated the need for

berthing/unberthing criteria to be defined along with the implementation of a marine liaison plan both during construction and operation which can be implemented through a combination of VTS and other port and construction management practises.

Allision with Trunk Way

- 5.8.7 This risk has been considered in all three NRAs. All three NRAs believe that this risk can be mitigated to a tolerable and/if ALARP state if further controls are put in place. Specifically, 'impact protection' measures are identified by the IOT Operators. In this regard, however, although the Applicant broadly agrees with the IOT NRA assessment, as is set out in paragraph 9.9.24 and Table C4 of its NRA **[APP-089]**, as the ExA is aware, the Applicant does not consider the provision of impact protection measures to be necessary and such measures will only be provided as part of the project specific adaptive controls if required.

6 Conclusion

- 6.1.1 As outlined throughout this Review, the Applicant is satisfied and confident that it has been provided with an independent and robust NRA as part of the IERRT DCO application. The Applicant's NRA considers all relevant elements concerned with navigational risk, especially those raised by port stakeholders during HAZID workshop and thus has given comprehensive consideration to the risk against a wide range of subject matter expertise and stakeholder opinion.
- 6.1.2 The NRA conducted for the Applicant's DCO submission considers the views of stakeholders and seeks to reduce risk by increasing safety and considering a wide range of potential controls. This was achieved by identifying which hazard scenarios exist, what might cause them to happen, and how one might control or limit these causes. Following this, the Applicant's NRA analysed the risks, which involved attributing risk outcomes (consequence and likelihood/frequency) in consultation with a diverse range of stakeholders and port users. This is known as Hazard Identification and Risk Analysis and must be included in any risk assessment if it is to comply with the PMSC's GtGP **([REP1-016])**.
- 6.1.3 Further, the Applicant's NRA considered the identified risks against the appropriate standard of acceptability for the SHAs, the Harbour Authority and HASB set 'tolerability' threshold. The controls identified for a hazardous scenario were then considered, in consultation with the Humber Harbour Master and the Immingham Dock Master (amongst others), against the concepts of ALARP and 'tolerability'. This stage is known as Risk Assessment and in this instance was accompanied by a preliminary cost-benefit analysis assessment. This then enabled the NRA produced for the Applicant to demonstrate to their Duty Holders, Designated Person, and SHAs that considerable effort and thought had been put into safely managing the risks identified by the stakeholders.

- 6.1.4 The SHAs have fully considered the Applicant's NRA and has determined that the identified risks are capable of being properly mitigated to the point where safe operations can continue to occur at the port. This is in relation both to existing operations and for the construction and operation phases of the IERRT project.
- 6.1.5 In contrast, the fundamental issues identified above make the IOT NRA **[REP2-064]** impossible for the SHA to accept as a whole because the engagement with wider port stakeholders is non-existent and as a result the potential controls considered are so limited that it artificially forces the document to consider that controls far too drastic are required to mitigate the identified risks. No consultation with or consideration for the SHAs tolerability means that any conclusion drawn is false as it is based upon the opinion of an Interested Party objecting in isolation.
- 6.1.6 In summary, the IOT NRA has been completed with:
- A narrow perspective with a failure to consider either the IERRT project or the Port of Immingham as a whole;
 - A lack of stakeholder engagement with other port users and fundamentally the Statutory Harbour Authority;
 - An inappropriate application of COMAH regulations;
 - Over-reliance on statistical assumptions of outcomes, rather than actual experience;
 - Inappropriate definitions and application of frequency;
 - No consideration of levels of tolerability set by the SHA; and
 - Insufficient integration of risk controls into the risk assessment process resulting in a disproportionate assessment of residual risk and unjustified recommendations for further control measures.
- 6.1.7 The table below provides a summary of how each aspect of the Applicant's NRA and the IOT NRA has been met, highlighting the differences and the fundamental shortcomings of the alternative NRA provided by the IOT Operators. Ultimately, the fundamental point is that it is for the SHA to assess navigational risk, assess tolerability and to be accountable for its decisions. It is neither appropriate, nor usual, for third parties to make their own assessments independent of all other stakeholders, nor is there any mechanism for third parties to be held accountable for the outcomes of their opinions.

Table 1. Summary of approach taken in each NRA

Aspect of NRA	Applicant NRA	IOT Alternative NRA
Stakeholder engagement	Comprehensive stakeholder engagement undertaken to inform risk assessment	No engagement undertaken relying on output of Applicant's NRA – biased perspective about operations with no evidence that any port stakeholder confirmed or validated internally held opinions on risks
Hazard identification	Based on formal HAZID process involving all key stakeholders as part of the NRA	Relied on Applicant's process and their own data - no new hazards identified
Existing risk controls	Fully considered existing controls used to manage risk within the Port, identified at HAZID	No consideration of existing controls used to manage risk within the Port
Additional risk controls	29 additional risk controls identified at HAZID and another seven controls identified with the SHA	Three additional risk controls identified in the NRA
Assessment of frequency	Based on known local and extensive data, using agreed definitions of probability already accepted by Duty Holder, clearly explained to stakeholders. Aligned with SHA guidance and process.	Attempts to use COMAH for navigational matters. Inappropriate, not aligned with SHA accepted frequencies.
Methodology	Most Likely/Worst Credible principle (industry standard and appropriate) Transparent approach to risk scoring	Worst Credible Outcomes consider only. Inappropriate mixing of COMAH and HSE methodology in marine environment. Inflates risks and receptors. Inappropriate risk scoring.
Outcomes	No intolerable risks identified with suggested risk controls agreed by SHA	Two intolerable risks and application of risks controls not considered reasonably practicable – in contrast to position of SHA

Appendix A

Collision – Ro-Ro on passage to/from Immingham Eastern Ro-Ro Terminal with another vessel

Party	Risk and worst credible/most likely scenarios	Causes identified	Embedded Controls identified	Embedded Worst Credible Consequence/ Likelihood Outcomes	Embedded Most Likely Consequence/ Likelihood Outcomes	Further controls identified	Future Worst Credible Consequence/ Likelihood Outcomes	Future Most Likely Consequence/ Likelihood Outcomes	Tolerance and ALARP outcome
Applicant	<p>Collision; Scenario: Ro-Ro on passage to/from Immingham Eastern Ro-Ro Terminal with another vessel</p> <p>Worst Credible: Manoeuvring speed collision with no avoiding action leading to multiple fatalities, hull breach, serious impact to property, significant consequence to the environment including a tier 2 pollution event, and serious consequence to the port business and reputation.</p> <p>Most Likely: Low speed glancing collision with bridge crew taking avoiding action, minor injuries, minor impact to property, no appreciable consequence to the environment or to the port's business/reputation.</p>	<p>Failure to comply with Towage guidelines</p> <p>High traffic density</p> <p>COLREGs failure to comply</p> <p>Restricted visibility</p> <p>Failure to follow passage plan</p> <p>Vessel breakdown or malfunction</p> <p>AIS failure/ lack of AIS</p> <p>Excessive vessel speed</p> <p>Incorrect assessment of tidal flow</p> <p>Excessive vessel speed</p> <p>Poor situational awareness</p> <p>Human error/fatigue - Pilot/ Vessel Personnel</p> <p>Inadequate bridge resource management</p> <p>Inadequate procedures in place onboard vessel</p> <p>Manoeuvre misjudged</p> <p>Ship/Tug/Launch failure</p> <p>Communication failure - Personnel</p> <p>Adverse weather conditions</p>	<p>Towage, available and appropriate</p> <p>Communications - traffic broadcast</p> <p>International COLREGs 1972 (as amended)</p> <p>Passage planning</p> <p>Vessel propulsion redundancies</p> <p>Vessel Traffic Services</p> <p>Accurate tidal measurements</p> <p>Byelaws</p> <p>Aids to navigation, Provision and maintenance of</p> <p>Harbour Authority requirements</p> <p>Joint emergency drills with VTS and Port staff</p> <p>Local Port Service</p> <p>Availability of latest hydrographic information</p> <p>Arrival/Departure, advance notice of</p> <p>Oil spill contingency plans</p>	<p>The worst credible outcome for this risk (at the embedded/baseline stage) was considered by the attendees at the HAZID workshop to result in:</p> <p>People - Multiple Fatalities;</p> <p>Property - Serious (£4M - £8M);</p> <p>Planet - Significant (Has the potential to cause significant damage and impact - Tier 2, pollution control measures from external organisations required);</p> <p>Port - Serious (Negative national publicity. Serious damage to reputation. Serious loss of revenue, £4M - £8M)</p> <p>It was also considered that the risk is:</p> <p>Unlikely - The impact of the hazard might occur but is unlikely (within the lifetime of the entity)</p>	<p>The most likely outcome for this risk (at the embedded/baseline stage) was considered by the attendees at the HAZID workshop to result in:</p> <p>People - Minor injury(s);</p> <p>Property - Minor (£10,000 - £750,000);</p> <p>Planet - None (No incident - or a potential incident/near miss);</p> <p>Port - None</p> <p>It was also considered that the risk is:</p> <p>Possible - The impact of the hazard could very well occur, but it also may not (within the lifetime of the entity)</p>	<p>Nil further controls identified at HAZID Workshop and post-workshop consultation; Risk considered against existing risks within the MSMS in place and considered ALARP and tolerable with existing controls by the SHA</p>	<p>No Change</p>	<p>No Change</p>	<p>Deemed tolerable and ALARP by the SHA with the controls agreed</p>
DFDS	<p>Collision - Project Vessel (Passenger / Driver) ICW Coastal Tanker</p> <p>Most Likely: light touch, low speed contact between two project vessels whilst underway.</p> <p>Worst Credible: heavy contact collision occurrence at relative high speed resulting in loss of vessel and loss of cargo.</p>	<p>The DFDS NRA does not present a table or list of causes</p>	<p>Towage, available and appropriate</p> <p>Accurate tidal measurements</p> <p>Harbour Authority requirements</p> <p>Availability of latest hydrographic information</p> <p>Vessel Traffic Services</p> <p>Berthing procedures</p> <p>Towage guidelines</p> <p>Arrival/Departure, advance notice of</p> <p>Monitoring of met ocean conditions</p> <p>Byelaws</p> <p>Oil spill contingency plans</p> <p>Communications - traffic broadcast</p> <p>Passage planning</p> <p>Design criteria</p> <p>Adequate berth tendering</p> <p>Hydrographic Survey</p> <p>Aids to navigation, Provision and maintenance of International COLREGs 1972 (as amended)</p> <p>Anchors cleared and ready for use</p> <p>Joint emergency drills with VTS and Port staff</p> <p>Communications equipment</p> <p>Mooring analysis</p> <p>Local Port Service</p> <p>Vessel simulation study</p> <p>Port Facility Emergency Plan</p> <p>Weather limits</p> <p>Training of port marine/operations personnel</p> <p>Pilotage</p> <p>Vessel propulsion redundancies</p>	<p>The worst credible outcome for this risk (at the embedded/baseline stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Multiple fatalities;</p> <p>Property - Major, More than £8 million;</p> <p>Planet - Major, Has the potential to cause catastrophic and/or widespread damage. Tier 3, requires major external assistance;</p> <p>Port Major, Negative national and international publicity. Major damage to reputation. Major loss of revenue, more than £8 million.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur once in 1,000 years.</p>	<p>The most likely outcome for this risk (at the embedded/baseline stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Serious injury(s) MAIB/RIDDOR reportable injury;</p> <p>Property - Moderate £750,000 - £4 million;</p> <p>Planet - Minor, An incident that results in pollution with limited/local impact. Tier 1, Harbour Authority pollution controls measures deployed;</p> <p>Port - Moderate, Negative local publicity. Moderate damage to reputation. Moderate loss of revenue, £750,000 - £4m.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur once in 10 years.</p>	<p>RC03 Deconfliction plan</p>	<p>The worst credible outcome for this risk (at the potential/future/residual stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Multiple fatalities;</p> <p>Property - Major, More than £8 million;</p> <p>Planet - Major, Has the potential to cause catastrophic and/or widespread damage. Tier 3, requires major external assistance;</p> <p>Port - Major, Negative national and international publicity. Major damage to reputation. Major loss of revenue, more than £8 million.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur less than once > 1, 000 years.</p>	<p>The most likely outcome for this risk (at the potential/future/residual stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Serious injury(s) MAIB/RIDDOR reportable injury;</p> <p>Property - Moderate £750,000 - £4 million;</p> <p>Planet - Minor, An incident that results in pollution with limited/local impact. Tier 1, Harbour Authority pollution controls measures deployed;</p> <p>Port - Moderate, Negative local publicity. Moderate damage to reputation. Moderate loss of revenue, £750,000 - £4m.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur once in 100 years.</p>	<p>Deemed 'Tolerable if ALARP' by authors of the DFDS NRA (NASH Maritime) against tolerance suggested by DFDS, which differs from that of the IOT Operators and the SHA.</p>
IOT Operators	<p>This risk was considered 'Tolerable if ALARP' at both the Baseline and Residual risk stages (Embedded and Future) within the IOT Operators NRA. Therefore no comparison of intolerable risk is required in this context.</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>Deemed 'Tolerable if ALARP' by authors of the IOT Operators NRA (NASH Maritime) against tolerance suggested by IOT Operators, which differs from that of DFDS and the SHA</p>

Allision with Finger Pier

Party	Risk and worst credible/most likely scenarios	Causes identified	Embedded Controls identified	Embedded Worst Credible Consequence/ Likelihood Outcomes	Embedded Most Likely Consequence/ Likelihood Outcomes	Further controls identified	Future Worst Credible Consequence/ Likelihood Outcomes	Future Most Likely Consequence/ Likelihood Outcomes	Tolerance and ALARP outcome
Applicant	<p>Allision; Scenario: Vessel proceeding to/from Immingham Eastern Ro-Ro with tanker moored at IOT Finger Pier</p> <p>Worst Credible: Ro-Ro makes contact with berthed tanker resulting in a significant allision that punctures the tanker's double hull leading to a tier 3 pollution event with possible ignition of the petrochemical. That could cause a fire which significantly damages the vessel and/or infrastructure. Incident results in multiple fatalities, and negative international news that significantly affects the ports reputation and port operations.</p> <p>Most Likely: An approaching Ro-Ro misses its berth and continues to the IOT Finger Pier which results in a low speed glancing collision, dislodging a tanker from its berth causing a tier 3 pollution event. Major damage to port infrastructure and vessel, serious injuries to personnel, and negative national port reputational damage.</p>	<p>Adverse weather conditions Incorrect assessment of tidal flow Restricted visibility Inadequate bridge resource management Failure to follow passage plan Inadequate procedures in place onboard vessel Manoeuvre misjudged Vessel breakdown or malfunction Ship/Tug/Launch failure Failure to comply with Towage guidelines Inadequate number/type tugs Interaction with passing vessel Poor situational awareness Communication failure - Personnel Excessive vessel speed Human error/fatigue - Vessel Personnel</p>	<p>Monitoring of met ocean conditions Passage planning Port Facility Emergency Plan Towage guidelines Towage, available and appropriate Vessel Traffic Services Harbour Authority requirements Oil spill contingency plans</p>	<p>The worst credible outcome for this risk (at the embedded/baseline stage) was considered by the attendees at the HAZID workshop to result in:</p> <p>People - Multiple Fatalities; Property - Major (> £8M); Planet - Major (Potential to cause catastrophic and/or widespread damage - Tier 3, requires major external assistance); Port - Major (Negative national and international publicity. Major damage to reputation. Major loss of revenue, > £8 M)</p> <p>It was also considered that the risk is:</p> <p>Unlikely - The impact of the hazard might occur but is unlikely (within the lifetime of the entity)</p>	<p>The most likely outcome for this risk (at the embedded/baseline stage) was considered by the attendees at the HAZID workshop to result in:</p> <p>People - Serious injury(s) (MAIB/RIDDOR reportable injury); Property - Serious (£4M - £8M); Planet - Major (Potential to cause catastrophic and/or widespread damage - Tier 3, requires major external assistance); Port - Serious (Negative national publicity. Serious damage to reputation. Serious loss of revenue, £4M - £8M)</p> <p>It was also considered that the risk is:</p> <p>Possible - The impact of the hazard could very well occur, but it also may not (within the lifetime of the entity)</p>	<p>Charted safety area, berthing procedures Additional pilotage training/ familiarisation Berthing criteria <i>Move finger pier to east side of trunk way</i></p> <p>Moving finger pier deemed too onerous by the SHA, other controls taken forward and amended as: Project specific adaptive procedures Charted safety area, berthing procedures Specific berthing criteria for each of the three berths</p>	<p>The worst credible outcome for this risk (at the potential/future/residual stage, in contemplation of further controls) was considered by representatives of the SHA, in review of the comments made by attendees at the HAZID workshop, to result in:</p> <p>People - Serious injury(s) (MAIB/RIDDOR reportable injury); Property - Serious (£4M - £8M); Planet - Minor (Incident results in pollution with limited/local impact - Tier 1, Harbour Authority pollution control measures deployed); Port - Moderate (Negative local publicity. Moderate damage to reputation. Moderate loss of revenue, £750,000 - £4M)</p> <p>It was also considered that (in contemplation of further controls) the risk is:</p> <p>Rare - The impact of the hazard is realised but should very rarely occur (within the lifetime of the entity)</p>	<p>The most likely scenario for this risk (at the potential/future/residual stage, in contemplation of further controls) was considered by representative of the SHA attendees at the HAZID workshop to result in:</p> <p>People - Minor injury(s); Property - Moderate (£750,000 - £4M); Planet - Significant (Has the potential to cause significant damage and impact - Tier 2, pollution control measures from external organisations required); Port - Minor (Little local publicity. Minor damage to reputation. Minor loss of revenue, £0 - £750,000)</p> <p>It was also considered that (in contemplation of further controls) the risk is:</p> <p>Unlikely - The impact of the hazard might occur but is unlikely (within the lifetime of the entity)</p>	Deemed tolerable and ALARP by the SHA with the controls agreed
DFDS	<p>Contact (Allision) - Project Vessel (Passenger /Driver) with IOT Finger Pier (or moored vessel)</p> <p>Most Likely: light contact with Coastal tanker / Bunker Barge moored alongside resulting in moderate damage to both vessels, IOT Finger Pier, breakaway of Coastal tanker / Bunker Barge and ruptured loading arm(s).</p> <p>Worst Credible: high impact contact with Coastal tanker / Bunker Barge moored alongside resulting in multiple vessel breakaway puncture of tanker / barge hull, rupture of IOT Finger Pier pipeline(s) and significant damage to IOT Finger Pier infrastructure (with extension of breakaway causing impact to IOT trunkway).</p>	<p>The DFDS NRA does not present a table or list of causes</p>	<p>Accurate tidal measurements Harbour Authority requirements Availability of latest hydrographic information Vessel Traffic Services Berthing procedures Towage guidelines Arrival/Departure, advance notice of Monitoring of met ocean conditions Byelaws Oil spill contingency plans Communications - traffic broadcast Passage planning Design criteria Adequate berth tendering Hydrographic Survey Aids to navigation, Provision and maintenance of International COLREGs 1972 (as amended) Anchors cleared and ready for use Joint emergency drills with VTS and Port staff Communications equipment Mooring analysis Local Port Service Vessel simulation study Port Facility Emergency Plan Weather limits Training of port marine/operations personnel Pilotage Vessel propulsion redundancies</p>	<p>The worst credible outcome for this risk (at the embedded/baseline stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Multiple fatalities; Property - Major, More than £8 million; Planet - Major, Has the potential to cause catastrophic and/or widespread damage. Tier 3, requires major external assistance; Port - Major, Negative national and international publicity. Major damage to reputation. Major loss of revenue, more than £8 million.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur once in 1,000 years.</p>	<p>The most likely outcome for this risk (at the embedded/baseline stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Serious injury(s) MAIB/RIDDOR reportable injury; Property - Serious, £4 million - £8 million; Planet - Significant, Has the potential to cause significant damage and impact. Tier 2, pollution control measures from external organisations required; Port - Serious, Negative national publicity. Serious damage to reputation. Serious loss of revenue, £4m - £8m.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur once in 10 years.</p>	<p>RC01 Berthing / unberthing criteria RC02 Standby tug provision RC06 Moving finger pier</p>	<p>The worst credible outcome for this risk (at the potential/future/residual stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Multiple fatalities; Property - Major, More than £8 million; Planet - Major, Has the potential to cause catastrophic and/or widespread damage. Tier 3, requires major external assistance; Port - Major, Negative national and international publicity. Major damage to reputation. Major loss of revenue, more than £8 million.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur less than once > 1, 000 years.</p> <p><i>It is not explained how the outcomes about allison are reached in circumstances where the controls that are being assessed include moving the finger pier.</i></p>	<p>The most likely outcome for this risk (at the potential/future/residual stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Serious injury(s) MAIB/RIDDOR reportable injury; Property - Serious, £4 million - £8 million; Planet - Significant, Has the potential to cause significant damage and impact. Tier 2, pollution control measures from external organisations required; Port - Serious, Negative national publicity. Serious damage to reputation. Serious loss of revenue, £4m - £8m.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur once in 100 years.</p> <p><i>It is not explained how the outcomes about allison are reached in circumstances where the controls that are being assessed include moving the finger pier.</i></p>	Deemed 'Tolerable if ALARP' by authors of the DFDS NRA (NASH Maritime) against tolerance suggested by DFDS, which differs from that of the IOT Operators and the SHA.
IOT Operators	<p>Contact (Allision) - IERRT Ro-Ro Vessel with IOT Finger Pier</p>	<p>The IOT Operators NRA does not present a table or list of causes</p>	<p>The IOT Operators NRA does not present a table or list of embedded controls</p>	<p>The worst credible outcome for this risk (at the embedded/baseline stage) was considered by NASH Maritime to result in:</p> <p>People - Potential for many fatalities on site or potential for serious injury or fatality off site; Property - >£10million; Planet - DETR criteria – the highest levels of harm to the receptor (long term/permanent/widespread damage); Port - International negative publicity, serious disruption to operations to port / ship register >£10million International publicity.</p> <p>It was also considered that the risk could occur with a:</p> <p>1 in 10,000 to 1 in 100 chance per year</p>	<p>The IOT Operators NRA does not consider the 'Most Likely' scenario</p>	<p>IOT RC1: Impact protection IOT RC2: Relocation Finger Pier IOT RC3: Marine & Liaison Plan</p>	<p>The worst credible outcome for this risk (at the potential/future/residual stage) was considered by NASH Maritime to result in:</p> <p>People - Potential for some (one/few) fatalities / many serious injuries on site, some potential for minor injury off site; Property - £1million - £10million; Planet - Department of the Environment, Transport and the Regions (DETR) criteria – the lowest level of harm that can be considered a MATTE; Port - Widespread negative publicity, temporary suspension of activities at port / ship register £100,000 Local publicity - £1million</p> <p>It was also considered that the risk could occur with a:</p> <p>1 in 1,000,000 to 1 in 10,000 chance per year</p> <p><i>It is not explained how the outcomes about allison are reached in circumstances where the controls that are being assessed include moving the finger pier.</i></p>	<p>The IOT Operators NRA does not consider the 'Most Likely' scenario</p>	Deemed 'Tolerable if ALARP' by authors of the IOT Operators NRA (NASH Maritime) against tolerance suggested by IOT Operators, which differs from that of DFDS and the SHA

Allision with Trunk Way

Party	Risk and worst credible/most likely scenarios	Causes identified	Embedded Controls identified	Embedded Worst Credible Consequence/ Likelihood Outcomes	Embedded Most Likely Consequence/ Likelihood Outcomes	Further controls identified	Future Worst Credible Consequence/ Likelihood Outcomes	Future Most Likely Consequence/ Likelihood Outcomes	Tolerance and ALARP outcome
Applicant	<p>Allision; Scenario: Ro-Ro allision with IOT trunk way</p> <p>Worst Credible: Ro-Ro vessel collides with IOT trunk way, severing the charged pipeline causing a tier 3 pollution incident. Possibility of ignition and fire when the motor spirit pipeline is burst due to its flammability. Two refineries must be closed for a considerable time in order to repair the pipeline. This causes significant impacts for multiple weeks and has national affect to petroleum production. Multiple fatalities, negative international publicity for port and greater than £8 million of damage to port infrastructure.</p> <p>Most Likely: Ro-Ro has a slow speed impact with IOT trunk way leading to minor damage to vessel and distortion of pipe line on trunk way. Single fatality to personnel on the trunk way and tier 3 pollution, negative international publicity and greater than £8 million of damages to the port.</p>	<p>Anchors not cleared</p> <p>Inadequate number/type tugs</p> <p>Failure to comply with Towage guidelines</p> <p>Adverse weather conditions</p> <p>Restricted visibility</p> <p>Incorrect assessment of tidal flow</p> <p>Vessel breakdown or malfunction</p> <p>Human error/fatigue - Pilot/ Vessel Personnel</p> <p>Poor situational awareness</p> <p>Excessive vessel speed</p> <p>Inadequate bridge resource management</p> <p>Inadequate procedures in place onboard vessel</p> <p>Communication failure - Personnel</p> <p>Ship/Tug/Launch failure</p>	<p>Anchors cleared and ready for use</p> <p>Towage, available and appropriate</p> <p>Towage guidelines</p> <p>Weather limits</p> <p>Vessel propulsion redundancies</p> <p>Harbour Authority requirements</p> <p>Vessel Traffic Services</p> <p>Local Port Service</p> <p>Port Facility Emergency Plan</p> <p>Oil spill contingency plans</p> <p>Communications equipment</p> <p>Training of port marine/operations personnel</p>	<p>The worst credible outcome for this risk (at the embedded/baseline stage) was considered by the attendees at the HAZID workshop to result in:</p> <p>People - Multiple Fatalities;</p> <p>Property - Major (> £8M);</p> <p>Planet - Major (Potential to cause catastrophic and/or widespread damage - Tier 3, requires major external assistance);</p> <p>Port - Major (Negative national and international publicity. Major damage to reputation. Major loss of revenue, > £8 M)</p> <p>It was also considered that (at the embedded/existing stage) the risk is:</p> <p>Possible - The impact of the hazard could very well occur, but it also may not (within the lifetime of the entity)</p>	<p>The most likely outcome for this risk (at the embedded/baseline stage) was considered by the attendees at the HAZID workshop to result in:</p> <p>People - Single Fatality;</p> <p>Property - Major (> £8M);</p> <p>Planet - Major (Potential to cause catastrophic and/or widespread damage - Tier 3, requires major external assistance);</p> <p>Port - Major (Negative national and international publicity. Major damage to reputation. Major loss of revenue, > £8 M)</p> <p>It was also considered that (at the embedded/existing stage) the risk is:</p> <p>Possible - The impact of the hazard could very well occur, but it also may not (within the lifetime of the entity)</p>	<p>Impact protection</p> <p>Berthing criteria</p> <p>Additional tug provisions</p> <p>Controls taken forward and amended as:</p> <p>Project specific adaptive procedures</p> <p>Specific berthing criteria for each of the three berths</p>	<p>The worst credible outcome for this risk (at the potential/future/residual stage, in contemplation of further controls) was considered by the attendees at the HAZID workshop to result in:</p> <p>People - Multiple Fatalities;</p> <p>Property - Major (> £8M);</p> <p>Planet - Major (Potential to cause catastrophic and/or widespread damage - Tier 3, requires major external assistance);</p> <p>Port - Major (Negative national and international publicity. Major damage to reputation. Major loss of revenue, > £8 M)</p> <p>It was also considered that (in contemplation of further controls) the risk is:</p> <p>Unlikely - The impact of the hazard might occur but is unlikely (within the lifetime of the entity)</p>	<p>The most likely outcome for this risk (at the potential/future/residual stage, in contemplation of further controls) was considered by the attendees at the HAZID workshop to result in:</p> <p>People - Single Fatality;</p> <p>Property - Major (> £8M);</p> <p>Planet - Major (Potential to cause catastrophic and/or widespread damage - Tier 3, requires major external assistance);</p> <p>Port - Major (Negative national and international publicity. Major damage to reputation. Major loss of revenue, > £8 M)</p> <p>It was also considered that (in contemplation of further controls) the risk is:</p> <p>Unlikely - The impact of the hazard might occur but is unlikely (within the lifetime of the entity)</p>	<p>Deemed tolerable and ALARP by the SHA with the controls agreed</p>
DFDS	<p>Contact (Allision) - Project Vessel (Passenger /Driver) with IOT Trunkway</p> <p>Most Likely: high impact contact resulting rupture of IOT Trunkway pipeline(s).</p> <p>Worst Credible: high impact contact at relative high speed resulting in puncture of hull and rupture of IOT Trunkway pipeline(s).</p>	<p>The DFDS NRA does not present a table or list of causes</p>	<p>Towage, available and appropriate</p> <p>Accurate tidal measurements</p> <p>Harbour Authority requirements</p> <p>Availability of latest hydrographic information</p> <p>Vessel Traffic Services</p> <p>Berthing procedures</p> <p>Towage guidelines</p> <p>Arrival/Departure, advance notice of</p> <p>Monitoring of met ocean conditions</p> <p>Byelaws</p> <p>Oil spill contingency plans</p> <p>Communications - traffic broadcast</p> <p>Passage planning</p> <p>Design criteria</p> <p>Adequate berth tendering</p> <p>Hydrographic Survey</p> <p>Aids to navigation, Provision and maintenance of International COLREGS 1972 (as amended)</p> <p>Anchors cleared and ready for use</p> <p>Joint emergency drills with VTS and Port staff</p> <p>Communications equipment</p> <p>Mooring analysis</p> <p>Local Port Service</p> <p>Vessel simulation study</p> <p>Port Facility Emergency Plan</p> <p>Weather limits</p> <p>Training of port marine/operations personnel</p> <p>Pilotage</p> <p>Vessel propulsion redundancies</p>	<p>The worst credible outcome for this risk (at the embedded/baseline stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Multiple fatalities;</p> <p>Property - Major, More than £8 million;</p> <p>Planet - Major, Has the potential to cause catastrophic and/or widespread damage. Tier 3, requires major external assistance;</p> <p>Port - Major, Negative national and international publicity. Major damage to reputation. Major loss of revenue, more than £8 million.</p> <p>It was also considered that (at the embedded/existing stage) the risk could occur with a:</p> <p>An event that could be expected to occur once in 1,000 years.</p>	<p>The most likely outcome for this risk (at the embedded/baseline stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Single fatality;</p> <p>Property - Major, More than £8 million;</p> <p>Planet - Major, Has the potential to cause catastrophic and/or widespread damage. Tier 3, requires major external assistance;</p> <p>Port - Major, Negative national and international publicity. Major damage to reputation. Major loss of revenue, more than £8 million.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur once in 100 years.</p>	<p>RC01 Berthing / unberthing criteria</p> <p>RC02 Standby tug provision</p> <p>RC05 Impact protection for IOT Trunkway</p>	<p>The worst credible outcome for this risk (at the potential/future/residual stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Serious injury(s) MAIB/RIDDOR reportable injury;</p> <p>Property - Serious, £4 million - £8 million;</p> <p>Planet - Minor, An incident that results in pollution with limited/local impact. Tier 1, Harbour Authority pollution controls measures deployed.;</p> <p>Port - Serious, Negative national publicity. Serious damage to reputation. Serious loss of revenue, £4m - £8m.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur less than once > 1, 000 years.</p>	<p>The most likely outcome for this risk (at the potential/future/residual stage) was considered by NASH Maritime, DFDS and two instructed consultants to result in:</p> <p>People - Serious injury(s) MAIB/RIDDOR reportable injury;</p> <p>Property - Moderate, £750,000 - £4 million;</p> <p>Planet - No Measurable Impact. An incident or event occurred, but no discernible environmental impact. Tier 1 but no pollution control measures needed.;</p> <p>Port - Moderate Negative local publicity. Moderate damage to reputation. Moderate loss of revenue, £750,000 - £4m.</p> <p>It was also considered that this risk scenario could occur in:</p> <p>An event that could be expected to occur once in 1,000 years.</p>	<p>Deemed 'Tolerable if ALARP' by authors of the DFDS NRA (NASH Maritime) against tolerance suggested by DFDS, which differs from that of the IOT Operators and the SHA.</p>
IOT Operators	<p>Contact (Allision) - IERRT Ro-Ro Vessel with IOT Trunkway</p>	<p>The IOT Operators NRA does not present a table or list of causes</p>	<p>The IOT Operators NRA does not present a table or list of embedded controls</p>	<p>The worst credible outcome for this risk (at the embedded/baseline stage) was considered by NASH Maritime to result in:</p> <p>People - Potential for many fatalities on site or potential for serious injury or fatality off site;</p> <p>Property - >£10M;</p> <p>Planet - DETR criteria – the highest levels of harm to the receptor (long term/permanent/widespread damage);</p> <p>Port - International negative publicity, serious disruption to operations to port / ship register >£10million International publicity.</p> <p>It was also considered that (at the embedded/existing stage) the risk could occur with a:</p> <p>1 in 10,000 to 1 in 100 chance per year</p>	<p>The IOT Oerators NRA does not consider the 'Most Likely' scenario</p>	<p>IOT RC1: Impact protection</p>	<p>The worst credible outcome for this risk (at the potential/future/residual stage) was considered by NASH Maritime to result in:</p> <p>People - Potential for serious injury / injuries on site.;</p> <p>Property - £1million - £10million;</p> <p>Planet - Catastrophic environmental impact on 2 or more MATTE categories over the designated threshold and for greater than 1 year (widespread, requires long term additional resources considered a MATTE on 2 or more environmental receptors;</p> <p>Port - National negative publicity, prolonged closure or restrictions to port / ship register £1million National publicity -£10million.</p> <p>It was also considered that the risk could occur with a:</p> <p>1 in 1,000,000 to 1 in 10,000 chance per year</p>	<p>The IOT Oerators NRA does not consider the 'Most Likely' scenario</p>	<p>Deemed 'Tolerable if ALARP' by authors of the IOT Operators NRA (NASH Maritime) against tolerance suggested by IOT Operators, which differs from that of DFDS and the SHA</p>