Isle of Man Government
Reiltys Ellan Vannin

GD 2018/0012

Technical Information on Harbours Strategy

March 2018

Department of Infrastructure

FOREWORD

To the Hon Stephen Rodan, MLC, President of Tynwald, and the Hon Council and Keys in Tynwald assembled.

As an Island community, our sea links have been important to us for hundreds of years, and their strategic significance will continue for the foreseeable future. With our dependence upon our sea links and our ports for economic and social wellbeing, we embrace our close connection to the water.

As part of a master planning exercise, several schemes have been developed for Douglas Outer Harbour to improve or upgrade the existing berths and facilities. The Royal HaskoningDHV review further identifies their merits and possibilities, providing current cost estimates for each scheme. The resultant Douglas Harbour Master Plan takes advantage of essential Harbour maintenance to identify the opportunities to develop modern and flexible port facilities.

The idea of providing a deep water berth for visiting cruise vessels has been discussed for many years. The Deloitte Cruise Ship Deep Water Berth Report is an independent desktop assessment commissioned by the former Department of Economic Development to provide passenger forecast indications for three of the proposals suggested for cruise development on the Isle of Man.

There is a significant amount of work required to fully realise the social and economic benefits of our harbours and I am pleased to present these two reports, which have informed both the Department of Infrastructure and the Department for Enterprise in preparing the Harbours Strategy, GD 2018/0011.

Hon R Harmer MHK
Minister for Infrastructure

Royal HaskoningDHV
Enhancing Society Together

REPORT

Douglas Harbour - Master Plan Review

Technical and Cost Report

Client: Isle of Man Government

Reference: M&APB6105R001F0.1
Revision: 0.1/Final
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Royal HaskoningDHV

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1 Introduction

The Isle of Man Government are responsible for the infrastructure on the island which includes the ports, harbours and airports.

As part of a Master Planning exercise Douglas Outer Harbour has been reviewed and several schemes developed to either improve or upgrade the existing berths and facilities, the schemes have been prepared by the Department of Infrastructure on behalf of the Ports Division. A drawing illustrating the proposed Master Plan was issued to Royal HaskoningDHV and is included in the Appendices of this document – Drg No HB / 2840.

The Isle of Man (IoM) Governments aspirations are to develop Douglas Harbour into a modern port with flexibility and redundancy in the RoRo berths while offering improvements to the tanker berth. Opportunities exist within the harbour area to generate new business opportunities both in terms of berths and commercial activities.

1.1 Royal HaskoningDHV tasks and reporting

Following a meeting in Douglas between Royal HaskoningDHV and the IoM Government in November 2016 a formal proposal was issued by Royal HaskoningDHV to review the proposed schemes regarding the technical aspects and provide a cost estimate for each scheme. An awarded letter was issued by the IoM Government and the work commenced on the 7th December.

Our agreed Tasks were to review each of the schemes highlighted on the Master Plan drawing and consider the merits and possibilities for the scheme along with the technical constructability and provide a budget cost. In order to discuss each of the proposed schemes within the context of the Harbour we have identified seven operational or development zones and noted them as Area A through to Area G.

This Report is divided into Sections starting with the description of each Area discussing the proposed development or upgrade i.e. Area A including the proposed method of construction. The following Section reviews the wave study which was carried out by ABPMER on behalf of the RNLI and the proposed new floating Lifeboat pen which is to be built in the Harbour. The interest that we have in this report is the modelling of the wave climate inside the harbour and how the waves reflect around the solid structures that form the berths.

The following Section then discusses the dredging requirements that will need to take place both at the north side of the Queen Victoria Pier and throughout most of the Harbour and Middle Harbour areas. With this Section we have provided the approximate dredge and fill quantities to highlight the significant volumes under consideration.

There is a separate Section which deals with the IoM Government request that Royal HaskoningDHV consider an order of priority with regard to which of the proposed Master Plan developments is considered more important than another.

The final two Sections contain firstly the budget costs for the developments and secondly the conclusions and recommendations.

1.2 Master Plan Areas

Royal HaskoningDHV prepared the review and this Report based on dividing the harbour into seven areas and giving each area a letter of identification, illustrated below;

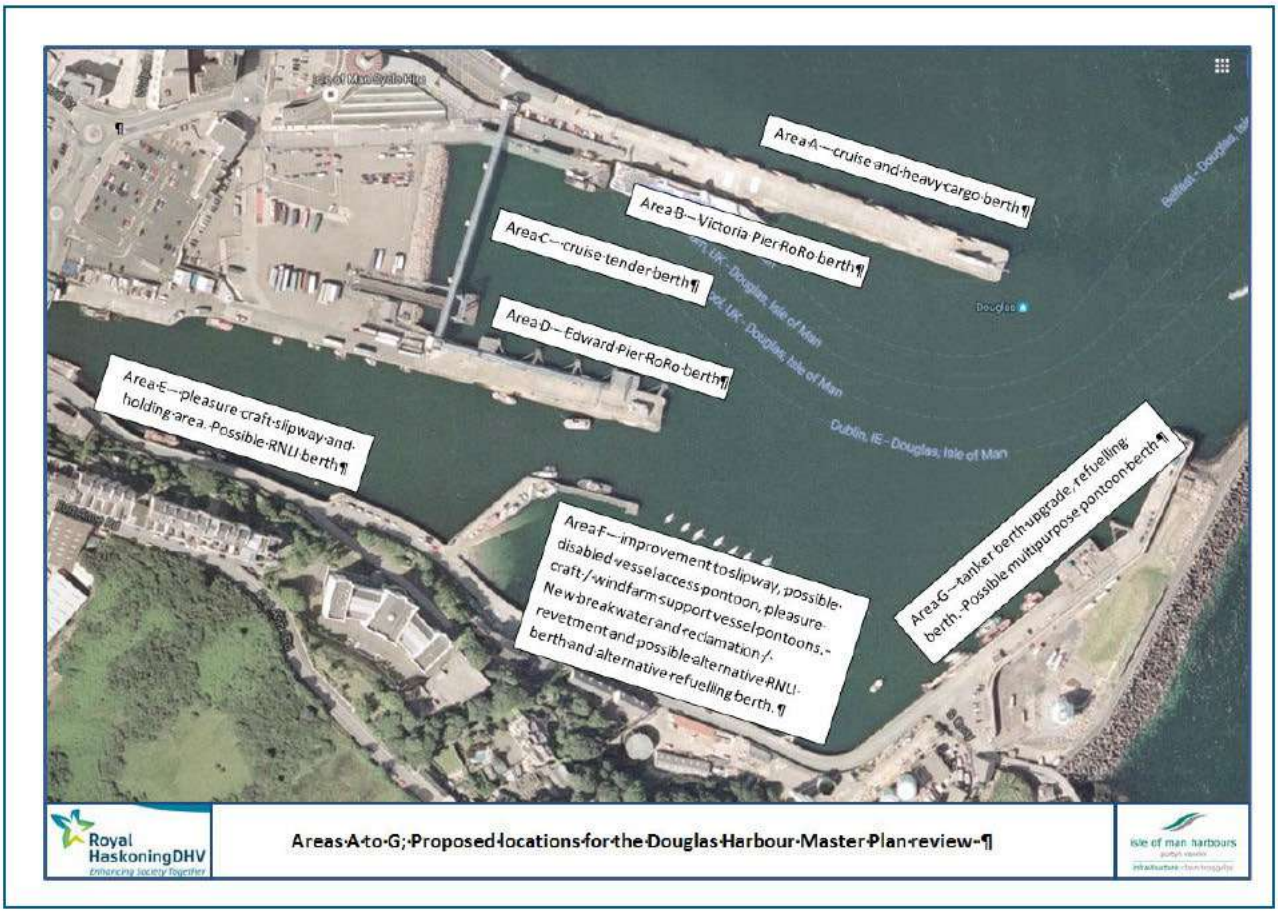

Figure 1: Agreed Area notation for the Review

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2 Master Plan Review

2.1 Area A – Proposed Cruise Berth & Heavy Load-out Quay

Area A is to the north side of the Queen Victoria Pier and currently acts as a layby berth with the provision of allowing a crane to park at right angles to the quay edge and extend its outriggers for unloading / loading cargo and supplies. The capacity of the quay has not been calculated by Royal HaskoningDHV; however the crane shown in the image looks to have the capacity of between 12 to 25 tonnes.

Figure 2: Queen Victoria Pier

2.1.1 Proposed Cruise Berth – see Drg No PB6105 / 01 & 03

The requirement is for the proposed berth to safely moor a day-call cruise vessel up to 240 metres in length. We would therefore expect the vessel to be about 30 metres beam and have a draft of around 8 metres. The typical passenger numbers for this sized vessel range from 1200 to 2000; it is unlikely that crew exchanges need to be considered in Douglas. We have assumed that a small marquee structure or the existing terminal building will be set up to cover any security or Customs issues.

In order for this scheme to be realised there are two major Civil Engineering Works to be undertaken;

- Dredging of a vessel turning area and at the berth pocket
- Fendering to the berth face.

The existing bed level drawing that we have suggests that the bed on the north side of the pier ranges from - 8.00 Charter Datum (CD) at the eastern end rising to – 3.00 CD half way along its length. It is likely that the bed continuous to rise into Pollock Rock and the Peveril Steps. Therefore the dredging required that allows an 8.00 metre draft vessel to safely arrive, manoeuvre and leave through all states of the tide is significant, the required finished dredge depth is – 9.5 metres CD.

Without further detailed investigation as to the founding level of the Victoria Pier we propose to protect the base of the Pier from undermining during the dredging by proving a steel fence and post arrangement that acts as a permanent shutter behind which mass concrete is tremmied.

Cruise vessel companies and the vessel Masters generally prefer floating pneumatic fenders. The main advantage to the Port is that they can easily be recovered for maintenance and also be removed if a particular low level door is blocked by the floating fender.

For the cruise berth we suggest that a steel frame supported on bored piles and propped off the existing pier provide the face that the floating fenders slide up and down and take the berthing and mooring loads.

The final design of this type of fendering will be subject to further investigation of the sea bed soils investigation.

In order to provide protection for the vessel from leaving the dredged pocket whilst approaching the berth and running aground at the stern we have introduced a pair of fendered dolphins at the limit of the dredging.

Between each of the fender frames we have indicated steel infill panels to allow the crew and Port staff easier access to the side of the vessel during deploying mooring lines and the access walkways for the passengers.

The cost for these Works is provided in Section 6.

2.1.2 Heavy Load-out Quay – see Drg No PB 6105 / 01 & 03

A dedicated heavy load-out quay would assist the Port in attracting wind farm support or tidal turbine companies to establishing a base on the island. The facility would utilise the floating fenders described above and benefit from the -9.5 CD dredged seabed.

It is likely that the Victoria Pier will require a structural relieving slab support by a series of vertical piles. The exact size will depend on the crane capacity required. From our experience of similar berths around the UK we have suggested that a 80 tonne harbour mobile would be a sensible starting point for the purposes of this report.

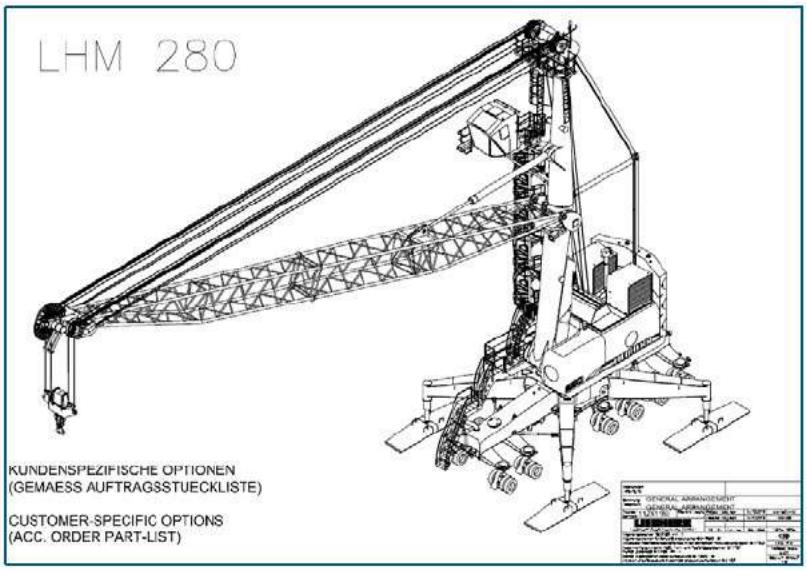

Figure 3: Liebherr LH280 Harbour Mobile 80 T capacity

The maximum out reach of the Liebherr LH280 is 40 metres, depending on where the crane is placed on the relieving slab the reach from the berthing line is approximately 26 metres. We have not included for the cost of a crane in the costs Section of this report.

There have been several incidents recently where a cruise vessel has come in contact with machinery parked or stored on the quayside. We would therefore recommend that the harbour mobile is moved to the southern side of the quay when a cruise vessel is scheduled to call at the new cruise berth.

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2.2 Area B – Queen Victoria Pier RoRo Berth

Area B is to the south side of the Queen Victoria Pier and is currently used as a RoRo berth and on the day of the site visit in November 2016 the M.V. Manannan was sitting on the berth. There is a well maintained lifted and lower vehicle linkspan at the landward end of the Pier, however this linkspan is fairly aged and does not suit all the RoRo vessels that call at the Port, therefore does not offer the berth redundancy for the linkspan at King Edward VIII Pier, and therefore should be considered as an important upgrade.

Figure 4: Existing vehicle linkspan to Queen Victoria Pier

There are two passenger access routes to the vessel on the RoRo berth, one is via a covered walkway on the road area of the vehicle linkspan and the other is along the Pier at ground level in a covered walkway.

The seabed level at the linkspan nose is about -5.7 m CD however there is a small rock outcrop at -3.9 m CD adjacent to the Pier about 15 metres from the linkspan nose. The bed level drops towards the eastern end of the Pier to -7.2 m CD.

2.2.1 Proposed upgrade to the RoRo Berth - see Drg No PB6105 / 02 & 03

The Victoria RoRo berth should be capable of providing redundancy for the main RoRo berth at the King Edward VIII Pier and therefore a significant investment is required.

Future proofing the upgraded berth should consider a vessel type known locally (in the North West Region) as a 'Heysham Max'. i.e. the maximum sized RoRo vessel that could navigate into and out of the port of Heysham, be able to turn within the port water-space and fit onto one of the three RoRo berths.

Our understanding is that the Heysham Max vessel will be 142 m long and have a beam of 25 m and a draft of 5.7 metres. With these statistics we advise that a dredge level at the upgraded berth should be -7.00 m CD. The proposed dredging provides an opportunity to address the rock outcrop although we have illustrated a new berthing line set by the use of new torsion arm fenders which will relieve much of the difficult work on the rock. Each torsion arm fender requires a vertical pile to mount the assembly on, the sleeve carrying the assembly will be propped off the Pier, and the fender panel would be supplied long enough to pick up the low level belting on the M.V. Manannan. With the new offset berthing line we do not believe the Pier will be undermined on this side.

Between each of the torsion arm fenders we have indicated steel infill panels to allow the Port staff easier access to the side of the vessel during deploying mooring lines and the access walkways for the ship's crew or passengers if the new Sea Port Boarding Bridge (SPBB) is not included in the upgrade.

The final part of the upgrade would be the procurement of a new floating semi-submersible vehicle linkspan which in turn will require a new abutment and a re-alignment of the approach road. A 'nice-to-have' would be a new high level walkway and (SPBB) which could be built as an extension from the existing tower system which feeds the high level walkway across the harbour to the King Edward VIII Pier.

The IoM Government drawing identifies the possible need to improve the passenger handling facilities which affects this Pier area. In order to better understand the need as to what extent of the increased floor area is required we suggest a separate study is carried out regarding predicted passenger numbers and passenger flows / movements at peak times.

The cost for these Works including the 'nice to have' SPBB is provided in Section 6.

2.3 Area C – Proposed Upgrade to the Tender vessel Day-call Berth

The Isle of Man is a popular day-call for the cruise industry and within the Master Plan for Douglas provision for allowing vessels up to 240 metres in length to berth alongside Queen Victoria Pier has already been discussed in Section 2.1.

The cruise industry continues to see steady growth and ports are responding to demand with deeper and larger terminals being planned and built to match the growth. A key issue to matching the growth is noting that the cruise companies are increasing the size of the vessels that they are ordering.

Figure 5: Cruise vessel at anchor off Douglas with tender alongside

Figure 6: Existing Day-call berth

Douglas Harbour will not in the short to medium term be offering alongside berthing for vessels longer than 240 metres, these vessels carry anything from 2500 to 5000 passengers (the industry norm is around 3500 passengers). At ports where the larger vessels cannot berth such as Douglas the norm is for the vessel to go to anchor providing the weather allows. Passengers are tendered ashore and Douglas enjoys this visitor income during the summer cruise months, a special floating Day-call berth exists between the RoRo berths where a welcoming building and covered walkway has been supplied.

The larger the cruise vessel the more tender vessel have to be deployed in order to get the passengers ashore a quickly as possible, tender vessels are slow and there are issues with getting some passengers into and out of from the low level doors on the cruise vessel.

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2.3.1 Tender Vessel Day-call Berth Upgrade – see Drg No PB6105 / 04

Several Day-call berths around the world have invested in larger floating pontoons that are suitable for passenger ferry craft to berth against. These vessels have twice the carrying capacity of a typical cruise tender and are more passenger friendly regarding embarking and disembarking. This means that the cruise vessel is emptied much quicker and with added safety.

Our proposal would be to provide a larger floating pontoon and access brow with a berth on either side of the pontoon. We have also included for a mooring dolphin arrangement at the bow and stern. As we are suggesting larger passenger vessels to act as Tenders we have moved the entire berth to a position equal between the two moored RoRo vessels on the Victoria Pier and Edward VIII Pier.

Figure 7: Typical passenger ferry craft with increased seating capacity

When not in use as a cruise passenger craft is there a business opportunity for the ferry vessels to be used as a more general island scenic tour. Clearly the choice of craft for the island waters would have to be defined, the vessel illustrated below has the seating capacity of around 220.

The cost for these Works is provided in Section 6 but does not include for the new vessel(s).

2.4 Area D – King Edward VIII Pier RoRo Berth

Area D is currently used as a RoRo berth and includes a well maintained lifted and lower vehicle linkspan at the landward end of the Pier which was installed in 1994. The original design vessels for this linkspan included the M.V. Peveril, M.V. King Orry and the Steam Packet Seacat all of which do not call at Douglas anymore. The primary vessels using the berth are the M.V. Ben My Chree and the M.V. Arrow.

Figure 8: The M.V. Arrow at King Edward Pier RoRo berth

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2.4.1 Proposed Upgrade to the RoRo Berth – see Drg No PB 6105 / 05 & 06

The Edward VIII RoRo berth should be capable of providing redundancy for the RoRo berth at the Queen Victoria Pier and provide future proofing with the upgraded berth to suit the Heysham Max sized RoRo vessel both bow and stern in.

The current bed level within the berth envelope is around -7.30 m CD which is satisfactory and would tie in with the comments made regarding a future dredge level for the Queen Victoria Pier RoRo berth. The existing berth has a berthing line formed by berthing and mooring dolphins supported on struts from the face of the Pier. A later addition was the installation of steel mesh flooring panels at quay level between the five berthing dolphins allowing the mooring better crew access to the side of the vessel.

The Master Plan proposes to make a permanent new quay face along the line of the steel infill panels with the berthing line remaining on the same line. During the site visit in November this improvement was discussed by the IoM Government as an important improvement to the berth. In order to best execute this scheme we suggest that pre-cast concrete caisson are built at a location yet to be determined and floated into their final position. The caissons are sunk onto a pre-prepared bed using a ballast filling operation (dredged material), once the complete berth face is formed, the caissons would also be used to lengthen the quay, the void between the existing quay and the back of the new caisson is then de-watered and filled with dredged material.

A capping slab is cast over the tops of the caissons and up to the existing Pier face at the same level as the Pier. There is a fill compacting operation which takes place before the concrete slab is cast. The existing fender panels and rubbers can be reused and fitted to the new caisson walls.

It is known that the existing Pier is showing signs of cracking along the deck surfacing and up the wall of the building on the end of the Pier. Despite remedial works the cracking has re-occurred. The proposed extension to the Pier towards the Eastern end should prevent further movement of the Pier structure.

To the eastern end of the Pier and in line with the berthing line we proposed to add a new mooring / turning dolphin with a bollard to take a bow line from the larger Heysham Max vessel.

On the south side of the Pier a new pontoon and brow could be installed to supplement the fish boat quay, the pontoon could be protected from wave action by providing shelter using the new caissons extending beyond the southern edge of the Pier.

The final part of the upgrade would be the procurement of a new high level walkway and Sea Port Boarding Bridge (SPBB) which could be built out of the existing walkway tower system that brings foot passengers across the harbour. As with the proposed SPBB at Queen Victoria Pier this is a 'nice to have'

The cost for these Works including the new SPBB is provided in Section 6

2.5 Area E – Middle Harbour Upgrade

The Master Plan looks at improvements to the water space towards the southern side of the Middle Harbour area leaving the northern side which is part of the main Port area to remain for commercial fishing vessels and smaller bulk cargos. The rock salt and chippings berth being at the western end of the existing Port side towards the Bascule Bridge.

Figure 9: View of the Middle Harbour towards the Bascule Bridge

2.5.1 Proposed Upgrade to the Middle Harbour – see Drg No PB 6105 / 07, 08 & 09

Royal HaskoningDHV have reviewed the water space in the Master Plan as commented below, the landside has been separated into Option 1; which includes an area of land reclamation for the re-located RNLI life station and boat pen. Whereas Option 2 has the same land reclamation but uses it for a commercial development i.e. the RNLI remain at their current location in the outer Harbour.

The water space area towards the southern side of Middle Harbour has been designated for a floating pontoon some 170 metres in length for pleasure craft to moor against whilst waiting for the Bascule Bridge to be lifted allowing access to the marina area.

The IoM Infrastructure Department drawing HB / 2840 (included in the Appendices) has a graduated dredged bed level from -2.5 m CD at the eastern end of the pontoon rising to -2.0 m CD and finally -1.5 m CD at the western end. The same level is illustrated on both sides of the pontoon. We believe that this layout may cause the deeper vessel to have difficulty at low water levels when proceeding towards the open Bridge without realising the depth is getting shallower. Our drawings illustrate a change to the dredge depths with -1.5 m CD on the southern side of the pontoon and -2.5 m CD on the northern side of the pontoon.

There is no link proposed from the pontoon to the shore, any bridge or brow structure would not allow easy access to the southern side, therefore we suggest that a water taxi is made available using a pre-selected waveband number who can be called to take the boat owners to a suitable shore access point for a small charge.

At the western end of the southern bank there is a hard standing area which offers the opportunity to introduce a new slipway for public use. Due to the point made above at low water the dredge level at the bottom of the slipway would only be -1.5 m, this could be pointed out by signage on the slipway.

As part of the upgrade to Area F there will be a car / boat trailer park for public use which is approximately 300 metres from the new slipway.

The creation of a reclamation area within Area E will be formed by pre-cast concrete caissons similar to those proposed for the Pier improvements to Area D. Once again a considerable amount of compacted fill material will be required; Section 5 of this report discusses the required dredging for each of the schemes and the re-use of the material.

- Option 1 – Relocated RNLI Station and boat pen

It is proposed by the IoM Government that above the cast concrete capping slab the RNLI pay for a new building, car parking spaces for their crew and additional parking for new visitors centre.

The lifeboat pen including floating pontoon and access brow would be protected by Fort Anne Jetty with the vessel in a dredged pocket from -1.5 m to -2.5 m CD. We have commented on the wave climate within the Middle Harbour area in Section 3 of this report.

- Option 2 – Commercial opportunity

Should the RNLI remain in their existing location the reclamation area described above could be used as a commercial opportunity along with a parking area for a Café / Bar / Restaurant at the water's edge overlooking the Port and the bascule Bridge.

Figure 10; Illustration of a possible commercial outlet

The cost for these Works is provided in Section 6 excluding the RNLI station or the commercial development.

2.6 Area F – South Quay Development

The South Quay area includes the water space from Fort Anne Jetty to the existing RNLI station. The Master Plan drawing illustrates a new breakwater at a right angle to South Quay to form a protected water space using the Fort Anne Jetty as the other arm, although Fort Anne Jetty is not a solid structure at this time.

Area F is subject to high wave impact directly through the Harbour entrance; the Master Plan suggests a wave relieving rock face against the existing South Quay wall including the face inside the newly formed protected water space.

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2.6.1 Proposed new Works to South Quay – see Drg No PB6105 / 10 & 11

South Quay is affected by the discussions above regarding Option 1 or Option 2 at the Middle Harbour Area; therefore we have developed an Option 1 & 2 for the South Quay Area.

The following items are common in both of the South Quay Options 1 & 2.

The creation of a protected water space to the east of Fort Anne Pier with the construction of a new solid quay wall is a major piece of construction. The Master Plan shows a new breakwater at right angles to South Quay, however the wave report prepared by ABPMER suggests that it should be at an angle in order to cushion certain incoming waves and protect the life boat pen. We have commented about the ABPMER report in Section 3 of this report and in the case of the orientation of the breakwater we agree to its angular positioning. However the continuation of the rock amour slope from the South Quay wall along the eastern face of the proposed new breakwater is critical in order to cushion the incoming waves.

Inside the proposed protected water space a floating pontoon is illustrated for use by an Offshore Support Company or may be a Tidal Turbine Company, we have suggested in our version of the area that the rock face can be removed from within the protected water space and be replaced with a further pontoon with a brow. This would replace the one show on the IoM Government drawing which is on the eastern face of the new breakwater, an area required for wave reducing revetment.

Running down the eastern side of the Fort Anne Jetty is an existing public access slipway. It is known to be in a poor condition along the outer edge and at the water's edge. It is proposed to repair the slipway, increasing its width, we have also shown the seaward edge being re-laid so that it turns in line with a new pontoon which is positioned on the southern face of the Fort Anne Jetty. A brow serves the pontoon and it is thought that this could become a dedicated facility for disabled access to specially equipped boats for use by disabled persons.

Figure 11: The north side of Fort Anne Jetty

Figure 12: Area for disable people's access pontoon

It may be necessary to install a wave screen along the north face of the Fort Anne Jetty to protect the proposed disable pontoon facility as this face is an open structure as can be seen from Figure 11.

A further study regarding siltation may need to be carried out prior to any further design work being carried out on the new breakwater structure.

Our current thinking is that the new breakwater could be formed by using tubular steel piles bored and socketed into the bed with sheet pile pans between each tube; this is known as a combi-wall. Steel tie

rods are attached between each line of tubes and fill material is placed in the void between the tubes which is compacted by use of kentledge blocks for surcharging. Following the compaction period a concrete slab can be poured over the top of the piled walls and fill material.

Across the South Quay road there is a large area of land owned by the IoM Government which could be made available for commercial use by a wind farm support or tidal turbine company. The new facilities inside the proposed breakwater would give the companies easy access to their support craft, any heavy load-outs could be carried out on the proposed slab on the Queen Victoria Pier.

Figure 13: Yard area available, fire pumps to the left

Figure 14: Yard area depth opposite entrance

Within the yard area there is a partitioned off section within which the fire pumps for are positioned. The pumps when called into operation draw water from within the harbour and spray the large storage tanks with Area G. Clearly any company taking over the yard area would have to provide 24 / 7 access to the pumps.

The Master Plan drawing prepared by the IoM Government shows a re-alignment of the quay face of South Quay road. The new alignment forms a straight line from Fort Anne Jetty to the existing life boat station; this provides several areas of space at road level, and the Master Plan calls one area a new boat park (boats on trailers). We have set aside some of the area labelled new Platform as a trailer only park, this would be used by those wishing to launch and retrieve their own pleasure craft from either the slipway next to Fort Anne Jetty or the proposed new slipway at Middle Harbour.

In order to create this new quay line with the areas described above Royal HaskoningDHV suggests that concrete caissons could be used. We are aware of the rock outcrops that are along South Quay at bed level, therefore this form of construction would be well suited. As with the other areas of the Harbour where caissons could be used a large amount of fill material will again be required.

As stated above, South Quay is subject to large waves during certain environmental conditions. Waves currently reflect from the quay wall into the main Harbour area and into the Middle Harbour Area. Therefore it is suggested in the Master Plan to place a wave reducing revetment along the realigned wall face. From our review of the ABPMER wave study we have deduced that the revetment will also have to be placed along the east side of the new breakwater structure which forms the proposed sheltered water space.

Fixed to the realigned quay wall it is proposed to have two separate access structures each feeding onto a brow providing access to a floating pontoon which is to be used by pleasure craft. It is likely that these have to be removed during the autumn / winter months due to the incoming waves in this area.

- Option 1 – The RNLI Lifeboat station remains.

In this case the RNLI will provide a new boat pen at the base of the existing slipway from the station. Access to the life Boat would be via a brow down to the float pontoon berth. It is intended that a wave screen is built to protect the pen and boat with its mooring facilities. From our understanding of the size of wave the structure will have to be very robust.

- Option 2 – The RNLI relocate to Area E

In this case the existing lifeboat station would be demolished and an additional brow and pontoon for the public would be supplied.

Figure 15: The existing RNLI Lifeboat station

The current seabed in this area is between -1.7 m CD to drying out at Mean Low Water. In order for the area to remain operational through all states of the tide we have noted this area to be – 4.0 m CD in the new protected water space and – 2.5 m CD at the public floating pontoons.

The cost for these Works is provided in Section 6 expect for any of the proposed RNLI lifeboat pen or protection screen.

2.7 Area G – Tanker and Refuelling Berth

The existing tanker berth is located at the eastern end of the Harbour and at right angles to Queen Victoria Pier and the King Edward VIII Pier. The facility was designed to handle oil tankers up to 80 metres in length; however larger vessels have been managed at the berth. There is a significant need to upgrade this quay not only to provide safe mooring for the larger vessels but also due to the current condition of the structure which sustained damage to the berth face of the jetty when it was struck by the M.V. Ben-My-Chree in a marine accident.

Figure 16: Aerial view of the tanker Berth

2.7.1 Upgrade of the Tanker Berth – see Drg No PB6105 / 13

The tanker berth at Douglas Harbour is the location for a significant amount of the fuel supply required to sustain the Island, therefore it forms a key part of the Governments infrastructure. The Master Plan proposal is to upgrade the berth and Royal HaskoningDHV suggests that again a concrete caisson solution is used to form a new berth face with compacted fill material and a capping slab forming the new facility. The berth face should be 140 metres long allowing tanker vessels of 120 metres in length having a typical draft of 7.5 metres to safely arrive and depart from the berth.

When not in use for discharging fuel oil the southern end of the new quayside could be used as a cement import berth to complement the one currently operating at Peel on the west coast of the island.

The current seabed level around the oil berth is between -6.5 m CD to -7.4 m CD on the approaches therefore dredging will be required in order to reach -9.00 m CD in order to match the larger expected tankers to call at Douglas Harbour.

We suggest that to the north of the new tanker berth a floating refuelling pontoon is provided for fishing boats and the like thereby keeping the discharging and refuelling at the eastern end of the harbour away from the other more general Port activities.

The cost for these Works is provided in Section 6.

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3 The Wave Study Report

3.1 General

Royal HaskoningDHV have reviewed the wave study report for Douglas Harbour which was prepared by ABPMER on behalf of the RNLI. The study is important as the modelling results included within the report assist our thoughts for the type and alignment of the maritime structures and more importantly the cost or effect of the structure on the overall Master Plan that the IoM Government wish to pursue.

ABP Mer were commissioned to undertake a wave study to assess the protection provided by the existing breakwater structures to a new RNLI berth located in the south east corner of the harbour. The study concluded that additional protection to the berth was required and examined a number of layouts using wave screens and lengths of revetment along the South Quay.

3.2 Wave Study Report

3.2.1 Wave Conditions at Entrance to Outer Harbour

Douglas Harbour is largely protected from the prevailing south westerly wind waves and swell in the Irish and is primarily affected by northerly to easterly waves.

Offshore waves from these directions are modified as they approach the harbour and inshore waves, from 60 through 100 degrees N have the largest influence on wave conditions within the harbour. In particular waves from the north east are able to penetrate directly through the entrance in to the Outer Harbour whilst wave from the east are diffracted around the end of the Princess Alexandra Jetty and penetrate into the Outer Harbour.

3.2.2 Wave Conditions with the Outer Harbour

The Outer Harbour at Douglas has limited protection from northerly through to easterly waves. As noted above waves from these directions are able to penetrate in to the Outer Harbour and reflect off the vertical walls of Battery Pier, South Quay and Fort Anne Jetty. These reflected waves increase the disturbance in the Outer Harbour by combining with the incoming waves. As a consequence conditions can at certain times of the year (particularly in the winter months) be poor.

3.2.3 Influence of Quays and Jetties

The South Quay faces the entrance to the harbour and, as a consequence, has a significant influence on wave conditions throughout the Outer Harbour. Waves are reflected from this wall back across the harbour affecting Victoria Pier and King Edward Pier and also penetrating into inner part of the Outer Harbour to the west of the Fort Anne Jetty (referred to as the Middle Harbour in the remainder of this note).

Fort Anne Jetty and Battery Pier have less influence on wave conditions in the Outer Harbour but focus wave energy into the south east corner of the harbour.

3.2.4 Location of RNLI Facilities

- South East Corner – (Known as Option 1 South Quay in this Report).

The Douglas Life Boat Station is located in the south east corner of the harbour directly opposite the entrance. This is also the location where wave reflections from Fort Anne Jetty and Battery Pier are focussed which results in increased disturbance.

RNLI are planning to replace the current life boat with the new generation Shannon class vessel which has to be afloat at all time.

Although it was not possible to provide the level of wave calming specified by the RNLI based of limiting wave conditions under a 1 in 1 year storm, ABP concluded that based on downtime considerations an acceptable layout was for all possible providing a wave screen was built.

- Middle Harbour (Known as Option 1 Middle Harbour in this Report)

The Middle Harbour would provide a more shelter location for the new lifeboat berth. The Middle Harbour has limited exposure to waves penetrating into the harbour but is affected by reflections from the South Quay.

Conditions in the Middle Harbour and for the new life boat berth could be improved by the construction of a revetment along the South Quay which would reduce internal reflections. If this did not reduce conditions sufficiently then a modest extension to Fort Anne Jetty would provide sheltered conditions in the lee of this jetty.

- New Breakwater to the east of Fort Anne Jetty

The provision of facilities to the east of Fort Anne Jetty will require the construction of an eastern breakwater structure to provide protection from waves penetrating though the entrance. This structure will result in additional reflection of waves from the eastern side of the structure which will adversely affect wave conditions in the south eastern corner of the Outer Harbour and along the Battery Quay. To reduce these reflections it is likely that the eastern breakwater structure will need to be faced with a sloping rock revetment to absorb some the incident wave energy.

3.2.5 Conclusions

A review of the work by ABP indicates that appropriate modelling techniques have been used and the results appear sensible. It is, however, noted that the set-up of their wave penetration model unusual and differs from the approach that would have been adopted by RHDHV. This needs to be clarified with ABP.

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4 Dredging

4.1 General

There are very few major maritime projects that Royal HaskoningDHV get involved with where dredging is not required. By the nature of upgrading port facilities to suit the growth of modern vessels dredging becomes inevitable.

4.1.1 Calculation of Dredged and Fill Material – see Drg No PB6105 / 14

Each Section of this report that describes the new Works by Area includes a line on the current and proposed seabed level. We have also prepared a drawing which illustrates how the proposed dredged areas tie-in with one another (PB6105 / 14).

Clearly the volumes of dredged material suggested could not be viewed as maintenance dredging and therefore will be subjected to full Environmental Licencing under the Capital Dredging requirements. The Licencing process may differ slightly in the IoM from the England & Wales Regulations but generally the principals in the whole of the UK and Republic of Ireland are much the same. Royal HaskoningDHV have a large Maritime Environmental team with considerable experience in this type of commission and could advise in the future if required in the future.

The table below sets out the approximate volumes per Area of dredging required;

Area	Dredged volume
A	106,000 m³
B	10,000 m³
C	62,560 m³
D	3,900 m³
E	1,500 m³
F	12,850 m³
G	62,160 m³
Total	**258,970 m³**

Table 1: Est dredge volumes

The seabed in the Harbour area is made up from soft silts through to a more solid strata and then into rock formations at differing levels. To fully understand the effects of the material changes and depths a further study is required.

The type of construction proposed in this report for the new quay walls in Areas D, E, F and G is the use of concrete caissons with fill material placed and compacted inside and to the rear of the caisson structures. In Area F we also have a twin combi-wall requiring fill material.

During the late 1990's Royal HaskoningDHV provided a detailed design for a new quay wall for a fisherman's quay. Our solution was a series of concrete caissons with precast concrete panels between the caisson blocks retaining the fill.

Figure 17 below shows the new caisson wall with the fill material behind being surcharged prior to being levelled and the finished with a concrete slab.

Figure 17: Wexford in the Republic of Ireland - New Fisherman's Quay - Caisson Wall Construction

Figure 18: Wexford Fishing Quay in operation

4.1.2 Dredging issues

In many port locations the dredge material can have varying degrees of contaminates. In some cases this becomes a major issue and greatly affects the costs and where the dredge material can be dumped, in some cases the material has to be stored permanently in sealed containers. In other cases the material can be treated and then reused, this of course adds to the costs.

The Section dealing with costs discusses this again in more detail, however the caisson construction method could provide a solution if contaminates is an issue in Douglas particularly as we intend to cap (seal) the caissons once filled and compacted.

We have estimated the quantity of fill material required for all of the locations where we have suggested a caisson or combi-wall and fill construction thus;

Area	Dredged volume
D	26,500 m³
E	92,500 m³
F	31,500 m³
G	12,500 m³
Total	**163,000 m³**

Table 2: Volume of Fill material req'd

Tables 1 and 2 illustrate the estimated dredge material and how much of that material could be reused within the new form of construction. The volume not required i.e. the difference between the two totals is approximately 96,000 m³. However we have not taken account of any compaction effects or the surcharge that may be required during the construction process.

4.1.3 Benefit of using Concrete Caissons

One of the main benefits to using concrete caissons as the main form of constructing the new quay walls other than the requirement to use all of the dredging material is that the design of the caisson structure would be optimised so that the shutters used to cast the walls would be fabricated out of steel as opposed to timber and therefore could be re-used over and over again as the Areas are bought into the construction phase.

5 Order of Construction

5.1 General

The IoM Government have requested that we provide guidance as to which Areas should be considered for construction first through to our suggested lowest priority. The form of construction in Areas D through to G requires significant amounts of fill material which could come from the dredging which in turn has its own issues as described above. Therefore the Areas noted above become linked as one is providing the other with dredged material and mobilising the dredging contractor once will save a significant amount of money.

5.1.1 Cruise berth and Tender Vessel Upgrade

Royal HaskoningDHV recommends that the Day-call Cruise (Area A) and the Tender Berth upgrade should take highest priority for four main reasons,

- The cruise market continues to expand fuelled by increased vessel size and the locations now available to use as a day-call location. The Isle of Man currently enjoys several calls per year and a dedicated berth to accept vessels up to 240 metres in length would be seen as a bonus by the industry. The quicker disembarkation offered by the passenger ferry craft for the larger cruise vessels at anchor adding value to the cruise industry.

- The heavy construction is outside of the main harbour area and therefore would not directly affect the main RoRo berths. Once completed would offer an extra berth while the following works on the other Area developments continue, albeit Area A does not have a linkspan.

- There is a sizable amount of dredging to be carried out from Area A, which if planned correctly could be immediately used in the second Area of priority, the Middle Harbour and South Quay upgrade.

- Once completed this new cruise berths would generate income and start to pay for themselves. The heavy load-out quay would do the same and also be an important selling point when it comes to encouraging a wind farm or tidal turbine company to establish their business on the island.

5.1.2 Middle Harbour and South Quay Upgrade

As the construction phase comes to a close at the cruise berth caissons could be under construction to be placed at the Middle Harbour and South Quay forming the reclamation profile and the new quay line. The required fill material for this Area is 92,500 m³ (Middle Harbour) and 31,500 m³ (South Quay) the timing of the dredged material at the cruise berth becoming available will be critical.

Installing the pontoon berths in the Middle Harbour will support the growing pleasure boat market and be seen as a positive in using the impounded marina at Douglas. Hopefully the suggested water taxi call system can be put in place to coincide with the launch of the new facility.

Forming the new breakwater and providing the rock wave reducing revetment will allow a wind turbine or tidal current manufacturer / maintenance company the opportunity to begin trading and the IoM Government can again begin to generate income from the investment.

Depending on whether or not the RNLI are to relocate the new land mass created at Middle Harbour would be formed and ready for a commercial development should the RNLI decide to remain where they currently are, again an opportunity to start the revenue stream for the IoM Government.

5.1.3 King Edward VIII Pier upgrade

The King Edward VIII RoRo berth upgrade with the right planning and a continuation of the caisson production should be the third Area to be constructed. Caissons could be placed between sailings at the berth with fill placed into each caisson which is temporarily propped off the Pier to allow some of the mooring load to go through the fender panel on the caisson.

Once all the caissons are in place the longer slower job of de-watering behind the caisson and placing the remainder of the fill can take place. The props removed as part of the process. We have not tested this by calculation but believe it is a viable solution.

Area D only requires approximately 26,500 m³ but combined with Area E would be more than Area A will generate, therefore the dredging process must begin with the main Harbour area to fulfil the fill requirement.

It is known that this Pier has settlement issues at the eastern end which have not been fully addressed. This scheme would see the length and width of the Pier extended therefore stabilising the structure in the process of the Works.

5.1.4 Oil and Cement import Berth

The Oil and Cement import berth (Area G) has again utilised the concrete caisson form of construction to act as the new quay wall with compacted fill; using approximately 12,500 m³ of the dredged material.

This would be the final area to be developed that required any fill material and has a substantial dredged volume in front of the new quay wall to complete the works. Other than being used as surcharge it is likely that some of this material will have to be either dumped at sea or capped and stored, unless any additional berths could be created at other locations on the island.

5.1.5 Queen Victoria Pier RoRo Berth

Royal HaskoningDHV suggest that the final area for upgrade should be the Queen Victoria RoRo Pier area B). This is a major upgrade of the berthing line, fenders and vehicle linkspan without the requirement for any fill material. There is a requirement for dredging however this is linked to the overall dredging for the main Harbour area. We have also made a provision for procuring a new Sea Port Boarding Bridge to suit a variety of ferry vessels that could use the berth. Once completed the Queen Victoria RoRo berth will offer redundancy for the primary RoRo berth at King Edward VIII Pier.

5.1.6 Summary of dredging / fill demand

Phase	Area	Arisings	Fill	Net
1	A	106000		106000
2	E	1500	92500	15000
2	F	12850	31500	-3650
3	D	3900	26500	-26250
4	G	62160	12500	23410
5	B	10000		33410
6	C	62560		95970
		258970	163000	

Table 3; Dredge / fill requirements per Area

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6 Budget Costs for the Works

6.1 General

The seven areas of development or upgrade set out above (Areas A through to G) could be delivered as separate construction projects and they are therefore costed accordingly with mobilisation and de-mobilisation added to each one. The dredging costs could be viewed in a similar way although this activity is a key factor both in terms of preparing the berths for the future vessels and providing the material to form the new berths and landmass.

We have selected the most cost effective form of construction by using concrete caissons. The fact that the underlying strata with the Port is rock means that traditional steel sheet piles cannot be considered as these are driven by piling hammer into softer material until sufficient length is in the ground so as to support the surcharge load of the back fill and live loads from the quay traffic.

An alternative to the caissons might be a steel tubular combi-wall which relies on bored holes deep into the rock material and the tubes and grouted into the holes. This form of construction was use for the mono-pile berthing dolphins at King Edward VIII Pier during the upgrading in 1993. However a combi-wall retaining fill material requires an anchor wall a fair distance behind the main wall with tie bars linking the two together. It is not possible to achieve this detail on any of the proposed berths other than the new breakwater structure in Area F where we have tied the two combi-walls to each other with compacted fill between.

The costs set out below assume that there is a phased construction programme where the maritime civil engineering contractor remains on site (one mobilisation) and commences with the day-call cruise berth and heavy load out quay and moves onto preparing the caissons for the Middle Harbour and South Quay as the dredging contractor commences to form the turning circle and required dredge depth for the cruise berth.

The phasing continues as set out in Section 5 until the Works are completed and the remainder of the dredge material which is surplus is dumped at a Permitted location.

In the latter part of Section 6 we have set out the costs for each Area as standalone projects so that a comparison can be made; the dredging has also been estimated per Area in order to provide a total cost for each Area.

The proposed Works are major maritime civil engineering tasks and there are several experience contractors in Europe who could carry out this type of work. Royal HaskoningDHV are not aware of any contractor based on the island that could lead on such a project. However there will be the need for many smaller sub-contractors to carry out all types of differing parts of the works and these could be supplied directly from local companies.

6.1.1 Dredging Costs

As discussed in Section 4 the cost of dredging material can vary considerably depending on the type of material, whether it is used locally, such as fill material or if it is to be taken away and dumped. If the material requires some type of cleaning or mixing process it can vary again and we have attempted to cost this important item to give a realistic balance as to where we believe the overall costs might be. For the upper bound cost band we have used £ 20 / m^3 to dredge and treat the material, the Lower bound cost band is set at £ 10 / m^3.

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6.2 Estimated Costs

6.2.1 Combined costs

The combined costs for the construction of all the areas are set out in the table below;

All Areas	Civils costs	Dredging costs	Sub total	Contingency	Totals
Upper bound	£ 65 m	£ 5.14 m	£ 70.14 m	£ 7.0 m	£ 77.14 m
Lower bound	£ 59.0 m	£ 2.57 m	£ 61.57 m	£ 6.15	£ 67.72 m

Table 4: Total Upper bound and lower bound costs

Table 4 assumes the construction route as described in Section 5 of this report, the costs do not include the following items which will need to be undertaken either before during or after the construction is completed.

- All Consultancy fees (design/supervision and environment)
- Soils Investigations
- Authorities' fees and charges, internal or external
- Approval costs
- Client Project Management
- Cost escalation
- Delay cost
- Holding costs and interest charges
- Legal fees
- Costs of any interruptions to harbour traffic
- Marine surveys
- Unknown services
- Temporary or permanent navigational aids
- Supply of power to the vessels

The costs set out in Table 4 should be reviewed after 6 months as the base costs of structural steel fuel and labour remains on an upward cycle.

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6.2.2 Breakdown of Costs

The following table provides a breakdown of the costs per area and includes a mobilisation/ demobilisation cost for each Area along with a dredging cost.

Area	Civils costs	Dredging costs	Sub-totals	Contingency	Totals
A	£ 7.9 m	£ 2.1 m	£ 10.0 m	£ 1.00 m	£ 11.0 m
	£ 7 5 m	£ 1.3 m	£ 8.8 m	£ 0.88 m	£ 9.68 m
B	£ 9.4 m	£ 0.2 m	£ 9.6 m	£ 0.96 m	£ 10.56 m
	£ 8.5 m	£0.1 m	£ 8.6 m	£ 0.86 m	£ 9.46 m
C	£ 2.6 m	£ 1.25 m	£ 3.85 m	£ 0.38	£ 4.23 m
	£ 2.0 m	£ 0.63 m	£ 2.63 m	£ 0.26 m	£ 2.89 m
D	£ 13.4 m	£ 0.08 m	£ 13.48 m	£ 1.35 m	£ 14.83 m
	£ 12.8 m	£ 0.04 m	£ 12.84 m	£ 1.28 m	£ 14.12 m
E	£ 6.3 m	£ 0.05 m	£ 6.35 m	£ 0.63 m	£ 6.98 m
	£ 5.7 m	£ 0.02 m	£ 5.72 m	£ 0.57 m	£ 6.29 m
F	£ 15.4 m	£ 0.26 m	£ 15.66 m	£ 1.56 m	£ 17.22 m
	£ 14.5 m	£ 0.15 m	£ 14.65 m	£ 1.46 m	£ 16.11 m
G	£ 12.9 m	£ 1.24 m	£14.14 m	£ 1.41 m	£ 15.55 m
	£ 11.9 m	£ 0.65 m	£ 12.55 m	£ 1.25 m	£ 13.80 m

Table 5: Breakdown of costs per Area

Table 5 only serves to provide a breakdown of the costs for each area; they each contain the contractor mobilisation/demobilisation which would be incurred if the contracts were let separately or with a time lag between the completion of one and the starting of the next.

As discussed above we cannot recommend this route as the dredging in one Area does not tie-up with the requirement for the same Area. However that does not mean to say that this route is not possible to manage and execute. The cost difference compared to the suggested route of flowing the work packages one after the other is between £3 to 4m.

Table 5 has the same 'not included' list as Table 4.

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7 Conclusions and Recommendations

7.1 Conclusions

Royal HaskoningDHV has reviewed the Master Plan for Douglas Harbour prepared by the IoM Government's Infrastructure Department on behalf of the Ports Division. The proposed new berths and upgrades seek to modernise the Harbour's older quays and bring business opportunities in other areas.

All of the suggested schemes have merit and would bring benefit to the Harbour. Any civil engineering works where there is deep water construction and dredging requires a considerable amount of capital investment.

Our cost estimates for the new Works ranges between £77.14 m to £67.72 m if a programme for all the projects is carried at one after another taking benefit from the capital dredging that has to be undertaken.

Should each project be delivered as separate packages where the civil engineering contractors and dredging contractors have to mobilise and demobilise each time the costs rise by £ 3 m to £ 4 m.

7.2 Recommendations

There are several major steps to be taken in order to get to the point where Tender Documents could be prepared and issued for the new Works. Following the review and approval of this document by the IoM Government the next steps involve better identifying the following;

- The existing construction details for all the Piers and quay walls in the Harbour
- Understanding the current dredging policy and any known issues with the dredge material and how it is managed year on year
- Based on the comments from the IoM Government and the information from the above two points re-visit the costs and the construction methodology
- Identify and agree the order of priority for the Harbour Developments
- Test samples from the Harbour bed for contaminates
- Meeting with ABPMER to better understand their findings
- A soils investigation to compliment the information from the SI carried out in 1993
- An outline design of the new structures.

7.2.1 Segregated Areas – see Drg No PB 6106/15

Royal HaskoningDHV have prepared the above noted drawing to illustrate how the Harbour could be segregated into operational and public access/pleasure craft areas and amenities. The main Port area for Ro-Ro and cruise is currently fenced off in accordance with the ISPS Code. The petrochem berth has fencing around the key items of infrastructure such as the loading arms and storage tanks but the remainder of the berth and Pier area are more open other than when a tanker vessel is on the berth. A more restricted access may be required in the future.

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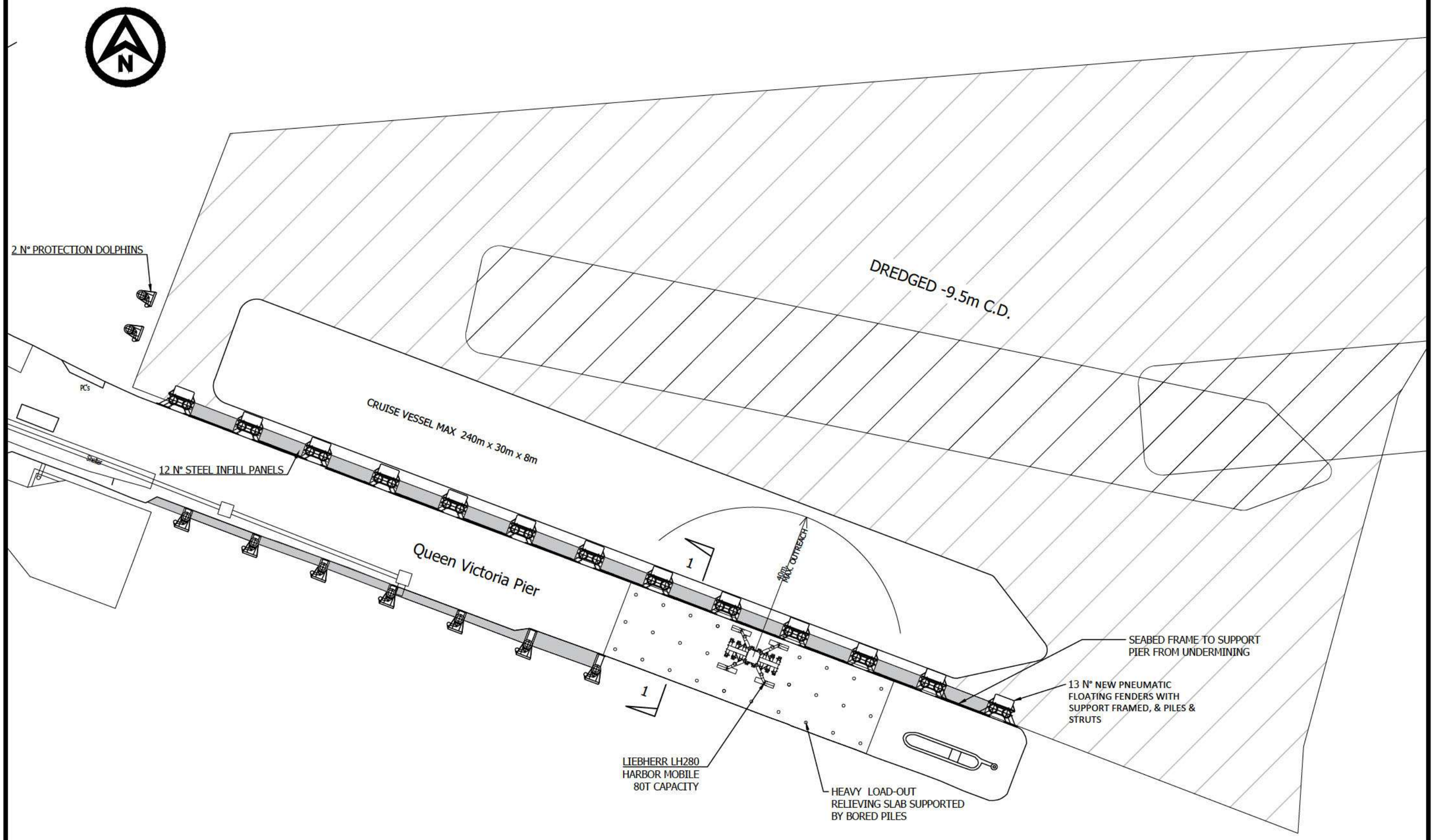
Appendices

A1 RHDHV Drg PB6105/01 through to 15

DO NOT SCALE



TITLE
AREA A - PROPOSED CRUISE BERTH
& HEAVY LOADOUT QUAY
QUEEN VICTORIA PIER

PROJECT
DOUGLAS OUTER HARBOUR
MASTERPLAN REVIEW

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N

POSSIBLE FUTURE TERMINAL BUILDING EXTENSION

Shelter

PC's

NEW PASSENGER WALKWAY EXTEND FROM EXISTING SYSTEM

Shelter

NEW FLOATING/SEMI-LINKSPAN SUBMERSIBLE WITH RESTRAINT FRAME

REALIGNED APPROACH & NEW LINKSPAN ABUTMENT

Queen Victoria Pier

1

400m MAX. OUTREACH

BEN-MY-CHREE
SEATRUCK HEYSHAM MAX
MANANNAN SEATCAT

125m x 23m x 5.8m
142m x 25m x 5.7m
95.5m x 26m x 3.7m

7 N° STEEL INFILL PANELS

7 N° NEW
TORSION ARM FENDERS WITH
SUPPORT PILES & STRUTS

DREDGED -7.00m C.D.

DREDGED -7.00m C.D.

King Edward VIII Pier

TITLE
AREA B - PROPOSED UPGRADED
RO-RO BERTH
QUEEN VICTORIA PIER

PROJECT
DOUGLAS OUTER HARBOUR
MASTERPLAN REVIEW

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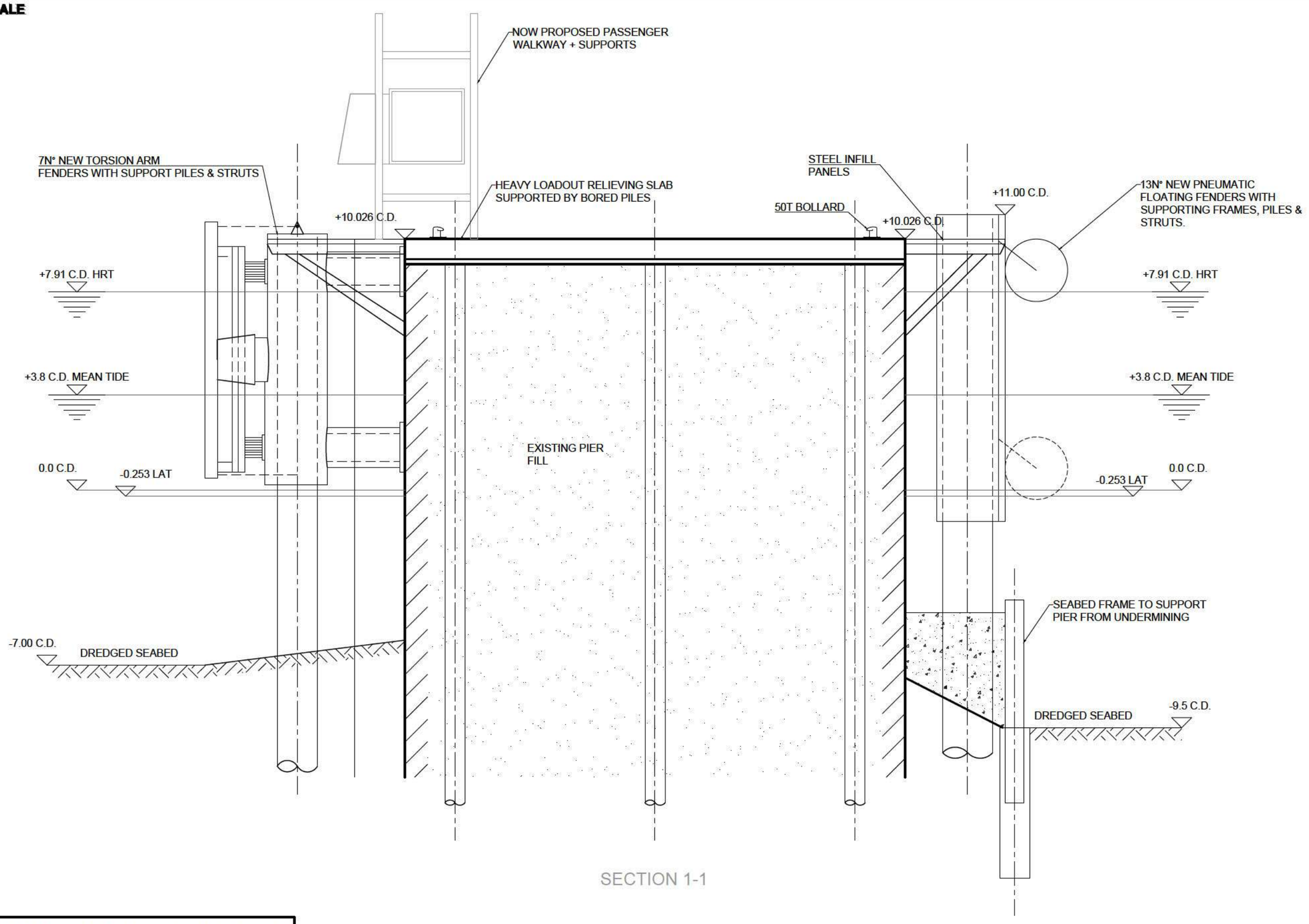

SECTION 1-1

TITLE: AREA A & B SECTION QUEEN VICTORIA PIER	PROJECT: DOUGLAS OUTER HARBOUR MASTERPLAN REVIEW	Royal HaskoningDHV Enhancing Society Together	DRAWN: A.E.	CHECKED: T.D. / APPROVED: J.G.
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N

Shelter

PCs

Shelter

Queen Victoria Pier

HURRICANE CLIPPER 220 SEATS
38m x 9.6m x 1m

EXTENDED PLATFORM

NEW WALKWAY LINK &
HINGED BRIDGES

40 x 10m

NEW FLOATING PONTOON

NEW MOORING DOLPHIN

HURRICANE CLIPPER 220 SEATS
38m x 9.6m x 1m

DREDG

Outer

DREDGED - 7.00m C.D.

Middle Harbour Area

King Edward VIII Pier

Area Dredged to 2.5m
below chart datum

TITLE
AREA C - PROPOSED UPGRADE TO
THE DAY-CALL TENDER BERTH

PROJECT
DOUGLAS OUTER HARBOUR
MASTERPLAN REVIEW

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DO NOT SCALE

N

PC's

Shelter

Queen Victoria Pier

400m MAX. OUTREACH

BEN-MY-CHREE
SEATRUCK HEYSHAM MAX
MANANNAN SEATCAT

125m x 23m x 5.8m
142m x 25m x 5.7m
95.5m x 26m x 3.7m

DREDGED -7.00m C.D.

Outer Harbour Area

PROPOSED NEW PASSENGER WALKWAY
FROM EXISTING SYSTEM

King Edward VIII Pier

NEW BERTHING/MOORING
DOLPHIN

NEW FLOATING PONTOON STRUCTURE WITH
ACCESS BROW

NEW CAISSON STRUCTURES
TO FORM EXTENDED & WIDENED PIER

2

2

ur Area

edged to 2.5m
chart datum

g pontoon
.5m
m

Car P

Fort Anne Jetty

TITLE
AREA D - PROPOSED UPGRADE
RO-RO BERTH
KING EDWARD VIII PIER

PROJECT
DOUGLAS OUTER HARBOUR
MASTERPLAN REVIEW

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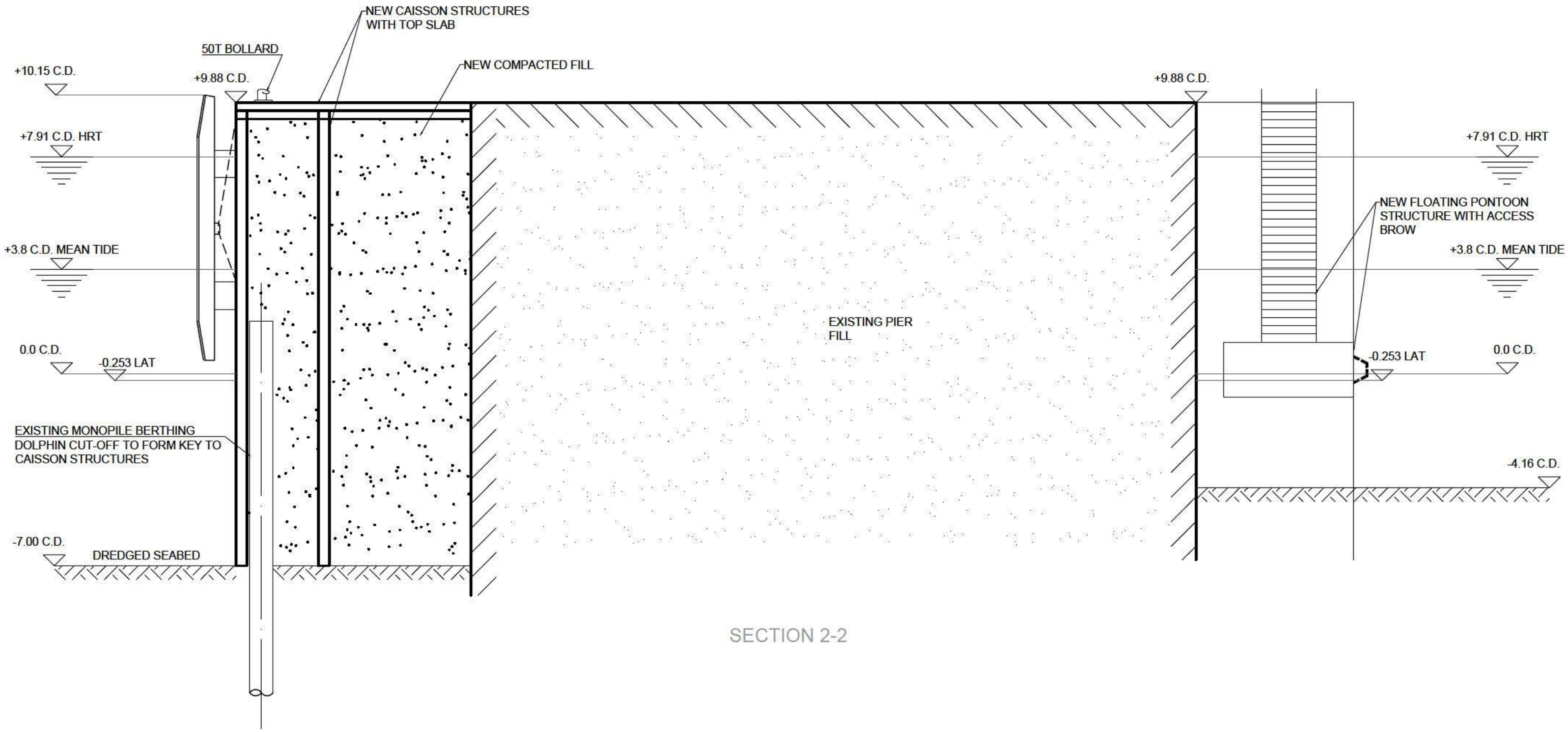

SECTION 2-2

TITLE: AREA D PROPOSED UPGRADED TO RO-RO BERTH KING EDWARD VIII PIER	PROJECT: DOUGLAS OUTER HARBOUR MASTERPLAN REVIEW	Royal HaskoningDHV Enhancing Society Together Rightwell House. Bretton Peterborough, PE3 8DW Tel +44(0)1733 334455 Email info.peterborough@rhdhv.com Website www.royalhaskoning.com	DRAWN: A.E. DATE: 05-12-2016 REF.: REF	CHECKED: T.D. SCALE AT A3: 1:150 DRG No.: PB6105/06	APPROVED: J.G. REV: P1

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Area

ROCK SALT & CHIPPINGS IMPORT BERTH

DRYING OUT BERTH

FISHING BOAT & BULK CARGO BERTH

PROPOSED NEW
SLIPWAY FOR PUBLIC USE

Middle Harbour Area

King Edward VIII Pier

Area Dredged to 2.5m
below chart datum

Line of floating pontoon

Area Dredged to 1.5m
below chart datum

PROPOSED LIFEBOAT PEN
WITH PONTOON & ACCESS
BROW

Car Park

RNLI Station

Fort Anne Jetty

Boat Park

Trailer Park

Depot

SOUTH QUAY

Fort William

Ivy House

The Towers

TITLE

AREA E OPTION 1 - PROPOSED FLOATING PONTOON & RNLI STATION TO MIDDLE HARBOUR

PROJECT

DOUGLAS OUTER HARBOUR
MASTERPLAN REVIEW

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DO NOT SCALE

rea

ROCK SALT & CHIPPINGS IMPORT BERTH

DRYING OUT BERTH

FISHING BOAT & BULK CARGO BERTH

PROPOSED NEW
SLIPWAY FOR PUBLIC USE

Middle Harbour Area

King Edward VIII Pier

Depot

SOUTH QUAY

Area Dredged to 2.5m
below chart datum

Line of floating pontoon

Area Dredged to 1.5m
below chart datum

Fort William

Fort William

Fort William

Ivy House

The Towers

Car Park

Cafe Bar

Fort Anne Jetty

Boat Park

Trailer Park

TITLE

AREA E OPTION 2 - PROPOSED FLOATING PONTOON & CAFE BAR DEVELOPMENT TO MIDDLE HARBOUR

PROJECT

DOUGLAS OUTER HARBOUR
MASTERPLAN REVIEW

Royal HaskoningDHV
Enhancing Society Together

Rightwell House, Bretton
Peterborough, PE3 8DW
Tel +44(0)1733 334455
Email info.peterborough@rhdhv.com
Website www.royalhaskoning.com

DRAWN A.E.	CHECKED T.D.	APPROVED J.G.	
DATE 05-12-2016	SCALE AT A3 1:1000		
REF. REF	DRG No. PB6105/08	REV P1	

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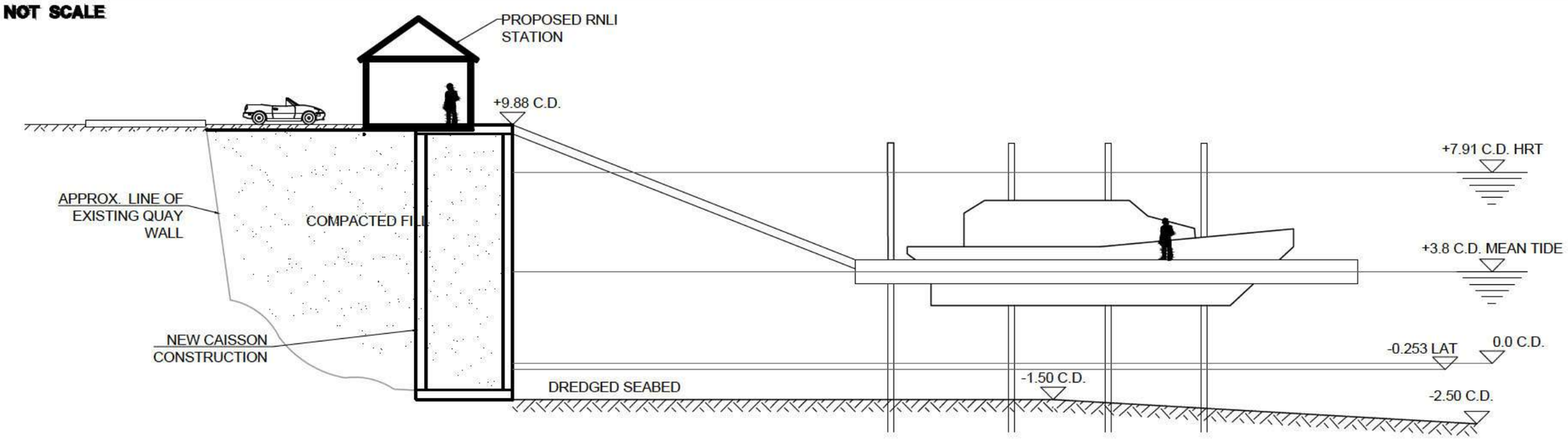
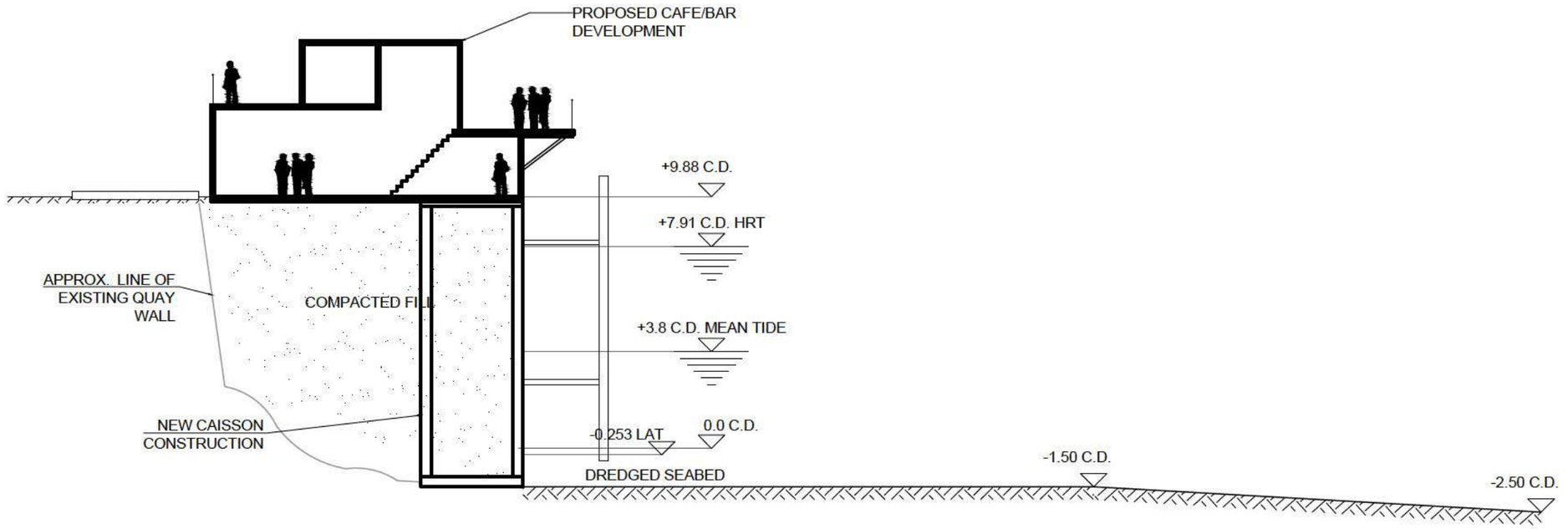


SECTION 3-3



SECTION 4-4

TITLE
AREA E
PROPOSED ALTERNATING DEVELOPMENTS AT MIDDLE HARBOUR

PROJECT
DOUGLAS OUTER HARBOUR MASTERPLAN REVIEW

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A.E.	T.D.	J.G.
DATE: 05-12-2016	SCALE AT A3: 1:200	
REF.: REF	DRG No.: PB6105/09	REV: P1

DO NOT SCALE

N

IMPROVED SLIPWAY FOR PUBLIC USE

NEW WAVE SCREEN

NEW FLOATING PONTOON BERTH WITH ACCESS BROW. POSSIBLE DISABLED PERSONS BERTHING FACILITY

Fort Anne Jetty

NEW BREAKWATER STRUCTURES

NEW FLOATING PONTOONS BERTH FOR OFFSHORE SUPPORT

NEW WAVE REDUCING REVETMENT

NEW PONTOON WITH BROW

PROPOSED PUBLIC BERTHS

DREDGED -2.50m C.D.

PONTOON 1

PONTOON 2

PROPOSED NEW BREAKWATER

PROPOSED RNLI LIFEBOAT PEN WITH FLOATING PONTOON

Car Park

Cafe Bar

New Boat Park

New Trailer Park

New Platform

South Quay

Ravens Wharf

Raven's Cliff

Raven's Cliff Lodge

Fire Pumps

AREA AVAILABLE FOR OFFSHORE WIND OR TIDAL CURRENT MAINTENANCE COMPANY

RNLI

PC

Depot

5

1

2

Haskoning UK Ltd.

TITLE: AREA F OPTION 1 - PROPOSED FLOATING BERTHS, BREAKWATER & RNLI PEN	PROJECT: DOUGLAS OUTER HARBOUR MASTERPLAN REVIEW	Royal HaskoningDHV *Enhancing Society Together*	DRAWN A.E. · CHECKED T.D. · APPROVED J.G. · DATE 05-12-2016 · SCALE AT A3 1:1000 · REF. REF · DRG No. PB6105/10 · REV P1

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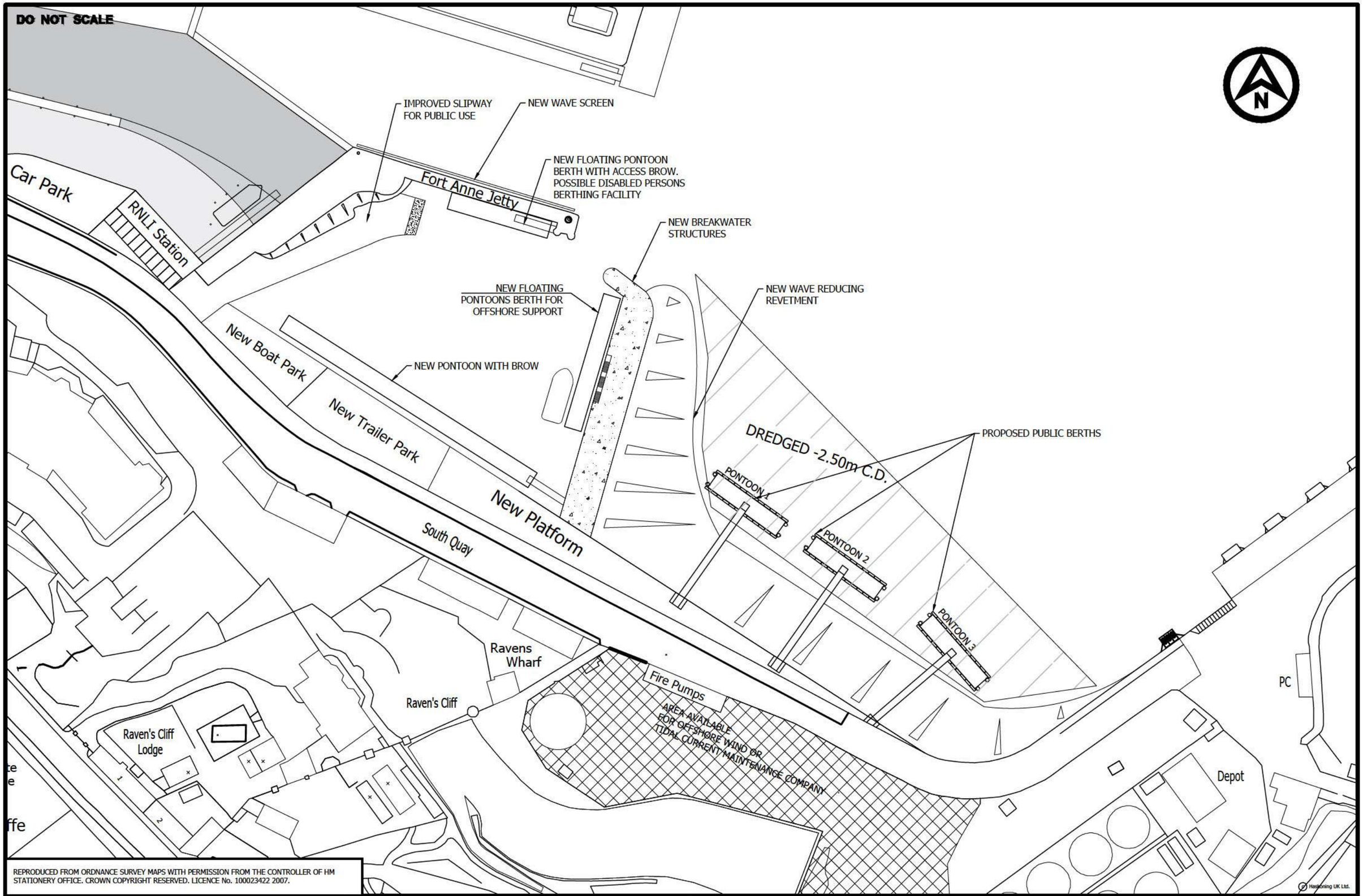

TITLE

AREA F OPTION 2 - PROPOSED FLOATING BERTHS AND BREAKWATER

PROJECT

DOUGLAS OUTER HARBOUR MASTERPLAN REVIEW

Royal HaskoningDHV
Enhancing Society Together
Rightwell House, Bretton
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DATE 05-12-2016	SCALE AT A3 1:1000	
REF. REF	DRG No. PB6105/11	REV P1

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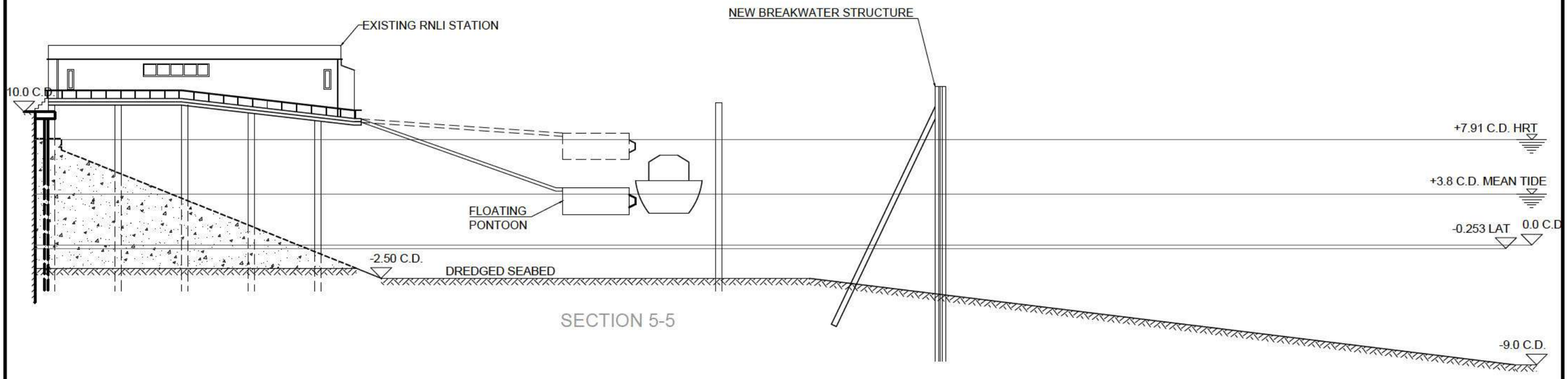

SECTION 5-5

TITLE
AREA F
PROPOSED UPGRADED PONTOONS
SOUTH QUAY

PROJECT
DOUGLAS OUTER HARBOUR
MASTERPLAN REVIEW

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Website www.royalhaskoning.com

DRAWN AE	CHECKED T.D.	APPROVED J.G.	
DATE 05-12-2016	SCALE AT A3 1:300		
REF. REF	DRG No. PB6105/12	REV P1	

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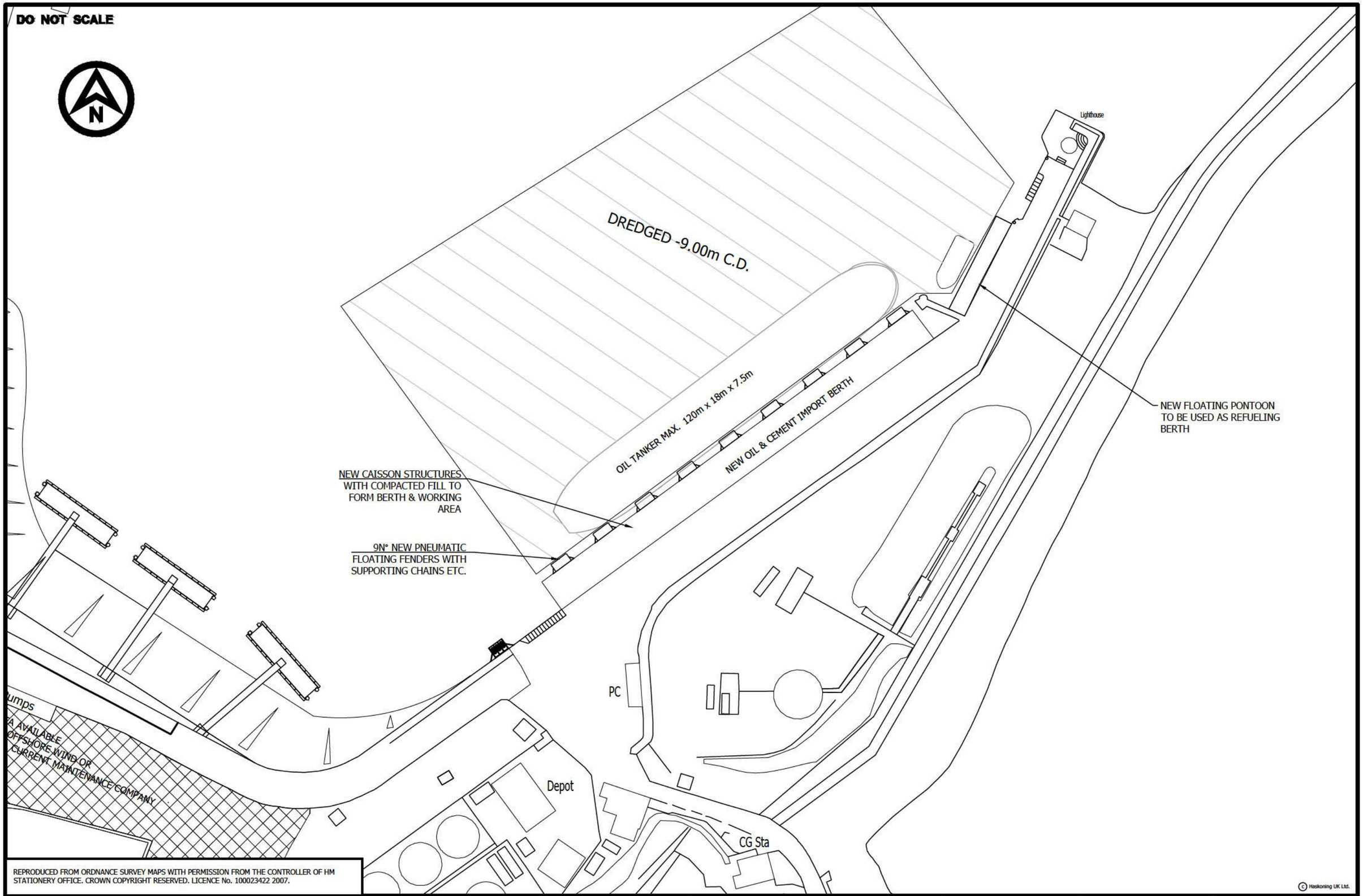

TITLE: AREA G - PROPOSED OIL & CEMENT IMPORT BERTH	PROJECT: DOUGLAS OUTER HARBOUR MASTERPLAN REVIEW	Royal HaskoningDHV Enhancing Society Together	DRAWN: A.E. / CHECKED: T.D. / APPROVED: J.G.
			DATE: 05-12-2016 / SCALE AT A3: 1:1000
			REF.: REF / DRG No.: PB6105/13 / REV: P1

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Peterborough, PE3 8DW
Tel +44(0)1733 334455
Email info.peterborough@rhdhv.com
Website www.royalhaskoning.com

DO NOT SCALE

N

NEW LINKSPAN

Queen Victoria Pier

CRUISE VESSEL MAX. 240 x 30m

BEN-MY-CHREE SEATRUCK HEYSHAM MAX MANANNAN 125 x 23m 140 x 25m 95.5 x 20m

HURRICANE CLIPPER 30 x 9.6m

40 x 10m

HURRICANE CLIPPER 38 x 9.6m

DREDGED -9.5m C.D.

APPROX -8m C.D.

APPROX -11m C.D.

DREDGED -7.00m C.D.

Outer Harbour Area

Middle Harbour Area

King Edward VIII Pier

Area Dredged to 2.5m below chart datum

Line of floating pontoon

Area Dredged to 1.5m below chart datum

Car Park

Care Bar

Fort Anne Jetty

APPROX -4m C.D.

APPROX -4.1m C.D.

DREDGED -9.00m C.D.

Boat Park

Trailer Park

DREDGED -2.50m C.D.

A7

South Quay

Platform

Ravens Wharf

Raven's Cliff

Raven's Cliff Lodge

The Gate House

RNLI

Depot

PC

CG Sta

OIL TANKER MAX. 120m x 18m x 7.5m

REPRODUCED FROM ORDNANCE SURVEY MAPS WITH PERMISSION FROM THE CONTROLLER OF HM STATIONERY OFFICE. CROWN COPYRIGHT RESERVED. LICENCE No. 100023422 2007.

TITLE: OVERALL PLAN	PROJECT: DOUGLAS OUTER HARBOUR MASTERPLAN REVIEW	Royal HaskoningDHV *Enhancing Society Together*	DRAWN A.E. · CHECKED T.D. · APPROVED J.G.
			DATE 05-12-2016 · SCALE AT A3 1:2500
			REF. REF · DRG No. PB6105/14 · REV P1

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DO NOT SCALE

LEGEND

- Petrocem and cement berth
- Fishing fleet berths and small dry bulk
- Cruise and RoPAX berths
- Areas and facility for offshore wind and tidal trubine support company
- Salt and chippings import berth
- Public amenities
- RNLI facility
- RoPAX ferry turning circles

NEW LINKSPAN
Queen Victoria Pier
DREDGED -9.5m C.D.
40 x 10m
King Edward VIII Pier
Middle Harbour Area
Outer Harbour Area
DREDGED -7.00m C.D.
Area Dredged to 2.5m below chart datum
Line of floating pontoon
Area Dredged to 1.5m below chart datum
APPROX -4m C.D.
DREDGED -9.00m C.D.
Car Park
Cafe Bar
Fort Anne Jetty
Boat Park
Trailer Park
Platform
DREDGED -2.50m C.D.
South Quay
A37
Ravens Wharf
Raven's Cliff
Raven's Cliff Lodge
Fire Pumps
AREA AVAILABLE FOR OFFSHORE WIND OR TIDAL CURRENT MAINTENANCE COMPANY
RNLI
PC
Depot
CG Sta
The Gate House
Ravenscliffe Mews
The Stables
OLD BUS STATION
REVELL SQUARE
MAIN PLACE
PARADE STREET
SOUTH QUAY
FORT WILLIAM ROAD

TITLE	AREAS
PROJECT	DOUGLAS OUTER HARBOUR MASTERPLAN REVIEW

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DATE	05-12-2016	SCALE AT A3	1:2000		
REF.	REF	DRG No.	PB6105/15	REV	P1

Royal HaskoningDHV

A2 IoM Government Drg No HB / 2840

KEY

- Future freight & passenger vehicle marshalling area at ground level and potential multi-storey car park & office development above.
- Cargo handling area
- Circus Beach existing freight & passenger vehicle marshalling area to be retained
- Potential Port Related Development (none residential)
- Potential area for future vehicle marshalling / passenger handling facilities

Existing piles to be concrete cased to protect from corrosion

Existing steps to be infilled where shown to provide additional useful berthing space

Strengthened area for heavy project cargo

Queen Victoria Pier

New Floating Linkspan

New Vessel up to 135m length (to be confirmed as more details become available)

Existing walkway could be curtailed to allow easier access to elevated walkway

Inner Harbour Area

Drying out berth

Middle Harbour Area

Multi-purpose, all weather, afloat berth for cargo, fishing, survey, etc vessels

Existing Pier surface to be extended out to the existing berthing line with a reinforced concrete slab on a new permeable wall.

King Edward VIII Pier

Outer Harbour Area

Improved and extended tanker berth

Area Dredged to 1.5m below chart datum

Area Dredged to 2.0m below chart datum

Area Dredged to 2.5m below chart datum

Line of floating pontoon (N.B. Not individual fingers)

Dredged Area

Existing retaining wall to be lowered across new entrance to berthing area

135m turning circle of vessel

250m Required Clear turning area

Car Park

RNLI Station

Fort Anne Jetty

Possible additional pontoon

Extended & Widened Slipway

Wave Reflecting Structure

Amenity Area

Fuelling berth

Boat Park

Pontoon Berths for visiting craft, fishing vessels, etc.

Access pontoons for wind farm servicing vessels

Infill Area

Existing slipway removed and pontoon with wave attenuation screen installed for RNLI

South Quay

Wave Absorbing Rock Revement

Calsson platform

Multi-purpose, all weather, afloat berth for cargo, fishing, survey, etc vessels, but restricted by tanker operations and weather

Ravens Wharf

Raven's Cliff

Raven's Cliff Lodge

Fire Pumps

PC

Depot

CG Sta

The Gate House

Ravenscliffe Mews

The Stables

Harold Tower

A37

DOUGLAS HEAD ROAD

Barton Gloccamorra

Camera Obscura

Douglas Head Lighthouse

OLD BUS STATION

VICTORIA STREET

FORT STREET

BRIDGE AVENUE

PEVERIL SQUARE

BATH PLACE

MARKET STREET

DOUBLE CORNER

Ref.	Revision	Date	By	Chk.
F	RNLI berth changed and tanker berth improvements added	Aug '16	G.Sm	
E	Wind farm pontoons added	Aug '12	G.Sm	
D	Advice from Royal Haskoning	May '12	G.Sm	
C	Consultation with Mezeron, Laxey Towing, Manx Gas, Manx Petroleum & Ramsey S.S.	10/8/11	G.Sm	
B	Consultation wth D.B.Y.C	23/5/11	G.Sm	
A	Consultation with Steam Packet	12/5/11	G.Sm	

AMENDMENTS

Status: Consultation Draft 2

infrastructure

bun-troggalys

Technical Services
Sea Terminal Building,
Douglas, Isle of Man
IM1 2RF

Isle of Man Government

Telephone: (01624) 686600
Fax: (01624) 686970

Client: Harbours

Job Title: Douglas Outer Harbour Masterplan

Drawing Title: Plan Showing Overall Harbour Improvements

Drawn By: GSm		Date: Aug '12	
Checked By: AMC		Scale: 1 : 1250	
Job Ref: HB / 2840	Drawing No: 100		Rev.: F

Deloitte.

Department of Economic Development
Development of an Isle of Man Cruise Ship Deep Water Berth

July 2017

Important notice

This report is strictly private and confidential to the Isle of Man Government Department of Economic Development ("the Addressee") and is intended for the sole use of the Addressee.

Save as expressly provided for in the Contract it must not be recited or referred to in any document, or copied or made available (in whole or in part) to any other party.

We accept no responsibility or liability for its contents to any other party other than the Addressee.

For your convenience, this report may have been made available to you in electronic and hard copy format. Multiple copies and versions of this report may, therefore, exist in different media. Only a final signed copy should be regarded as definitive.

Deloitte.

Isle of Man Government
Department of Economic Development
St Georges Court
Upper Church Street
Douglas
Isle of Man
IM1 1EX

19 July 2017

Dear Sirs

Isle of Man Cruise Ship Deep Water Berth

We enclose our final report (the "Report").

We draw your attention to the disclaimer notice which can be found on page 142.

We also draw your attention to the section titled "Requirements" in which we refer to the scope of our work, sources of information and the limitations of the work undertaken.

Our work was completed on 30 June 2017 (the "Cut-off Date" for the purposes of Clause 5.5 of the Contract, Terms of Business) and we have not updated our work since that date.

We provided a draft of this Final Report dated 14 June 2017 to the management of the Isle of Man Government Department of Economic Development for their confirmation of certain facts and matters. They provided the confirmation we requested.

Yours faithfully

Deloitte LLP

Index

Glossary

DED	Department of Economic Development
DOI	Department of Infrastructure
FTE	Full Time Equivalent
GRT	Gross Tonnage
IOM	Isle of Man
IRR	Internal Rate of Return
LOA	Length of Vessel
NPV	Net Present Value Calculations
PAX	Passenger Numbers

Background

Background

Isle of Man Cruise Ship Deep Water Berth review

We have been engaged by the Isle of Man Department of Economic Development to undertake a desktop review of the potential for an IOM cruise market and specifically the various proposals (as set out below) to build a deep water berth in the IOM.

This review is an independent assessment of the proposed project, including a sense check of existing data and findings, to enable the DED to establish whether a detailed business case should be developed. Our review was undertaken based on the phases set out below.

Several options have been put forward for the cruise berth development, namely:

- A 240 metre berth proposed by DOI, by extending the existing Queen Victoria Pier in Douglas – capital cost estimate £16m;
- 450 metre fixed (caisson) structure cruise berth off the Alexander Pier, including a 250 metre smaller berth in Douglas (proposed by the Isle of Man Shipping Association) which would allow both cruise ships and existing Steam Packet vessels to berth simultaneously – capital cost estimate £80m.
- 450 metre fixed (concrete) cruise berth, which would be positioned in the same location as the proposed caisson structure in Douglas – capital cost estimate £35m - £40m.

Our review is not a feasibility study of the above proposals, however as part of our review, we have provided forecast passenger indications based on the desktop research we have obtained for each of the above proposals.

These passenger growth forecasts, along with the expected average passenger spend have been used to create an indication of the direct economic benefit that might be generated through the implementation of the above berth options.

Indicative NPV calculations have been prepared for each proposal based on the passenger forecasts and assumptions relating to expected passenger spending levels.

Phase 1
Initial data gathering and review of the commissioned documents provided to us by the DED. Initial meeting held with the DED to refine our proposed approach.

Phase 2
Analysis of the data gathered and the development of a user-friendly report that responds to the specific requirements as laid down by the DED.

Phase 3
Delivery of tailored report and a presentation to the DED summarising our findings.

Executive summary

Requirements

Deloitte.

	Your requirements	Work Performed	Key findings
1	Sense check British Cruise Ship Trends, including the estimated growth of 80,000 to 100,000 passengers per annum as a result of a 350 metre deep water berth, as outlined in the GP Wild Report, and compare these against the performance achieved in other British Isles cruise ship destinations.	• We have considered Passenger trends in comparable islands in the UK and Channel islands and British Ports, as well as ship build market data and vessel size analysis. • The 350m berth option is no longer considered feasible, as such we have estimated passenger numbers for the 240m and 450m length berth options. See section 5 and 10. These figures have also been sense checked by members of the Isle of Man Shipping Association	• Absolute passenger numbers have generally increased significantly over the last 5 years in the comparable islands. • Cruise ships are being built bigger than ever before. • 80,000 – 100,000 passengers in 20 – 30 years' time appears to be achievable based on the estimated passenger growth analysis we have performed, assuming a 450m cruise berth is constructed.
2	Consider both the direct and indirect economic benefit resulting from the development e.g. visitor spend, job creation, business investment and other associated tangible benefits that would arise.	• We have considered the direct economic benefits of each option within our NPV calculations detailed in section 4. • We have considered the indirect economic benefits, outside of the NPV calculations, also set out in Section 4.	• Passenger direct gross spend has been estimated as £44.48 based on available information. A net exchequer benefit of £11.93 has been estimated per passenger. • Indirect passenger spend is not included in our NPV calculations as it has not been possible to obtain reliable information about the IOM or other comparable islands. As noted in Section 6, the it is understood from discussions with Carl Hawker, that the £11.93 net exchequer benefit figure used takes into account other indirect benefits experienced by the IOM.
3	Conduct a desk top review of recent cruise berth developments in the British Isles and neighbouring North Sea ports, establishing development costs of on-shore and off-shore facilities, economic benefit generated and indicative income and expenditure of operation.	• We have considered the current and future developments of neighbouring ports in Section 9.	• Neighbouring ports, in particular Liverpool have plans to, or have already improved their cruise port facilities recently. • Liverpool improving its cruise port offering further, could have a significant impact on the Isle of Man's ability to attract more passing trade if a bigger berth were available.
4	Analyse current Isle of Man cruise visitor spend and harbour pricing compared to other British Isles cruise ship destinations, identifying areas for improvement and development.	• We have analysed historic Isle of Man visitor spend and harbour fee pricing structure, compared to other British Isle cruise ship destinations in Section 6.	• Historical visitor spend has been considered in relation to other neighbouring islands and UK ports.

Requirements (continued)

Deloitte.

	Your requirements	Work performed	Key findings
5	Review and assess the capital cost estimates provided by DOI for the development of the on-shore infrastructure, identifying issues requiring further investigation and/or consideration.	• We have been unable to assess the capital cost estimates as explained in section 1, however the cost estimations provided have been used in the NPV calculations in Section 4.	• N/A
6	Review and assess the technical facility study and off-shore capital cost estimates provided by FDN Engineering, identifying cost options for consideration.	• Since the commencement of this report, the original proposal for a floating 350m berth, as outlined by FDN has been removed from considerations. • A new proposal of a fixed 450m (caisson) berth has been tabled by the Isle of Man Shipping Association. Please see Section 2. • The 450 metre (caisson) berth has been challenged by us in terms of the project viability due to the capital cost estimate of at least £80m. This capital cost is considerably more than other ports built recently per our research. • As such a new 450 metre (concrete) berth has been quoted for, which would take a 400m cruise ship. The capital cost of this is £35 - £40m for the berth.	• The new proposal of the 450m (Concrete) berth appears to carry a better return on investment than the 450m (caisson) option, the 240m berth and doing nothing per our Net Asset Value Calculations see section 4. • The capital cost of the 450m (concrete) berth is much lower than the 450m (caisson) berth option, yet both berths have the capacity to accommodate the same size vessels and hence the same projected passenger numbers and associated revenue have been forecast.
7	Consider the merits of a 250 metre berth proposed by DOI.	• For each proposal; 'Do nothing', 240m, 450m (caisson) and 450m (concrete); we have performed a 'SWOT' analysis to consider merits. See section 3. • We have calculated a NPV for each proposal in Section 4, in order to consider the quantitative merits.	• There are a number of strengths and weaknesses to all options. • It is noted a common weakness of "doing nothing" and having only a 240m berth would be that tendering of larger boats may still be necessary which can bring negative perceptions of the Isle of Man as it is found that tendering is not popular with cruise ship visitors. • It is noted on the larger projects, 450m (concrete) and 450m (caisson) the return on investment is contingent on passenger number assumptions and related growth.

Requirements (continued)

Deloitte.

	Your requirements	Work performed	Key findings
8	Consider the potential benefit arising from utilising the berth for other activities e.g. floating hotels during TT and other major events, servicing off-shore renewable energy maintenance vessels, car parking and retail provision.	• In section 10, we have considered the alternative uses of the berths, including berthing floating hotels during festivals/summer, party boats, maintenance of wind farm vessels, berthing of wind farm crew vessels, shelter from bad weather, and wind turbines.	• It is noted that use of the berth to accommodate a floating hotel could compliment the increasing influx of visitors to the Isle of Man for annual world famous events such as the TT and Grand Prix. • Locals might be inclined to use party boats for an evening out with a difference. This is something which could be marketed now on the existing 150m pier. • Maintenance vessels could be serviced during the winter months when the cruise season is over, bringing in all year round harbour fees.
9	Provide an indicative estimate of ongoing maintenance costs associated with the operation of a deep water berth.	• This has been addressed in section 4. We have not been able to obtain sufficient information for a comparable port; however, we have held discussions with Ann Reynolds, Director of Ports, from the DOI in order to include indicative maintenance numbers in our NPV calculations. These figures have also been sense checked by members of the Isle of Man Shipping Association.	• It is noted that this input could be a factor of success or failure of the different berth options. The indicative maintenance figures used in the NPV calculations have been sense checked by members of the Isle of Man Shipping Association.
10	Provide an indication of return on investment for the project over a 20, 25 and 30 year period.	• Net Present Values, Internal Rates of Return and discounted payback periods have been calculated for each proposal in Section 4.	• Based solely on the numerical projections, "doing nothing" is more lucrative than investing in the 240m or 450m (caisson) options. • Overall however, the 450m (concrete) option is the most profitable, with a significantly higher NPV, highest IRR, and lowest payback period than the other projects.
11	Identify and assess the potential funding models for the development, for example: • Fully funded by the Isle of Man Government • Public/private partnership • Private equity/Bond funded • Fully funded by the Private sector	• Please see Section 9, where we have considered the funding options available.	• The 240m berth proposed by the DOI would be a government initiative, and as such would be funded out of Government funds. • Private bond funding options exist for the larger 450m (caisson) berth option; however following discussions with the Treasury, DOI and the DED it is considered more likely that public spend would be used to fund the berth.

Executive summary - Overview of findings

Isle of Man Deep Water Berth Review

We have performed a desktop review of information to establish the trends in the local market and the wider cruise ship industry. This research has been performed to assist the Department of Economic Development in concluding on a number of proposals to build a deep water berth in the Isle of Man to enable more cruise ships to visit the Island. These options are set out in the boxes below:

Option 1 – Do nothing

- Doing nothing at all (i.e. stay exactly how we are at the moment) or doing nothing except for increasing the harbour port charges in line with a similar jurisdiction such as Orkney;
- No capital costs of doing nothing.
- Do nothing - Estimated NPV after 50 years: £12,094,442
- Do nothing except increase harbour fees - NPV after 50 years: £23,644,801
- Break even year: N/A

Option 2 – 240m berth

- Extending the existing Queen Victoria Pier for an expected capital cost of £16m;
- No additional road infrastructure costs as already able to exit by the main Isle of Man Sea terminal.
- Estimated NPV after 50 years: £1,514,347
- Break even year: 48

Option 3 – 450m (caisson) berth

- Building a 450m cruise ship berth (complete with a 250m smaller berth) as part of a wider harbour development, enabling both cruise ships and potentially the Steam Packet/freight vessels to use the berth. N.B. for the purposes of this report, we have not considered the revenue streams outside of the cruise market. Estimated capital cost of £80m for the berth.
- Additional costs required to move the fibre optic cable (expected £2m);
- Further road infrastrucure required to transport cruise passengers from the berth to their excursions (expected £5m)
- Estimated NPV after 50 years:£53,385,213
- Break even year: 37

Option 4 – 450m (concrete) berth

- Building a new 450m concrete breakwater, with attached cruise ship berth, capable of berthing a 400m cruise ship near to the existing Alexander Pier, with estimated capital costs of £35m - £40m for the berth;
- Additional costs required to move the fibre optic cable (expected £2m); and
- Further road infrastrucure required to transport cruise passengers from the berth to their excursions (expected £5m).
- It is recommended that this option is explored further in terms of the expected capital cost to see if it is possible that it could be built locally by the DOI.
- Estimated NPV after 50 years: £87,105,082
- Break even year: 28

Executive Summary – further considerations

This report is not a feasibility study, and as such does not carry a recommendation as to which (if any) berth option the Department should take forward. We have however, laid out some further considerations we feel the Department may wish to consider for each scenario.

Do nothing:

- Regardless of whether a cruise berth is constructed, there is an opportunity to increase the harbour fees for cruise vessels in line with other similar jurisdictions, which charge on a gross tonnage basis. There is also an opportunity to increase the passenger dues on and off the cruise vessels from £0.50 each way in line with other places. Research suggests other comparable ports charge up to a maximum £1.65 each way (Shetland) per passenger. Assuming this was done, as demonstrated by the NPV calculations, the estimated net income received as a result of cruise passengers' gross spend and harbour fees would be almost doubled per annum.
- There is also the potential to improve the existing service offering to cruise companies and their passengers by purchasing some larger passenger tender vessels, which are estimated to cost in the region of £2m. This may also be a means of justifying any increase proposed in the harbour fees to the cruise companies, and could potentially attract some more cruise companies to visit the Island, however feedback suggests that a number of cruise companies will not consider a location if tendering involved.

240m berth:

- This proposed berth has a significantly lower capital cost than the 450m berth proposals, and could be a phase 1 development for assessing cruise ship appetite and developing the local market offerings on a smaller scale.
- Expectation is that the captive cruise companies and therefore the associated passenger numbers would cap at approximately 40,000 passengers per annum by year 50, due to berth size restrictions, and the underlying increases in new vessel build sizes. Therefore, the berth may not be future proof over a longer term.
- Feedback suggests the position of the berth from a weather and tidal perspective could mean some ships may not be able to berth alongside the berth in certain weather conditions.
- NPV calculations include a £4m contingency for any capital overspend. Assuming the original capital cost estimates of £16m for the berth and 3.8m for tugs is accurate, this sensitivity could bring the break even year forward from year 48 to year 40.

Executive Summary – further considerations

450m caisson berth:

- There are significantly higher capital costs involved with the provision of the caisson berth proposal. There may be an impact on public response, particularly if public spend were to be used to finance the berth.
- In terms of passenger numbers it expected that the berth would attract the same number of cruise vessels and passengers as the 450m concrete berth option. The payback period is therefore longer due to the higher capital cost implications for a caisson berth compared to a concrete berth.
- The overall capital cost could be reduced by removing the additional 250m berth from the plan, however it is estimated this would only save approximately £5m out of an estimated £80m build (before infrastructure work required and tug requirements).
- Onshore facilities would likely be required to house security equipment and check-in facilities. Additional security staff would also be required for both 450m berth options, located on site at the cruise berth, rather than at the Sea Terminal location. The onshore facility costs have been included in the NPV as part of the contingency amount for overspend.

450m concrete berth:

- The berth would be capable of berthing the largest cruise ships in the global cruise market today, therefore future proofing the Island.
- At present, there is no coach turning bay currently included in the plans for the 450m concrete berth. Therefore, depending on the proposed method of including the turning bay/widening the breakwater, this could lead to further capital spend.
- There could be an opportunity to extend the berth itself in the future to house even larger vessels if required, and there may also be an ability to include a 250m cargo ferry berth alongside the cruise berth per communication received from Royal Haskoning.
- Based on the assumptions contained within this report, the 450m concrete berth option breaks even at year 28, which despite higher capital costs than the 240m berth, breaks even 20 years earlier.

There are significant assumptions applied in terms of passenger growth, and uncertainty exists around whether the forecast passenger numbers would be achieved in all scenarios, particularly due to the long term forecasting nature.

Executive Summary – further considerations

Other considerations:

- Multi-lingual materials and tour guides – feedback from Guernsey cruise passenger surveys and the presentation given by Michael Morrison about Orkney is that cruise passengers feel more welcome when language alternatives are provided to them.
- Isle of Man tourism attractions could also look to improve their multi-lingual information for foreign passengers. E.g. The Isle of Man Motor Museum in Jurby only has English information signs. This is an example of an attraction where it would be reasonable to expect to see German, French and Italian information leaflets as a minimum for the TT biker tourists who are most likely to attend such an attraction, as well as any cruise visitors who may visit.
- Likewise, restaurants and bars could look to have menus in foreign languages also to give a more multi-cultural feel to the Island.

1. Review of capital cost estimates provided by the DOI

1. Review of capital costs estimates provided by the DOI

The following information has been gathered from discussions with Ann Reynolds, DOI in relation to the capital cost expectations for a 240m berth:

- DOI expect that the maximum capital outlay required to extend the existing Queen Victoria Pier would be £16m.
- £16m is considered to be the maximum cost for the extension of the existing Queen Victoria pier, as there is a potential cost saving estimated at around £2m if other DOI schemes were to be undertaken around the Middle Harbour Area at the same time. This is due to the Middle Harbour Area requiring to be filled in around the edges, and rock dredged as part of the cruise berth project would be able to be used to fill in these other areas of the harbour which require materials.
- Two tugs would be likely to require purchasing, at an estimated cost of £1.5m each.

It is understood that a formal report is available in relation to the proposed 240m berth, however we have not been able to obtain a copy of this report hence we have not considered the reasonableness of the initial capital cost estimates which have been used in our projections and have formed the basis for the NPV calculations within this report. Sensitivity analysis and a contingency for overruns have, however, been applied to this initial cost assessment.

The capital costs estimates above have been used as the basis for our NPV calculations, however we have added in contingencies for any overruns, and have used a tug cost of $5m (equivalent GBP £3.88m). Please see Appendix 1 for more details in relation to the tug assumptions used.

It is anticipated that 2 staff members would be required to be employed to operate the tug at an estimated total net cost of £80,000 per annum, and that groundsmen would also be required seasonally. An estimated total net cost of £40,000 per annum (seasonal contractors) has been included in the NPV calculations included within Section 4.

Due to the location of the berth, we understand that no further facilities would be required to be built in terms of providing security and x-ray machines, or check-in desks, as this would be able to take place within the existing Sea Terminal building, which is adjoined to the Queen Victoria Pier.

2. Consider the technical facility study of off-shore capital costs provided by FDN

2. Consider the technical facility study of off-shore capital costs provided by FDN

350 metre floating berth proposal (FDN): Since the commencement of this report, the original proposal for a floating 350m berth, as outlined by FDN, has been removed from considerations.

The reason by several interested and expert parties, namely the Isle of Man Shipping Association, the Department of Infrastructure, Royal Haskoning DHV and Neptumar as to why a floating berth is not deemed suitable in the proposed Douglas location, is that the floating berth would move too much with where it would be positioned in the harbour due to the strong tidal force, and therefore it would make berthing some vessels difficult, if not dangerous.

450 metre caisson fixed berth: Therefore, the new proposal of a 450 metre (caisson) fixed berth has been tabled by the Isle of Man Shipping Association. See model proposed at Appendix 3.

Their proposal would include a main berth of 450m for cruise ships and a second berth of 250m suitable for cruise ships and also cargo vessels. This proposal is estimated to cost in the region of £80m just for the berthing structure, before any infrastructure costs of roads networks and the cable requiring to be moved have been undertaken (see below); this cost is significantly more than the original proposed floating berth cost of circa £50m.

450 metre concrete breakwater berth: The capital costs for the caisson berth have been challenged by Deloitte during the course of the review, and new fixed breakwater plans for a 450 metre (concrete) fixed berth in the same position, capable of housing a 400m cruise vessel have been considered as a compromise solution, which would be capable of servicing the cruise line industry. This proposal is estimated to cost in the region of £35m - £40m for the concrete berthing structure, before any infrastructure costs of roads networks and the cable requiring to be moved have been undertaken (see below);

The plans for the 450m (concrete) berth have been prepared by Royal Haskoning DHV, see comments on next page, together with Appendix 3, which shows the model proposed.

In Section 3 we have carried out a SWOT analysis for each of the proposed options.

In both 450m berth options, the infrastructure costs are estimated to be in the region of £5m to build a road bridge and improve the existing road infrastructure to take passengers from the berth by coach. There is an additional estimated cost of £2m required to move an underwater cable and fibre optic cable, which runs from the Isle of Man to the UK Mainland. These costs together with contingencies for any overruns have been included in the NPV calculations performed in Section 4.

Staffing requirements and onshore facilities would also be required for the 450m berth options so that there are suitable security and check in facilities in the proposed berth location. A contingency has been included for these costs in the NPV calculations.

Phased development – 450m (concrete) berth option

Capable of berthing up to a 400m cruise ship

Tim Davies, Royal Haskoning DHV:

"The new scheme includes for a 450 metre long breakwater structure which comprises of a rock core with an outer layer of large rock, the south easterly face will be faced with either very heavy rock (+6 tonnes) or precast concrete Accropodes.

The berth face would be 200 metres long x 10 metres wide. We need to allow for turning a coach around, but this is an early scheme. In addition we need to design 5 monopile berthing dolphins with mooring crew footbridges. The total berth length will be 400 metres, but solid quay is as stated 200 metres long. The solid quay is formed with steel tubular piles acting as a combi wall with fill behind and a concrete slab on top. A rock facing will fill in the ends of the quay wall. At the vessel side of the quay wall will be two floating pontoons which will provide the location for the vessels access gangways to land on. A steel bridge will provide access from the pontoons to the quay level. There will also be a scissor lift platform for disabled access.

Access to the quay from Alexandra Pier will be via a twin lane road supported on a steel tubular trestle.

This scheme is much cheaper than the caisson version because:

- The caissons were designed to 'seal for life' the contaminated material that exists on land and seabed / riverbeds on the island. The rock breakwater will not do this.
- The caissons were designed to provide support for tidal or air current turbines to meet the needs of renewable energy sources. The rock breakwater will not do this.
- The caisson design was to provide 'all year round' berthing, the rock breakwater will be designed to prevent overtopping during peak weather conditions / tidal conditions from April through to the end of September.

A second smaller berth has not been included for the scheme, however it would be possible to add it later or include it now and put the cost up.

Confirm that no caissons are included in the new scheme and we would call this a rock faced breakwater."

3. Consider the merits of each option: SWOT Analysis

SWOT analysis

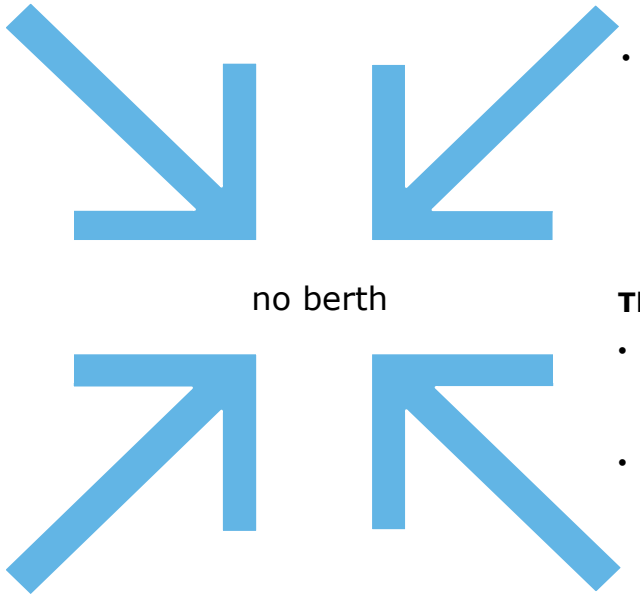
"Do nothing" – if no berth is created

Strengths

- Existing Queen Victoria Pier can already take up to 150m length vessels and approximately half of the vessels currently visiting the IOM are less than 150m.
- No capital cost required, therefore positive NPV will always be the case as long as cruise ships continue to visit.

Weaknesses

- Not attracting all possible cruise ships that could include the Isle of Man on their itineraries due to the tendering required to bring passengers ashore.
- Not all cruise ships have a tender vessel of their own, and there are currently no tender vessels provided at the Isle of Man harbour.
- Even smaller vessels which could come alongside the current berth choose not to due to the shallow nature of the berth and the weather and tidal conditions not always being favourable.



Opportunities

- Increase existing harbour dues to similar pricing structures such as Orkney, or other comparable islands to increase revenue streams.

Threats

- Could be missing out on potential large revenue streams from a growing cruise industry.
- As cruise ships increase in size, they may not visit the Isle of Man in the future unless a bigger and better berthing facility is available.
- Where no berthing facilities are provided, and most other ports provide them as standard, both passenger perception and cruise company perception of the Isle of Man could be negatively influenced on arrival.

SWOT analysis

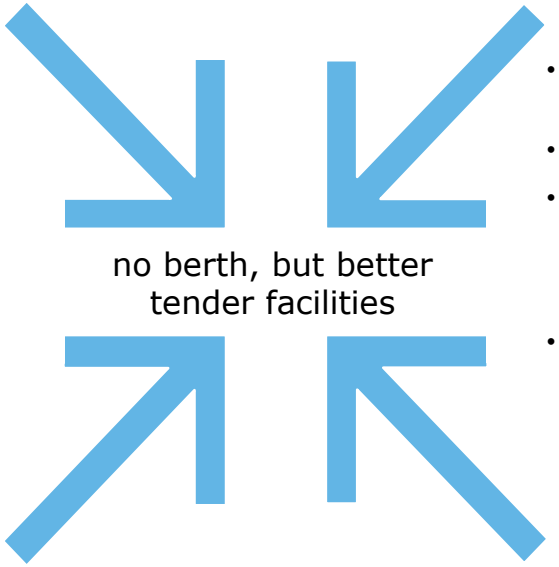
Improve current facilities – purchase of tender vessels

Strengths

- Could offer a more robust journey from the cruise ships to the port in a more comfortable boat.
- Could take more passengers onshore at a time.
- People would get more time on the Island.

Weaknesses

- It's still not a berth, so the potential risk in relation to the perception of both passengers and cruise companies in relation to the Island due to the tendering has not disappeared.
- It doesn't guarantee more cruise ship visits.
- Would this be a disabled friendly option?
- Some cruise companies have said they wouldn't even consider talking about cruising to the IOM until there is a suitable berth.
- Additional staff would be required to service the tender vessel, leading to increased staff costs. There is a risk that these staff costs would not be covered by the additional harbour fees generated.



Opportunities

- More scope for more people to come ashore if the tender is quicker and smoother, and takes more passengers.
- Tender vessels could be used as passenger ferries for round island trips?
- Job creation – captain and crew for the tender vessels would need to be employed.

Threats

- If alternative uses suggested are not appropriate the boats would be redundant and could require more expenditure in relation to ongoing maintenance if not in regular use.

There is scope to improve the do nothing service offering by purchasing a tender vessel which could take up to 200 passengers from the cruise ship to the tender berth, however feedback from Neptumar and cruise companies generally is that it is not a preferable option for the cruise companies, as it can damage the image they are trying to portray. The exception to this rule appears to lie with the "expedition" cruises, where tendering into the port is considered part of the experience. It is expected that this passenger tender vessel could cost in the region of £2million maximum if bought second hand. No NPV calculations have been prepared, as it is not expected to have a significant impact on the overall position if no berths are built, as there is no significant capital outlay.

SWOT analysis

240m berth

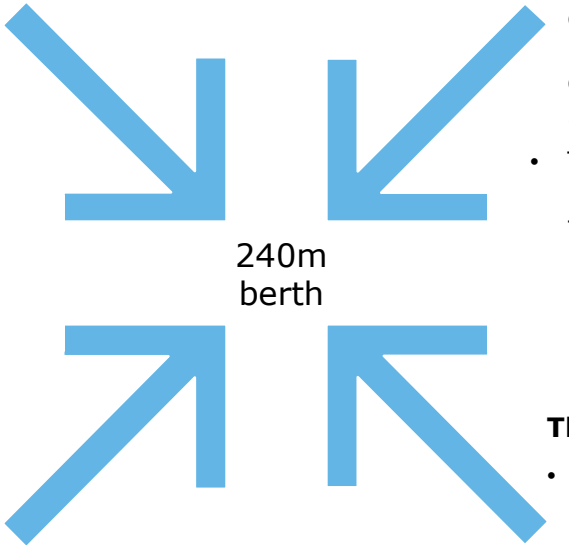
See Appendix 3 for pictorial plans of proposed berth

Strengths

- Pier is already there - so would likely be a quicker project to extend an existing pier, rather than build an entirely new berthing facility.
- It would mean more cruises may be able to include the IOM on their cruise schedules in the next few years.
- It could be a worthwhile berth on top of a larger berth, so that the IOM could take in even more ships at any one time.
- Already attached to the welcome centre and infrastructure of roads, covered walkway etc.

Opportunities

- May attract more vessels if there was a fixed berth so that passengers can get off the vessel on to dry land.
- Increase harbour port fees.
- Could increase demand for future bigger berths.
- Could be Phase 1 of an Isle of Man cruise port development program, involving a larger berth built at a later date.
- Opportunity to improve state of existing pier as part of the extension.



Weaknesses

- Research by the IOM Shipping Association and Neptumar, backed up by our review of recent and planned cruise ship builds (see Section 8) suggests that new cruise ships builds are getting bigger, and the older (generally smaller) vessels are being scrapped.
- May not be as profitable in the long term as a larger berth (see NPV calculations).
- Although 240m long, research suggests that approximately 30m of leeway should be given, meaning that it's possible the maximum vessels size that could be berthed on a 240m berth would be in the region of 210m.
- This is an extension to an existing 150m pier (Queen Victoria Pier), built in 1984 as part of the last harbour regeneration. As such, it may not last for as long as a complete new build, and could cost more in maintenance.

Threats

- Age of existing pier – built 1984, may be unfit to extend if proper surveys / renovation work is not carried out.
- Could be obsolete as size trend in new builds is increasing. Could render a 240m berth redundant over time.

SWOT analysis

450m berth caisson option (includes a 250m smaller berth)

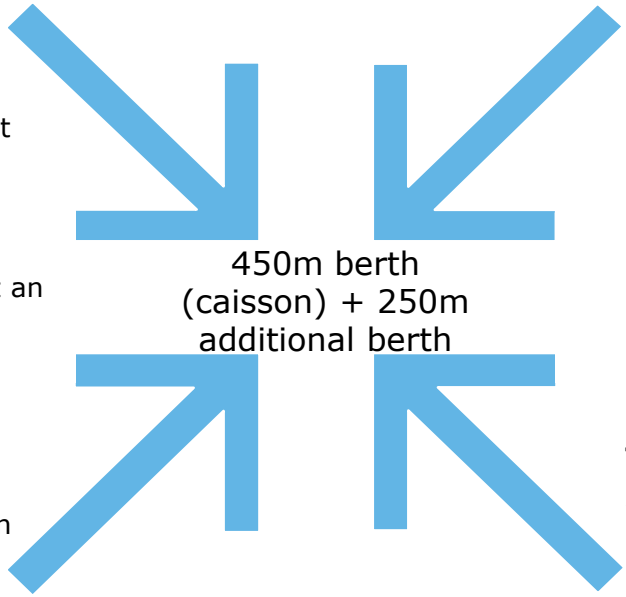
See Appendix 3 for pictorial plans of proposed berth

Strengths

- Would be set up for the future in terms of being able to offer any interested cruise ship company a berth.
- Can take any size vessel, including the world's current largest cruise ship.
- Competitive with the global market.
- Job creation opportunities.
- Infrastructure would be expected to last 100 years.
- Future proofed in terms of vessel sizes getting larger.
- Not just a cruise ship development, but an overall harbour development.

Weaknesses

- Cost is much more sizeable than the cost of extending the existing Queen Victoria Pier to a 240m berth.
- Risk of investment not returning required income to break even if the expected future passenger numbers are not achieved.



Opportunities

- May attract more vessels if there was a larger fixed berth so that passengers can get off the vessel on to dry land.
- Could provide alternative uses.
- Increase harbour port fees.
- UK cruise passenger trends are rising.
- Possibility of providing fueling services to the cruise ships and possibly wind farm maintenance vessels.

Threats

- There may be a potential perceived threat from the IOM Steam Packet Company in terms of potential to take away their business if the 250m add-on pier were suitable for car ferry business.
- Wider economy / cruise trends could go the other way and start to decline.

SWOT analysis

450m concrete berth

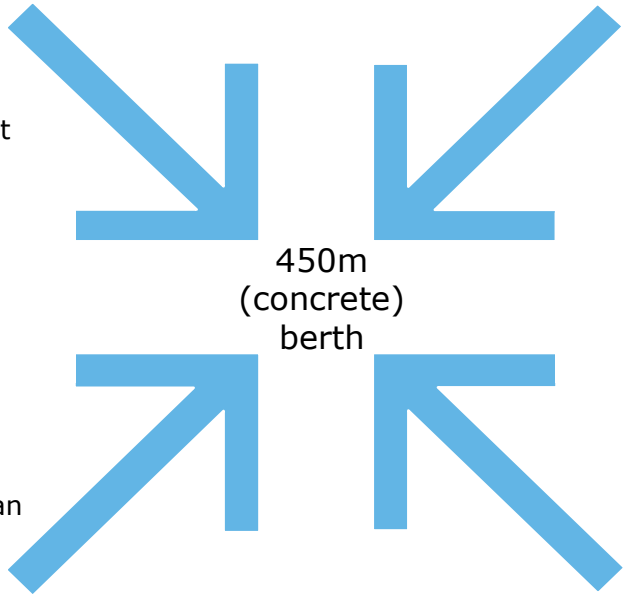
See Appendix 3 for pictorial plans of proposed berth

Strengths

- Would be set up for the future in terms of being able to offer any interested cruise ship company a berth.
- Can take any size vessel, including the world's current largest cruise ship.
- Competitive with the global market.
- Job creation opportunities.
- Infrastructure would be expected to last 100 years.
- Significantly cheaper than the caisson based 450m berth option.
- Future proofed in terms of vessel sizes getting larger.

Weaknesses

- Cost is much more sizeable than the cost of extending the existing Queen Victoria Pier to a 240m berth.



Opportunities

- May attract more vessels if there was a larger fixed berth so that passengers can get off the vessel on to dry land.
- Could provide alternative uses.
- Increase harbour port fees.
- UK cruise passenger trends are rising.
- Possibility of providing fueling services to the cruise ships and possibly wind farm maintenance vessels.

Threats

- Wider economy / cruise trends could go the other way and start to decline.

4. Net asset value calculations

Net present value calculations – unsensitised summary positions

	Do nothing	Do nothing - except increase the harbour rates	240m Berth	450m (caisson) Berth	450m (concrete) Berth
Initial Investment	0	0	(23,877,300)	(108,530,060)	(68,530,060)
TOTAL 15 year NPV	3,018,713	5,777,839	(17,394,622)	(84,641,379)	(44,927,147)
TOTAL 20 year NPV	4,248,120	8,160,735	(14,645,468)	(68,156,139)	(28,858,500)
TOTAL 25 year NPV	5,497,863	10,592,516	(11,918,121)	(49,459,502)	(10,772,046)
TOTAL 30 year NPV	6,768,603	13,073,277	(9,213,935)	(28,721,592)	9,158,691
TOTAL 35 year NPV	8,061,971	15,610,307	(6,525,972)	(7,412,449)	29,522,328
TOTAL 40 year NPV	9,380,577	18,219,621	(3,838,506)	13,369,211	49,283,073
TOTAL 45 year NPV	10,725,130	20,902,678	(1,152,409)	33,623,418	68,460,969
TOTAL 50 year NPV	12,094,442	23,644,801	1,514,347	53,385,213	87,105,082
IRR (50 years)	n/a	n/a	0.23%	1.38%	3.01%
NPV (at X%)	2.30%	2.30%	3.00%	3.00%	3.00%
Payback Period (Years)	n/a	n/a	48	37	28

- For assumptions made in preparing these net present value calculations, please see Appendix 1.
- Please see passenger numbers forecasts and assumptions in Section 5.
- Please see Appendix 1 for the annual net cash flows up to year 50.
- Sensitivity analysis has been performed based on a single variable factors, being:

  - passenger numbers / capital costs /discount factor

Conclusions on the sensitivity analysis have been included within this section. Sensitivity workings can be seen in Appendix 1.

Net present value calculations
Section Summary

- *The previous page shows the NPV calculations for each of the five options below, based on projections up to year 50:*

  - "do nothing",

  - "do nothing except increase harbour fees",

  - "240m berth",

  - "450m (caisson) berth",

  - "450m (concrete) berth",

  The Internal Rate of Return ("IRR") and payback period has also been calculated for each option where possible.

- It can be seen on the previous page that at the 15, 20, and 25 year NPV positions, all three berth options result in a negative NPV. However, it is assumed that the longevity of the project spans longer than 25 years, and hence a 30 – 50 year NPV may be a more appropriate timeframe to draw comparisons and assess the profitability of the project options. It should be noted, however, that the assumptions used in calculating the NPV's become more difficult to project as you look further into the future, beyond 30 years.

- "Doing nothing" results in a higher NPV than the 240m berth overall. At the 30 year NPV point, the 450m (concrete) berth option becomes more lucrative than "doing nothing", and at the 40 year point the 450m (caisson) option become more profitable than "doing nothing". However, "doing nothing" has no capital expenditure associated with it.

- The 450m (concrete) option results in a significantly higher NPV compared to all other options after 30 years and is the only berth option to break even within 30 years based on the discounted cash-flows (payback period 28 years). The 240m berth payback period is 48 years, and the 450m (caisson) berth payback period is 37 years.

- When looking at the return on cost of capital involved in the three berth options, the Internal Rate of Return ("IRR"), is highest at 3.01% for the 450m (concrete) option, and lowest for the 240m berth option at 0.23%. The 450m (caisson) berth option has an IRR of 1.38%.

- Note, that we have not prepared an NPV for the option in relation to purchasing better tender vessels, due to the low capital costs expected of £2m. As such, there would be a short pay back period based on the "do nothing" options. It would also be unlikely to significantly increase the number of additional vessels visiting the Isle of Man if the tendering vessels were provided.

Overall, based on the underlying assumptions made, the 450m (concrete) option is the most profitable, with a significantly higher NPV than the other berths due to the lower capital costs, and forecast passenger numbers. It carries the highest IRR and has shortest payback period. It is also important to note that the forecasts and assumptions are highly sensitive in nature. Sensitivity analysis has been carried out in Appendix 1, and summarised in the next few pages.

Net present value calculations – sensitivity analysis
Passenger numbers

Sensitivity supporting workings can be found in **Appendix 1**.

The **passenger number** sensitivity analysis shows that:

- It is not expected that a negative NPV would be suffered in either of the "do nothing" or "do nothing except increase harbour fees" options, due to there being no upfront capital expenses associated with doing nothing, and it is assumed that any income generated from cruise passenger spend would exceed any possible maintenance costs of maintaining the existing 150m berth.

- **"Do nothing"** – Initial expected NPV at year 50 is £12.1m based on the forecast passenger numbers. However, assuming passenger numbers remained constant at 9,756 PAX per annum over 50 years, this would result in an NPV of £5.4m over 50 years (net decrease from the initial expected NPV of £6.7m). Assuming a more favourable scenario, whereby growth of 3% per annum of constant growth is experienced after year 10 until year 50 (assuming a rate of 7% is maintained for the first 10 years – see assumptions in section 5), this would result in an NPV of £19.7m, representing an increase from the initial expected NPV of £7.6m.

- **"Do nothing except increase harbour dues"** – Initial expected NPV at year 50 is £23.6m based on the forecast passenger numbers. However, assuming passenger numbers remained constant at 9,756 PAX per annum over 50 years, this would result in an NPV of £11.5m over 50 years (net decrease from the initial expected NPV of £12.1m). Assuming a more favourable scenario, whereby growth of 3% per annum of constant growth is experienced after year 10 until year 50 (assuming a rate of 7% is maintained for the first 10 years – see assumptions in section 5), this would result in an NPV of £38.6m, representing an increase from the initial expected NPV of £15.0m.

- **"240m berth"** – Initial expected NPV at year 50 is £1.5m based on the forecast passenger numbers. However, assuming the passenger numbers growth rate was 10% rather than the original 13.5% per annum for the first 10 years, and then remained at 0.5% thereafter up to year 50, this would result in a negative NPV of (£2.5m) over 50 years (net decrease from the initial expected NPV of £4.0m). Assuming a more favourable scenario, whereby passenger numbers grow at a rate of 13.5% remained until year 10, and a growth rate of 3.5% were to be experienced thereafter, this would result in an NPV of £14.0m, representing an increase from the initial expected NPV of £12.5m.

- **"450m (caisson) berth"** – Initial expected NPV at year 50 is £53.4m based on the forecast passenger numbers. However, assuming passenger numbers growth rate was 15% rather than the original 25% per annum for the first 10 years (see assumptions in Section 5), and then remained at a constant 2% growth rate thereafter up to year 50, this would result in a negative NPV of (£54.7m) over 50 years (net decrease from the initial expected NPV of £108.0m). Assuming a more favourable scenario, whereby growth of 25% is experienced per annum for the first 10 years, and then 5% for 5 years, 4% for 5 years, 3% for 10 years and 0.5% thereafter until year 50 (5% being the expected maximum annual growth after 10 years due to the assumption most vessels that are going to include the Isle of Man in their itineraries will have done so within 10 years of the berth being operational), this would result in an NPV of £67.8m, representing an increase from the initial expected NPV of £14.4m.

- **"450m (concrete) berth"** – Initial expected NPV at year 50 is £87.1m based on the forecast passenger numbers. However, assuming passenger numbers growth rate was 15% rather than the original 25% per annum for the first 10 years (see assumptions in Section 5), and then remained at a constant 2% growth rate thereafter up to year 50, this would result in a negative NPV of (£16.9m) over 50 years (net decrease from the initial expected NPV of £104.0m). Assuming a more favourable scenario, whereby growth of 25% is experienced per annum for the first 10 years, and then 5% for 5 years, 4% for 5 years, 3% for 10 years and 0.5% thereafter until year 50 (5% being the expected maximum annual growth after 10 years due to the assumption most vessels that are going to include the Isle of Man in their itineraries will have done so within 10 years of the berth being operational), this would result in an NPV of £100.8m, representing an increase from the initial expected NPV of £13.7m.

Net present value calculations – sensitivity analysis

Passenger Spend

Sensitivity supporting workings can be found in **Appendix 1**.

Forecast passenger gross spend: £44.48 – this being an estimated gross passenger spend for excursions, based on the work performed in Section 6. This gross spend of £44.48 is estimated to result in a **net exchequer benefit of £11.93 per passenger**.

Pessimistic passenger gross spend: £25 – this being an estimated minimum passenger spend for excursions, based on including £20 for current Manx National Heritage prices and £5 for other, such as coffee and cake/bus tickets, etc. A gross spend of £25 per passenger, is estimated to result in a **net exchequer benefit of £6.26 per passenger**.

More favourable passenger gross spend: £59 - this being the average amount achieved per the recent 2017 cruise visits provided by Neptumar. A gross spend of £59 per passenger, is estimated to result in a **net exchequer benefit of £14.78 per passenger**.

The **passenger spend** sensitivity analysis shows that:

- It is not expected that a negative NPV would be suffered in either of the "do nothing" or "do nothing except increase harbour fees" options, due to there being no upfront capital expenses associated with doing nothing, and it is assumed that any income generated from cruise passenger spend would exceed any possible maintenance costs of maintaining the existing 150m berth.

- **"Do nothing"** – Initial expected NPV at year 50 is £12.1m based on the forecast net exchequer benefit of £11.93 per passenger. However, assuming passenger numbers remained in line with the original forecasts based on expected growth rates, over 50 years, but passenger gross spend reduced to £25 per person, resulting in a net exchequer benefit of £6.26 per passenger, this would result in an NPV of £7.5m over 50 years (net decrease from the initial expected NPV of £4.5m). Assuming a more favourable scenario, whereby passenger gross spend increased to £59 per person, resulting in a net exchequer benefit of £14.78 per passenger this would result in an NPV of £14.4m, representing an increase from the initial expected NPV of £2.3m.

- **"Do nothing except increase harbour dues"** – Initial expected NPV at year 50 is £23.6m based on the forecast net exchequer benefit of £11.93 per passenger. However, assuming passenger numbers remained in line with the original forecasts based on expected growth rates, over 50 years, but passenger gross spend reduced to £25 per person, resulting in a net exchequer benefit of £6.26 per passenger, this would result in an NPV of £19.1m over 50 years (net decrease from the initial expected NPV of £4.5m). Assuming a more favourable scenario, whereby passenger gross spend increased to £59 per person, with a resulting net exchequer benefit of £14.78 per passenger, this would result in an NPV of £25.9m, representing an increase from the initial expected NPV of £2.3m.

- **"240m berth"** – Initial expected NPV at year 50 is £1.5m based on the forecast net exchequer benefit of £11.93 per passenger. However, assuming passenger numbers remained in line with the original forecasts based on expected growth rates, over 50 years, but passenger gross spend reduced to £25 per person, resulting in a net exchequer benefit of £6.26 per passenger, this would result in an NPV of (£5.1m) over 50 years (net decrease from the initial expected NPV of £6.6m). Assuming a more favourable scenario, whereby passenger gross spend increased to £59 per person, resulting in a net exchequer benefit of £14.78 per passenger, this would result in an NPV of £4.8m, representing an increase from the initial expected NPV of £3.3m.

- **"450m (caisson) berth"** – Initial expected NPV at year 50 is £53.4m based on the forecast net exchequer benefit of £11.93 per passenger. However, assuming passenger numbers remained in line with the original forecasts based on expected growth rates, over 50 years, but passenger gross spend reduced to £25 per person, resulting in a net exchequer benefit of £6.26 per passenger, this would result in an NPV of £26.6m over 50 years (net decrease from the initial expected NPV of £26.8m). Assuming a more favourable scenario, whereby passenger gross spend increased to £59 per person, resulting in a net exchequer benefit of £14.78 per passenger, this would result in an NPV of £66.8m, representing an increase from the initial expected NPV of £13.4m.

- **"450m (concrete) berth"** – Initial expected NPV at year 50 is £87.1m based on the forecast net exchequer benefit of £11.93 per passenger. However, assuming passenger numbers remained in line with the original forecasts based on expected growth rates, over 30 years, but passenger gross spend reduced to £25 per person, resulting in a net exchequer benefit of £6.26 per passenger, this would result in an NPV of £60.3m over 50 years (net decrease from the initial expected NPV of £26.8m). Assuming a more favourable scenario, whereby passenger gross spend increased to £59 per person, resulting in a net exchequer benefit of £14.78 per passenger, this would result in an NPV of £100.6m, representing an increase from the initial expected NPV of £13.5m.

Net present value calculations – sensitivity analysis
Discount factor

Sensitivity supporting workings can be found in **Appendix 1**.

The **discount factor** sensitivity analysis shows that:

- Increasing the discount factor used in the NPV calculations from 3% to a rate of 7% causes all 3 of the berth proposals to be negative NPVs in year 50.
- Any decrease in the discount factor below 3% results in a more favourable NPV position in all 5 scenarios.
- **"Do nothing"** – Initial expected NPV at year 50 is £12.1m based on a discount factor of 2.3%, being the April 2017 inflation rate, has been applied as a discount factor, as there are no borrowing costs involved in doing nothing. However, assuming a higher discount factor of 5% is used with all other variables held constant, the NPV would be £6.5m (representing an overall decrease in NPV of £5.6m). If a lower discount rate of 1% is used with all other variables held constant, the NPV would be £17.2m (representing an overall increase in NPV of £5.1m).
- **"Do nothing except increase harbour dues"** – Initial expected NPV at year 50 is £23.6m based on a discount factor of 2.3%, being the April 2017 inflation rate, has been applied as a discount factor, as there are no borrowing costs involved in doing nothing except increasing the harbour fees. However, assuming a higher discount factor of 5% is used with all other variables held constants, the NPV would be £12.7m (representing an overall decrease in NPV of £10.9m). If a lower discount rate of 1% is used, with all other variables held constant, the NPV would be £33.7m (representing an overall increase in NPV of £10.1m).
- **"240m berth"** – Initial expected NPV at year 50 is £1.5m based on a discount factor of 3%, being the expected cost of lending, has been applied as a discount factor. However, assuming a higher discount factor of 7% is used with all other variables held constant, the NPV would become a negative NPV of (£13.0m) (representing an over decrease in NPV of £14.5m). If a lower discount rate of 1% is used, with all other variables held constant, the NPV would be £19.8m (representing an overall increase in NPV of £18.3m).
- **"450m (caisson) berth"** – Initial expected NPV at year 50 is £53.4m based on a discount factor of 3%, being the expected cost of lending, has been applied as a discount factor. However, assuming a higher discount factor of 7% is used with all other variables held constant, the NPV would become a negative NPV of (£48.9m)(representing an overall decrease in NPV of £102.3m). If a lower discount rate of 1% is used, with all other variables held constant, the NPV would be £186.2m (representing an overall increase in NPV of £132.8m).
- **"450m (concrete) berth"** – Initial expected NPV at year 50 is £87.1m based on a discount factor of 3%, being the expected cost of lending, has been applied as a discount factor. However, assuming a higher discount factor of 7% is used with all other variables held constant, the NPV would be negative (£10.8m) (representing an overall decrease in NPV of £97.9m). If a lower discount rate of 1% is used, with all other variables held constant, the NPV would be £213.8m (representing an overall increase in NPV of £126.7m).

Net present value calculations – summary positions

240 metre berth:

Total capital investment: **£23,877,300**

£20,000,000 (being £16m expected cost, plus 25% contingency), and

£3,877,300 (based on market prices) for a 50 ton tug.

Based on NPV calculations, would break even by year 48 of the project.

450 metre (caisson) berth:

Total capital investment: **£108,530,060**

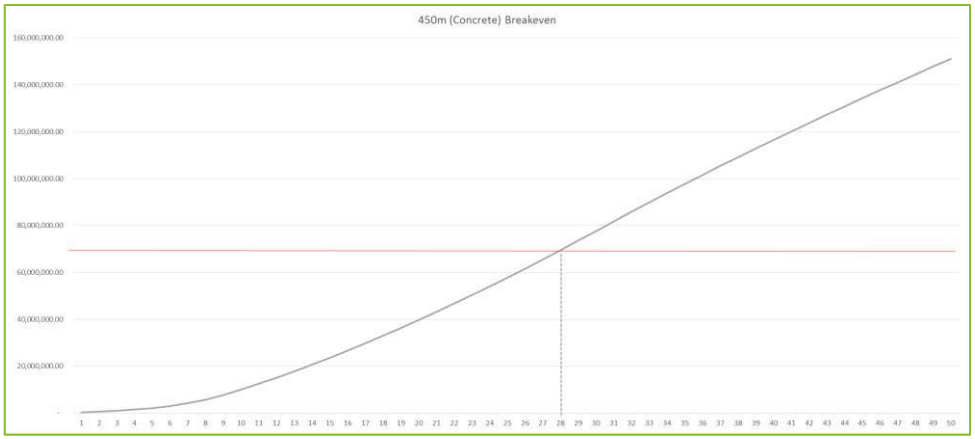
£80,000,000 – expected cost of the berth

£7,000,000 – expected road infrastructure costs and moving of cable

£13,000,000 – contingency for overspend

£8,530,060 – 1 x 50 ton bollard pull tug ($5m) and 1 x 70 ton bollard pull tug ($6m) (based on market prices, using oanda.com exchange rate of 0.77546)

Based on the NPV calculations, project would break even in year 37 of the project.



450 metre (concrete) berth:

Total capital investment: **£68,530,060**

£40,000,000 – expected cost of the berth (£35m - £40m)

£7,000,000 – expected road infrastructure costs and moving of cable

£13,000,000 – contingency for overspend

£8,530,060 – 1 x 50 ton bollard pull tug ($5m) and 1 x 70 ton bollard pull tug ($6m) (based on market prices, using oanda.com exchange rate of 0.77546)

Based on the NPV calculations, project would break even by year 28 of the project.

Other possible indirect benefits not accounted for in NPV calculations:

Other sources of income:
On board local entertainment e.g. Manx singing, folk band, bagpipes etc.
Taxi and car rental
Food and drink bought locally
On board guest speakers
Cruise line purchases ashore for their passengers
Independent guide hire
Tipping
Manx National Heritage
Other potential job creations in the local economy
Return visits from cruise passengers
Provision of water, removal of ship waste
Supply of food and drink to the cruise ships

Other possible indirect items not accounted for in NPV calculations: Staff requirements

Orkney:

We have enquired of Michael Morrison, Orkney Marine Services' Business Development Manager as to the number of additional staff employed by Orkney to service the cruise ships. Michael commented as follows:

"We do not have, within the Harbour Authority employees specifically for cruise ships. The Harbour staff are employed all year round for all shipping. We do, via a public tender exercise, recruit a Meet and Greet team for the season at a cost of £50,000 for this season, plus additional port security and a cost of circa £30,000 for the season."

Isle of Man:

Volunteers on the Isle of Man currently provide the meet and greet services free of charge, however it is likely that should cruise visits grow significantly, there may well be a future charge associated with the provision of this service.

Neptumar, the DED's cruise consultants are paid £25,000 per annum, on a 5 year contract. This not only covers standard cruise liaison, but also marketing plans etc. This is an existing cost of the DED, and has not therefore been included in the NPV calculations. However, it should be noted that this cost would likely increase in line with the growth in the cruise economy if the cruise industry took off locally.

At present, there are 16 harbour full time equivalent (FTE) staff members employed by the Isle of Man DOI who service the port in Douglas. Per discussions with Ann Reynolds, Director of Ports in the Isle of Man, there would be a need to employ more ground staff for the cruise ship arrivals, the tug operation, and in the case of the 450m berth options (due to their location being further away from the Sea Terminal facilities), there would also need to be an onshore facility to house x-ray equipment for security and desks to check-in the cruise passengers.

240m berth:

The 240m berth would require additional groundsmen on a seasonal basis (approximately 2 or 3 staff) to facilitate the cruise ship arrivals. It is also anticipated that 2 further staff members would be employed to operate the tug.

450m (caisson) and 450m (concrete) berths:

It is anticipated that additional groundsmen would be employed on a seasonal basis (approximately 2 or 3 staff) to facilitate the cruise ship arrivals. Further staff would be required to be employed to operate the two tugs. Each tug requires 2 staff to man it for health and safety purposes. However, it will not always be necessary for 2 tugs to be deployed at the same time to manoeuver cruise vessels. Therefore it is anticipated that 2 full time tug operators would be required, and 2 part time staff would be required to cover annual leave or for instances where the second tug is in use.

Furthermore, as the 450m berth is in a separate location from the Sea Terminal, it is expected that a further 2 staff members would be required to perform the security requirements and check in the passengers on a seasonal basis.

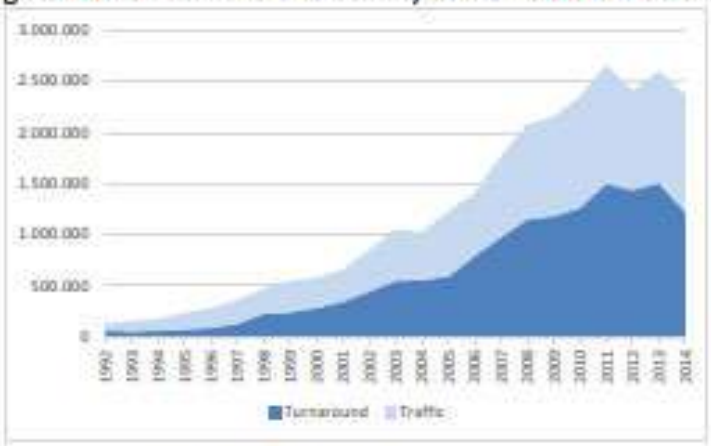
Other possible indirect items not accounted for in NPV calculations: Job creation – Case study - Barcelona

There are few publications available which enable an accurate assessment of the impact of the cruise economy on job creation in the UK. In 2013/14 an article was produced for the 19th International Conference on Cultural Economics entitled "Economic impact on cruises activities – the case of the Port of Barcelona". This report is from a European perspective, attempting to quantify the impact of cruise tourism in a port such as Barcelona. The following tables have been extracted from this case study for ease of reference.

It was noted that cruise passenger numbers growth since the 1990s, and especially since 2001 have increased significantly despite the economic crisis. The numbers of cruise passengers grew between 2007 and 2011 at an average annual rate of 10.8% and 1,765,838 cruise passengers in 2007 to 2,657,244 in 2011. Since 2011 the trend has been more stable.

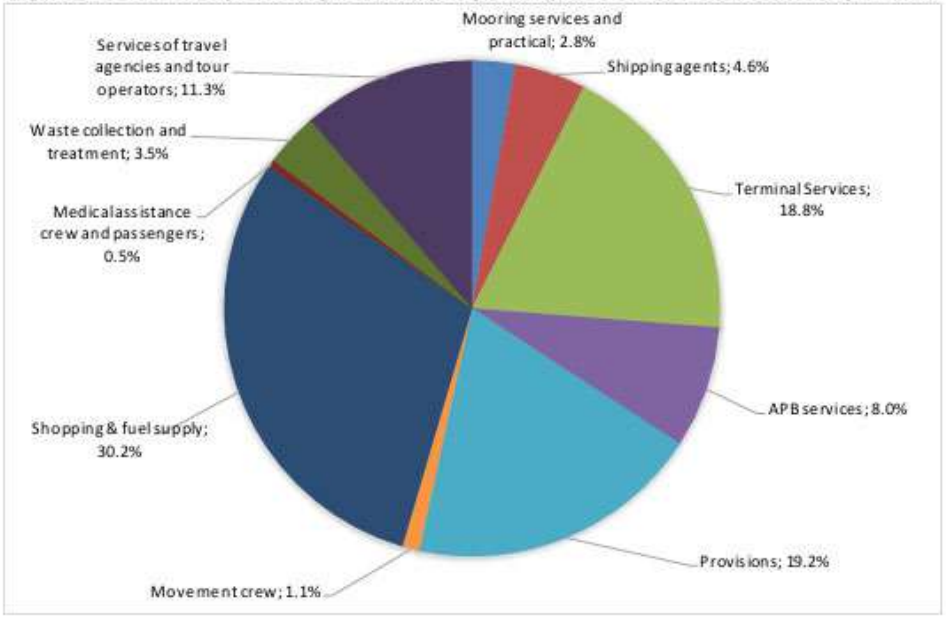
The following graphs and tables have been extracted from this case study for ease of reference:

Figure 1. Evolution of cruise activity at the Port of Barcelona



Source: Barcelona Port Authority (APB)

Figure 2. Direct spending of shipping companies broken down by items



Other possible indirect items not accounted for in NPV calculations: Job creation – Case study - Barcelona

The indirect impact is the effect on other sectors of the economy, generated as a result of goods and services required by the companies that are receiving direct expenditure. This is significantly more difficult to measure due to the range of goods and services that could be included.

A breakdown of the total impact and its components from Barcelona has been detailed below:

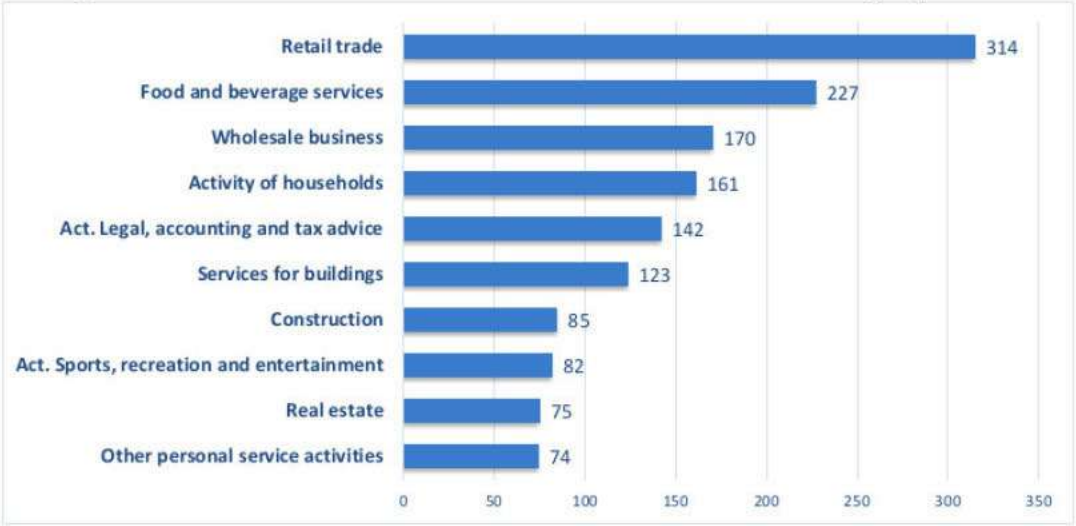
	Turnover	GVA	Income Wage	Occupation*
Direct Impact	442.5 M€	225.9 M€	116.7M€	4,026
Indirect and Induced Impact	353.5 M€	187.3 M€	80.9 M€	2,733
TOTAL IMPACT	796.0 M€	413.2 M€	197.6 M€	6,759

Note: * Posts full-time equivalent work.

The indirect impact in terms of job creation from direct jobs is approximately:

1 indirect : 2 direct.

The graph highlights the number of indirect jobs created across the top 10 most impacted sectors:



Note: * Posts full-time equivalent work.

Full version of the publication can be found at:

http://eventos.uva.es/event_detail/3433/programme/19th-international-conference-on-cultural-economics.html

"Economic impact of cruises activity: the case of the port of Barcelona"

5. Validate British Cruise Ship Trends

Detailed Passenger trend analysis

Section Summary

As can be seen from the passenger analysis (PAX) graphs for the comparable islands reviewed, there has been a consistent increase in cruise passenger numbers visiting all of the considered UK and Channel Island ports over the last 5 years. Early indications are that this increase in passenger numbers is expected to continue to rise based on 2018 cruise ship schedules that we have viewed as part of our desktop analysis.

This increase in passenger numbers is also reflective of a growing cruise ship industry – further work in respect of the cruise industry has been performed Section 8 "Cruise ship new builds and UK market analysis".

The analysis of port facilities also shows that ports which have a larger berth have higher cruise passenger numbers.

With one exception, being Guernsey, which has the largest number of passengers overall in terms of the islands considered by us. This is despite there being no berth for cruise ships. Passengers are required to tender to the quayside in St Peter Port in order to visit the town centre. It is thought that the reason passengers are more willing to tender in Guernsey than in other comparable Islands, is due to the onshore VAT advantages they experience in terms of retail activities.

A VAT arrangement exists in Guernsey whereby there is no VAT payable by the cruise ships in Guernsey, as it is not part of the EU. They are also able to open their duty free shops on board and gain considerable revenue
Source: http://guernseypress.com/news/2017/01/27/even-more-cruise-ships-to-sail-our-way/#2sYSJ4fMQgpuXXGA.99

Although geographically Jersey is positioned well to attract Guernsey passengers, research suggests that cruise ships are unable to berth in Jersey, and the tendering time is 1 hour from the cruise ship to the nearest quayside. This is due to the water levels being very low around the main ports in Jersey. Cruise ship itinerary managers do not generally plan visits where such a long tender to port is required, as such there are only a handful of scheduled cruise ship visits to Jersey in 2017.

Validate British Cruise Ship Trends

In order to validate British Cruise Ship trends, we have considered the following:

- Passenger trends in comparable islands in the UK and Channel Islands;
- Passenger trends in neighbouring British ports
- Cruise ship builds and market increase
- Vessel size analysis

Comparable islands ports analysed include:

- Orkney Islands
- Shetland Islands
- Jersey
- Guernsey
- Isle of Mull
- Faroe Isles
- Isle of Man

The above ports were selected due to their geographical location, similarities to the Isle of Man, being Islands and places with similar historic interest.

UK Ports analysed include:

- Liverpool
- Belfast
- Dublin
- Greenock

The above major UK ports were selected for analysis due to their geographical location being near to the Isle of Man.

Most of the current UK cruises on offer to the comparable islands will pass through either Liverpool, Belfast, Dublin or Greenock. The Isle of Man is perfectly positioned to between all of these ports, meaning it may be possible to piggy-back onto existing cruises passing by to increase the IOM's incoming passenger numbers.

IOM Deep Water Berth

Passenger Growth trends

Cruise Passenger Growth Trend – Isle of Man

Our desk top review of the recent cruise passenger numbers to the Isle of Man has found that overall cruise passenger numbers have increased in numbers from 3,253 in 2004 to 9,756 (estimated) in 2017. The increase in passenger numbers is due to more vessels visiting the Isle of Man. In 2004, it is estimated based on current average passenger numbers that approximately 9 vessels visited the Isle of Man. In 2017, there are 28 planned cruise calls as at May 2017, and it is possible that more cruises could call at short notice, but this is unlikely given market feedback that cruise companies like to plan their itineraries sometimes up to 2 or 3 years in advance.

Cruise Passenger Growth Trend – comparable islands

- Our review of trends over the last 5 years for the comparable islands, being Orkney, Shetland, the Faroe Isles, Isle of Mull, Jersey and Guernsey has demonstrated that these locations have also experienced significant growth in passenger numbers.
- Orkney has experienced the largest absolute increase in passenger numbers since 2013, increasing passenger numbers from 50,765 in 2013 to expected passenger numbers of 136,758 in 2017.
- This growth in Orkney is as a result of Orkney building a deep water berth, which is the largest in Scotland, measuring 385m in length with a 10.5m draft.

Cruise Passenger Growth – Neighbouring UK Ports

- We have reviewed the numbers of passengers travelling through Liverpool, Belfast, Dublin, and Greenock.
- Most of the cruise ships using Liverpool and Belfast feature on the comparable islands itineraries, with the exception of some of the very large cruise ships such as the Queen Mary II.
- As explained further in the review of the neighbouring port developments, Liverpool, Belfast and Dublin have all recently either improved their cruise port facilities or have plans to do so.

Cruise Passenger Growth Trend – World stage

- General passenger numbers in the world cruise industry have increased from 17.8m in 2009 to 25.3m (estimated) passengers in 2017.
- This trend in growth is expected to continue to rise as more younger adults are now cruising.

Passenger analysis – Comparable Islands

The estimated passenger numbers ("PAX") for 2017 has been formed based on publically available information, being the published 2017 cruise ship schedules in each of the below ports, extracted during April 2017.

Where PAX was not included on the cruise ship schedule, we have collated information in respect of the size of the vessels, and maximum passenger capacity to form an expectation of PAX. Data in respect of the previous 4 years' PAX figures has been obtained from press releases and annual reports prepared by the ports and local areas. The graphs on the following page show the trend in passenger numbers by location.

N.B. we have considered passenger only numbers, exclusive of crew in the figures in the table.

Additionally, prior year data has not been readily obtainable for the Isle of Mull and Jersey cruise passenger numbers. However, based on the low volume of cruise ship visits and passengers to these two destinations, we do not consider them to be the best comparison ports for the Isle of Man in terms of long term passenger growth.

Destination	2017 EST. PAX	2016 PAX	2015 PAX	2014 PAX	2013 PAX
Orkney	136,758	97,000	80,000	63,829	50,765
Shetland	69,734	50,723	50,500	43,273	26,648
Isle of Mull	6,060	Unavailable	Unavailable	Unavailable	Unavailable
Guernsey	177,179	130,000	123,000	105,000	113,380
Jersey	5,420	Unavailable	Unavailable	Unavailable	Unavailable
Faroe Isles	43,198	29,423	43,805	50,304	44,900
Isle of Man	9,756	5,468	5,375	2,823	6,036

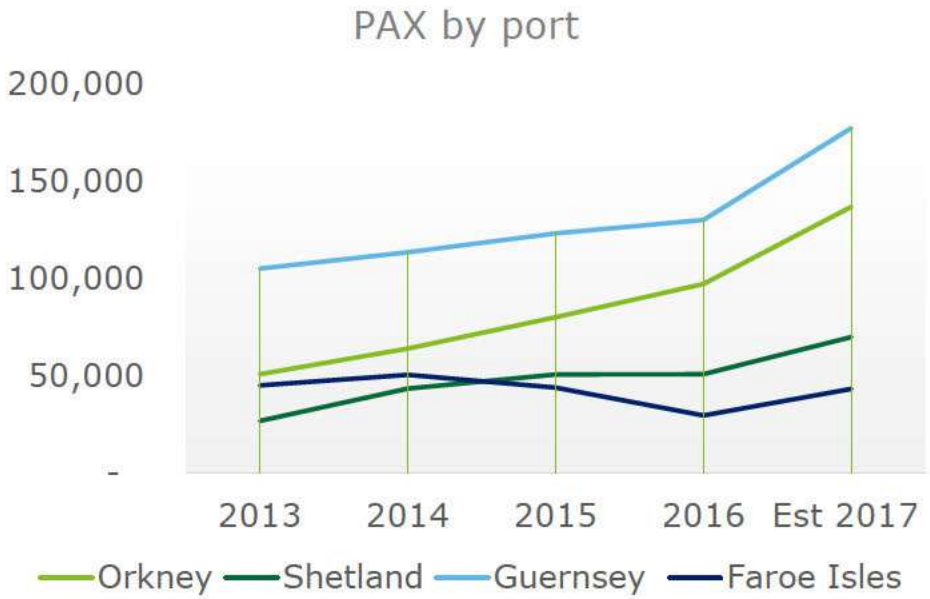
Island port	Est PAX 2017	No of cruise ship visits	Average no of PAX per visit (rounded)
Orkney	136,758	140	977
Shetland	69,734	82	850
Isle of Mull	6,060	11	551
Guernsey	177,179	131	1,353
Jersey	5,420	11	493
Faroe Isles	43,198	48	900
Isle of Man	9,756	28	348

As can be seen in the left hand table, although the Isle of Man is experiencing high volumes of cruise ship visits in relation to Jersey and the Isle of Mull, the other islands are attracting larger vessel sizes and are therefore experiencing higher volumes of passengers per visit on average.

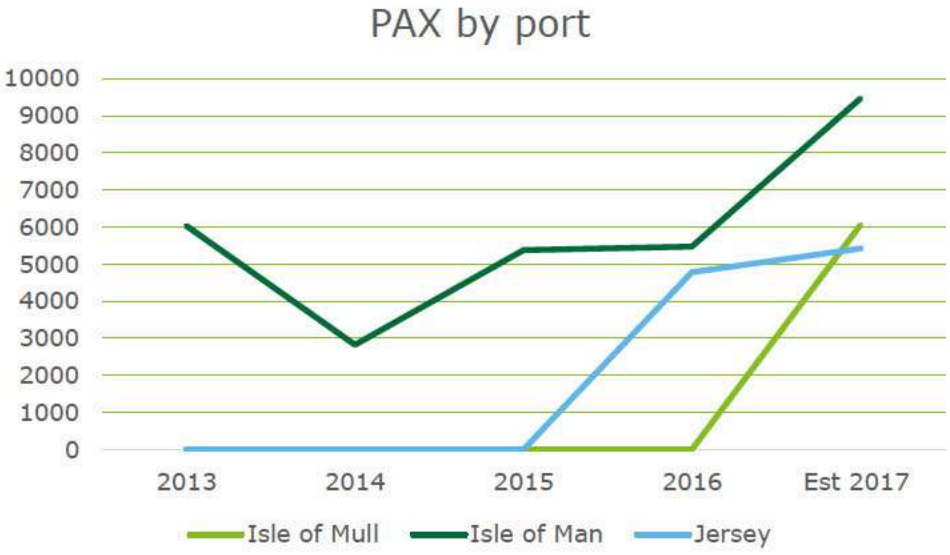
It is also noted that Guernsey is also experiencing more passengers per annum than Orkney, however, less overall vessel visits, meaning vessel sizes are likely to be larger on average in Guernsey than Orkney.

Copies of the cruise ship schedules used to create an expectation of current year passenger numbers have been included in Appendix 4.

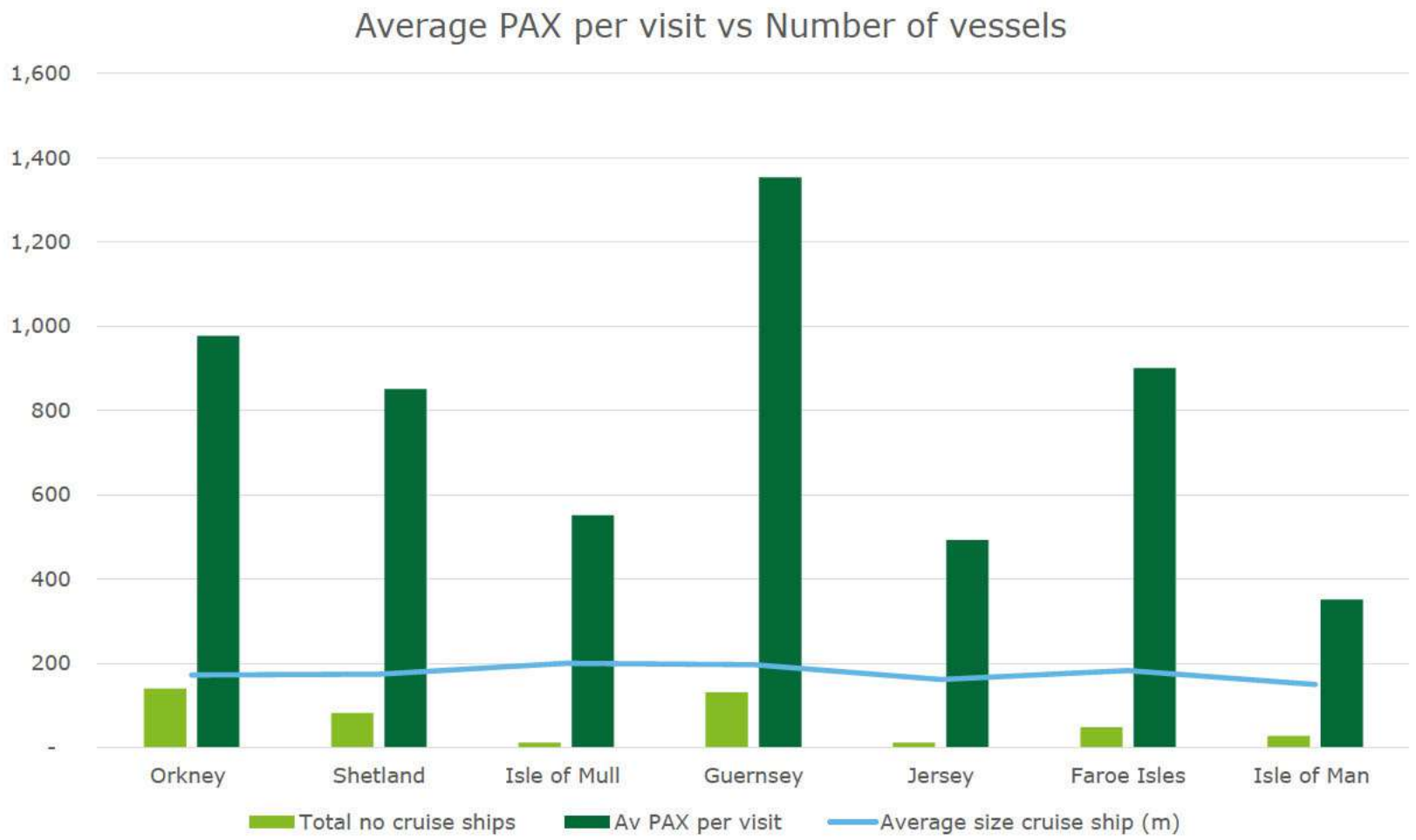
Passenger analysis – Comparable Islands (continued)



- The graphs demonstrate an overall increase in passenger numbers visiting the comparable islands over the last 5 years.
- The increase in passenger numbers is reflective of the general increase in the cruise line industry over the last five years. More details are given about the general cruise industry trend in Section 8 "Cruise Ship new builds and UK market analysis", which demonstrates that the cruise industry has experienced steady growth over the last decade. This growth is expected to continue.



Average number of passengers per visit - comparable islands



There is a direct correlation between the number of the visiting vessels and the average passenger numbers.

More information is given in the Vessel Length Analysis in relation to the average cruise ship sizes by comparable Island and also neighbouring sea ports.

Neighbouring UK Ports – Passenger and vessel analysis

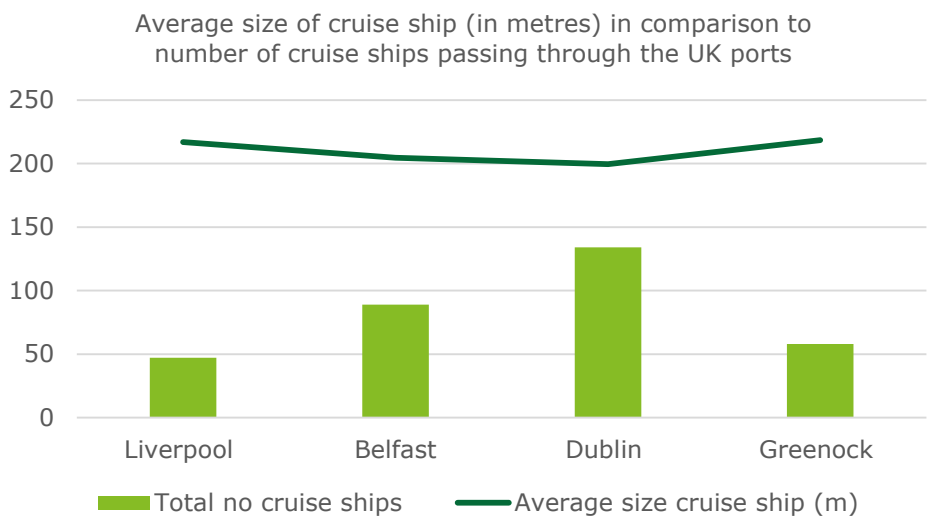
A review of the 2017 cruise schedules for Liverpool, Belfast, Dublin and Greenock cruise ports has been undertaken to establish the number of vessels passing through these ports, the number of passengers, and the length of the vessels.

The review of the cruise schedules highlighted that a large proportion of the cruise ships passing through these ports are also travelling to the comparable islands as part of UK cruise tours.

The vessel length analysis undertaken (LOA) has highlighted that in terms of the size of vessels passing through these ports, the majority of vessels were below 240m long. Greenock was an exception to this rule, with nearly half of the vessels being over 240m.

UK Port	Est PAX 2017	Total no of cruise ship calls	Average size cruise ship (m)	No of vessels >240m LOA	% of vessels <240m
Liverpool	66,647	47	216.84	8	83%
Belfast	119,533	89	204.59	28	69%
Dublin	169,069	134	199.49	40	70%
Greenock	103,799	58	218.33	27	53%

Neighbouring UK Ports – Vessel number and average vessel size analysis



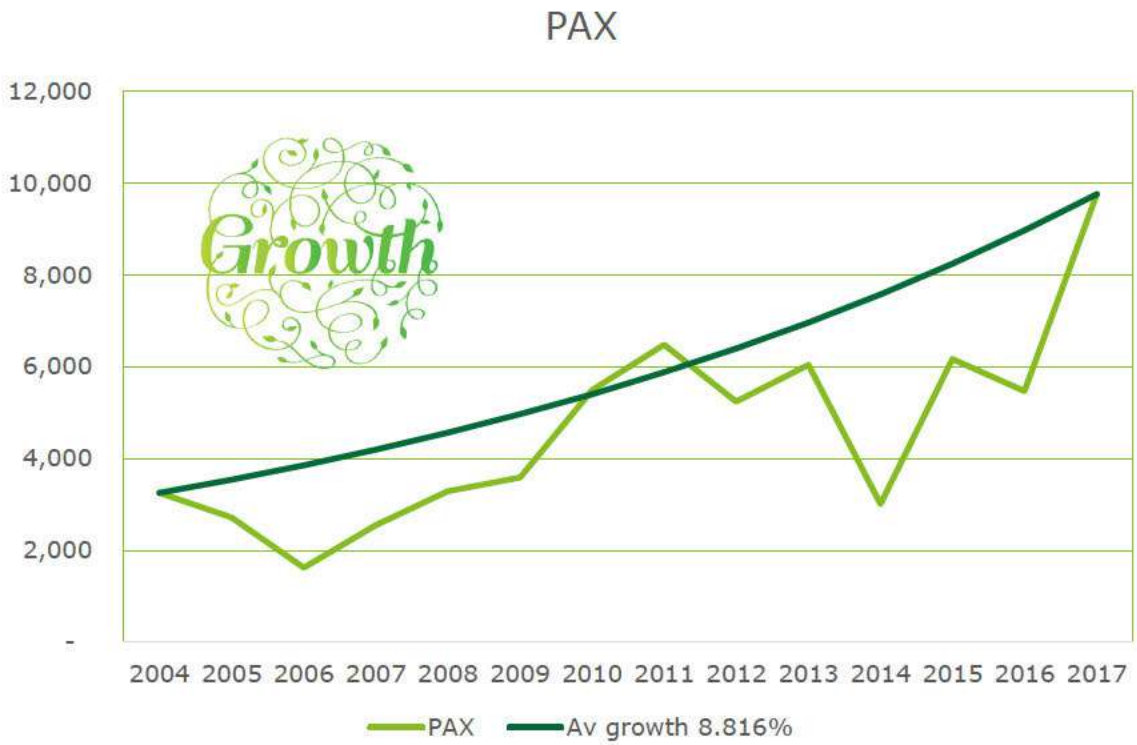
As can be seen in the graph, the average size of the cruise ships sits at approximatelyy 209m across the 4 UK Ports that were reviewed. Length of Vessel has been further analysed in the "Vessel Length Analysis" section of this report.

This average length is fairly consistent despite the variations in the numbers of vessels passing through the UK ports.

It is noted that the average vessel size, being 209m is encroaching on the estimated maximum vessel length (210m) which could be berthed on a 240m long berth.

Historic Passenger Growth Trend 2004 to date - Isle of Man

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	EST 2017
No of vessels	9.0	8.0	5.0	7.0	9.0	10.0	15.0	19.0	15.0	17.0	9.0	18.0	16.0	28.0
PAX	3,253	2,713	1,619	2,548	3,289	3,585	5,487	6,478	5,237	6,036	3,010	6,164	5,468	9,756
% mvmt		-17%	-40%	57%	29%	9%	53%	18%	-19%	15%	-50%	105%	-11%	78%
	← Based on actuals per the Treasury Business Case Report →													



Passenger growth trend

- The above prior year data has been obtained from the Treasury Business Case report, and has been used to look at the actual growth experienced on average over the last 13 years in the Isle of Man cruise ship industry, including the current year estimated cruise passenger numbers.
- The figures show an average increase in passenger numbers of 8.816% from 2004 to date.
- We have used the historical growth rate as a basis for rationalising the future growth forecasts set out on the following pages.

Expected passenger growth – "do nothing" – 50 year forecast methodology

Assuming no berth is built, the expected growth in terms of numbers of passengers is expected to continue to rise at an average growth rate of 7% for the first 10 years, followed by an estimated 0.5% until year 50. This would result in an estimated number of passengers of 23,429 by 2067. A full passenger forecast for 50 years can be found within the NPV calculation schedule in Appendix 1.

Passenger growth assumptions

- We have assumed that by year 10, based on the number of vessels currently cruising in the comparable islands (a total of 91 – see Appendix 2), that of those vessels, 80% of the 30 vessels less than 150m in length will visit the Isle of Man, and 40% of the 36 vessels less than 240m but greater than 150m will visit the Isle of Man. Total of 38 vessels when rounded.
- The 38 vessels expected times by the current year average passengers of 350 (rounded), multiplied by the average number of visits per vessel, being 1.5, gives an expected number of passengers of 19,950 by year 10.
- Historical experience shows the average passenger growth rate is around 8.816% (see page 47). To reflect the reducing pool of cruise ships within the market willing to tender, we have used a lower percentage growth of 7% for the first 10 years in our forecast passenger numbers. This would then give passengers of 19,192 in year 10.
- Thereafter, we have assumed an increase of 0.5% for years 11 – 50. This is due to the fact that it is expected that the cruise market will continue to rise, however, as ship builds are getting larger in size, this growth is likely to be limited.

Average vessel assumptions

- We have assumed that the estimated passengers, divided by the average passenger reflects the number of expected vessel visits.
- Thereafter, we have assumed that if no berth was built, and nothing further was done to improve the existing Queen Victoria Pier, that there would be an average number of cancelled visits of 15% due to the weather and operational delays at other ports causing a knock on effect to the Isle of Man visits. We understand that as there is no larger berth, where these delays occur, captains generally will miss out a port with no/inadequate berthing facilities in favour of a larger berth and port.

Average passengers per vessel assumptions

- We have assumed that the average passenger numbers per vessel will also increase by 1% year on year up to year 50, reflecting the general trend in cruise ship vessel sizes getting larger.

Expected passenger growth – 240m berth – 50 year forecast methodology

Assuming an extension is built to the existing Queen Victoria Pier in Douglas, the expected growth in terms of numbers of passengers is expected to continue to rise at an average growth rate of 13.5% for the first 10 years, followed by an estimated 0.5% until year 50. This would result in an estimated number of passengers of 42,254 by 2067. A full passenger forecast for 50 years can be found within the NPV calculation schedule in Appendix 1.

Passenger growth assumptions

- We have assumed that by year 10, based on the number of vessels currently cruising in the comparable islands (a total of 91 – see Appendix 2), that of those vessels, at most approximately 60% of the 30 vessels less than 150m in length will visit the Isle of Man, and at most approximately 60% of the 36 vessels less than 240m but greater than 150m will visit the Isle of Man. This gives a total of 40 vessels when rounded. The 60% assumptions are based on the fact that feedback from the cruise operators is that tendering is not a preferred option for cruise ships and their passengers.
- The 40 vessels expected multiplied by the current year average passenger numbers per vessel of 583, multiplied by the average number of visits per vessel, being 1.5, gives an expected number of passengers of 34,980 by year 10. 583 has been used as the average number of passengers per vessel less than 240m in length (see Appendix 2), based on the analysis performed on the existing 91 vessels cruising to the comparable islands.
- Historical experience shows the average passenger growth rate in the do nothing scenario is around 8.816% (see page 47). To reflect the increased pool of cruise ships larger than 150m and less than 240m which may be willing to visit the Isle of Man and use the 240m berth (or possibly tender if required due to weather conditions), we have assumed an expected growth rate in passenger numbers over 10 years of 13.5%. This would then give forecast passengers of 34,612 in year 10.
- Thereafter, we have assumed an increase of 0.5% for years 11 – 50. This is due to the fact that it is expected that the cruise market will continue to grow, however, as ship builds are getting larger in size, this growth is likely to be limited as most ship builds are being built larger than 240m (see section 8).

Average vessel assumptions

- We have assumed that the estimated passengers, divided by the average passenger reflects the number of expected vessel visits.
- Thereafter, we have assumed that if an extension to the existing Queen Victoria Pier was built, that there would be an average number of cancelled visits of 15% due to the weather and operational delays at other ports causing a knock on effect to the Isle of Man port visits. We understand from the Isle of Man Shipping Association, that at present vessels can experience difficulty berthing on the existing 150m Queen Victoria Pier due to the wind direction and the depth of the draft, and operational delays can still affect a captain's decision as to whether to miss out a port in favour of a larger berth and port.

Average passengers per vessel assumptions

- We have assumed that the average passenger numbers per vessel will also increase by 1% year on year up to year 50, reflecting the general trend in cruise ship vessel sizes getting larger.

Expected passenger growth – for both a 450m (caisson) and 450m (concrete) berth – 50 year forecast methodology

Assuming a new 450m berth is built adjacent to the Alexander Pier in Douglas, the expected growth in terms of numbers of passengers is expected to continue to rise at an average growth rate of 25.0% for the first 10 years, followed by an estimated 5% for 5 years, 4% for 5 years,3% for 10 years, and then 0.5% thereafter until year 50. This would result in an estimated number of passengers of 209,497 by 2067. A full passenger forecast for 50 years can be found within the NPV calculation schedule in Appendix 1.

Passenger growth assumptions

- We have assumed that by year 10, based on the number of vessels currently cruising in the comparable islands (a total of 91 – see Appendix 2), that of those 91 vessels, 60% of these vessels will include the Isle of Man in their cruise itineraries. Resulting in an expected 54 vessels when rounded.
- The 54 vessels expected times by the current year average passengers of 1,135 these 91 vessels, multiplied by the average number of visits per vessel, being 1.5, gives an expected number of passengers of 92,935 by year 10. 1,135 has been used as the average number of passengers per vessel based on the analysis performed on the existing 91 vessels cruising to the comparable islands.
- Historical experience shows the average passenger growth rate in the do nothing scenario is around 8.816% (see page 47). To reflect the increased pool of cruise ships larger than 150m and up to 400m in length which may be willing to visit the Isle of Man, we have assumed an expected growth rate in passenger numbers over 10 years of 25%. This would then give forecast passengers of 90,860 in year 10.
- Thereafter, an assumed growth rate of 5% for years 11 – 15, 4% for years 16 – 20 year, 3% 10 years up to year 30, and 0.5% for 20 years until year 50 has been applied. This growth forecast is based on the fact that the UK cruise market is expected to continue to grow, ship builds are getting larger in size, it is likely that a larger berth would experience higher overall increased passenger numbers if the captive market includes the Isle of Man on their itineraries. The growth rate has been stepped as it is expected that more cruise operators will build the IOM into their itineraries in the earlier years, when the IOM is a newer cruise destination to offer their passengers.

Average vessel assumptions

- We have assumed that the estimated passengers, divided by the average passenger reflects the number of expected vessel visits.
- Thereafter, we have assumed that if a new 450m berth was built, that there would be an average number of cancelled visits of 2% due to the weather and any operational delays at other ports causing a knock on effect to the Isle of Man visits. The lower % of cancelled visits is due to the fact that the weather is no longer considered to be such a problem for bigger vessels and bigger berths, and also due to the proposed location of the 450m berths as opposed to the 240m berth. As such, we would only expect operational delays to occur where a captain may miss out a port to catch up on time, rather than due to the berthing facilities on offer.

Average passenger per vessel assumptions

- We have assumed that the average passenger numbers will increase by 1% year on year up to year 50, reflecting the general trend in cruise ship vessel sizes getting larger.

6. Passenger spend and Harbour Port Prices

Passenger spend and harbour port prices Section Summary

- We have calculated an average of £44.48 as the average passenger gross spend in the economy per head. Of the £44.48, £11.93 is considered to represent the direct exchequer benefit. As such, the £11.93 figure has been used in the NPV calculations in section 4. The calculation is based on the current offerings in the Isle of Man and the neighbouring UK and Channel Islands offerings.
- This amount of £11.93 has not been increased in our NPV calculations in Section 4, other than for basic inflation at 2.3% (per April 2017). It is possible that this amount could be increased if the Isle of Man offerings to cruise passengers were enhanced.
- It is noted when reviewing comparable ports pricing structure, that the majority of harbour port fees are based on Gross Tonage (GRT).
- Orkney has the highest pricing structure of all comparable ports reviewed when reviewing based on a vessel <240m and >240m.
- It has been assumed in the NPV calculations in Section 4 that the IOM would follow a similar pricing structure to that which Orkney follows.

Passenger Gross Spend Analysis

We have obtained the average passenger gross spends from a number of reports, including historic Isle of Man figures, other comparable islands and Rest of World (ROW) from 2012 - 2015, resulting in an calculated average gross spend of £44.48 which has been used in our NPV calculations.

Source	Location, Date	Curr.	Curr.	Rate	GBP	Source Link
Treasury Report	Isle of Man 2013	39.00	GBP	-	39.00	Hard Copy
Treasury Report	European Average	89.00	EUR	1.18	75.42	Hard Copy
2012 Cruise Analysis Report	Carr bean 2012	95.92	USD	1.29	74.36	Hard Copy
Online Article - Travel Weekly	British Ports 2014	100.00	GBP	-	100.00	http://w w w .travelw eekly.co.uk/articles/49346/cruise-passenger-spend-in-british-ports-increases-by-10
2015 Cruise Analysis Report	Carr bean 2015	103.83	USD	1.29	80.49	http://w w w .f-cca.com/dow nloads/2015-cruise-analysis-volume-1.pdf
Neptumar report 2016	Isle of Man 2016	34.00	GBP	-	34.00	Hard Copy
Neptumar report 2017	Isle of Man 2017	59.13	GBP	-	59.13	Hard Copy
Orkney Presentation	Orkney 2016	55.18	GBP	-	55.18	Hard Copy
BBC news article on GSY	GSY 2015	32.00	GBP	-	32.00	http://w w w .bbc.co.uk/new s/w orld-europe-guernsey-34713416
GP Wild Report	Kirkall 2007	56.11	EUR	1.18	47.55	http://w w w .orkneyharbours.com/pdfs/economic_benefit_of_cruise_to_orkney.pdf
CLIA 2015	Europe 2015	62.00	EUR	1.18	52.54	Hard Copy
				Average	59.06	
			Average British & Channel Islands		**44.48**	

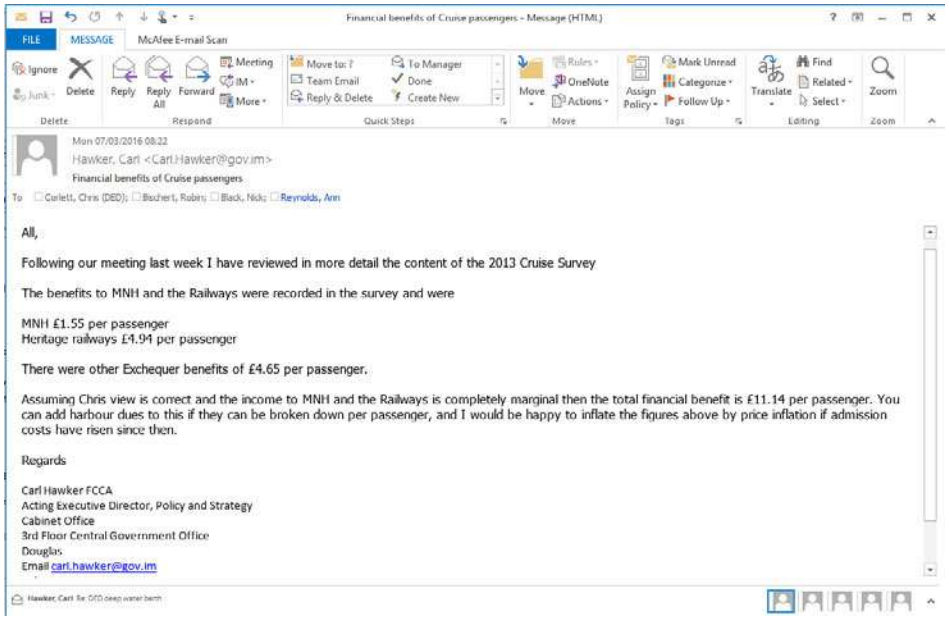
Assumptions

- Expected spend includes money spent on excursions, restaurants, bars, watches & jewellery, clothing, internet & telephone, other retail, local crafts & souvenirs, museum entrance fees, entertainment, nightclubs and casino spend.
- Although there appears to be scope for higher average gross spend per passenger, when taking into account the ROW countries averages; an average of £44.48 based on British & Channel Islands spend is deemed more appropriate for forecasting revenue, given the similar economic factors and on shore activities available.

Limitations

- This is not a comprehensive review of all comparable ports data and therefore the average may be skewed by the limited population range.

Passenger net exchequer benefit



Assumptions:

- Based on discussions with Carl Hawker, and based on the previous work performed by the Treasury in deriving a gross passenger direct spend and a net exchequer benefit per passenger, we have used the net exchequer benefit figure derived in 2013 as a basis for estimating a current net exchequer benefit. To estimate the current net exchequer benefit, we have applied a 3 year inflationary rate to the 2013 net exchequer benefit figure of £11.14, to give £11.93 as an estimated current net exchequer benefit per passenger amount.
- It was estimated by the Treasury that the gross direct passenger spend in 2013 was £39.40 per passenger, with a resultant £11.14 net exchequer benefit per passenger. The £11.14 was 28% of the gross passenger spend amount in 2013. The current exchequer benefit estimate of £11.93 per passenger represents 26% of the estimated 2017 gross spend per passenger.
- It is understood following discussions with Carl Hawker, that the "Other Exchequer benefits" of £4.65 within the original £11.14 derived, accounted for other direct and indirect benefits experienced by the Island as a result of cruise passenger business.

Limitations:

- A review of current Manx National Heritage and Railway rates has been undertaken, however it has not been possible to confirm with certainty the previous charges applied to cruise passengers and therefore the uplift in charges since 2013, as it is understood that bookings for cruise passengers can be at different rates to the general public.
- It has not been possible to obtain any comparable indirect benefit information from comparable ports.

Harbour port price analysis – Comparable Islands

We have obtained the port harbour charges from the relevant Islands' port websites. A summary of the charges has been included below:

Location	Anchorage/Tendering	Pier/Berthing	Passenger Fees	In and Out of Port	Boarding and Landing Charges
Orkney	**£0.20** (per GRT)	**£0.31** (per GRT)	**£1.30 - £1.50** (per passenger, depending on where berthing)	**£150** for Vessels up to 4,000 GRT **£1.60** per 100 GRT in excess	**£200** for Vessels up to 4,000 GRT **£1.60** per 100 GRT in excess
Shetland	**£0.068** (per GRT)	**£0.135** (per GRT)	**£0.83 - £1.65** (per passenger, child/adult price each way)	**£141.05 - £1,872.16** (incremental increases per 10,000 GRT)	**£190.01 - £326.45** (incremental increases per 10,000 GRT)
Guernsey	**£0.06** (per GRT, up to a maximum of £1,515)		**£0.85** (per passenger, plus £1.50 ISPS)	**£0.2511** (per GRT up to 2,000 maximum GRT, minimum due of £200)	
Jersey	**£37.10 - £132.50** (incrementally increasing by GRT, subject to cap at 5,000 GRT)	**£9.60** <30m vessels **£14.42** >30m vessels	**£2.13** (per passenger, plus £3.98 ISPS)	**£2.57 - £4.69** (depending on length in metres and time of day)	**£102.82** (fixed fee per vessel)
Faroe Isles	None noted	None noted	None noted	**1100 DKK (£121) - 1900 DKK (£209)** (per hour, incrementally increasing by GRT, minimum 2 hours)	
Isle of Man	**£798.45** (fixed fee – per vessel) (N.B. increased 1 May 2017 to £808.11)		**£0.50** (per passenger)	**£300** for Vessels up to 1000GRT £20 per 1000 GRT in excess	**£500**
Dublin	After 7 days **EUR 0.44** per ton per day.	**EUR 200** (minimum plus 0.18 EUR per GRT)	None Noted	**EUR 280 (£237) - EUR 2,273 (£1,926)** (incremental increases per GRT)	
Belfast	Charges on application	**£27.88 - £781.16** (incrementally increasing by 1,000 GRT)	None Noted	**£139.60 - £799.03** (incremental increases per 5,000 GRT)	**£81.62 - £321.2** (incremental increases per 5,000 GRT)

Harbour port price analysis – Comparable Islands

We have calculated what the estimate cost would be for a vessel <240m and a vessel >240m to visit each comparable island:

Location	Total Costs for a <240m vessel	Total Costs for a >240m vessel
Orkney	**Berthing Fee**: 20,061 * £0.31 = **£6,218.91** **Passenger Fee**: 583 * £1.40 = **£816.20** **Pilotage Fees:** £150*2 + [1.60 * (20,061 – 4,000)/100)] + £200 + [(1.60 * (20,061 – 4,000)/100] = **£863.95** **£7,899.06**	**Berthing Fee**: 94,353 * £0.31 = **£29,249.43** **Passenger Fee**: 2,593 * £1.40 = **£3,630.20** **Pilotage Fees:** £150*2 + [1.60 * (94,353 – 4,000)/100)] + £200 + [(1.60 * (94,353 – 4,000)/100] = **£3,391.29** **£36,270.29**
Shetland	**Berthing Fee:** 20,061 * £0.135 *60% = **£1,624.94** **Tendering Fee:** 20,061 * £0.068 * 40% = **£545.66** **Passenger Fee:** 583 * £1.24 = **£722.92** **Pilotage Fees: £494.29*2 + £326.45** **£4,208.95**	**Berthing Fee:** 94,353 * £0.135 = **£12,737.66** **Passenger Fee:** 2,593 * £1.24 = **£3,215.32** **Pilotage Fees: £1,766.17*2 + £326.45** **£19,811.62**
Guernsey	**Berthing/Tendering Fee: 20,061 * £0.06 = £1,203.66** **Passenger Fee: 583 * £0.85 = £495.55** **Pilotage Fee: £502.20*2** **£2,703.61**	**Berthing Fee: 94,353 * £0.06 = £5,661.18** **Passenger Fee: 2,593 * £0.85 = £2,204.05** **Pilotage Fee: £502.20*2** **£8,869.63**
Jersey	**Tendering Fee: £132.50** **Passenger Fee: 583 * £2.13 = £1,241.79** **Pilotage Fee: (£3.12 *142.54)*2 + £102.82 = £992.26** **£2,366.55**	**Tendering Fee: £132.50** **Passenger Fee: * £2.13 = £495.55** **Pilotage Fee: (£3.12 * 283.92)*2 + 102.82 = £1,874,48** **£2,502.53**

Harbour port price analysis – Comparable Islands

Location	Total Costs for a <240m vessel	Total Costs for a >240m vessel
Faroe Isles	DKK 1400 per hour = **£154 per hour (12 hours? * 154 = £1,848.18** **Pilotage only**	DKK 1900per hour = £209 *12 **= £2,508** **Pilotage only**
Isle of Man	**Tendering Fee: £798.45** **Passenger Fee**: £0.50 *583 **= £291.50** **Pilotage Fees:** £500*2 + £300 + (20,061 -1000)/1000 * £20 **= £1,681.22** **£2,771.17**	**Tendering Fee: £798.45** **Passenger Fee**: £0.50 *2,593 **= £1,296.50** **Pilotage Fees:** £500*2 + £300 + (94,353 -1000)/1000 * £20 **£4,462.01**
Dublin	**Berthing Fee**: 200 + (0.18 * 20,061) *60% = EUR**2,366.58** **Tendering Fee** (after 7 days assume less than) **= £0** **Passenger Fee: None** **Pilotage Fee: EUR 1,308*2** **EUR 4,982**	**Berthing Fee**: 200 + (0.18 * 94,353) = **EUR 17,183.54** **Tendering Fee** (after 7 days assume less than) **= £0** **Passenger Fee: None** **Pilotage Fee: EUR 2,273*2** **EUR 21,729.94**
Belfast	**Berthing/Tendering ISPS Fee: £524.49** **Passenger Fee: None** **Pilotage Fee: £799.03*2 + £321.27** **£2,968.31**	**Berthing/Tendering ISPS Fee: £781.16** **Passenger Fee: None** **Pilotage Fee: £799.03*2 + (94,353-20,000)/10,000 * 540.69 + £321.27 + (94,353-20000)/10,000 * £160.78** **£5,724.95**

Harbour port price analysis – Comparable Islands

Assumptions used within the calculation:

- Average Gross Tonnage of a vessel <240m = 20,061
- Average Gross Tonnage of a vessel > 240 = 94,353
- Average Passenger Numbers of a vessel <240m = 583
- Average Passenger Numbers of a vessel >240m = 2,593
- We have assumed that 100% vessels will berth in Orkney given our knowledge from discussions with Peter Bamford, Neptumar.
- We have assumed that 100% vessels will tender in Jersey as there is no berthing facility.
- For all other locations we have assumed that for vessels below 240m, 40% will tender and 60% will berth.
- Pilotage fees – (in and out) - have been multiplied by two as it is assumed that the fee is for one journey.

The following sources have been used to obtain the harbour port prices for each port:

Location	Source
Orkney	http://orkneyharbours.com/pdfs/schedule_of_charges_2017.pdf
Shetland	http://www.lerwick-harbour.co.uk/assets/files/2017%20LPA%20Charges%20Book.pdf
Guernsey	http://www.harbours.gg/CHttpHandler.ashx?id=105576&p=0
Jersey	http://www.ports.je/SiteCollectionDocuments/ID%20Commercial%20Tariff%20Brochure%2020150105%20KW.pdf
Faroe Isles	http://www.skipaeftirlitid.fo/get.file?ID=12372
Isle of Man	https://www.gov.im/media/1356390/harbour-duesandcharges-regulations2017.pdf (page 17 of the document)
Dublin	http://www.dublinport.ie/wp-content/uploads/2016/09/2016_Pilotage_Charges_1.0.pdf
Belfast	https://www.belfast-harbour.co.uk/documents/

7. Vessel analysis

Vessel analysis

Section Summary

Our review highlighted that of the 91 vessels currently visiting the comparable islands, 25 of these vessels were greater than 240m in length (27%).

If a 450m berth were constructed, it would be able to take all of these vessels, as the maximum vessel length was found to be 333m (MSC Preziosa).

A 240m berth, allowing 15m either side of the vessel (front and back), would mean that the maximum length of vessel that would be able to be taken is estimated to be around 210m. Based on 210m being the largest size vessel the 240m berth could take, this would mean 36 of the 91 vessels would be too large for the berth.

In Section 8, Cruise Ship New Builds and Market Analysis, it can be seen that of the cruise companies which are currently sending the 91 vessels to the comparable islands, their new builds are being built bigger than the existing vessel lengths.

As such, from a future proofing point of view, it is possible that a 240m berth could be outgrown by the vessels over time, whereas a 450m berth would be able to berth all of the current and the planned builds.

Additionally, an age analysis has been performed, see Appendix 2. This age analysis demonstrates that the smaller vessels below 240m in length have an average age of 26 years, and the vessels over 240m in length have an average age of 12 years. Research suggests that passenger cruise ships are built to last for around 30 years, although some may last longer if well maintained.

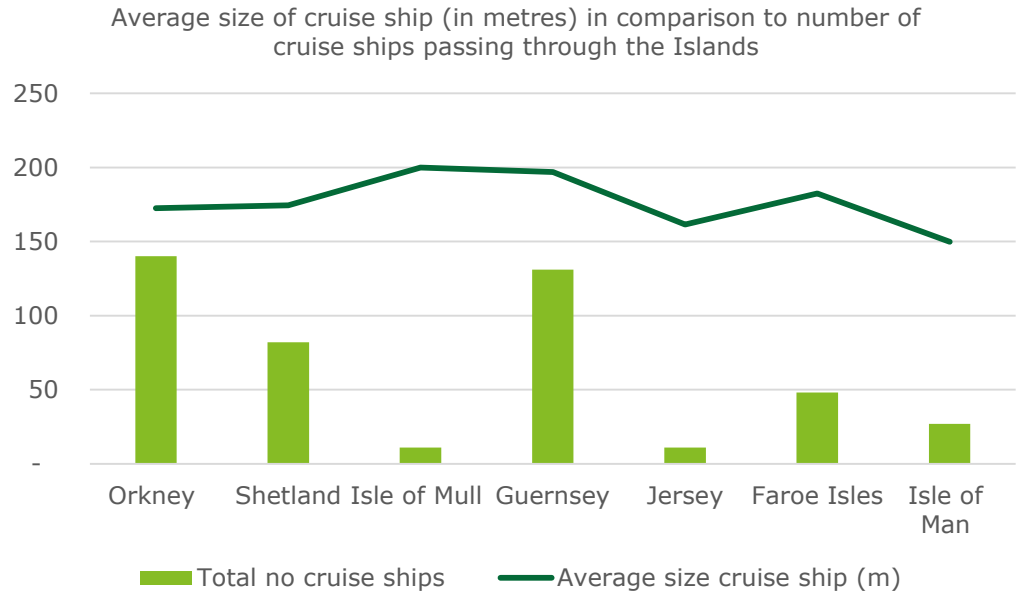
Older vessels are generally scrapped, and the trend is that they are generally replaced with bigger vessels. Of the review of planned builds, it can be seen that with the exception of the mega and expedition yachts, the length of the cruise ships being built start at 198m and range up to 340m.

Average length of vessels visiting comparable islands

Island port	Est PAX 2017	No of cruise ship visits	Average size of cruise ship (m)	No of vessel >240m LOA	No of vessels <240m LOA	% of vessel <240m
Orkney	136,758	140	172.46	32	108	77%
Shetland	69,734	82	174.38	11	71	87%
Isle of Mull	6,060	11	199.95	0	11	100%
Guernsey	177,179	131	196.89	49	82	63%
Jersey	5,420	11	161.37	0	11	100%
Faroe Isles	43,198	48	182.46	8	40	83%
Isle of Man	9,756	28	149.82	0	28	100%

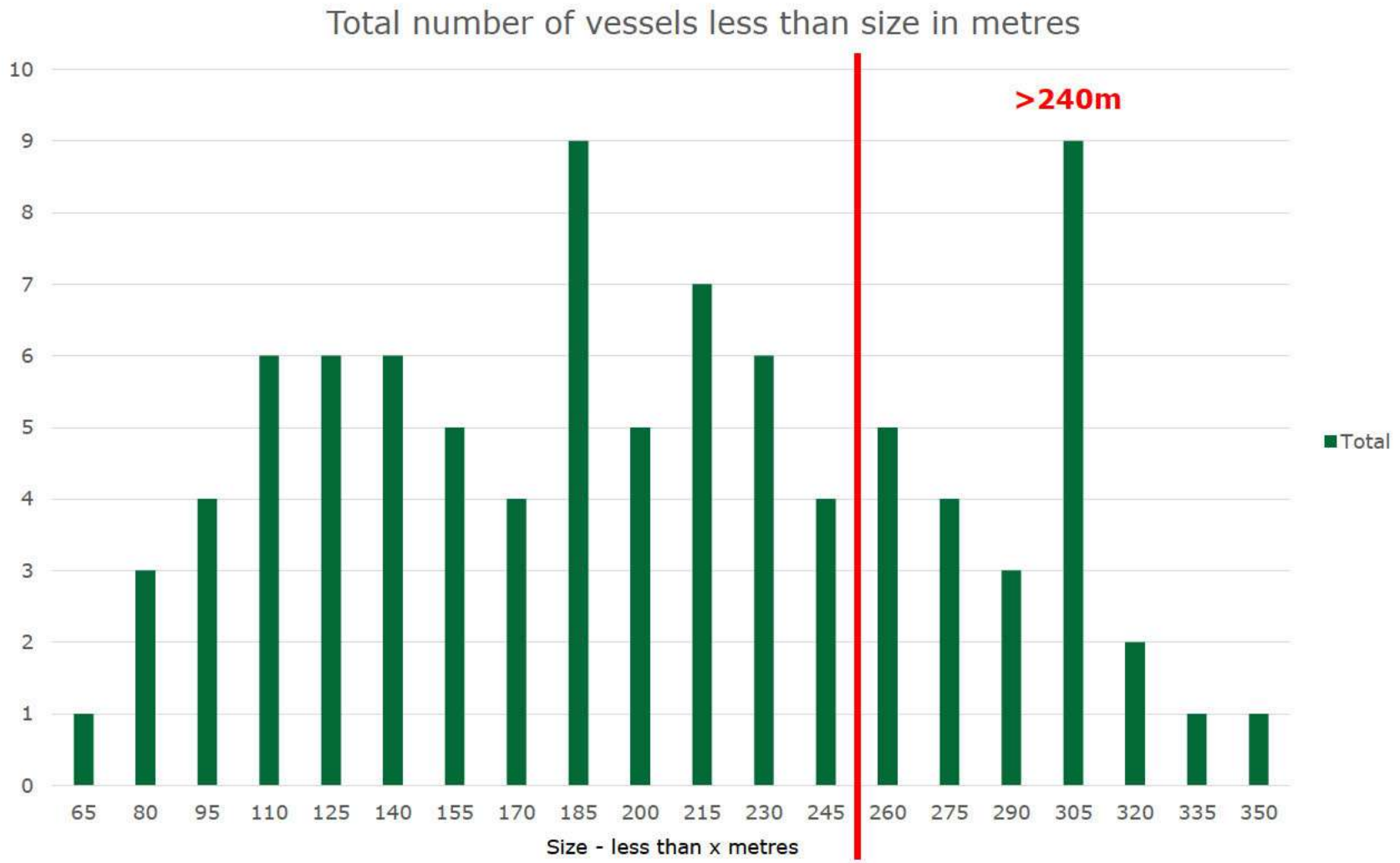
As can be seen in the table, the Isle of Man has the smallest average size of visiting vessels at the moment when compared to neighbouring islands. This is likely due to the types of cruises the Isle of Man is currently attracting, which are specific themes, such as Celtic Coastlines, Summer in the Isles etc. A lot of these visiting cruises are currently expedition yachts due to the tendering issues faced by the Isle of Man. We have performed an analysis of current cruises visiting the IOM in Section 8.

The Isle of Mull experienced the highest average vessel sizes, due to predominantly two vessels visiting, being Boudicca and Black Watch, both of which are 205m vessels.



Summary of vessels visiting comparable islands

Range of vessels in 15m intervals



The above graph shows the cross-section of the 91 vessels which visit the islands, and how their range in size. The most common vessel sizes fall between 171 – 185m , and 291m – 305m. Additionally, 25 vessels exceeded 240m in length, representing 27% of the total 91 vessels.

Summary of vessels visiting comparable islands (continued)

Opportunity

The graph on the previous page shows the cross-section of the 91 vessels which visit the comparable islands at the moment.

Of these 91 vessels cruising around the British Isles to the comparable islands, 18 of these vessels are already visiting the IOM. Some of these 18 vessels are in fact doing multiple visits, resulting in a total of 28 port calls in 2017 to the Isle of Man (N.B. Appendix 4 shows 27 scheduled visits, however a further vessel included the IOM in its itinerary per Neptumar). These 18 vessels account for 20% of the current cruise ships in the market.

Of the current list of cruise ships visiting the IOM, as 9 of them are less than 150m long, and according to discussions with the DOI, cruise ships less than 150m can already berth alongside the existing Queen Victoria Pier, meaning passengers are able to directly disembark from the cruise ship on to dry land and straight into the Sea Terminal building. There are 21 more vessels which are currently not visiting the IoM which would be able to dock on the existing Queen Victoria Pier if this is correct, and no tender would be necessary.

The analysis of the existing 91 vessels cruising in the British Isles set out below, shows that approximately a third of these visiting vessels are less than 150m long in length. Of these 30 vessels which are less than 150m long, 9 of them are already stopping at least once in the Isle of Man.

The remaining 21 vessels which are less than 150m long could be targeted now as they could berth directly on the Queen Victoria Pier.

LOA	No. already visiting IOM	Remaining opportunity	Total	% Already visiting IOM
>240m	0	25	25	0%
150m – 240m	9	27	36	25%
<150m	9	21	30	30%
Total	**18**	**73**	**91**	**20%**

"Le Soleal", Douglas Bay 3 May 2017, photo credit: Tiaan Burger, Delo tte Isle of Man

The 150m – 240m category highlighted 27 vessels that could potentially tender in the bay if the cruise companies would be willing to tender, along with the other 25 vessels that are greater than 240m long. However, feedback from the cruise companies is that passengers do not like to tender, and tenders can cause uncertainty where the weather is unfavourable, and can lead to missed port calls.

We have used this data in relation to the market opportunities that exist for our NPV calculations (See section 4) to further analyse the expected additional number of vessels which would potentially visit the IOM if:

- No further berths were built;
- a 240m berth is constructed; and
- if there was a berth of 450m, either a concrete or a caisson structure.

8. Cruise ship new builds and UK market analysis

Cruise ship new build and UK market analysis

Section Summary

We noted that an increase in the size of new builds has been gradually increasing year on year, which in turn has lead to increased expectation in passenger numbers. In 2017, 25.3m passengers are expected to cruise globally, this has grown substantially from 17.8m total global passengers in 2009.

Based on the analysis of the cruise companies which already visit the comparable islands, we have noted that the new build cruise ships range in size from 198m to 340m, excluding the expedition and mega yachts, which are inherently smaller in size. The new build expedition and mega yachts are also increasing in size compared to the yachts they are replacing.

The average size of the new build cruise ships based on the table within this section (excluding mega and expedition yachts) is 280m. Including the expedition yachts and mega yachts, this gives an overall average of 248m.

Expedition yachts are becoming increasingly more popular, and could be a market which the IOM could tap into more, particularly if there are no berths built, as most of these vessels are small enough to fit on the existing 150m Queen Victoria Pier and the type of passengers which these expeditions attract, tend to be more willing to tender as they consider it to be part of the overall experience.

A review of market share shows Carnival and Royal Caribbean dominate the cruise sector, dominating approximately 70% of the market between them. Feedback from Carnival and Royal Caribbean, along with Disney, is positive in relation to the Isle of Man as a new cruise destination.

New cruise ship builds in the world market

Research source: CruiseMapper and gCaptain.com

According to CruiseMapper.com, during the period 2015 – 2016, 17 new big cruise ships were launched, creating additional passenger capacity of over 41,000, representing a 9.1% industry growth, and an additional $3.4 billion in annual revenue.

gCaptain.com announced MSC Cruise ships are planning to build 2 new mega cruise ships (scheduled for delivery in 2017 and 2019), with an option for 2 more same class cruise ships. These mega cruise ships are represent an approximately $4.5 billion investment. This would mean MSC would have eleven next-generation new builds by 2026. The new builds are liquefied natural gas (LNG) fuelled, with a passenger capacity of 6,300.

gCaptain.com also reported that Carnival has also recently announced contracts with Italian shipbuilder Fincantieri to build five new cruise ships costing more than $3.4 billion. Delivery of those ships are scheduled for 2019 and 2020. These are again LNG fuelled, with a passenger capacity of 6,600.

File photo: Shutterstock/Leonard Zhukovsky

New builds – review of cruise companies already doing UK Cruises to the comparable islands we reviewed

Research source: CruiseMapper and gCaptain.com

Cruise company	Number of new builds	Launch period	PAX	LOA
AIDA Cruises	3	2017 - 2021	3,250 – 6,600	300m
Celebrity Cruises	4	2018 – 2022	2,900	306m
Crystal Cruises	5	2019 – 2022	1,000 (*mega yachts)	183m
Disney	2	2021 – 2023	2,500	340m
Hanseatic Cruises	2	2019	230 (*expedition yachts)	138m
Norwegian Cruise Line	8 (+ 2 optional)	2015 – 2027	3,300 - 4,200	333m
P & O Cruises	2	2019 - 2020	4,200 – 5,200	260m
Compagnie du Ponant	4	2018 - 2019	184 (*expedition yachts)	128m
Princess Cruises	3	2017 – 2022	3,600	330m
TUI Cruises	3	2017 – 2019	2,500 – 2,900	293m - 295m
Seabourn Cruises	1	2018	604	198m
Silversea Cruises	1	2017	596	213m
Viking Cruises	2	2017 – 2018	944	227m

New cruise trends in the world and UK Market – Expedition yachts

Research source: Charterworld.com

Source: https://www.noble-caledonia.co.uk/vessels/sea/hebridean-sky/

The Isle of Man already has a number of expedition yachts planning visits during 2017 (Le Soleal, Hebridean Sky, Hebridean Princess, Star Pride to name a few) . The expedition yacht market is a market we consider to be worth exploring further for the Isle of Man if no cruise ship berths are built in particular, as the explorer yachts generally have a tender vessel of their own, and passengers of explorer yachts generally view the tendering into port as part of the experience of being on an explorer/expedition cruise, so they are more amenable to the idea of tendering.

Additionally, explorer yachts are generally smaller in length than most standard cruise ships, and can potentially berth on the existing Queen Victoria Pier.

We enquired as to whether Le Soleal, which visited the Island twice during May 2017 used the existing pier, as it was technically small enough to berth on it. The captain apparently tried to berth on the existing 150m Queen Victoria Pier on the first visit, but due to the weather conditions he decided to tender, and did not attempt to use the berth at all on the second visit.

Extracts from Charterworld.com, expedition and luxury explorer yachts are a growing trend in the UK and the world cruise scene.

"The key features and benefits of explorer yachts are:

- that their range for world cruising is unrivalled, enabling you to explore remote exotic areas of the globe unreachable by any other means.
- By their type and design explorer yachts are high volume with plenty of space. This makes them comfortable to live aboard during extended exploration cruising. Typically, both guest and crew accommodation is larger and more spacious. Essentially these yachts are designed and built (or rebuilt) with extended cruising specifically in mind, so living space and comfort is a distinct consideration.
- Explorer yachts, especially luxury ones, are comfortable because they offer more space. They are also more stable in adverse conditions. At the same time they often have the same interior luxuries and stylish décor as a traditional superyacht as well as great deck space and Spa Pool etc."

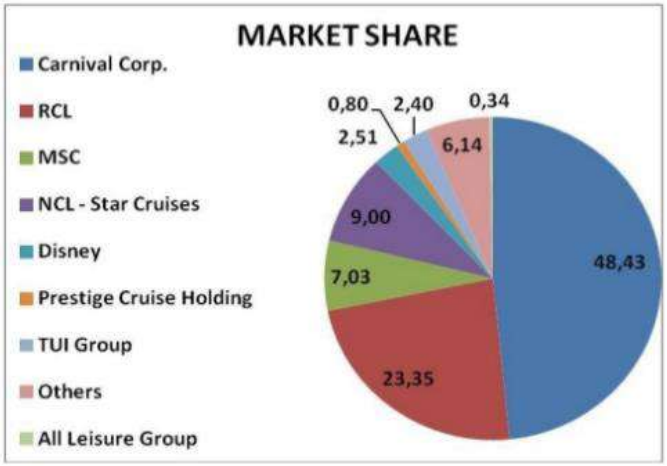
Indicative market share

Research source: Finpro (2015 position) and Cruise industry news 2016 – 2017 annual report

The market data pie chart has been created by Finpro, using data collected from World Cruise Industry. This is based on 2015 data of the market share, and is based on revenue.

We have received some feedback care of the Isle of Man Department of Economic Development's cruise consultants, Neptumar, from Royal Caribbean, Carnival and Disney in terms of their likelihood of visiting the Isle of Man on their cruise itineraries if the Isle of Man were to build a larger berth facility (see feedback later on in this section).

Since the 2015 position report of cruise company market share, the table below shows that Carnival has lost approximately 4% of its market share to Royal Caribbean, however these two companies are still dominating the market overall.



Source: https://www.slideshare.net/FinproRy/us-shipyards-presentat on/

Key:

- RCL – Royal Caribbean Limited
- NCL – Norwegian Cruise Line
- MSC – MSC Cruises
- TUI – Touristic Union Internation (Thomson Travel)

Carnival Corporation:	Ships	Berths	Capacity	Market Share
Carnival Cruise Line	24	63,790	3,936,970	29.5%
Princess Cruises	11	29,380	1,211,286	9.1%
Holland America Line	13	22,042	733,998	5.5%
Seabourn Cruise Line	4	1,954	42,400	0.3%
Total:	**52**	**117,166**	**5,924,654**	**44.4%**

Royal Caribbean Cruises:	Ships	Berths	Capacity	Market Share
Royal Caribbean International	21	62,409	3,076,970	23.1%
Celebrity Cruises	10	22,366	817,848	6.1%
Azamara	2	1,428	46,498	0.3%
Total:	**33**	**86,203**	**3,941,316**	**29.5%**

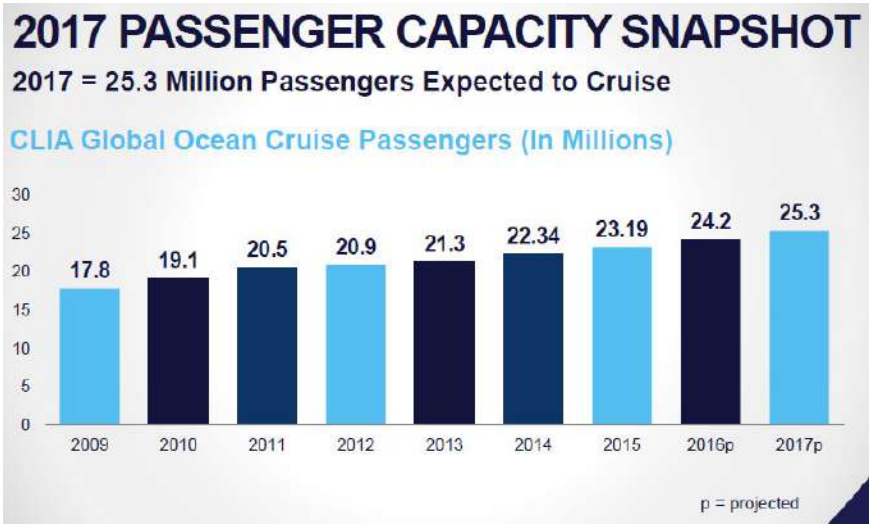
Norwegian Cruise Line:	Ships	Berths	Capacity	Market Share
Norwegian Cruise Line	14	38,530	1,941,800	14.5%
Oceania	6	5,256	143,820	1.1%
Regent	4	2,660	65,070	0.5%
Total:	**24**	**46,446**	**2,150,690**	**16.1%**

SUMMARY:	Ships	Berths	Capacity	Market Share
Three companies:	**109**	**249,815**	**12,016,660**	**90.0%**

Source: https://www.cruiseindustrynews.com/flip/cina16/#p=14

CLIA Global Trend Review 2017 summary of findings

Cruise Industry Outlook - CLIA



Source: CLIA Cruise Industry Outlook 2017 (Dec 2016)

CLIA predict the number of passengers expected to cruise globally during 2017 will be in the region of 25.3m.

Since 2009, the graph shows a steady increase in cruise passengers, representing a 42% increase in numbers of passengers cruising.

CLIA has reported a rise in expedition cruises as well as general leisure cruises.

2017 NEW SHIPS

26 New Ships on Order (as of December 2016)

Total Investment of More than $6.8 Billion in New Ocean Vessels in 2017

Year	Ocean	River	Ships Ordered	New Capacity
2017	13	13	26	30,006
2018	15	2	17	29,448
2019	20	2	22	51,824
2020 – 2026	32	0	32	119,510
Total	**80**	**17**	**97**	**230,788**

Feedback from the cruise industry
Carnival UK

"Cruising around the UK will be very big business inside 5 years"

Chairman of Carnival UK, David Dingle CBE

Feedback care of Tim Davies, Royal Haskoning DHV

Reply Reply All Forward IM

Fri 19/05/2017 10:14

Tim Davies <tim.davies@rhdhv.com>

Meeting with Carnival UK

To Lowe, Jenny (UK - Isle of Man)

Cc 9987CBF2-031A-E711-80F9-0050568767A7

Morning Jenny

I have just had a meeting with the Chairman of Carnival UK, David Dingle CBE.

We talked about cruise developments in the Irish Sea ports and he was very interested in the opportunity at Douglas.

His advice was build a quay for 340metre long vessels or build as much as you can with the ability to extend to 340 otherwise the port will miss out on the future vessels. He told me that cruising around the UK will be very big business inside 5 years.

I would be happy for you to quote my meeting and his comments in your report. He has told me that he would support in any way he can and left the door open for me to contact him again.

Regards

Tim

Tim Davies MCIHT
Senior Project Director
Global Sector Director for Passenger & Vehicle Terminals
Maritime & Aviation

Feedback from the cruise industry
Royal Caribbean

*"I met T.J. O'Sullivan (***Sr. Manager, Commercial Development, Royal Caribbean Cruises, Ltd.)** *by chance at Fort Lauderdale. He was enormously enthusiastic about the possibility of being able to bring his larger cruise ships to the Island and has an interest in the Isle of Man from a personal point of view, and also as a potential "new" destination for his Itinerary Planners. They are in the process of identifying new ports in the development phase of their next "batch" of itineraries.*

This was possibly the easiest "sales pitch" ever – basically all we have to do for T.J. is offer him a berth to accommodate his ships. Planning wise, if he can bring them to us, he will."

Royal Carribbean – feedback care of Seonad Duggan, Neptumar

From: T.J. O'Sullivan [mailto:tosullivan@rccl.com] ↑ Next ↓ Previous
Sent: 24 April 2017 13:53
To: cruise@neptumar-iom.com
Subject: RE: [EXTERNAL] Isle of Man Calling!

Seonad,

Thank you for the follow-up email. Your email was filtered and I just found it.....

I am glad you took the RCL message and are spreading it to the rest of the members of the industry in your part of the world. I would love to visit Isle of Man. I may be coming to Europe in September, and maybe I could coordinate a trip to Isle of Man then; thank you very much for the invite.

Regards,

T.J. O'Sullivan | Sr. Manager, Commercial Development
Royal Caribbean Cruises, Ltd.
1050 Caribbean Way, Miami, Florida 33132
O: +1 305-539-4151 | M: +1 954-338-0168 | E: tosullivan@rccl.com

Feedback from the cruise industry
Disney Cruise Line

"An occasional call in the Isle of Man would be a real possibility"

"Our ships are not equipped with tenders, so a suitable berth or a large fleet of shore-based tenders are absolutely essential"

Disney – feedback care of Seonad Duggan, Neptumar

To Lowe, Jenny (UK - Isle of Man)

Cc cruise@neptumar-iom.com; Colquitt, Julie (Julie.Colquitt@gov.im)

You replied to this message on 20/04/2017 14:43.

My feedback would be as follows:

Disney currently has a relatively small European program, so the number of ports we visit is limited. We do like to refresh our itineraries, and add in new ports, and so an occasional call in the Isle of Man would be a real possibility, providing there was adequate infrastructure, particularly considering our ships are not equipped with tenders, so a suitable alongside berth or large fleet of shore-based tenders are absolutely essential (and in a relatively exposed location like the IOM, with our demographics an alongside berth is effectively essential). Other than the physical pier itself, and related basic marine infrastructure (bollards, fenders, safe water, suitable gangway location, basic ISPS fencing), the only infrastructure absolutely required is provision for tours – both in terms of suitable capacities and destinations, and in terms of parking at the pier, and a suitable way for independent guests to get to the city. Potable water supply is very desirable, but other infrastructure (such as storing facilities, shore power, terminal, x-ray machines etc) are unlikely to have any practical benefit in a port of this kind, and may make the port less attractive in terms of higher fees.

Paul
Paul Britton - Marine Operations Manager - Disney Cruise Line"

Feedback from the cruise industry
Other comments

The following is an extract from an email received from Seonad Duggan, of Neptumar, the DED's cruise consultants:

Another quote from Carnival:

- *"Finding new ports is not always easy and because of the size of our ships, the infrastructure has to be a certain size to give a good experience, but if we could find attractive places closer together, we would be interested" – Carnival, Thornton*

This backs up our findings which previously sent, stating that:

Fuel and distance are very important criteria in the itinerary planning process – the short steaming times available to cruise lines makes the Isle of Man the obvious choice for the larger ships calling in at the already very popular city destinations for cruise ships, of Liverpool, Belfast, Holyhead, Greenock (for Glasgow, Dublin (which can cater for up to 4 cruise vessels measuring max 300 m in length at any one time), etc, and represent a huge chunk of business currently by-passing the Isle of Man.

Interestingly, you would expect that these neighbouring ports would consider any deep sea berth developments close to them, competition. To the contrary, however, they are all most supportive – maybe something interesting to include within your report. The basis for the support comes from the fact that any additional vessels which may be attracted into the area, are considered an opportunity for the other neighbouring ports, not a threat. This support can be clearly evidenced by the recent visits of Michael Morrison of Orkney and Angie Redhead of Liverpool (both of whom are willing to return to offer more support). It can be further evidenced by the number of offers which have come directly to Neptumar since the start of the year, to meet with, and assist where possible, the Shipping Association, Government, developers, and any other relevant parties. This list includes T.J. O'Sullivan of Royal Caribbean (visiting in September); Michael McCarthy of Cove Harbour (currently developing an extended berth and an additional deep sea berth in Glenda Lough); Jens Skrede of Cruise Europe; Peter Wild Independent Consultant; Sonia Limbrick of Dover Ports and Ian McQuade of Portland Ports.

- I was speaking with Ian McQuade of **Portland Harbour Authority** at the Cruise Europe Conference in Bremerhaven recently, where he explained that they were extending the cruise berth to allow vessels of up to 340 m in length. He was quoted in the attached article as stating that this work would *"future proof the port's cruise business as the industry continues to grow"*. See www.bbc.co.uk/news/uk-england-dorset-39564215

- When we met with Marc Miller, Director of Deployment & Itinerary Planning at **Royal Caribbean Cruises** in Fort Lauderdale, he confirmed that they are *"very keen for us to forge ahead with developments"* to allow them to bring their largest ships in to the Island. He has promised to forward all suggested plans for this on to his Captains and Technical Team for comment and to pass on the feedback to allow us to ensure that any developments will be adequate for their needs.

IOM Cruise Ship Schedule 2017

Sample of cruise itineraries for current cruises visiting the IOM

We have reviewed the cruise schedule for 2017, and selected a number of cruises, namely the cruise ships where multiple visits are taking place, to consider the routes and tours being offered at present by the cruise ship companies.

Ships we have considered are as follows:

- Le Soleal
- Hebridean Sky
- Hebridean Princess
- Silver Whisper
- Silver Explorer
- Wind Surf

The review has been a valuable exercise in terms of highlighting where the Isle of Man can fit into excursions and tours already on offer, and also in terms of its location from an opportunity perspective in terms of slotting into routes which it is not already included on.

A full page version of the Isle of Man cruise schedule can be found in Appendix 4.

cruiseisleofman.com

CRUISE SHIP SCHEDULE 2017

Ship name	Port	Date	ETA	Date	ETD	LOA	Draft exp	GRT	Pax	Crew
LE SOLEAL	DOUGLAS	23-Apr	08:00	23-Apr	18:00	142.00	4.70	10,332	209	142
MIDNATSOL	DOUGLAS BAY	29-Apr	08:00	29-Apr	18:00	135.80	4.90	16,151	638	74
LE SOLEAL	DOUGLAS	03-May	08:00	03-May	19:00	142.00	4.70	10,332	209	142
HEBRIDEAN SKY	PEEL	13-May	07:00	13-May	21:00	90.60	4.20	4,200	120	72
SILVER WHISPER	DOUGLAS BAY	29-May	08:00	29-May	23:00	186.00	6.00	28,258	382	295
SILVER WHISPER	DOUGLAS BAY	06-Jun	12:00	06-Jun	23:00	186.00	6.00	28,258	382	295
HEBRIDEAN SKY	DOUGLAS	12-Jun	06:00	12-Jun	22:00	90.60	4.20	4,200	120	72
SILVER WHISPER	DOUGLAS BAY	12-Jun	14:00	12-Jun	22:00	186.00	6.00	28,258	382	295
SILVER EXPLORER	DOUGLAS	13-Jun	07:00	13-Jun	17:00	108.11	4.38	6,130	132	115
STAR PRIDE	DOUGLAS BAY	13-Jun	08:00	13-Jun	16:00	133.40	5.20	9,375	208	164
WIND SURF	DOUGLAS BAY	25-Jun	08:00	25-Jun	16:00	187.00	5.20	14,745	280	190
STAR PRIDE	DOUGLAS	27-Jun	09:00	27-Jun	17:00	133.40	5.20	9,375	208	164
HEBRIDEAN PRINCESS	PEEL/DOUGLAS	29-Jun	20:00	29-Jun	13:00	72.00	3.00	2,112	50	38
STAR PRIDE	DOUGLAS	29-Jun	09:00	29-Jun	16:00	133.40	5.20	9,375	208	164
AEGEAN ODYSSEY	DOUGLAS	20-Jul	08:00	20-Jul	17:00	140.50	6.47	12,094	380	180
DEUTSCHLAND	DOUGLAS BAY	22-Jul	07:00	22-Jul	13:00	175.30	5.80	22,496	600	260
SAGA SAPPHIRE	DOUGLAS BAY	04-Aug	07:00	04-Aug	18:00	199.60	8.40	37,043	628	437
SILVER WIND	DOUGLAS	07-Aug	08:00	07-Aug	18:00	155.80	5.70	17,000	296	212
SEABOURN QUEST	DOUGLAS BAY	13-Aug	08:00	13-Aug	18:00	198.15	6.50	32,346	208	142
GANN	DOUGLAS	23-Aug	11:30	27-Aug	19:00	108.00	4.70	4,072	210	32
ROTTERDAM	DOUGLAS BAY	25-Aug	08:00	25-Aug	16:00	238.00	8.30	61,849	1,404	600
HEBRIDEAN SKY	DOUGLAS	26-Aug	07:00	26-Aug	22:00	90.60	4.20	4,200	120	72
STAR PRIDE	DOUGLAS	01-Sep	09:00	01-Sep	17:00	133.40	5.20	9,375	208	164
WIND SURF	DOUGLAS BAY	03-Sep	09:00	03-Sep	17:00	187.00	5.20	14,745	280	190
SAGA PEARL II	DOUGLAS BAY	11-Sep	08:00	11-Sep	17:00	164.35	6.30	18,627	450	252
ALBATROS	DOUGLAS BAY	20-Sep	07:00	20-Sep	12:00	205.46	7.53	28,518	1,000	472
HANSEATIC	DOUGLAS	29-Sep	12:00	29-Sep	18:00	122.80	4.81	8,378	157	122
									9,471	5,357

"Le Soleal" – Ponant Cruises – Arriving in IOM 29 April and 3 May

Ponant Cruises is a French cruise company, which currently includes the Isle of Man in its "Celtic Coastlines" cruise, which runs over a period of 8 days, and 7 nights.

This particular cruise is running twice on the following dates:

- 24 April 2017
- 1 May 2017

An example itinerary is provided below.

1. Portsmouth (UNITED KINGDOM)
   Embarkation 04/24/2017 from 17h00 to 18h00
   Departure 04/24/2017 at 19h00
2. Guernsey (Channel Islands) (UNITED KINGDOM)
   04/25/2017 from 12h00 to 19h00
3. Scilly Islands (UNITED KINGDOM)
   04/26/2017 from 08h00 to 18h00
4. Cork (IRELAND)
   04/27/2017 from 08h00 to 18h00
5. Liverpool (UNITED KINGDOM)
   04/28/2017 from 14h30 to 23h00
6. Douglas (IRELAND)
   04/29/2017 from 08h00 to 18h00
7. Belfast-Northern Ireland (UNITED KINGDOM)
   04/30/2017 from 08h00 to 18h00
8. Dublin (IRELAND)
   Disembarkation 05/01/2017 at 08h00

“Hebridean Sky” – Noble Caledonia Cruises – Arriving in IOM 13 May, 12 June and 26 August

Noble Caledonia Cruises is a UK cruise company, which currently includes the Isle of Man in its “Summer in the Isles” cruise, which runs over a period of 15 days, and 14 nights.

This particular cruise is running three times on the following dates:

- 4 May 2017
- 3 June 2017
- 17 August 2017

“Arrive this morning on the Isle of Man and the main fishing port of Peel. Settlements have been here since the Mesolithic Age and the island also claims to have the longest continuous parliament which was founded in 979AD. This morning we will travel to Tynwald Hill, located in the little village of St John’s. This grass topped, tiered hill is made from the soil and stones from each of the island’s 17 parishes and is the point from which, each July 5th all the laws enacted in the year preceding are promulgated to the gathered government officials and the public at large, both in Manx and English languages. This process has been a continuous procedure for well over a thousand years. We continue to Castletown and the magnificent Castle Rushen, one of the best examples of a Medieval castle in Europe which was the former seat of the Kings and Lords of Mann, with the castle’s oldest part dating back to the time of Magnus, the last Norse King of Mann, who died here in 1266. We end our tour at Castletown station and board the vintage steam train for a delightful and traditional journey to Douglas. Dating from 1874, the Isle of Man Steam Railway is the island’s oldest Victorian rail system and this narrow gauge railway still runs with its original locomotives and carriages. Return to the vessel for lunch and enjoy an afternoon at leisure.”

An example itinerary is provided below:

Day 1 – Leith, Scotland
Day 2 – Scrabster, Scotland
Day 3 – Kirkwall, Orkney
Day 4 – Westray and Papa Westray
Day 5 – Unst & Fetlar, Shetland Isles
Day 6 – Lerwick, Sheltand Isles
Day 7 – Stornaway, Isle of Lewis
Day 8 – Canna & Muck, Outer Hebrides
Day 9 – Derry, Northern Ireland
Day 10 – Peel, Isle of Man
Day 11 – Holyhead, Wales
Day 12 – Waterford, Ireland
Day 13 – Isles of Scilly
Day 14 – Guernsey and Herm, Channel Isles
Day 15 – Portmouth

"Hebridean Princess" – Hebridean Island Cruises – Arriving in IOM 29 June 2017

Hebridean Island Cruises is a Hebridean cruise company, which currently includes the Isle of Man in its "Footloose through the Irish Sea" cruise, which runs over a period of 7 days and 7 nights.

This particular cruise is running on the following date:

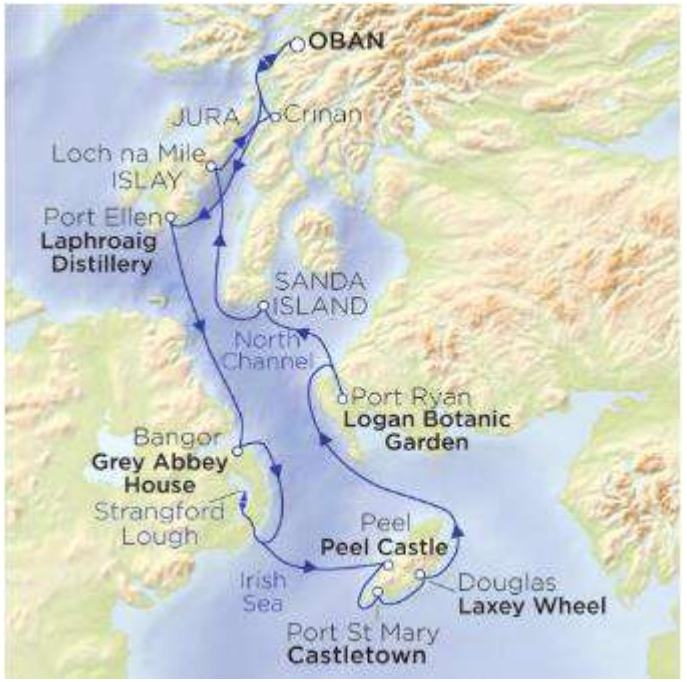
- 27 June

An example itinerary is provided below.

"The third Celtic nation beckons as we arrive in Peel and the Isle of Man's mythological sea god, Manannan, welcomes us to his fascinating kingdom and guides us through its rich Celtic, Viking and maritime past. From Port St Mary we travel by steam train to explore the ancient capital of Castletown whilst walkers head off for a full day walk. Our final Manx visit is to the famous Laxey Wheel, designed in 1854 by the Victorian engineer, Robert Casement, to pump water from Glen Mooar, part of the Great Laxey Mines industrial complex."

Hebridean Princess
Source: http://www.hebridean.co.uk/en/photo-gallery_49142/

Day	Port (Itinerary Description)
Tuesday 27th June	Oban Oban - Embarkation.
Wednesday 28th June	Islay Morning; Port Ellen, Islay - Walks ashore or Laphroaig Distillery. Afternoon; Cruise the North Channel.
Thursday 29th June	Bangor Morning; Bangor, Northern Ireland - Full day walk or Grey Abbey House with lunch. Afternoon; Strangford Lough - Re-join ship.
Friday 30th June	Peel Morning; Peel, Isle of Man - House of Manannan and Peel Castle. Afternoon; Port St Mary, Isle of Man - Castletown, ancient island capital.
Saturday 1st July	Douglas Morning; Douglas, Isle of Man - Laxey Wheel. Afternoon; Cruise north from Isle of Man.
Sunday 2nd July	Port Ryan Morning; Port Ryan - Logan Botanic Garden or walks. Afternoon; Sanda Island - Walks ashore
Monday 3rd July	Jura Morning; Loch na Mile, Jura - Walks at Craighouse. Afternoon; Crinan - Towpath walks.



“Silver Whisper” – Silversea Cruises – Arriving in IOM 29 May, 6 June and 12 June 2017

Silversea Cruises currently includes the Isle of Man in its “Southampton to Southampton” cruise, which runs over a period of 12 days, and 11 nights.

This particular cruise is visiting the IOM on the following dates:

- 22 May 2017
- 6 June 2017
- 12 June 2017

An example itinerary is provided below:

Date	Port	Arrive	Depart
Mon 22/05/17	Southampton / England		17:00
Tue 23/05/17	At Sea		
Wed 24/05/17	Leith (Edinburgh) / Scotland	14:15	
Thu 25/05/17	Leith (Edinburgh) / Scotland		21:30
Fri 26/05/17	Invergordon / Scotland	12:00	18:00
Sat 27/05/17	Portree (Isle of Skye) / Scotland	10:00	16:00
Sun 28/05/17	Belfast / Ireland	08:30	23:00
Mon 29/05/17	Douglas (Isle of Man) / England	08:00	23:00
Tue 30/05/17	Dublin / Ireland	07:00	19:00
Wed 31/05/17	Cobh (Cork) / Ireland	08:00	17:00
Thu 01/06/17	Fowey / England	08:00	17:00
Fri 02/06/17	Southampton / England	07:00	

“Silver Explorer” – Silversea Cruises – Arriving in IOM 13 June

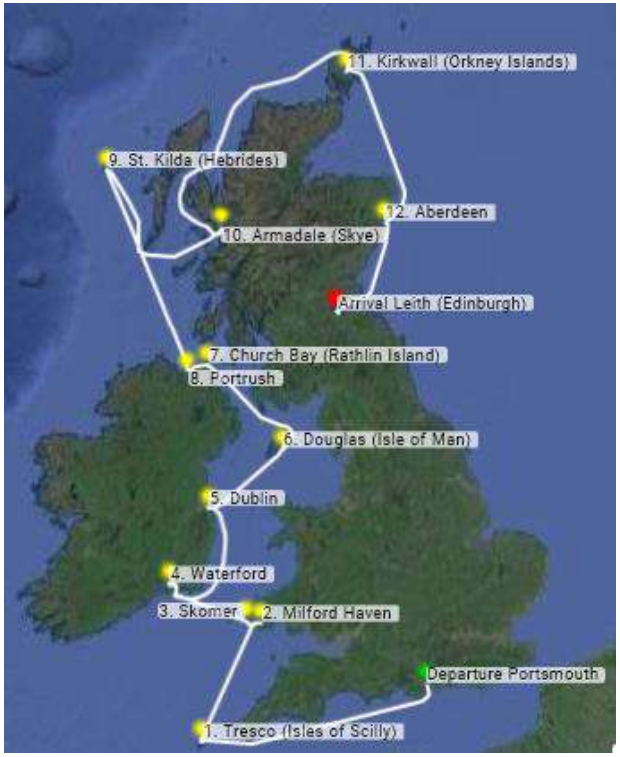
Silversea Cruises currently includes the Isle of Man in its “British Isles” cruise, which runs over a period of 12 days, and 11 nights.

This particular cruise is running on the following dates:

- 8 June 2017

An example itinerary is provided below:

Date	Port	Arrive	Depart
Thu 08/06/17	Portsmouth / England		16:00
Fri 09/06/17	Tresco (Isles of Scilly) / England	13:00	18:30
Sat 10/06/17	Milford Haven / Wales	06:30	12:00
Sat 10/06/17	Skomer / Wales	15:00	20:00
Sun 11/06/17	Waterford / Ireland	07:00	18:30
Mon 12/06/17	Dublin / Ireland	08:00	22:00
Tue 13/06/17	Douglas (Isle of Man) / England	07:00	17:00
Wed 14/06/17	Church Bay (Rathlin Island) / Ireland	06:30	10:30
Wed 14/06/17	Portrush / Ireland	13:30	19:00
Thu 15/06/17	St. Kilda (Hebrides) / Scotland	09:30	16:00
Fri 16/06/17	Armadale (Skye) / Scotland	06:30	12:00
Sat 17/06/17	Kirkwall (Orkney Islands) / Scotland	08:00	22:00
Sun 18/06/17	Aberdeen / Scotland	07:00	18:00
Mon 19/06/17	Leith (Edinburgh) / Scotland	08:00	



“Wind Surf” – Windstar Luxury Cruises – Arriving in IOM 27 June

Wind Surf is one of the largest sailing cruise ships in the world, and can carry up to 310 passengers, in a total of 154 staterooms, 31 ocean-view rooms and 122 deluxe ocean view staterooms, along with a crew of 214.

Windstar Luxury Cruise Line currently includes the Isle of Man in its “Edinburgh to Dublin” cruise, which runs over 9 days and 8 nights.

This particular cruise is calling at the IOM on the following dates running on the following dates:

- 27 June 2017
- 9 September 2017

An example itinerary is provided below:

DATE	PORT
JUN 20 TUE	EDINBURGH, SCOTLAND
JUN 21 WED	AT SEA
JUN 22 THU	INVERGORDON, SCOTLAND
JUN 23 FRI	KIRKWALL, SCOTLAND
JUN 24 SAT	PORTREE, SCOTLAND
JUN 25 SUN	OBAN, SCOTLAND
JUN 26 MON	PORTRUSH, IRELAND
JUN 27 TUE	ISLE OF MAN, UNITED KINGDOM
JUN 28 WED	DUBLIN, IRELAND

9. Desktop review of neighbouring ports' development costs

Desktop review of neighbouring port development costs
Current developments

Liverpool Cruise Terminal

http://creativecommons.org/l censes/by-sa/2.0

Liverpool's cruise terminal was built in 2008, and has been widely used with effect from 2012 as a cruise start and end port.

A £50m development of a new cruise terminal facility on the River Mersey has been commissioned by Liverpool City Council.

More generally a £5.5bn development, Liverpool Waters has been proposed by Peel Group in the Vauxhall area of Liverpool, regenerating the river side.

Photo: Queen Mary 2 in 2015 visiting Liverpool.

Dublin Cruise Terminal

http://dublinportblog.com/wp-content/uploads/2015/11/1236242_526019954118897_824735355_n-1.jpg

Dublin Port has a EUR230m scheme in place spanning over 5 years from 2015, to allow bigger containers and cruise sips to enter its navigation channel.

Dublin Port Company plan to redevelop the Alexandra Basin to include two berths for cruise ships of up to 340m in length which will accommodate ships that are significantly larger than the current maximum length of 300m.

Belfast City Cruise Terminal

http://www.belfasttelegraph.co.uk/news/northern-ireland/full-steam-ahead-for-belfasts-cruise-ships-9500-visitors-to-step-ashore-this-week-35721999.html

A £15m investment by Belfast harbour has been made to develop a new terminal The development comprises the construction of a 340m long quay with mooring dolphins and associated dredging.

Greenock Cruise Terminal

http://www.cruisemapper.com/ports/greenock-port-553

As part of a £30m proposed investment, the government have proposed expansion of the ocean terminal which intends to significantly improve cargo and cruise berthing facilities. The expansion includes a new visitor centre.

Analysis of Port Facilities – UK Ports

Destination	Type of berth	Size of berth	Cost	Funding
Liverpool	Floating pontoon berth in Mersey.	The original berth was restricted meaning only cruise vessels up to 180m long could berth on it. As such, this original berth is no longer used. Approximately 15 years ago, a dedicated floating berth was conceived by the City Council, which would cater for larger cruise vessels. The berth is in the Mersey river, hence a floating pontoon option was suitable as the tidal range is low. The cost was £16m, 15 years ago. Plans are in progress at Liverpool to build a 3,500 passenger terminal building. The estimated cost of this is £40m, including maritime infrastructure. Therefore, realigning £15m at today's rates would be approximately £22m, plus the £40m expected spend for the new terminal would mean the total costs for the overall cruise facilities would be in the region of around £62m.	Estimated cost is in the region of £62m	Public
Dublin	Existing gravity wall general cargo berth. Future development in progress to use the existing quay wall of the historical port.	The current berth in Dublin can berth ships up to 300m in length. If the plans come to fruition, Dublin's new port will be able to house vessels up to 340m in length. http://dublinportblog.com/wp-content/uploads/2015/11/Dublin_Port_Masterplan.pdf	£20m expected upgrade cost	Public
Belfast	Existing gravity wall general cargo berth. Future development in progress to use the existing quay wall of the historical port.	Similar situation to Dublin exists. Planned developments, whereby hoping to increase future berth capacity to accommodate vessels up to 340m in length.	Estimated cost of new build £15m	Public
Greenock	Gravity structure quay wall.	Can berth vessels up to 340m long with a 10 metre draft.	£5m	Public

The above information has been compiled with some assistance from Tim Davies, Royal Haskoning DHV.

Analysis of Port Facilities – Comparable Islands

Destination	Type of berth	Size of berth	2017 EST. PAX
Orkney	Fixed berth	Orkney has three main berths are located at Kirkwall, within walking distance to the town centre, Hatston just outside Kirkwall where a complimentary shuttle bus is provide into town, and Stromness, Orkney's second town all offer excellent berthing facilities for cruise ships with anchorage also popular in Kirkwall Bay. Kirkwall has Scotland's longest deep-water , commercial berth at Hatston measuring 385 metres with a 10.5 metre draft.	136,758
Shetland	Fixed berth	Up to 230m cruise ships. >230m ships anchor by tender to a modern landing stage and pavilion located in Lerwick.	69,734
Isle of Mull	No berth	N/A	6,060
Guernsey	No berth	Guernsey does not have a cruise ship terminal, and passengers tender to St Peter Port, however this is a short tender.	177,179
Jersey	No berth	Jersey does not have a dedicated cruise ship terminal, The cruise ships dock approximately an hour from St Helier by tender vessel in the deeper waters offshore.	5,420
Faroe Isles	No berth	Torshavn does not have a dedicated cruise ship terminal, The cruise ships dock at the commercial pier at the eastern breakwater or if it is busy already, the cruise ships anchor in the bay and the passengers are tendered ashore.	43,198
Isle of Man	Most tender	Ships <150m can berth at Queen Victoria Pier, however >150m must tender	9,756

Funding options

- The extension of the existing Queen Victoria Pier from 150m to a 240m berth is a Department of Infrastructure initiative and as such would be funded with public money. Following discussions held with Sheila Lowe, Chief Financing Officer of the Treasury and Carl Hawker, Acting Executive Director, Policy and Strategy of the Cabinet Office, it is anticipated that the external cost of lending to the Isle of Man Government would not exceed 3%. As such, this is the rate we have applied as a discount factor in our NPV calculations for the various options.
- Originally, proposals were put forward for the 450m (caisson) berth to be part public and part privately financed by way of bond funding. However, this part private proposal as been considered to be non-feasible, as the Government would be ultimately securing the bond and thereby taking on risk (although there would be no interest costs if the bond was fully serviced by the income from the harbour dues). As such, it would be less risk for the Government if they took on the full capital cost by way of external debt financing, as finance costs would be known.
- It is assumed that the 450m (concrete) berth would be a Government initiative, and as such would be proposed to be publically funded. It is recommended this option is explored further in terms of capital costs, as it may be possible the DOI could provide a cheaper alternative than Royal Haskoning DHV for the construction of the berth, and could possibly use some of the dredged materials to assist in filling out other areas of the main Douglas Harbour.

10. Alternative uses of a 450m berth

Floating hotels

The idea of berthing a cruise ship on any eventual berth built for a period of say 2 weeks over TT week or the summer period has been considered as a viable option to generate additional revenue streams for the local economy.

Other examples could include accommodation for events such as the Isle of Man food and drink festival, local music festivals with big name performers e.g. Tom Jones concert in 2016; Isle of Man Grand Prix, Southern 100, Cultural events such as Yn Chruinnaght, Viking Long boat races, Castletown World Famous Tin Bath Races, Tynwald Day, Cyclefest, Isle of Man Walking Festival, etc.

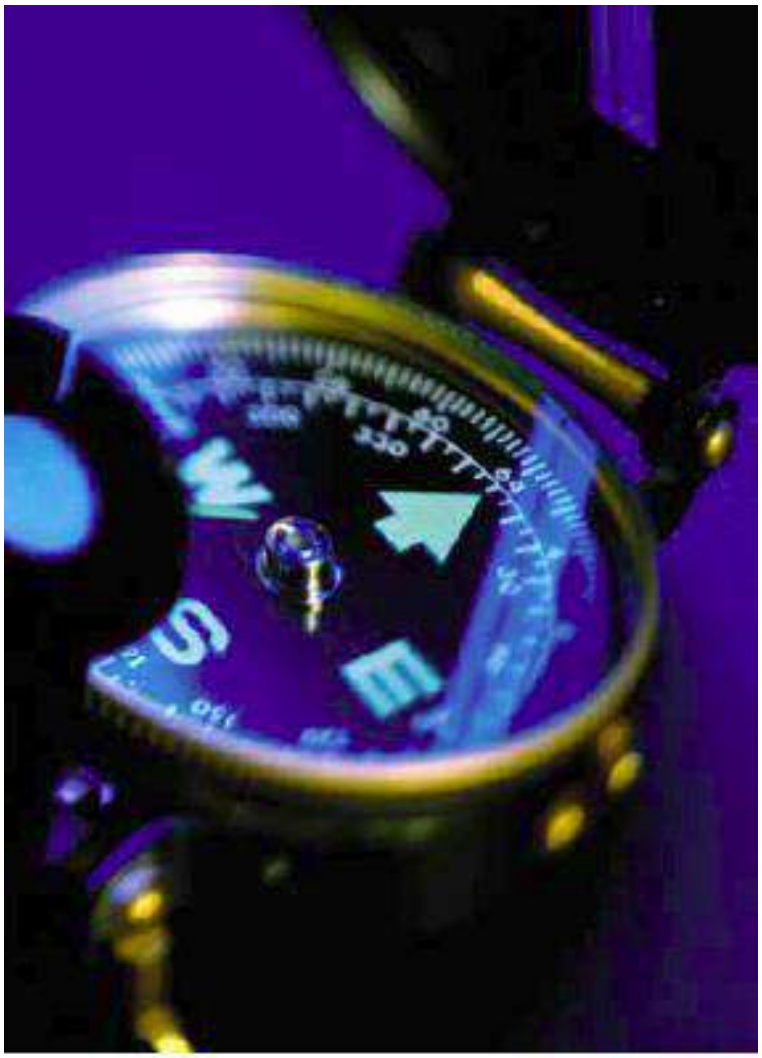
At present, the Isle of Man has no 5 star hotels to offer its visitors. The highest accredited hotel at the moment is The Claremont Hotel, which has a 4 Star Gold accreditation. Offering a five star hotel in the form of a cruise ship hotel in short bursts over the summer months e.g. "a pop-up hotel", could attract more tourists to the Island generally, as well as potentially attracting some local business too.

Pop up bars and restaurants are extremely popular at the moment, and the idea of a pop-up hotel could attract interest from further afield, as well as locally. Locals could well wish to use the cruise ship's facilities if it was equipped with nice restaurants, bars, and spa facilities.

Most cruise ships generally have onboard entertainment in the evenings. It may be possible to sell tickets to locals and the floating cruise ship's hotel guests to some top class acts on board the floating hotel.

There are many options available within this report. All of them/a combination of them could work for a floating hotel. E.g. smaller vessels could berth as a floating hotel on the 150m berth, whilst still allowing larger cruise ships to visit as per itineraries.

Or, a larger cruise ship could be berthed for a longer period of time on the larger 450m berth, whilst still allowing smaller cruise ships to berth on a 150/240m berth on the Queen Victoria pier, thereby increasing the number of tourists to the Island further, and therefore revenue generated. Examples of permanent floating hotels exist in London and Gibraltar (Sunborn Hotels: www.sunbornhotels.com).



Party boats

Fred Olsen are berthing Boudicca, (a cruise ship which also visits the Isle of Man), in Liverpool for the city's annual 'International Beetleweek Festival', taking place from 23rd to 29th August 2017.

Fred Olsen has arranged for one of the best-known Beatles tribute acts around – 'The Backbeat Beatles' – to entertain guests live on the party evening, being 28 August 2017.

"A feast of fun, food and fantastic entertainment awaits Fred Olsen guests, as they are docked in the heart of Liverpool, in the shadow of the iconic Liver Building. Guests (over 18s only) will be treated to a taste of the Fred Olsen cruise experience, with a sumptuous five-course à la carte dinner, served by attentive waiting staff in the elegant surroundings of Boudicca's Tintagel, Four Seasons and The Heligan Room Restaurants.

Entertainment for Fred Olsen's 'Summer Party Night' will include the world-famous 'Backbeat Beatles', and the hilarious Stan Boardman, Liverpool's favourite TV comedian. A late-night DJ will continue this special Merseyside celebration into the early hours.

After revelling in the evening's festivities, guests can retire to their comfortable, spacious room for a restful night's sleep on board Boudicca. The following morning, they can then enjoy a delicious full English breakfast, or a lighter Continental choice, with a wide selection of pastries, cereals and fruits, before disembarking for home and reminiscing on a great evening of fun and laughter.

Prices for this very special Liverpool 'Summer Party Night' start from just £99 per person, based on two adults sharing a twin-bedded Interior Room, and include accommodation, all meals and entertainment on board, VAT and port taxes.

Fred. Olsen will be offering a total of 10 sailings from Liverpool during its 2017/18 cruise season."

Source: http://media.fredolsencruises.com/pressreleases/join-the-party-on-fred-olsen-cruise-lines-boudicca-this-summer-right-in-the-heart-of-liverpool-1909656

Maintenance vessels

Similarly to floating hotels, it would be possible to berth maintenance vessels that are linked to the offshore wind farms and other energy structures using either of the larger 450 berthing options.

These maintenance vessels require refuelling and replenishing of materials/staff before returning to the offshore energy structures.

Fuel and other goods such as food and water, could be sold to the maintenance vessels whilst in port. Additional services such as waste disposal could also be provided to the maintenance vessels.

Maintenance vessels could use a smaller 240m berth, however, the location of the proposed 240m berth may have limitations with onshore space and facilities, and feedback from experts suggests that the wind direction could also mean it may also be more weather dependent in terms of berthing.

This alternative use would enable more fees to be collected in harbour port fees all year round, rather than seasonally with the cruise ships. The cruise season generally runs from March/April – September/October.

Floating hotels / Maintenance Vessels
Dashboard

	150m Queen Victoria Pier / 240m Queen Victoria Pier	Harbour regeneration project – 450m berth (incl 250m berth)	450m breakwater and 400m cruise berth
Revenue potential			
Revenue streams	Harbour dues Direct and indirect visitor spend	Harbour dues Direct and indirect visitor spend	Harbour dues Direct and indirect visitor spend
Limitations?	Limited to vessels sizes which can fit on the 150m berth/ 240m berth, as tendering hotel guests is not realistic. May be weather dependent for smaller vessels.	Can take a cruise ship up to 400m, however, if a floating hotel is berthed there for a period of time, this could mean other planned cruise ship visits would have to be worked around	Can take a cruise ship up to 400m, however, if a floating hotel is berthed there for a period of time, this could mean other planned cruise ship visits would have to be worked around
Opportunities	Opportunity to generate more revenue in harbour dues if vessels are in port over an extended period of time. Could be possibility of berthing smaller vessels using both piers simultaneously – i.e. 2 floating hotels	Opportunity to generate more revenue in harbour dues if vessels are in port over an extended period of time. The bigger vessels harbour charges are likely to be considerably more than the smaller vessels. Likewise, bigger vessels will have more rooms and could generate proportionately more direct and indirect spend than a smaller vessel.	Opportunity to generate more revenue in harbour dues if vessels are in port over an extended period of time. The bigger vessels harbour charges are likely to be considerably more than the smaller vessels. Likewise, bigger vessels will have more rooms and could generate proportionately more direct and indirect spend than a smaller vessel.

Renewable energy initiatives

There is a lot of potential in relation to renewable energy sources, given the natural location of the Isle of Man, in terms of wind and tidal/wave energy.

It would be possible to add in to the proposed breakwater structure, the provision of renewable wind energy structures, which would provide a revenue stream once fully operational.

Wind turbines appear to be the most appropriate renewable energy add on to a fixed breakwater in Douglas harbour, rather than any tidal/wave energy solutions.

Tidal wave solutions would have to be integrated into the design of the breakwater from the outset of the project.

There are various types of wind turbines available, which are commercially proven. The main types of wind turbine are:

- Horizontal Axis Wind Turbines; and
- Vertical Axis Wind Turbines.

Horizontal Axis Wind Turbines are the most common types of wind turbines. There are a number of offshore wind turbines located in UK waters close to the Isle of Man at present.

Vertical turbine are less well known, however they have advantages in terms of efficiency which the horizontal turbines do not due to the reduced centre of gravity and oscillation.

"Implementing renewable energy generation technology could add a long-term revenue stream. Financing for renewable energy is typically arranged over a 15 year period, whilst a fixed breakwater would be expected to last approximately 100 years. The technology itself isn't expected to last that long, but if the infrastructure is already in place, maintenance and upgrade costs of the technology will be minimal compared to installing such technology once construction is completed and the revenues contribute to the long-term repayment of the breakwater. The energy generated could potentially provide a revenue stream long after the renewable technology is paid for".

Source, Isle of Man Shipping Association "IOM Deepwater Berth" Report, dated 31 March 2017

Other recommendations based on research

- It is recommended that multi-lingual documentation is provided to cruise passenger visitors when they arrive – this would give a much more sophisticated feel to the Island in terms of being geared up to cater for multi-lingual visitors, and is a small thing that can make cruise passengers feel more welcome. Orkney provide welcome brochures to the cruise passenger guests in 6 languages at present.
- Other areas of Manx National Heritage and other tourist attractions should also be encouraged to provide multi-lingual versions of brochures, and information signs within their facilities. E.g. Manx Motor Museum in Jurby – it was noted on a recent visit that only English signs are provided which give facts about the vehicles and motorbikes. This is one attraction, where it would be straightforward to provide brochures of the vehicles and motor bikes in foreign languages for the cruise passengers, and also the existing TT biker market. Examples of where this is done well for tourists are the likes of the Mercedes Benz Museum in Stuttgart, Germany, where they provide their guests with handheld "phone" devices which are programmed in multiple foreign languages, with number keys to enable guests to be able to play the relevant excerpt in their language about the car/motorbike they are viewing.
- Other opportunities to sell multi-lingual versions of books about the Isle of Man and the attractions may also be being missed by the vendors.


Appendices

Appendix 1

Net present value supporting assumptions and workings

Net present value calculations – assumptions

Input	Basis of calculation	Justification
Passenger numbers	Passenger numbers have been estimated using the current year expected passengers of 9,756 as an initial basis. Growth percentages have been applied to initial passenger number of 9,756 for each of the different scenarios. Detailed assumptions have been documented for each scenario in Section 5. After year 30, all scenarios have had a growth rate of 0.5% applied until year 50. After 30 years, due to the length of the project, it is increasingly more difficult to forecast accurate passenger numbers.	Please see supporting workings prepared for "do nothing", "240m berth" and "450m berth" in Section 5. The full 50 year forecast passenger numbers can be found in Appendix 1 on the relevant NPV working papers. Growth percentages have been estimated using knowledge gained through our industry review, and also based on the existing data gathered about cruise ships currently operating cruises to the comparable islands.
Passenger spend	Passenger spend has been assumed constant in all 5 scenarios based on the expected passenger gross spend of £44.48 per passenger, and expected net exchequer benefit of £11.93 per passenger. Basic inflationary increase has been applied over the project life, based on the April 2017 inflation rate of 2.3%. We have used our passenger numbers calculations from Section 5 (up to year 30) for each of the scenarios and thereafter applied a constant growth rate of 0.5% to passenger numbers between year 30 - 50, and have assumed that 80% of passengers will alight the vessel when in port.	Please see supporting passenger spend workings based on the research performed in Section 6.
Vessel visits – "do nothing" and "do nothing except increase harbour fees"	We have estimated the number of vessel visits by analysing the average number of passengers based on the size of the vessel. The "do nothing" average is based on the average number of passengers currently, which is 9,756 passengers and 28 vessels, giving 348 per vessel. Thereafter, annually, we have assumed passenger numbers per vessel would increase by 1% on average. The total estimated annual passenger numbers, have therefore been divided by the expected average passenger numbers to give an expected number of vessel visits. The expected number of vessel visits have then had a cancellation percentage applied. In both "do nothing" scenarios, we have applied a 15% cancellation percentage to reduce the vessel visits.	The tables included in Section 5, show the expected number of visits per annum up to year 30 based on the calculations described. The full 50 year forecast vessel visit numbers can be found in Appendix 1 on the relevant NPV working papers.

Net present value calculations – assumptions

Input	Basis of calculation	Justification
Vessel visits – "240m berth"	We have estimated the number of vessel visits by analysing the average number of passengers based on the size of the vessel. The "240m berth" average passengers per vessel is based on the average number of passengers currently, which is 9,756 passengers and 28 vessels, giving 348 passengers per vessel, and the average number of passengers on board the vessels currently cruising the comparable islands, which are less than 240m in length, being 583 PAX (see Section 5). Thereafter, annually, we have assumed passenger numbers would increase by 0.5% on average. The total estimated annual passenger numbers, have therefore been divided by the expected average passenger numbers to give an expected number of vessel visits. The expected number of vessel visits have then had a cancellation percentage applied. In the 240m berth scenario, we have applied a 15% cancellation percentage to reduce the vessel visits.	The tables included in Appendix 1, show the expected number of visits per annum up to year 50 based on the calculations described. The 15% cancellation rate is based on the current year actual cancellations experienced by vessels which could have berthed on the 150m berth but cancelled their visits to the IOM entirely due to poor weather (based on 4 visits being cancelled out of 28 scheduled visits).
Vessel visits – "450m berth"	We have estimated the number of vessel visits by analysing the average number of passengers based on the size of the vessel. The "450m berth" average passengers per vessel is based on the average number of passengers for the do nothing scenario (348 PAX), the 240m berth (583 PAX), and the average number of passengers on board the vessels currently cruising the comparable islands, considering all lengths, being 1,135 (see Section 5). The average of the three averages gives 688 passengers per vessel as a starting point. This has thereafter been increased annually, assuming passenger numbers would increase by 5% for 5 years, 4% for 5 years, and then 3% up to year 30 on average. Between year 31 – 50, a 0.5% growth rate has been applied. The total estimated annual passenger numbers, have therefore been divided by the expected average passenger numbers to give an expected number of vessel visits. The expected number of vessel visits have then had a cancellation percentage applied. In both "450m berth" scenarios, we have applied a 2% cancellation percentage to reduce the vessel visits.	The tables included in Appendix 1, show the expected number of visits per annum up to year 50 based on the calculations described. By year 30, 175 vessel visits have been forecast using these assumptions. This would mean assuming only one vessel visit per day, over the cruise season of March – October (214 days), this would mean an 81% usage rate for the berth during the peak season. A 2% cancellation rate has been applied based on discussions with IOMSA and Neptumar. The location of the 450m berth is considered to be more sheltered from weather disruption, and feedback and research suggests larger vessels cancellation rates are low.

Net present value calculations – assumptions

Input	Basis of calculation	Justification
Harbour fees – "do nothing" - assuming no change to existing dues	Passenger charges have been calculated based on the estimated numbers of alighting passenger per annum (see passenger calculations in Section 5), at a rate of £0.50 each way (i.e. getting off and back on the vessel whilst in port). There is also currently a fixed charge for berthing in the bay, which is £808.11 per vessel. Towage fees are not currently payable to the IOM government, as this function is outsourced to Laxey Towage Company, as such no towage fees have been reflected	These are the current harbour charges charged by the IOM. See Section 6 for further information.
Harbour fees – "do nothing except increase harbour fees"	Passenger charges have been calculated based on the estimated numbers of alighting passenger per annum (see passenger calculations in Section 5), at a rate of £0.80 each way (i.e. getting off and back on the vessel whilst in port). It is assumed that harbour rates would be charged on a gross tonnage basis per vessel, at a rate of £0.20 per GRT. An average gross tonnage of 20,062 per vessel has been used based on our review of the comparable island vessels. This average cost was then times by the number of expected vessel visits as calculated. Pilotage fees have been calculated based on the Orkney scales charges. A fixed fee of £150 is charged initially, and then for each 1,000 GRT over 4,000 GRT, a fee of £1.60 is payable. This result is then multiplied by the number of vessel visits, and then by a factor of 2 to account for pilotage in and out of the bay/existing berth. Finally, boarding and landing charges have also been included, based on the Orkney rates. A fixed fee of £200 is charged initially, and then for each 1,000 GRT over 4,000 GRT, a fee of £1.60 is payable. This result is then multiplied by the number of vessel visits.	20,062 GRT was found to be the average GRT of the vessels which were less than 240m long. See working in Appendix 2.
Crew spend	Crew spend has been included as a token amount, assuming that 15 crew members per vessel alight, and spend £10 each.	Research suggests that crew spend accounts for a small proportion of income.
Inflation	All sources of income have been inflated annually at a rate of 2.3% which was the prevailing rate of inflation per the Bank of England as at April 2017.	Office of National Statistics.

Net present value calculations – assumptions

Net present value calculations

The following page shows the estimated NPV positions for the following 5 scenarios:

- "Do nothing" – this is the expected position if there are no changes made to the existing harbour infrastructure or harbour charges.
- "Do nothing – except increase the harbour dues" – this is the expected position if there are no changes made to the existing harbour infrastructure, but the harbour charges are amended to charge on a gross tonnage, passenger boarding and alighting charges are increased, and pilotage charges become receivable.
- "240m berth" –this is the expected position if an extension to the existing Queen Victoria Pier is carried out.
- "450m (caisson) berth" - this is the expected position if a new 450m berth (including another 250m smaller berth fit for cargo vessels/smaller cruise ships) is built adjacent to the existing Alexander Pier as part of a wider harbour.
- "450m (concrete) berth" – this is the expected position if a new berth capable of housing vessels up to 400m in length is constructed.

Net present value calculations – summary positions

	Do nothing	Do nothing - except increase the harbour rates	240m Berth	450m (caisson) Berth	450m (concrete) Berth
Initial Investment	0	0	(23,877,300)	(108,530,060)	(68,530,060)
TOTAL 15 year NPV	3,018,713	5,777,839	(17,394,622)	(84,641,379)	(44,927,147)
TOTAL 20 year NPV	4,248,120	8,160,735	(14,645,468)	(68,156,139)	(28,858,500)
TOTAL 25 year NPV	5,497,863	10,592,516	(11,918,121)	(49,459,502)	(10,772,046)
TOTAL 30 year NPV	6,768,603	13,073,277	(9,213,935)	(28,721,592)	9,158,691
TOTAL 35 year NPV	8,061,971	15,610,307	(6,525,972)	(7,412,449)	29,522,328
TOTAL 40 year NPV	9,380,577	18,219,621	(3,838,506)	13,369,211	49,283,073
TOTAL 45 year NPV	10,725,130	20,902,678	(1,152,409)	33,623,418	68,460,969
TOTAL 50 year NPV	12,094,442	23,644,801	1,514,347	53,385,213	87,105,082
IRR (50 years)	n/a	n/a	0.23%	1.38%	3.01%
NPV (at X%)	2.30%	2.30%	3.00%	3.00%	3.00%
Payback Period (Years)	n/a	n/a	48	37	28

Net present value calculations – Do nothing

Year	Vessel visits	Adj Visits (after 15% cancel)	PAX	80% PAX alight	Harbour fees per PAX	Gross PAX spend	Net exchequer profit per PAX	Total Exchequer benefit per PAX (Harbour fees + Net	+ Crew spend	Total income	Costs	Total	Discount rate 2.3%	Discounted total	Discounted cumulative
0	28	24	9,756	7,805	1.10	44.48	11.14	12.24	3,600	86,945	0	86,945			
1	30	26	10,439	8,351	3.52	45.50	11.93	15.45	3,900	132,888	0	132,888	1.000	132,888	132,888
2	31	26	11,170	8,936	3.43	46.55	12.20	15.63	3,990	143,677	0	143,677	0.978	140,447	273,335
3	33	28	11,952	9,561	3.52	47.62	12.49	16.01	4,395	157,451	0	157,451	0.956	150,451	423,786
4	35	30	12,788	10,231	3.61	48.72	12.77	16.38	4,818	172,388	0	172,388	0.934	161,020	584,806
5	37	31	13,683	10,947	3.60	49.84	13.07	16.67	5,093	187,544	0	187,544	0.913	171,238	756,044
6	40	34	14,641	11,713	3.75	50.98	13.37	17.11	5,714	206,178	0	206,178	0.893	184,020	940,064
7	42	36	15,666	12,533	3.81	52.15	13.67	17.48	6,189	225,267	0	225,267	0.872	196,537	1,136,601
8	44	37	16,763	13,410	3.79	53.35	13.99	17.78	6,508	244,873	0	244,873	0.853	208,839	1,345,439
9	47	40	17,936	14,349	3.90	54.58	14.31	18.21	7,197	268,511	0	268,511	0.834	223,850	1,569,289
10	50	43	19,192	15,353	4.00	55.84	14.64	18.64	7,915	294,150	0	294,150	0.815	239,711	1,809,001
11	50	43	19,287	15,430	4.08	57.12	14.98	19.06	8,097	302,162	0	302,162	0.797	240,704	2,049,704
12	49	42	19,384	15,507	4.09	58.43	15.32	19.42	8,090	309,162	0	309,162	0.779	240,743	2,290,448
13	49	42	19,481	15,585	4.17	59.78	15.67	19.85	8,277	317,590	0	317,590	0.761	241,746	2,532,194
14	49	42	19,578	15,663	4.26	61.15	16.03	20.29	8,467	326,249	0	326,249	0.744	242,753	2,774,947
15	49	42	19,676	15,741	4.34	62.56	16.40	20.74	8,662	335,144	0	335,144	0.727	243,766	3,018,713
16	48	41	19,775	15,820	4.35	64.00	16.78	21.13	8,650	342,937	0	342,937	0.711	243,826	3,262,539
17	48	41	19,873	15,899	4.44	65.47	17.17	21.60	8,849	352,296	0	352,296	0.695	244,848	3,507,387
18	48	41	19,973	15,978	4.52	66.98	17.56	22.08	9,052	361,911	0	361,911	0.679	245,876	3,753,263
19	48	41	20,073	16,058	4.61	68.52	17.96	22.58	9,261	371,791	0	371,791	0.664	246,909	4,000,172
20	48	41	20,173	16,138	4.70	70.09	18.38	23.08	9,474	381,941	0	381,941	0.649	247,947	4,248,120
21	47	40	20,274	16,219	4.72	71.71	18.80	23.52	9,455	390,860	0	390,860	0.635	248,033	4,496,152
22	47	40	20,375	16,300	4.81	73.35	19.23	24.04	9,673	401,541	0	401,541	0.620	249,081	4,745,234
23	47	40	20,477	16,382	4.90	75.04	19.67	24.58	9,895	412,514	0	412,514	0.606	250,135	4,995,369
24	47	40	20,579	16,464	5.00	76.77	20.13	25.13	10,123	423,788	0	423,788	0.593	251,194	5,246,563
25	46	39	20,682	16,546	5.01	78.53	20.59	25.60	10,097	433,719	0	433,719	0.579	251,301	5,497,863
26	46	39	20,786	16,629	5.11	80.34	21.06	26.18	10,329	445,583	0	445,583	0.566	252,370	5,750,234
27	46	39	20,890	16,712	5.21	82.19	21.55	26.76	10,566	457,774	0	457,774	0.554	253,445	6,003,679
28	46	39	20,994	16,795	5.31	84.08	22.04	27.36	10,809	470,299	0	470,299	0.541	254,526	6,258,205
29	45	38	21,099	16,879	5.33	86.01	22.55	27.88	10,774	481,357	0	481,357	0.529	254,653	6,512,858
30	45	38	21,205	16,964	5.43	87.99	23.07	28.50	11,022	494,538	0	494,538	0.517	255,745	6,768,603
31	45	38	21,311	17,049	5.54	90.01	23.60	29.14	11,276	508,082	0	508,082	0.506	256,841	7,025,444
32	45	38	21,417	17,134	5.65	92.08	24.14	29.79	11,535	521,999	0	521,999	0.494	257,944	7,283,388
33	45	38	21,524	17,219	5.76	94.20	24.70	30.46	11,800	536,298	0	536,298	0.483	259,051	7,542,439
34	44	37	21,632	17,306	5.78	96.37	25.27	31.04	11,754	548,962	0	548,962	0.472	259,207	7,801,646
35	44	37	21,740	17,392	5.89	98.59	25.85	31.74	12,024	564,012	0	564,012	0.462	260,325	8,061,971
36	44	37	21,849	17,479	6.01	100.85	26.44	32.45	12,301	579,476	0	579,476	0.451	261,450	8,323,421
37	44	37	21,958	17,566	6.13	103.17	27.05	33.18	12,584	595,366	0	595,366	0.441	262,580	8,586,001
38	43	37	22,068	17,654	6.25	105.55	27.67	33.92	12,873	611,694	0	611,694	0.431	263,715	8,849,716
39	43	37	22,178	17,743	6.37	107.97	28.31	34.68	13,169	628,471	0	628,471	0.421	264,857	9,114,573
40	43	37	22,289	17,831	6.50	110.46	28.96	35.46	13,472	645,710	0	645,710	0.412	266,004	9,380,577
41	43	37	22,400	17,920	6.63	113.00	29.63	36.25	13,782	663,424	0	663,424	0.403	267,157	9,647,734
42	43	37	22,512	18,010	6.76	115.60	30.31	37.06	14,099	681,626	0	681,626	0.394	268,315	9,916,049
43	42	36	22,625	18,100	6.78	118.25	31.00	37.78	14,034	697,840	0	697,840	0.385	268,522	10,184,570
44	42	36	22,738	18,191	6.91	120.97	31.72	38.63	14,356	717,001	0	717,001	0.376	269,692	10,454,262
45	42	36	22,852	18,281	7.05	123.76	32.45	39.49	14,687	736,691	0	736,691	0.368	270,868	10,725,130
46	42	36	22,966	18,373	7.19	126.60	33.19	40.38	15,024	756,923	0	756,923	0.359	272,050	10,997,179
47	42	36	23,081	18,465	7.33	129.51	33.96	41.29	15,370	777,713	0	777,713	0.351	273,237	11,270,417
48	41	35	23,196	18,557	7.35	132.49	34.74	42.09	15,287	796,287	0	796,287	0.343	273,473	11,543,890
49	41	35	23,312	18,650	7.50	135.54	35.54	43.03	15,638	818,175	0	818,175	0.336	274,673	11,818,563
50	41	35	23,429	18,743	7.64	138.66	36.35	44.00	15,998	840,667	0	840,667	0.328	275,879	12,094,442

Key:

Orange cells are the expected passenger numbers which would be achieved in all scenarios, as it is assumed that it would take 3 years to construct a berth.

Green lines represent positive NPV points at 10 year intervals.

Net present value calculations – Do nothing except increase harbour fees

Year	Vessel visits	Adj Visits (after 15% cancel)	PAX	80% PAX alight	Harbour fees per PAX	Gross PAX spend	Net exchequer profit per PAX	Total Exchequer benefit per PAX (Harbour fees + Net	+ Crew spend	Total income	Costs	Total	Discount rate 2.3%	Discounted total	Discounted cumulative
0	28	24	9,756	7,805	1.10	44.48	11.14	12.24	3,600	86,945	0	86,945			
1	30	26	10,439	8,351	18.05	45.50	11.93	29.98	3,900	254,259	0	254,259	1.000	254,259	254,259
2	31	26	11,170	8,936	17.51	46.55	12.20	29.72	3,990	269,521	0	269,521	0.978	263,462	517,720
3	33	28	11,952	9,561	18.17	47.62	12.49	30.66	4,395	297,526	0	297,526	0.956	284,298	802,018
4	35	30	12,788	10,231	18.77	48.72	12.77	31.55	4,818	327,542	0	327,542	0.934	305,943	1,107,961
5	37	31	13,683	10,947	18.77	49.84	13.07	31.83	5,093	353,544	0	353,544	0.913	322,805	1,430,766
6	40	34	14,641	11,713	19.80	50.98	13.37	33.17	5,714	394,205	0	394,205	0.893	351,839	1,782,605
7	42	36	15,666	12,533	20.24	52.15	13.67	33.91	6,189	431,182	0	431,182	0.872	376,189	2,158,795
8	44	37	16,763	13,410	20.13	53.35	13.99	34.12	6,508	464,038	0	464,038	0.853	395,753	2,554,548
9	47	40	17,936	14,349	20.96	54.58	14.31	35.27	7,197	513,349	0	513,349	0.834	427,964	2,982,512
10	50	43	19,192	15,353	21.72	55.84	14.64	36.36	7,915	566,194	0	566,194	0.815	461,407	3,443,919
11	50	43	19,287	15,430	22.31	57.12	14.98	37.29	8,097	583,458	0	583,458	0.797	464,786	3,908,705
12	49	42	19,384	15,507	22.43	58.43	15.32	37.75	8,090	593,536	0	593,536	0.779	462,184	4,370,889
13	49	42	19,481	15,585	23.04	59.78	15.67	38.71	8,277	611,628	0	611,628	0.761	465,565	4,836,454
14	49	42	19,578	15,663	23.67	61.15	16.03	39.70	8,467	630,277	0	630,277	0.744	468,974	5,305,427
15	49	42	19,676	15,741	24.31	62.56	16.40	40.71	8,662	649,500	0	649,500	0.727	472,411	5,777,839
16	48	41	19,775	15,820	24.43	64.00	16.78	41.21	8,650	660,546	0	660,546	0.711	469,644	6,247,483
17	48	41	19,873	15,899	25.09	65.47	17.17	42.26	8,849	680,686	0	680,686	0.695	473,082	6,720,565
18	48	41	19,973	15,978	25.77	66.98	17.56	43.33	9,052	701,446	0	701,446	0.679	476,550	7,197,115
19	48	41	20,073	16,058	26.47	68.52	17.96	44.44	9,261	722,845	0	722,845	0.664	480,047	7,677,162
20	48	41	20,173	16,138	27.19	70.09	18.38	45.57	9,474	744,902	0	744,902	0.649	483,573	8,160,735
21	47	40	20,274	16,219	27.31	71.71	18.80	46.11	9,455	757,350	0	757,350	0.635	480,600	8,641,335
22	47	40	20,375	16,300	28.05	73.35	19.23	47.29	9,673	780,453	0	780,453	0.620	484,126	9,125,461
23	47	40	20,477	16,382	28.82	75.04	19.67	48.49	9,895	804,267	0	804,267	0.606	487,681	9,613,142
24	47	40	20,579	16,464	29.60	76.77	20.13	49.73	10,123	828,814	0	828,814	0.593	491,267	10,104,409
25	46	39	20,682	16,546	29.71	78.53	20.59	50.30	10,097	842,423	0	842,423	0.579	488,107	10,592,516
26	46	39	20,786	16,629	30.52	80.34	21.06	51.59	10,329	868,125	0	868,125	0.566	491,690	11,084,206
27	46	39	20,890	16,712	31.35	82.19	21.55	52.90	10,566	894,618	0	894,618	0.554	495,303	11,579,509
28	46	39	20,994	16,795	32.20	84.08	22.04	54.25	10,809	921,928	0	921,928	0.541	498,947	12,078,457
29	45	38	21,099	16,879	32.31	86.01	22.55	54.86	10,774	936,786	0	936,786	0.529	495,590	12,574,047
30	45	38	21,205	16,964	33.19	87.99	23.07	56.26	11,022	965,371	0	965,371	0.517	499,230	13,073,277
31	45	38	21,311	17,049	34.09	90.01	23.60	57.69	11,276	994,835	0	994,835	0.506	502,901	13,576,177
32	45	38	21,417	17,134	35.02	92.08	24.14	59.16	11,535	1,025,208	0	1,025,208	0.494	506,602	14,082,780
33	45	38	21,524	17,219	35.97	94.20	24.70	60.67	11,800	1,056,515	0	1,056,515	0.483	510,335	14,593,115
34	44	37	21,632	17,306	36.07	96.37	25.27	61.33	11,754	1,073,185	0	1,073,185	0.472	506,732	15,099,847
35	44	37	21,740	17,392	37.05	98.59	25.85	62.90	12,024	1,105,943	0	1,105,943	0.462	510,459	15,610,307
36	44	37	21,849	17,479	38.06	100.85	26.44	64.50	12,301	1,139,710	0	1,139,710	0.451	514,218	16,124,525
37	44	37	21,958	17,566	39.10	103.17	27.05	66.15	12,584	1,174,518	0	1,174,518	0.441	518,008	16,642,533
38	43	37	22,068	17,654	40.16	105.55	27.67	67.83	12,873	1,210,397	0	1,210,397	0.431	521,831	17,164,364
39	43	37	22,178	17,743	41.25	107.97	28.31	69.56	13,169	1,247,383	0	1,247,383	0.421	525,685	17,690,049
40	43	37	22,289	17,831	42.38	110.46	28.96	71.34	13,472	1,285,508	0	1,285,508	0.412	529,572	18,219,621
41	43	37	22,400	17,920	43.53	113.00	29.63	73.16	13,782	1,324,809	0	1,324,809	0.403	533,492	18,753,113
42	43	37	22,512	18,010	44.72	115.60	30.31	75.03	14,099	1,365,323	0	1,365,323	0.394	537,445	19,290,558
43	42	36	22,625	18,100	44.81	118.25	31.00	75.81	14,034	1,386,257	0	1,386,257	0.385	533,417	19,823,976
44	42	36	22,738	18,191	46.03	120.97	31.72	77.75	14,356	1,428,629	0	1,428,629	0.376	537,362	20,361,338
45	42	36	22,852	18,281	47.29	123.76	32.45	79.73	14,687	1,472,307	0	1,472,307	0.368	541,340	20,902,678
46	42	36	22,966	18,373	48.57	126.60	33.19	81.77	15,024	1,517,332	0	1,517,332	0.359	545,352	21,448,031
47	42	36	23,081	18,465	49.90	129.51	33.96	83.86	15,370	1,563,746	0	1,563,746	0.351	549,398	21,997,428
48	41	35	23,196	18,557	49.97	132.49	34.74	84.70	15,287	1,587,133	0	1,587,133	0.343	545,078	22,542,506
49	41	35	23,312	18,650	51.33	135.54	35.54	86.86	15,638	1,635,656	0	1,635,656	0.336	549,113	23,091,619
50	41	35	23,429	18,743	52.73	138.66	36.35	89.08	15,998	1,685,676	0	1,685,676	0.328	553,182	23,644,801

Key:

Orange cells are the expected passenger numbers which would be achieved in all scenarios, as t is assumed that it would take 3 years to construct a berth.

Green lines represent positive NPV points at 10 year intervals.

Net present value calculations – 240m berth

Year	Vessel visits	Adj Visits (after 15% cancel)	PAX	80% PAX alight	% PAX growth movement	Average PAX per vessel visit	% growth movt in average pax per vessel	Harbour fees per PAX	Gross PAX spend	Net exchequer profit per PAX	Total Exchequer benefit per PAX (Harbour fees + Net	+ Crew spend	Total income	Seasonal salary groundsmen (2 people - est £20k each)	Salary costs (2 x tug operators)	Costs	Total	Discount rate 3%	Discounted total	Discounted cumulative
0			9,756	7,805				Fixed presently	44.48	11.14			86,945		-					
1	30	26	10,439	8,351	7.0%	472	1.50%	24.92	45 50	11 93	36.85	3,900	311,635.97	-	-	(23,877,300)	(23,565,664)	1.000	(23,565,664)	(23,565,664)
2	31	26	11,170	8,936	7.0%	479	1.50%	24.15	46 55	12 20	36.35	3,990	328,805	-	-	(20,460)	308,345	0.971	299,364	(23,266,300)
3	33	28	11,952	9,561	7.0%	486	1.50%	25.07	47 62	12.49	37.56	4,395	363,492	-	-	(20,931)	342,561	0.943	322,897	(22,943,403)
4	33	30	16,190	12,952	13.5%	494	1.50%	20.83	48.72	12.77	33.60	4,818	439,993	(42,824)	(85,648)	(21,412)	290,110	0.915	265,491	(22,677,912)
5	37	31	18,376	14,701	13.5%	501	1.50%	19.72	49 84	13 07	32.79	5,093	487,142	(43,809)	(87,618)	(21,904)	333,811	0.888	296,587	(22,381,325)
6	42	34	20,857	16,685	13.5%	508	1.50%	19.73	50 98	13 37	33.10	5,714	557,940	(44,817)	(89,633)	(22,408)	401,082	0.863	345,977	(22,035,348)
7	47	36	23,672	18,938	13.5%	516	1.50%	19.12	52.15	13 67	32.79	6,189	627,173	(45,847)	(91,695)	(22,924)	466,707	0.837	390,860	(21,644,488)
8	52	37	26,868	21,495	13.5%	524	1.50%	18.04	53 35	13 99	32.03	6,508	694,942	(46,902)	(93,804)	(23,451)	530,785	0.813	431,577	(21,212,911)
9	58	40	30,495	24,396	13.5%	532	1.50%	17.82	54 58	14 31	32.13	7,197	791,072	(47,981)	(95,961)	(23,990)	623,140	0.789	491,912	(20,720,999)
10	65	43	34,612	27,690	13.5%	540	1.50%	17.52	55 84	14 64	32.16	7,915	898,368	(49,084)	(98,168)	(24,542)	726,573	0.766	556,858	(20,164,141)
11	64	43	34,785	27,828	0.5%	548	1.50%	17.99	57.12	14 98	32.97	8,097	925,622	(50,213)	(100,426)	(25,107)	749,876	0.744	557,978	(19,606,162)
12	64	42	34,959	27,967	0.5%	556	1.50%	18.10	58.43	15 32	33.42	8,090	942,831	(51,368)	(102,736)	(25,684)	763,044	0.722	551,239	(19,054,923)
13	63	42	35,134	28,107	0.5%	564	1.50%	18.59	59.78	15 67	34.27	8,277	971,423	(52,549)	(105,099)	(26,275)	787,501	0.701	552,337	(18,502,586)
14	63	42	35,310	28,248	0.5%	573	1.50%	19.10	61.15	16 03	35.13	8,467	1,000,890	(53,758)	(107,516)	(26,879)	812,737	0.681	553,434	(17,949,152)
15	62	42	35,486	28,389	0.5%	581	1.50%	19.62	62 56	16.40	36.02	8,662	1,031,258	(54,994)	(109,989)	(27,497)	838,777	0.661	554,530	(17,394,622)
16	61	41	35,664	28,531	0.5%	590	1.50%	19.73	64 00	16.78	36.51	8,650	1,050,183	(56,259)	(112,519)	(28,130)	853,275	0.642	547,685	(16,846,937)
17	61	41	35,842	28,674	0.5%	599	1.50%	20.26	65.47	17.17	37.43	8,849	1,082,033	(57,553)	(115,107)	(28,777)	880,596	0.623	548,759	(16,298,178)
18	60	41	36,021	28,817	0.5%	608	1.50%	20.81	66 98	17 56	38.37	9,052	1,114,857	(58,877)	(117,754)	(29,439)	908,788	0.605	549,832	(15,748,347)
19	59	41	36,201	28,961	0.5%	617	1.50%	21.38	68 52	17 96	39.34	9,261	1,148,686	(60,231)	(120,462)	(30,116)	937,877	0.587	550,904	(15,197,443)
20	59	41	36,382	29,106	0.5%	626	1.50%	21.96	70 09	18 38	40.34	9,474	1,183,549	(61,617)	(123,233)	(30,808)	967,892	0.570	551,975	(14,645,468)
21	58	40	36,564	29,251	0.5%	636	1.50%	22.07	71.71	18 80	40.87	9,455	1,204,948	(63,034)	(126,067)	(31,517)	984,330	0.554	545,000	(14,100,469)
22	58	40	36,747	29,398	0.5%	645	1.50%	22.67	73 35	19 23	41.90	9,673	1,241,503	(64,483)	(128,967)	(32,242)	1,015,811	0.538	546,048	(13,554,420)
23	57	40	36,931	29,545	0.5%	655	1.50%	23.29	75 04	19 67	42.96	9,895	1,279,176	(65,967)	(131,933)	(32,983)	1,048,293	0.522	547,096	(13,007,324)
24	57	40	37,115	29,692	0.5%	665	1.50%	23.92	76.77	20.13	44.05	10,123	1,318,002	(67,484)	(134,968)	(33,742)	1,081,809	0.507	548,144	(12,459,180)
25	56	39	37,301	29,841	0.5%	675	1.50%	24.03	78 53	20 59	44.62	10,097	1,341,487	(69,036)	(138,072)	(34,518)	1,099,861	0.492	541,059	(11,918,121)
26	56	39	37,488	29,990	0.5%	685	1.50%	24.68	80 34	21 06	45.74	10,329	1,382,185	(70,624)	(141,248)	(35,312)	1,135,001	0.478	542,083	(11,376,038)
27	55	39	37,675	30,140	0.5%	695	1.50%	25.35	82.19	21 55	46.90	10,566	1,424,128	(72,248)	(144,496)	(36,124)	1,171,259	0.464	543,107	(10,832,932)
28	54	39	37,863	30,291	0.5%	706	1.50%	26.04	84 08	22 04	48.09	10,809	1,467,354	(73,910)	(147,820)	(36,955)	1,208,669	0.450	544,130	(10,288,802)
29	54	38	38,053	30,442	0.5%	716	1.50%	26.14	86 01	22 55	48.69	10,774	1,493,099	(75,610)	(151,219)	(37,805)	1,228,465	0.437	536,934	(9,751,868)
30	53	38	38,243	30,594	0.5%	727	1.50%	26.85	87 99	23 07	49.92	11,022	1,538,396	(77,349)	(154,698)	(38,674)	1,267,675	0.424	537,933	(9,213,935)
31	53	38	38,434	30,747	0.5%	738	1.50%	27.59	90 01	23 60	51.18	11,276	1,585,078	(79,128)	(158,256)	(39,564)	1,308,131	0.412	538,933	(8,675,002)
32	52	38	38,626	30,901	0.5%	749	1.50%	28.34	92 08	24.14	52.48	11,535	1,633,189	(80,948)	(161,895)	(40,474)	1,349,872	0.400	539,931	(8,135,071)
33	52	38	38,819	31,056	0.5%	760	1.50%	29.11	94 20	24.70	53.81	11,800	1,682,772	(82,810)	(165,619)	(41,405)	1,392,938	0.388	540,930	(7,594,141)
34	51	37	39,014	31,211	0.5%	771	1.50%	29.20	96 37	25 27	54.47	11,754	1,711,779	(84,714)	(169,428)	(42,357)	1,415,280	0.377	533,598	(7,060,544)
35	51	37	39,209	31,367	0.5%	783	1.50%	30.00	98 59	25 85	55.85	12,024	1,763,720	(86,663)	(173,325)	(43,331)	1,460,401	0.366	534,572	(6,525,972)
36	50	37	39,405	31,524	0.5%	795	1.50%	30.82	100 85	26.44	57.26	12,301	1,817,249	(88,656)	(177,312)	(44,328)	1,506,954	0.355	535,546	(5,990,425)
37	50	37	39,602	31,681	0.5%	807	1.50%	31.65	103.17	27 05	58.70	12,584	1,872,417	(90,695)	(181,390)	(45,347)	1,554,985	0.345	536,520	(5,453,905)
38	49	37	39,800	31,840	0.5%	819	1.50%	32.52	105 55	27 67	60.19	12,873	1,929,273	(92,781)	(185,562)	(46,390)	1,604,540	0.335	537,494	(4,916,411)
39	49	37	39,999	31,999	0.5%	831	1.50%	33.40	107 97	28 31	61.71	13,169	1,987,870	(94,915)	(189,830)	(47,457)	1,655,668	0.325	538,466	(4,377,945)
40	48	37	40,199	32,159	0.5%	844	1.50%	34.31	110.46	28 96	63.27	13,472	2,048,261	(97,098)	(194,196)	(48,549)	1,708,418	0.316	539,439	(3,838,506)
41	48	37	40,400	32,320	0.5%	856	1.50%	35.25	113 00	29 63	64.87	13,782	2,110,501	(99,331)	(198,662)	(49,666)	1,762,842	0.307	540,411	(3,298,094)
42	47	37	40,602	32,481	0.5%	869	1.50%	36.21	115 60	30 31	66.52	14,099	2,174,648	(101,616)	(203,231)	(50,808)	1,818,993	0.298	541,383	(2,756,711)
43	47	36	40,805	32,644	0.5%	882	1.50%	36.30	118 25	31 00	67.31	14,034	2,211,222	(103,953)	(207,906)	(51,976)	1,847,387	0.289	533,819	(2,222,892)
44	46	36	41,009	32,807	0.5%	895	1.50%	37.29	120 97	31.72	69.01	14,356	2,278,391	(106,344)	(212,688)	(53,172)	1,906,188	0.281	534,768	(1,688,124)
45	46	36	41,214	32,971	0.5%	909	1.50%	38.31	123.76	32.45	70.76	14,687	2,347,617	(108,790)	(217,579)	(54,395)	1,966,853	0.272	535,715	(1,152,409)
46	46	36	41,420	33,136	0.5%	922	1.50%	39.36	126 60	33.19	72.55	15,024	2,418,964	(111,292)	(222,584)	(55,646)	2,029,443	0.264	536,663	(615,746)
47	45	36	41,627	33,302	0.5%	936	1.50%	40.43	129 51	33 96	74.38	15,370	2,492,497	(113,852)	(227,703)	(56,926)	2,094,016	0.257	537,610	(78,136)
48	45	35	41,835	33,468	0.5%	950	1.50%	40.51	132.49	34.74	75.24	15,287	2,533,567	(116,470)	(232,940)	(58,235)	2,125,921	0.249	529,904	451,769
49	44	35	42,044	33,635	0.5%	964	1.50%	41.61	135 54	35 54	77.15	15,638	2,610,535	(119,149)	(238,298)	(59,575)	2,193,514	0.242	530,828	982,596
50	44	35	42,254	33,804	0.5%	979	1.50%	42.75	138 66	36 35	79.10	15,998	2,689,861	(121,889)	(243,779)	(60,945)	2,263,248	0.235	531,751	1,514,347

Key:

Orange cells in the PAX column are the expected passenger numbers which would be achieved in all scenarios, as t is assumed that it would take 3 years to construct a berth.

Orange lines are the 10 year interval pos tions of the project, at which point the project is still in a negative cumulative NPV pos t on.

Green lines represent the break even year of the project.

Net present value calculations – 450m caisson berth

Year	Vessel visits	Adj Visits (after 2% cancel)	PAX	80% PAX alight	% PAX growth movement	Average PAX per vessel visit	% growth movt in average pax per vessel	Harbour fees per PAX	Gross PAX spend	Net exchequer profit per PAX	Total Exchequer benefit per PAX (Harbour fees + Net	+ Crew spend	Total income	Salary costs (2 x tug operators, 2 x port security (seasonal))	Capital and maintenance costs	Total	Discount rate 3%	Discounted total	Discounted cumulative
0			9,756	7,805				Fixed presently	44.48	11.14			86,945	-					
1	30	26	10,439	8,351	7 0%	698	1.50%	24.92	45.50	11 93	36.85	3,900	311,635.97	-	(108,530,060)	(108,218,424)	1 000	(108,218,424)	(108,218,424)
2	31	26	11,170	8,936	7 0%	709	1.50%	24.15	46.55	12 20	36.35	3,990	328,805	-	0	328,805	0 971	319,228	(107,899,196)
3	33	28	11,952	9,561	7 0%	719	1.50%	25.07	47.62	12.49	37.56	4,395	363,492	-	0	363,492	0 943	342,626	(107,556,570)
4	33	32	23,818	19,055	25 0%	730	1.50%	29.31	48.72	12.77	42.08	5,139	806,970	(171,296)	(80,295)	555,379	0 915	508,251	(107,048,319)
5	40	39	29,773	23,818	25 0%	741	1.50%	29.55	49.84	13 07	42.61	6,407	1,021,363	(175,236)	(82,142)	763,986	0 888	678,791	(106,369,528)
6	49	48	37,216	29,773	25 0%	752	1.50%	30.06	50.98	13 37	43.43	8,067	1,301,088	(179,266)	(84,031)	1,037,791	0 863	895,207	(105,474,321)
7	61	60	46,520	37,216	25 0%	764	1.50%	31.04	52.15	13 67	44.71	10,316	1,674,317	(183,389)	(85,964)	1,404,964	0 837	1,176,635	(104,297,685)
8	75	74	58,150	46,520	25 0%	775	1.50%	31.64	53.35	13 99	45.63	13,015	2,135,772	(187,607)	(87,941)	1,860,224	0 813	1,512,532	(102,785,153)
9	92	90	72,688	58,150	25 0%	787	1.50%	31.84	54.58	14 31	46.15	16,193	2,699,707	(191,922)	(89,963)	2,417,821	0.789	1,908,651	(100,876,503)
10	114	112	90,860	72,688	25 0%	798	1.50%	32.73	55.84	14 64	47.37	20,615	3,463,996	(196,336)	(92,033)	3,175,627	0.766	2,433,853	(98,442,649)
11	118	116	95,403	76,322	5 0%	810	1.50%	33.36	57.12	14 98	48.34	21,843	3,711,113	(200,852)	(94,149)	3,416,111	0.744	2,541,907	(95,900,742)
12	122	120	100,173	80,138	5 0%	823	1.50%	33.97	58.43	15 32	49.29	23,116	3,972,808	(205,472)	(96,315)	3,671,022	0.722	2,652,024	(93,248,718)
13	126	123	105,182	84,145	5 0%	835	1.50%	34.28	59.78	15 67	49.95	24,238	4,227,716	(210,198)	(98,530)	3,918,988	0.701	2,748,699	(90,500,018)
14	130	127	110,441	88,353	5 0%	847	1.50%	34.84	61.15	16 03	50.87	25,602	4,520,423	(215,032)	(100,796)	4,204,595	0 681	2,863,124	(87,636,894)
15	135	132	115,963	92,770	5 0%	860	1.50%	35.63	62.56	16.40	52.03	27,222	4,854,077	(219,978)	(103,115)	4,530,985	0 661	2,995,515	(84,641,379)
16	138	135	120,601	96,481	4 0%	873	1.50%	36.21	64.00	16.78	52.99	28,481	5,140,932	(225,037)	(105,486)	4,810,409	0 642	3,087,618	(81,553,761)
17	142	139	125,425	100,340	4 0%	886	1.50%	37.03	65.47	17.17	54.20	30,000	5,468,374	(230,213)	(107,912)	5,130,249	0 623	3,197,001	(78,356,759)
18	145	142	130,442	104,354	4 0%	899	1.50%	37.60	66.98	17 56	55.16	31,352	5,787,464	(235,508)	(110,394)	5,441,562	0 605	3,292,234	(75,064,525)
19	149	146	135,660	108,528	4 0%	913	1.50%	38.40	68.52	17 96	56.37	32,977	6,150,513	(240,925)	(112,933)	5,796,655	0 587	3,404,924	(71,659,601)
20	152	149	141,086	112,869	4 0%	927	1.50%	38.95	70.09	18 38	57.33	34,428	6,505,339	(246,466)	(115,531)	6,143,342	0 570	3,503,462	(68,156,139)
21	155	152	145,319	116,255	3 0%	941	1.50%	39.86	71.71	18 80	58.66	35,929	6,854,939	(252,135)	(118,188)	6,484,616	0 554	3,590,375	(64,565,764)
22	157	154	149,679	119,743	3 0%	955	1.50%	40.52	73.35	19 23	59.75	37,239	7,191,801	(257,934)	(120,906)	6,812,961	0 538	3,662,302	(60,903,462)
23	159	156	154,169	123,335	3 0%	969	1.50%	41.18	75.04	19 67	60.86	38,590	7,544,501	(263,866)	(123,687)	7,156,947	0 522	3,735,157	(57,168,305)
24	161	158	158,794	127,035	3 0%	983	1.50%	41.85	76.77	20.13	61.98	39,984	7,913,774	(269,935)	(126,532)	7,517,306	0 507	3,808,957	(53,359,348)
25	164	161	163,558	130,846	3 0%	998	1.50%	42.78	78.53	20 59	63.37	41,680	8,333,171	(276,144)	(129,442)	7,927,585	0.492	3,899,847	(49,459,502)
26	166	163	168,465	134,772	3 0%	1,013	1.50%	43.46	80.34	21 06	64.52	43,169	8,739,019	(282,495)	(132,420)	8,324,105	0.478	3,975,639	(45,483,863)
27	169	166	173,518	138,815	3 0%	1,028	1.50%	44.40	82.19	21 55	65.94	44,974	9,198,876	(288,992)	(135,465)	8,774,419	0.464	4,068,652	(41,415,211)
28	171	168	178,724	142,979	3 0%	1,044	1.50%	45.09	84.08	22 04	67.13	46,563	9,644,824	(295,639)	(138,581)	9,210,604	0.450	4,146,513	(37,268,698)
29	174	171	184,086	147,269	3 0%	1,060	1.50%	46.03	86.01	22 55	68.59	48,485	10,148,976	(302,439)	(141,768)	9,704,769	0.437	4,241,729	(33,026,970)
30	176	172	189,608	151,687	3 0%	1,075	1.50%	46.48	87.99	23 07	69.55	49,890	10,600,329	(309,395)	(145,029)	10,145,905	0.424	4,305,378	(28,721,592)
31	175	172	190,556	152,445	0 5%	1,092	1.50%	47.77	90.01	23 60	71.37	51,037	10,930,720	(316,511)	(148,365)	10,465,844	0.412	4,311,789	(24,409,803)
32	173	170	191,509	153,207	0 5%	1,108	1.50%	48.55	92.08	24.14	72.70	51,604	11,189,197	(323,791)	(151,777)	10,713,630	0.400	4,285,314	(20,124,489)
33	171	168	192,467	153,973	0 5%	1,125	1.50%	49.35	94.20	24.70	74.04	52,170	11,452,944	(331,238)	(155,268)	10,966,439	0 388	4,258,674	(15,865,814)
34	169	166	193,429	154,743	0 5%	1,141	1.50%	50.14	96.37	25 27	75.41	52,735	11,722,030	(338,857)	(158,839)	11,224,334	0 377	4,231,869	(11,633,946)
35	168	165	194,396	155,517	0 5%	1,159	1.50%	51.24	98.59	25 85	77.09	53,622	12,041,873	(346,650)	(162,492)	11,532,730	0 366	4,221,497	(7,412,449)
36	166	163	195,368	156,295	0 5%	1,176	1.50%	52.06	100.85	26.44	78.50	54,191	12,323,333	(354,623)	(166,230)	11,802,480	0 355	4,194,406	(3,218,043)
37	165	162	196,345	157,076	0 5%	1,194	1.50%	53.19	103.17	27 05	80.24	55,097	12,658,776	(362,780)	(170,053)	12,125,943	0 345	4,183,844	965,800
38	163	160	197,327	157,861	0 5%	1,211	1.50%	54.03	105.55	27 67	81.70	55,669	12,953,072	(371,123)	(173,964)	12,407,984	0 335	4,156,463	5,122,264
39	161	158	198,313	158,651	0 5%	1,230	1.50%	54.87	107.97	28 31	83.18	56,237	13,253,136	(379,659)	(177,965)	12,695,512	0 325	4,128,912	9,251,176
40	160	157	199,305	159,444	0 5%	1,248	1.50%	56.06	110.46	28 96	85.02	57,166	13,612,380	(388,391)	(182,059)	13,041,930	0 316	4,118,036	13,369,211
41	158	155	200,301	160,241	0 5%	1,267	1.50%	56.92	113.00	29 63	86.55	57,736	13,925,928	(397,324)	(186,246)	13,342,358	0 307	4,090,191	17,459,403
42	157	154	201,303	161,042	0 5%	1,286	1.50%	58.14	115.60	30 31	88.45	58,683	14,302,415	(406,463)	(190,530)	13,705,423	0 298	4,079,118	21,538,520
43	155	152	202,309	161,848	0 5%	1,305	1.50%	59.02	118.25	31 00	90.03	59,253	14,629,920	(415,812)	(194,912)	14,019,197	0 289	4,050,976	25,589,496
44	154	150	203,321	162,657	0 5%	1,325	1.50%	59.91	120.97	31.72	91.63	59,818	14,963,609	(425,375)	(199,395)	14,338,840	0 281	4,022,660	29,612,156
45	153	149	204,338	163,470	0 5%	1,344	1.50%	61.18	123.76	32.45	93.63	60,786	15,366,297	(435,159)	(203,981)	14,727,157	0 272	4,011,262	33,623,418
46	153	147	205,359	164,287	0 5%	1,365	1.50%	62.09	126.60	33.19	95.28	61,350	15,714,590	(445,168)	(208,672)	15,060,751	0 264	3,982,644	37,606,063
47	152	146	206,386	165,109	0 5%	1,385	1.50%	63.40	129.51	33 96	97.35	62,334	16,136,264	(455,406)	(213,472)	15,467,386	0 257	3,971,043	41,577,106
48	151	145	207,418	165,934	0 5%	1,406	1.50%	64.73	132.49	34.74	99.47	63,331	16,568,818	(465,881)	(218,382)	15,884,556	0 249	3,959,365	45,536,471
49	150	143	208,455	166,764	0 5%	1,427	1.50%	65.67	135.54	35 54	101.20	63,894	16,941,046	(476,596)	(223,404)	16,241,046	0 242	3,930,314	49,466,784
50	149	142	209,497	167,598	0 5%	1,448	1.50%	67.04	138.66	36 35	103.40	64,906	17,393,794	(487,558)	(228,543)	16,677,693	0 235	3,918,429	53,385,213

Key:

Orange cells in the PAX column are the expected passenger numbers which would be achieved in all scenarios, as it is assumed that it would take 3 years to construct a berth.

Orange lines are the 10 year interval positions of the project, at which point the project is still in a negative cumulative NPV position.

Green lines represent the break even year of the project.

Net present value calculations – 450 concrete berth

Year	Vessel visits	Adj Visits (after 2% cancel)	PAX	80% PAX alight	% PAX growth movement	Average PAX per vessel visit	% growth movt in average pax per vessel	Harbour fees per PAX	Gross PAX spend	Net exchequer profit per PAX	Total Exchequer benefit per PAX (Harbour fees + Net	+ Crew spend	Total income	Salary costs (2 x tug operators, 2 x port security (seasonal))	Costs	Total	Discount rate 3%	Discounted total	Discounted cumulative
0			9,756	7,805				Fixed presently	44.48	11.14			86,945	-					
1	30	26	10,439	8,351	7 0%	698	1.50%	24.92	45.50	11.93	36.85	3,900	311,635.97	-	(68,530,060)	(68,218,424)	1.000	(68,218,424)	(68,218,424)
2	31	26	11,170	8,936	7 0%	709	1.50%	24.15	46.55	12.20	36.35	3,990	328,805	-	0	328,805	0.971	319,228	(67,899,196)
3	33	28	11,952	9,561	7 0%	719	1.50%	25.07	47.62	12.49	37.56	4,395	363,492	-	0	363,492	0.943	342,626	(67,556,570)
4	33	32	23,818	19,055	25 0%	730	1.50%	29.44	48.72	12.77	42.21	5,139	809,453	(171,296)	(80,295)	557,862	0.915	510,523	(67,046,047)
5	40	39	29,773	23,818	25 0%	741	1.50%	29.58	49.84	13.07	42.65	6,407	1,022,164	(175,236)	(82,142)	764,786	0.888	679,503	(66,366,544)
6	49	48	37,216	29,773	25 0%	752	1.50%	30.00	50.98	13.37	43.37	8,067	1,299,221	(179,266)	(84,031)	1,035,924	0.863	893,597	(65,472,947)
7	61	60	46,520	37,216	25 0%	764	1.50%	30.88	52.15	13.67	44.55	10,316	1,668,275	(183,389)	(85,964)	1,398,922	0.837	1,171,575	(64,301,372)
8	75	74	58,150	46,520	25 0%	775	1.50%	31.38	53.35	13.99	45.37	13,015	2,123,560	(187,607)	(87,941)	1,848,012	0.813	1,502,603	(62,798,769)
9	92	90	72,688	58,150	25 0%	787	1.50%	31.48	54.58	14.31	45.79	16,193	2,678,833	(191,922)	(89,963)	2,396,947	0.789	1,892,172	(60,906,597)
10	114	112	90,860	72,688	25 0%	798	1.50%	32.27	55.84	14.64	46.91	20,615	3,430,225	(196,336)	(92,033)	3,141,856	0.766	2,407,971	(58,498,626)
11	118	116	95,403	76,322	5 0%	810	1.50%	32.79	57.12	14.98	47.77	21,843	3,667,743	(200,852)	(94,149)	3,372,741	0.744	2,509,636	(55,988,990)
12	122	120	100,173	80,138	5 0%	823	1.50%	33.29	58.43	15.32	48.61	23,116	3,918,916	(205,472)	(96,315)	3,617,130	0.722	2,613,091	(53,375,898)
13	126	123	105,182	84,145	5 0%	835	1.50%	33.51	59.78	15.67	49.18	24,238	4,162,860	(210,198)	(98,530)	3,854,132	0.701	2,703,211	(50,672,688)
14	130	127	110,441	88,353	5 0%	847	1.50%	33.97	61.15	16.03	50.00	25,602	4,443,140	(215,032)	(100,796)	4,127,311	0.681	2,810,498	(47,862,189)
15	135	132	115,963	92,770	5 0%	860	1.50%	34.64	62.56	16.40	51.04	27,222	4,762,608	(219,978)	(103,115)	4,439,515	0.661	2,935,043	(44,927,147)
16	138	135	120,601	96,481	4 0%	873	1.50%	35.12	64.00	16.78	51.90	28,481	5,035,545	(225,037)	(105,486)	4,705,021	0.642	3,019,974	(41,907,173)
17	142	139	125,425	100,340	4 0%	886	1.50%	35.83	65.47	17.17	52.99	30,000	5,347,203	(230,213)	(107,912)	5,009,077	0.623	3,121,491	(38,785,681)
18	145	142	130,442	104,354	4 0%	899	1.50%	36.28	66.98	17.56	53.84	31,352	5,650,245	(235,508)	(110,394)	5,304,343	0.605	3,209,215	(35,576,466)
19	149	146	135,660	108,528	4 0%	913	1.50%	36.97	68.52	17.96	54.94	32,977	5,995,088	(240,925)	(112,933)	5,641,230	0.587	3,313,628	(32,262,838)
20	152	149	141,086	112,869	4 0%	927	1.50%	37.41	70.09	18.38	55.79	34,428	6,331,526	(246,466)	(115,531)	5,969,529	0.570	3,404,339	(28,858,500)
21	155	152	145,319	116,255	3 0%	941	1.50%	38.19	71.71	18.80	56.99	35,929	6,661,536	(252,135)	(118,188)	6,291,213	0.554	3,483,292	(25,375,207)
22	157	154	149,679	119,743	3 0%	955	1.50%	38.74	73.35	19.23	57.97	37,239	6,978,934	(257,934)	(120,906)	6,600,094	0.538	3,547,876	(21,827,331)
23	159	156	154,169	123,335	3 0%	969	1.50%	39.29	75.04	19.67	58.97	38,590	7,311,083	(263,866)	(123,687)	6,923,529	0.522	3,613,338	(18,213,993)
24	161	158	158,794	127,035	3 0%	983	1.50%	39.85	76.77	20.13	59.97	39,984	7,658,671	(269,935)	(126,532)	7,262,204	0.507	3,679,699	(14,534,295)
25	164	161	163,558	130,846	3 0%	998	1.50%	40.64	78.53	20.59	61.23	41,680	8,053,463	(276,144)	(129,442)	7,647,877	0.492	3,762,249	(10,772,046)
26	166	163	168,465	134,772	3 0%	1,013	1.50%	41.20	80.34	21.06	62.27	43,169	8,435,082	(282,495)	(132,420)	8,020,167	0.478	3,830,477	(6,941,570)
27	169	166	173,518	138,815	3 0%	1,028	1.50%	42.01	82.19	21.55	63.56	44,974	8,867,421	(288,992)	(135,465)	8,442,963	0.464	3,914,958	(3,026,612)
28	171	168	178,724	142,979	3 0%	1,044	1.50%	42.58	84.08	22.04	64.62	46,563	9,286,363	(295,639)	(138,581)	8,852,142	0.450	3,985,138	958,526
29	174	171	184,086	147,269	3 0%	1,060	1.50%	43.39	86.01	22.55	65.94	48,485	9,759,823	(302,439)	(141,768)	9,315,616	0.437	4,071,639	5,030,165
30	176	172	189,608	151,687	3 0%	1,075	1.50%	43.74	87.99	23.07	66.81	49,890	10,183,566	(309,395)	(145,029)	9,729,142	0.424	4,128,526	9,158,691
31	175	172	190,556	152,445	0 5%	1,092	1.50%	44.86	90.01	23.60	68.46	51,037	10,487,691	(316,511)	(148,365)	10,022,815	0.412	4,129,267	13,287,958
32	173	170	191,509	153,207	0 5%	1,108	1.50%	45.52	92.08	24.14	69.66	51,604	10,724,407	(323,791)	(151,777)	10,248,839	0.400	4,099,404	17,387,362
33	171	168	192,467	153,973	0 5%	1,125	1.50%	46.18	94.20	24.70	70.88	52,170	10,966,051	(331,238)	(155,268)	10,479,545	0.388	4,069,596	21,456,958
34	169	166	193,429	154,743	0 5%	1,141	1.50%	46.85	96.37	25.27	72.12	52,735	11,212,696	(338,857)	(158,839)	10,715,001	0.377	4,039,837	25,496,794
35	168	165	194,396	155,517	0 5%	1,159	1.50%	47.80	98.59	25.85	73.64	53,622	11,506,520	(346,650)	(162,492)	10,997,377	0.366	4,025,534	29,522,328
36	166	163	195,368	156,295	0 5%	1,176	1.50%	48.48	100.85	26.44	74.93	54,191	11,764,690	(354,623)	(166,230)	11,243,837	0.355	3,995,873	33,518,201
37	165	162	196,345	157,076	0 5%	1,194	1.50%	49.46	103.17	27.05	76.51	55,097	12,072,892	(362,780)	(170,053)	11,540,059	0.345	3,981,695	37,499,896
38	163	160	197,327	157,861	0 5%	1,211	1.50%	50.16	105.55	27.67	77.84	55,669	12,343,037	(371,123)	(173,964)	11,797,949	0.335	3,952,112	41,452,008
39	161	158	198,313	158,651	0 5%	1,230	1.50%	50.87	107.97	28.31	79.18	56,237	12,618,617	(379,659)	(177,965)	12,060,993	0.325	3,922,550	45,374,558
40	160	157	199,305	159,444	0 5%	1,248	1.50%	51.89	110.46	28.96	80.85	57,166	12,948,823	(388,391)	(182,059)	12,378,373	0.316	3,908,515	49,283,073
41	158	155	200,301	160,241	0 5%	1,267	1.50%	52.62	113.00	29.63	82.25	57,736	13,237,020	(397,324)	(186,246)	12,653,450	0.307	3,879,002	53,162,075
42	157	154	201,303	161,042	0 5%	1,286	1.50%	53.67	115.60	30.31	83.98	58,683	13,583,163	(406,463)	(190,530)	12,986,171	0.298	3,865,048	57,027,123
43	155	152	202,309	161,848	0 5%	1,305	1.50%	54.42	118.25	31.00	85.42	59,253	13,884,445	(415,812)	(194,912)	13,273,721	0.289	3,835,564	60,862,687
44	154	150	203,321	162,657	0 5%	1,325	1.50%	55.16	120.97	31.72	86.88	59,818	14,191,595	(425,375)	(199,395)	13,566,825	0.281	3,806,077	64,668,764
45	153	149	204,338	163,470	0 5%	1,344	1.50%	56.26	123.76	32.45	88.71	60,786	14,562,038	(435,159)	(203,981)	13,922,898	0.272	3,792,205	68,460,969
46	153	147	205,359	164,287	0 5%	1,365	1.50%	57.02	126.60	33.19	90.22	61,350	14,882,927	(445,168)	(208,672)	14,229,088	0.264	3,762,720	72,223,689
47	152	146	206,386	165,109	0 5%	1,385	1.50%	58.16	129.51	33.96	92.11	62,334	15,270,974	(455,406)	(213,472)	14,602,095	0.257	3,748,891	75,972,580
48	151	145	207,418	165,934	0 5%	1,406	1.50%	59.31	132.49	34.74	94.05	63,331	15,669,057	(465,881)	(218,382)	14,984,794	0.249	3,735,091	79,707,672
49	150	143	208,455	166,764	0 5%	1,427	1.50%	60.10	135.54	35.54	95.64	63,894	16,012,447	(476,596)	(223,404)	15,312,447	0.242	3,705,594	83,413,265
50	149	142	209,497	167,598	0 5%	1,448	1.50%	61.29	138.66	36.35	97.64	64,906	16,429,284	(487,558)	(228,543)	15,713,183	0.235	3,691,817	87,105,082

Key:

Orange cells in the PAX column are the expected passenger numbers which would be achieved in all scenarios, as it is assumed that it would take 3 years to construct a berth.

Orange lines are the 10 year interval positions of the project, at which point the project is still in a negative cumulative NPV position.

Green lines represent the break even year of the project.

Net present value calculations – sensitivity analysis "Do nothing"

Option 1

Do nothing

Variables:

Passenger numbers:	Original number of PAX in year 50	No of PAX post adjustment in year 50:	Impact on PAX (year 50)	Original number of cumulative PAX over 50 years	Cumulative PAX post adjustment (50 year)	Impact on cumulative PAX (50 year)	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assuming passenger numbers stayed the same at a level of 9,756 for the foreseeable future	23,429	9,756	(13,673)	995,942	487,800	(508,142)	12,094,442	5,397,701	(6,696,741)
Assuming passenger numbers carry on increasing at a rate of 3% after year 10	23,429	63,603	40,174	995,942	1,634,706	638,764	12,094,442	19,719,215	7,624,773

Passenger spend :	Original gross spend in the economy per passenger	Adjusted gross spend in the economy per passenger	Absolute impact on gross spend in the economy per passenger	Original net exchequer benefit per passenger	Adjusted net exchequer benefit per passenger	Absolute impact on net exchequer benefit per passenger	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assume passenger spend reduced to minimum spend of £25 per passenger	44.48	25.00	(19.48)	11.93	6.26	(5.67)	12,094,442	7,576,849	(4,517,593)
Assume passenger spend increased to a maximum spend of £59 per passenger	44.48	59.00	14.52	11.93	14.78	2.85	12,094,442	14,365,189	2,270,747

Discount factor	Original discount factor applied	Adjusted discount factor	Movement in discount factor	Original NPV (50 year)	NPV after adjustment (50 year)	Impact on NPV
Assume discount factor increased to 5%	2.30%	5.00%	-2.70%	12,094,442	6,518,699	(5,575,743)
Assume discount factor reduced to 1%	2.30%	1.00%	1.30%	12,094,442	17,185,992	5,091,550

Net present value calculations – sensitivity analysis "Do nothing"

	Snapshot in time:												
	Year 5	Year 10	Year 15	Year 20	Year 25	Year 30	Year 35	Year 40	Year 45	Year 50	Base NPV Year 50	Sensitised NPV year 50	Movement
Vessel Visits:													
Estimated visits (PAX / Average PAX per vessel)	37	50	49	48	46	45	44	43	42	41			
15% cancellation rate (weather)	6	7	7	7	7	7	7	6	6	6			
Residual visits expected	32	42	41	40	39	38	37	37	36	35			
Higher visits (PAX / Average PAX per vessel)	37	50	55	61	67	74	82	90	99	109			
15% cancellation rate (weather)	6	7	8	9	10	11	12	13	15	16			
Residual visits expected	32	42	47	52	57	63	69	76	84	93			
Lower visits (PAX / Average PAX per vessel)	27	25	24	23	22	21	20	19	18	17			
15% cancellation rate (weather)	4	4	4	3	3	3	3	3	3	3			
Residual visits expected	23	22	21	20	19	18	17	16	15	14			
Gross Tonnage													
Estimated average GRT (20,062 @T0 - assuming 1% annual increase)	20,877	21,942	23,061	24,237	25,473	26,773	28,138	29,574	31,082	32,668			
Average PAX per vessel (assume 1.0% annual increase) **(Small vessel starting point (average of small 348 PAX)**	366	384	404	425	446	469	493	518	545	572			
Gross PAX													
Estimated (growth 7% first 10 years, 0.5% thereafter until year 50)	13,683	19,192	19,676	20,173	20,682	21,205	21,740	22,289	22,852	23,429			
Higher (growth 7% first 10 years, 3.0% thereafter until year 50	13,683	19,192	22,248	25,792	29,900	34,662	40,183	46,583	54,002	62,603			
Lower (assume passengers remain at a level of 9,756 until year 50)	9,756	9,756	9,756	9,756	9,756	9,756	9,756	9,756	9,756	9,756			
80% of Passengers alight													
Estimated	10,947	15,353	15,741	16,138	16,546	16,964	17,392	17,831	18,281	18,743	12,094,442	12,094,442	0
Higher	10,947	15,353	17,799	20,633	23,920	27,730	32,146	37,266	43,202	50,083	12,094,442	19,719,215	7,624,773
Lower	7,805	7,805	7,805	7,805	7,805	7,805	7,805	7,805	7,805	7,805	12,094,442	5,397,701	(6,696,741)
Passenger Gross spend													
Estimated (£44.48 base)													
Higher (£59 base)													
Lower (£25 base)													
Passenger spend (net exchequer benefit per Pax)													
Estimated (£11.93 base) (Gross spend per PAX £44.48)	13.07	14.64	16.40	18.38	20.59	23.07	25.85	28.96	32.45	36.35	12,094,442	12,094,442	0
Higher (£14.78 base) (Gross spend per PAX £59)	16.19	18.14	20.32	22.77	25.51	28.58	32.02	35.88	40.20	45.04	12,094,442	14,365,189	2,270,747
Lower (£6.26 base) (Gross spend per PAX £25)	6.86	7.68	8.61	9.64	10.80	12.11	13.56	15.20	17.03	19.08	12,094,442	7,576,849	(4,517,593)

Net present value calculations – sensitivity analysis "Do nothing except increase harbour dues"

Option 2
Do nothing except increase harbour dues

Variables:

Passenger numbers:	Original number of PAX in year 50	No of PAX post adjustment in year 50:	Impact on PAX (year 50)	Original number of cumulative PAX over 50 years	Cumulative PAX post adjustment (50 year)	Impact on cumulative PAX (50 year)	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assuming passenger numbers stayed the same at a level of 9,756 for the foreseeable future	23,429	9,756	(13,673)	995,942	487,800	(508,142)	23,644,801	11,552,272	(12,092,529)
Assuming passenger numbers carry on increasing at a rate of 3% after year 10	23,429	63,603	40,174	995,942	1,634,706	638,764	23,644,801	38,696,963	15,052,162

Passenger spend :	Original gross spend in the economy per passenger	Adjusted gross spend in the economy per passenger	Absolute impact on gross spend in the economy per passenger	Original net exchequer benefit per passenger	Adjusted net exchequer benefit per passenger	Absolute impact on net exchequer benefit per passenger	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assume passenger spend reduced to minimum spend of £25 per passenger	44.48	25.00	(19.48)	11.93	6.26	(5.67)	23,644,801	19,127,208	(4,517,593)
Assume passenger spend increased to a maximum spend of £59 per passenger	44.48	59.00	14.52	11.93	14.78	2.85	23,644,801	25,915,549	2,270,748

Discount factor	Original discount factor applied	Adjusted discount factor	Movement in discount factor	Original NPV (50 year)	NPV after adjustment (50 year)	Impact on NPV
Assume discount factor increased to 5%	2.30%	5.00%	-2.70%	23,644,801	12,669,900	(10,974,901)
Assume discount factor reduced to 1%	2.30%	1.00%	1.30%	23,644,801	33,694,188	10,049,387

Net present value calculations – sensitivity analysis "Do nothing except increase harbour dues"

	Snapshot in time:												
	Year 5	Year 10	Year 15	Year 20	Year 25	Year 30	Year 35	Year 40	Year 45	Year 50	Base NPV Year 50	Sensitised NPV year 50	Movement
Vessel Visits:													
Estimated visits (PAX / Average PAX per vessel)	37	50	49	48	46	45	44	43	42	41			
15% cancellation rate (weather)	6	7	7	7	7	7	7	6	6	6			
Residual visits expected	32	42	41	40	39	38	37	37	36	35			
Higher visits (PAX / Average PAX per vessel)	37	50	55	61	67	74	82	90	99	109			
15% cancellation rate (weather)	6	7	8	9	10	11	12	13	15	16			
Residual visits expected	32	42	47	52	57	63	69	76	84	93			
Lower visits (PAX / Average PAX per vessel)	27	25	24	23	22	21	20	19	18	17			
15% cancellation rate (weather)	4	4	4	3	3	3	3	3	3	3			
Residual visits expected	23	22	21	20	19	18	17	16	15	14			
Gross Tonnage													
Estimated average GRT (20,062 @T0 - assuming 1% annual increase)	20,877	21,942	23,061	24,237	25,473	26,773	28,138	29,574	31,082	32,668			
Average PAX per vessel (assume 1.0% annual increase) (Small vessel starting point (average of small 348 PAX)	366	384	404	425	446	469	493	518	545	572			
Gross PAX													
Estimated (growth 7% first 10 years, 0.5% thereafter until year 50)	13,683	19,192	19,676	20,173	20,682	21,205	21,740	22,289	22,852	23,429			
Higher (growth 7% first 10 years, 3.0% thereafter until year 50	13,683	19,192	22,248	25,792	29,900	34,662	40,183	46,583	54,002	62,603			
Lower (assume passengers remain at a level of 9,756 until year 50)	9,756	9,756	9,756	9,756	9,756	9,756	9,756	9,756	9,756	9,756			
80% of Passengers alight													
Estimated	10,947	15,353	15,741	16,138	16,546	16,964	17,392	17,831	18,281	18,743	23,644,801	23,644,801	0
Higher	10,947	15,353	17,799	20,633	23,920	27,730	32,146	37,266	43,202	50,083	23,644,801	38,696,963	15,052,162
Lower	7,805	7,805	7,805	7,805	7,805	7,805	7,805	7,805	7,805	7,805	23,644,801	11,552,272	(12,092,529)
Passenger Gross spend													
Estimated (£44.48 base)													
Higher (£59 base)													
Lower (£25 base)													
Passenger spend (net exchequer benefit per Pax)													
Estimated (£11.93 base) (Gross spend per PAX £44.48)	13.07	14.64	16.40	18.38	20.59	23.07	25.85	28.96	32.45	36.35	23,644,801	23,644,801	0
Higher (£14.78 base) (Gross spend per PAX £59)	16.19	18.14	20.32	22.77	25.51	28.58	32.02	35.88	40.20	45.04	23,644,801	25,915,549	2,270,748
Lower (£6.26 base) (Gross spend per PAX £25)	6.86	7.68	8.61	9.64	10.80	12.11	13.56	15.20	17.03	19.08	23,644,801	19,127,208	(4,517,593)

Net present value calculations – sensitivity analysis 240m berth

Option 3
240m - extention to existing Queen Victoria Pier

Variables:

Passenger numbers:	Original number of PAX in year 50	No of PAX post adjustment in year 50:	Impact on PAX (year 50)	Original number of cumulative PAX over 50 years	Cumulative PAX post adjustment (50 year)	Impact on cumulative PAX (50 year)	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assuming passenger numbers grow at a lower rate of 10% (rather than 13.5%) for the first 10 years, and then 0.5% thereafter until year 50	42,254	30,892	(11,362)	1,745,058	1,292,079	(452,979)	1,514,347	(2,503,847)	(4,018,194)
Assuming passenger numbers grow at a rate of 13.5% until year 10 and carry on increasing at a rate of 3.5% until year 50	42,254	137,039	94,785	1,745,058	3,233,538	1,488,480	1,514,347	14,021,546	12,507,199

Passenger spend :	Original gross spend in the economy per passenger	Adjusted gross spend in the economy per passenger	Absolute impact on gross spend in the economy per passenger	Original net exchequer benefit per passenger	Adjusted net exchequer benefit per passenger	Absolute impact on net exchequer benefit per passenger	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assume passenger spend reduced to minimum spend of £25 per passenger	44.48	25.00	(19.48)	11.93	6.26	(5.67)	1,514,347	(5,069,016)	(6,583,363)
Assume passenger spend increased to a maximum spend of £59 per passenger	44.48	59.00	14.52	11.93	14.78	2.85	1,514,347	4,823,445	3,309,098

Discount factor	Original discount factor applied	Adjusted discount factor	Movement in discount factor	Original NPV (50 year)	NPV after adjustment (50 year)	Impact on NPV
Assume discount factor increased to 7%	3.00%	7.00%	-4.00%	1,514,347	(13,013,985)	(14,528,332)
Assume discount factor reduced to 1%	3.00%	1.00%	2.00%	1,514,347	19,786,896	18,272,549

Net present value calculations – sensitivity analysis 240m berth

	Snapshot in time:												
	Year 5	Year 10	Year 15	Year 20	Year 25	Year 30	Year 35	Year 40	Year 45	Year 50	Base NPV Year 50	Sensitised NPV year 50	Movement
Vessel Visits:													
Estimated visits (PAX / Average PAX per vessel)	36.68	64	61	58	55	53	50	48	45	43			
15% cancellation rate (weather)	6	10	9	9	8	8	8	7	7	6			
Residual visits expected	31	55	52	49	47	45	43	41	39	37			
Higher visits (PAX / Average PAX per vessel)	37	64	71	78	86	95	104	115	127	140			
15% cancellation rate (weather)	6	10	11	12	13	14	16	17	19	21			
Residual visits expected	31	55	60	66	73	81	89	98	108	119			
Lower visits (PAX / Average PAX per vessel)	31	47	45	42	40	38	37	35	33	32			
15% cancellation rate (weather)	5	7	7	6	6	6	5	5	5	5			
Residual visits expected	27	40	38	36	34	33	31	30	28	27			
Gross Tonnage													
Estimated average GRT (20,062 @T0 - assuming 1% annual increase)	20,877	21,942	23,061	24,237	25,473	26,773	28,138	29,574	31,082	32,668			
Average PAX per vessel (assume 1.5% annual increase)	501	540	581	626	675	727	783	844	909	979			
(Small/Medium vessel starting point (average of small (348 + 548)													
Gross PAX													
Estimated (growth 13.5% first 10 years, 0.5% thereafter until year 50	18,376	34,612	35,486	36,382	37,301	38,243	39,209	40,199	41,214	42,254			
Higher (growth 13.5% first 10 years, 3.5% thereafter until year 50	18,376	34,612	41,109	48,824	57,988	68,871	81,797	97,150	115,383	137,039			
Lower (growth 10% first 10 years, 0.5% thereafter)	15,712	25,305	25,944	26,599	27,270	27,959	28,665	29,389	30,131	30,892			
80% of Passengers alight													
Estimated	14,701	27,690	28,389	29,106	29,841	30,594	31,367	32,159	32,971	33,804	1,514,347	1,514,347	0
Higher	14,701	27,690	32,887	39,059	46,390	55,097	65,438	77,720	92,307	109,631	1,514,347	14,021,546	12,507,199
Lower	12,570	20,244	20,755	21,279	21,816	22,367	22,932	23,511	24,105	24,713	1,514,347	(2,503,807)	(4,018,154)
Passenger Gross spend													
Estimated (£44.48 base)													
Higher (£59 base)													
Lower (£25 base)													
Passenger spend (net exchequer benefit per Pax)													
Estimated (£11.93 base) (Gross spend per PAX £44.48)	13.07	14.64	16.40	18.38	20.59	23.07	25.85	28.96	32.45	36.35	1,514,347	1,514,347	0
Higher (£14.78 base) (Gross spend per PAX £59)	16.19	18.14	20.32	22.77	25.51	28.58	32.02	35.88	40.20	45.04	1,514,347	4,823,445	3,309,098
Lower (£6.26 base) (Gross spend per PAX £25)	6.86	7.68	8.61	9.64	10.80	12.11	13.56	15.20	17.03	19.08	1,514,347	(5,069,016)	(6,583,363)

Net present value calculations – sensitivity analysis 450m (caisson) berth

Option 4
450m berth caisson structure - new cruise berth adjacent to the Alexander Pier, including additional 250m berth

Variables:

Passenger numbers:	Original number of PAX in year 50	No of PAX post adjustment in year 50:	Impact on PAX (year 50)	Original number of cumulative PAX over 50 years	Cumulative PAX post adjustment (50 year)	Impact on cumulative PAX (50 year)	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assuming passenger numbers grow at a lower rate of 15% (rather than 25%) for the first 10 years, and then 2% growth until year 50 (rather than 5%, 4%, 3% and 0.5% respectively (for the next 5, 5, 10 and 20 years respectively))	209,497	87,148	(122,349)	7,236,585	2,654,049	(4,582,536)	53,385,213	(54,696,934)	(108,082,147)
Assuming passenger numbers grow at a rate of 25% for the first 10 years, and then 5%, 4%, 3% and 2% respectively for the next 5, 5, 10 and 20 years respectively, (rather than 5%, 4%, 3% and 0.5% for the next 5, 5, 10 and 20 years respectively)	209,497	281,748	72,251	7,236,585	7,938,004	701,419	53,385,213	67,773,752	14,388,539

Passenger spend :	Original gross spend in the economy per passenger	Adjusted gross spend in the economy per passenger	Absolute impact on gross spend in the economy per passenger	Original net exchequer benefit per passenger	Adjusted net exchequer benefit per passenger	Absolute impact on net exchequer benefit per passenger	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assume passenger spend reduced to minimum spend of £25 per passenger	44.48	25.00	(19)	11.93	6.26	(5.67)	53,385,213	26,609,261	(26,775,952)
Assume passenger spend increased to a maximum spend of £59 per passenger	44.48	59.00	15	11.93	14.78	2.85	53,385,213	66,844,025	13,458,812

Discount factor	Original discount factor applied	Adjusted discount factor	Movement in discount factor	Original NPV (50 year)	NPV after adjustment (50 year)	Impact on NPV
Assume discount factor increased to 7%	3.00%	7.00%	-4.00%	53,385,213	(48,958,545)	(102,343,758)
Assume discount factor reduced to 1%	3.00%	1.00%	2.00%	53,385,213	186,221,773	132,836,560

Net present value calculations – sensitivity analysis 450m (caisson) berth

	Snapshot in time:												
	Year 5	Year 10	Year 15	Year 20	Year 25	Year 30	Year 35	Year 40	Year 45	Year 50	Base NPV Year 50	Sensitised NPV year 50	Movement
Vessel Visits:													
Estimated visits (PAX / Average PAX per vessel)	40.17	114	135	152	164	176	168	160	152	145			
2% cancellation rate (weather)	1	2	3	3	3	4	3	3	3	3			
Residual visits expected	39	112	132	149	161	173	164	156	149	142			
Higher visits (PAX / Average PAX per vessel)	40	114	135	152	164	176	181	185	190	195			
2% cancellation rate (weather)	1	2	3	3	3	4	4	4	4	4			
Residual visits expected	39	112	132	149	161	173	177	181	186	191			
Lower visits (PAX / Average PAX per vessel)	26	49	51	52	53	55	56	57	59	60			
2% cancellation rate (weather)	1	1	1	1	1	1	1	1	1	1			
Residual visits expected	26	48	50	51	52	53	55	56	58	59			
Gross Tonnage													
Estimated average GRT (20,062 @T0 - assuming 1% annual increase)	42,856	44,597	46,871	49,262	51,775	54,416	57,192	60,109	63,176	66,398			
Average PAX per vessel (assume 1.5% annual increase)	741	798	860	927	998	1075	1,158.51	1,248.04	1,344.50	1,448.41			
(Medium vessel starting point (average of small (348 + 548 + 1,135)													
Gross PAX													
Estimated (growth 25.0% first 10 years, 5% (5 years), 4% (5 years) and 3% (10 years), 0.5% until year 50	29,773	90,860	115,963	141,086	163,558	189,608	194,396	199,305	204,338	209,497			
Estimated (growth 25.0% first 10 years, 5% (5 years), 4% (5 years) and 3% (10 years), 2% until year 50	29,773	90,860	115,963	141,086	163,558	189,608	209,343	231,131	255,188	281,748			
Lower (growth 15% first 10 years, 2% thereafter)	19,623	39,468	43,576	48,112	53,119	58,648	64,752	71,492	78,933	87,148			
80% of Passengers alight													
Estimated	23,818	72,688	92,770	112,869	130,846	151,687	155,517	159,444	163,470	167,598	53,385,213	53,385,213	0
Higher	23,818	72,688	92,770	112,869	130,846	151,687	167,474	184,905	204,150	225,398	53,385,213	67,773,752	14,388,539
Lower	15,698	31,575	34,861	38,489	42,495	46,918	51,802	57,193	63,146	69,718	53,385,213	(54,696,934)	(108,082,147)
Passenger Gross spend													
Estimated (£44.48 base)													
Higher (£59 base)													
Lower (£25 base)													
Passenger spend (net exchequer benefit per Pax)													
Estimated (£11.93 base) (Gross spend per PAX £44.48)	13.07	14.64	16.40	18.38	20.59	23.07	25.85	28.96	32.45	36.35	53,385,213	53,385,213	0
Higher (£14.78 base) (Gross spend per PAX £59)	16.19	18.14	20.32	22.77	25.51	28.58	32.02	35.88	40.20	45.04	53,385,213	66,844,025	13,458,812
Lower (£6.26 base) (Gross spend per PAX £25)	6.86	7.68	8.61	9.64	10.80	12.11	13.56	15.20	17.03	19.08	53,385,213	26,609,261	(26,775,952)

Net present value calculations – sensitivity analysis 450m (concrete) berth

Option 5
450m concrete berth - new cruise berth adjacent to the Alexander Pier capable of housing a 400m vessel

Variables

Passenger numbers	Original number of PAX in year 50	No of PAX post adjustment in year 50	Impact on PAX (year 50)	Original number of cumulative PAX over 50 years	Cumulative PAX post adjustment (50 year)	Impact on cumulative PAX (50 year)	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assuming passenger numbers grow at a lower rate of 15% (rather than 25%) for the first 10 years, and then 2% growth until year 50 (rather than 5%, 4%, 3% and 0.5% respectively (for the next 5, 5, 10 and 20 years respectively))	209,497	87,148	(122,349)	7,236,585	2,654,049	(4,582,536)	87,105,082	(16,936,234)	(104,041,316)
Assuming passenger numbers grow at a rate of 25% for the first 10 years, and then 5%, 4%, 3% and 2% respectively for the next 5, 5, 10 and 20 years respectively, (rather than 5%, 4%, 3% and 0.5% for the next 5, 5, 10 and 20 years respectively)	209,497	281,748	72,251	7,236,585	7,938,004	701,419	87,105,082	100,759,979	13,654,897

Passenger spend	Original gross spend in the economy per passenger	Adjusted gross spend in the economy per passenger	Absolute impact on gross spend in the economy per passenger	Original net exchequer benefit per passenger	Adjusted net exchequer benefit per passenger	Absolute impact on net exchequer benefit per passenger	Original NPV (Year 50)	NPV after adjustment (Year 50)	Impact on NPV
Assume passenger spend reduced to minimum spend of £25 per passenger	44.48	25.00	(19)	11.93	6.26	(5.67)	87,105,082	60,329,130	(26,775,952)
Assume passenger spend increased to a maximum spend of £59 per passenger	44.48	59 00	15	11.93	14.78	2.85	87,105,082	100,563,894	13,458,812

Discount factor	Original discount factor applied	Adjusted discount factor	Movement in discount factor	Original NPV (50 year)	NPV after adjustment (50 year)	Impact on NPV
Assume discount factor increased to 7%	3.00%	7.00%	-4.00%	87,105,082	(10,843,939)	(97,949,021)
Assume discount factor reduced to 1%	3.00%	1.00%	2.00%	87,105,082	213,815,116	126,710,034

Net present value calculations – sensitivity analysis 450m (concrete) berth

	Snapshot in time:												
	Year 5	Year 10	Year 15	Year 20	Year 25	Year 30	Year 35	Year 40	Year 45	Year 50	Base NPV Year 50	Sensitised NPV year 50	Movement
Vessel Visits:													
Estimated visits (PAX / Average PAX per vessel)	40.17	114	135	152	164	176	168	160	152	145			
2% cancellation rate (weather)	1	2	3	3	3	4	3	3	3	3			
Residual visits expected	39	112	132	149	161	173	164	156	149	142			
Higher visits (PAX / Average PAX per vessel)	40	114	135	152	164	176	181	185	190	195			
2% cancellation rate (weather)	1	2	3	3	3	4	4	4	4	4			
Residual visits expected	39	112	132	149	161	173	177	181	186	191			
Lower visits (PAX / Average PAX per vessel)	26	49	51	52	53	55	56	57	59	60			
2% cancellation rate (weather)	1	1	1	1	1	1	1	1	1	1			
Residual visits expected	26	48	50	51	52	53	55	56	58	59			
Gross Tonnage													
Estimated average GRT (20,062 @T0 - assuming 1% annual increase)	42,856	44,597	46,871	49,262	51,775	54,416	57,192	60,109	63,176	66,398			
Average PAX per vessel (assume 1.5% annual increase) (Medium vessel starting point (average of small (348 + 548 + 1,135)	741	798	860	927	998	1075	1,158.51	1,248.04	1,344.50	1,448.41			
Gross PAX													
Estimated (growth 25.0% first 10 years, 5% (5 years), 4% (5 years) and 3% (10 years), 0.5% until year 50	29,773	90,860	115,963	141,086	163,558	189,608	194,396	199,305	204,338	209,497			
Estimated (growth 25.0% first 10 years, 5% (5 years), 4% (5 years) and 3% (10 years), 2% until year 50	29,773	90,860	115,963	141,086	163,558	189,608	209,343	231,131	255,188	281,748			
Lower (growth 15% first 10 years, 2% thereafter)	19,623	39,468	43,576	48,112	53,119	58,648	64,752	71,492	78,933	87,148			
80% of Passengers alight													
Estimated	23,818	72,688	92,770	112,869	130,846	151,687	155,517	159,444	163,470	167,598	87,105,082	87,105,082	0
Higher	23,818	72,688	92,770	112,869	130,846	151,687	167,474	184,905	204,150	225,398	87,105,082	100,759,979	13,654,897
Lower	15,698	31,575	34,861	38,489	42,495	46,918	51,802	57,193	63,146	69,718	87,105,082	(16,936,234)	(104,041,316)
Passenger Gross spend													
Estimated (£44.48 base)													
Higher (£59 base)													
Lower (£25 base)													
Passenger spend (net exchequer benefit per Pax)													
Estimated (£11.93 base) (Gross spend per PAX £44.48)	13.07	14.64	16.40	18.38	20.59	23.07	25.85	28.96	32.45	36.35	87,105,082	87,105,082	0
Higher (£14.78 base) (Gross spend per PAX £59)	16.19	18.14	20.32	22.77	25.51	28.58	32.02	35.88	40.20	45.04	87,105,082	100,563,894	13,458,812
Lower (£6.26 base) (Gross spend per PAX £25)	6.86	7.68	8.61	9.64	10.80	12.11	13.56	15.20	17.03	19.08	87,105,082	60,329,130	(26,775,952)

NPV calculations – Capital and maintenance cost assumptions

Capital costs breakdown	Do nothing	Do nothing - increase harbour rates	240m berth	450m (caisson) berth	450m (concrete) berth
Expected cost of the cruise berth	-	-	16,000,000	80,000,000	40,000,000
Estimated cost of moving wire/fibre op ic cable to new location	-	-	-	2,000,000	2,000,000
Estimated cost of road infrastructure to trasport passengers from cruise berth to their excursions by coach.	-	-	-	5,000,000	5,000,000
Total before contingencies built in	-	-	**16,000,000**	**87,000,000**	**47,000,000**
Built in addi ional for poten ial overuns	-	-	4,000,000	13,000,000	13,000,000
Total after contingencies built in	-	-	**20,000,000**	**100,000,000**	**60,000,000**
Total : built in percentage for overuns	-	-	**25%**	**15%**	**28%**
Justifica ion for the es imated overruns	n/a	n/a	As his is an extension to an existing structure, it is possible when work begins, structural problems may be iden ified.	This project's estimated capital cost is £80m, however in the absence of a breakdown of this amount, it is possible that estimated costs could be understated, however as the base amount is sizeable to begin wi h, we have rounded the es imated capital cost up to 100,000,000 as an expected worst case scenario cost. There are further expected costs in rela ion to the inclusion of a coach turning bay and a onshore facility for passenger security and check-in purposes. It is es imated that the built in contingency amount ought to cover this.	This project's es imated capital cost is at a very initial stage in he planning process, as such it is more likely hat the estimated costs could be understated, however as he base amount is larger to begin with, we have rounded he estimated capital cost up to 60,000,000 as an expected worst case scenario cost. There are fur her expected costs in relation to he inclusion an onshore facility for passenger security and check-in purposes. It is estimated that he built in contingency amount ought to cover his.

Maintenance costs	Do nothing	Do nothing - increase harbour rates	240m berth	450m (caisson) berth	450m (concrete) berth
Expected annual maintenance cost	-	-	20,000	75,000	75,000
Commencing of maintenance charges	-	-	Year 2	Year 4	Year 4
Infla ion applied to annual charge	-	-	2.3%	2.3%	2.3%
Total cumula ive inflated maintence costs built in over 15 years	-	-	333,464	1,095,274	1,095,274
Total cumula ive inflated maintence costs built in over 20 years	-	-	480,732	1,647,531	1,647,531
Total cumula ive overall maintence costs built in over 25 years	-	-	645,734	2,266,287	2,266,287
Total cumula ive overall maintence costs built in over 30 years	-	-	830,604	2,959,550	2,959,550
Total cumula ive inflated maintence costs built in over 35 years	-	-	1,037,735	3,736,291	3,736,291
Total cumula ive inflated maintence costs built in over 40 years	-	-	1,269,807	4,606,562	4,606,562
Total cumula ive overall maintence costs built in over 45 years	-	-	1,529,824	5,581,624	5,581,624
Total cumula ive overall maintence costs built in over 50 years	-	-	1,821,150	6,674,097	6,674,097
Justifica ion for the es imated costs.	n/a	n/a	We have assumed hat mainenance costs would accrue evenly, although in reality it is likely hat maintenance costs could be more sporadic.	We have assumed hat mainenance costs would accrue evenly, although in reality it is likely hat maintenance costs could be more sporadic. We have assumed hat a new build would come with some kind of warranty for the first 3 years.	We have assumed that mainenance costs would accrue evenly, although in reality it is likely that maintenance costs could be more sporadic. We have assumed that a new build would come with some kind of warranty for he first 3 years.

NPV calculations – Tugs requirement assumptions

Expected Tug requirements	Do nothing	Do nothing - increase harbour rates	240m berth	450m (caisson) berth	450m (concrete) berth
1 x 50 ton bollard pull tug (es imated cost USD 5 million) (exchange 0.77546 Oanda.com)	-	-	£3,877,300		
1 x 70 ton bollard pull tug (es imated cost USD 6 million); and 1 x 50 ton bollard pull tug (es imated cost USD 5 million) (exchange 0.77546 Oanda.com)	-	-		£8,530,060	£8,530,060

Appendix 2
Vessel analysis summaries

Summary of vessels visiting comparable islands

Vessel name, Gross Tonnages and Length Data

The summary above has been derived from the cruise call schedules of the Isle of Man, Orkney, Shetland, Faroe Islands, Jersey, Guernsey and the Isle of Mull.

Vessel Name	GT	LOA	Year of build	Age	PAX
Adonia	30,277	180.00	2001	16	798
Aegean Odyssey	11,906	141.00	1972	45	420
AIDAcara	38,531	193.00	1996	21	1,180
AidAdiva	69,203	252.00	2007	10	2,100
AIDAluna	69,203	252.00	2009	8	2,100
AIDAsol	71,300	252.00	2011	6	2,174
AidaVita	42,289	202.00	2002	15	1,266
Albatros	28,518	206.00	1973	44	812
Amadea	29,008	192.00	1991	26	620
Arcadia	84,342	290.00	2005	12	2,556
Artania	44,656	231.00	1984	33	700
Astor	20,704	176.00	1987	30	578
Astoria	15,614	160.00	1948	69	580
Aurora	76,152	270.00	2000	17	1,874
Azamara Journey	30,277	181.00	2000	17	777
Azura	115,055	290.00	2010	7	3,597
Berlin	10,550	139.00	1980	37	450
Black Watch	28,613	205.00	1972	45	891
Boudicca	28,388	205.00	1973	44	856
Bremen	6,752	111.00	1990	27	184
Britannia	143,730	330.00	2015	2	4,324
Caribbean Princess	112,894	290.00	2004	13	3,599
Celebrity Eclipse	121,878	317.00	2010	7	2,852
Celebrity Silhouette	122,210	315.00	2011	6	2,886
Columbus	63,786	247.00	1989	28	1,817
Corinthian	4,077	88.00	1990	27	110

Vessel Name	GT	LOA	Year of build	Age	PAX
Costa Magica	102,587	271.00	2004	13	3,470
Crown Princess	113,561	288.00	2006	11	2,926
Crystal Symphony	51,044	238.00	1995	22	922
Deutschland	22,400	175.00	1998	19	520
Disney Magic	83,338	300.00	1998	19	2,809
Europa	28,890	179.00	1999	18	408
Europa 2	42,830	226.00	2013	4	706
Expedition	6,334	104.00	1972	45	140
Fram	11,647	114.00	2007	10	600
Gann	6,257	109.00	1982	35	120
Hamburg	15,067	144.13	1996	21	423
Hanseatic	8,378	122.00	1991	26	184
Hebridean Princess	2,112	72.00	1964	53	50
Hebridean Sky	4,200	91.00	1991	26	200
Island Sky	4,200	91.00	1992	25	200
Le Boreal	10,944	142.00	2010	7	264
Le Soleal	10,992	142.10	2013	4	264
Magellan	46,052	222.00	1985	32	1,860
Marco Polo	22,080	176.00	1965	52	850
Marina	66,084	238.00	2011	6	1,250
Mein Schiff 1	76,998	264.00	1996	21	1,870
Mein Schiff 3	99,526	293.00	2014	3	1,870
Mein Schiff 4	99,526	294.00	2015	2	1,870
Midnatsol	16,151	135.00	2003	14	674
Minerva	12,892	122.00	1996	21	2,790
MSC Preziosa	139,072	333.00	2013	4	4,345

Summary of vessels visiting comparable islands (continued)

Vessel name, Gross Tonnages and Length (continued)

The summary above has been derived from the cruise call schedules of the Isle of Man, Orkney, Shetland, Faroe Islands, Jersey, Guernsey and the Isle of Mull.

Vessel Name	GT	LOA	Year of build	Age	PAX
Nat. Geographic Explorer	6,471	112.00	1982	35	148
Nat. Geographic Orion	3,984	103.00	2003	14	106
Nautica	30,277	181.00	2000	17	684
Norwegian Jade	93,558	294.00	2006	11	2,400
Ocean Majesty	10,417	135.00	1966	51	623
Ocean Nova	2,183	50.00	1992	25	80
Oriana	69,840	260.00	1995	22	1,928
Pacific Pearl	63,500	247.00	1989	28	1,516
Pacific Princess	30,277	181.00	1999	18	688
Polar Pioneer	1,753	71.00	1985	32	54
Prinsendam	39,051	204.00	1988	29	793
Queen Elizabeth	90,901	294.00	2010	7	2,068
Rotterdam	61,849	238.00	1997	20	1,360
Saga Pearl II	18,627	164.00	1981	36	450
Saga Sapphire	37,049	200.00	1981	36	700
Sea Cloud II	3,849	106.00	2000	17	94
Seabourne Quest	32,477	198.00	2011	6	450
Serenissima	2,598	87.00	1960	57	120
Seven Seas Explorer	54,000	224.00	2016	1	750
Seven Seas Navigator	28,803	171.00	1999	18	750
Silver Cloud	16,927	137.00	1994	23	296
Silver Explorer	6,130	108.00	1989	28	150
Silver Spirit	36,009	196.00	2009	8	540
Silver Whisper	28,258	167.00	2001	16	750
Silver Wind	17,235	155.00	1995	22	296
Spitsbergen	7,025	98.00	2009	8	335
Star Legend	9,961	135.00	1992	25	212
Star Pride	9,975	134.00	1988	29	212
Statsraad Lehmkuhl	1,516	99.00	1914	103	200
Thomson Celebration	33,933	214.00	1984	33	1,254
Variety Voyager	1,593	66.00	2012	5	70
Ventura	116,017	291.00	2008	9	3,597
Viking Sea	47,800	227.00	2016	1	930
Viking Sky	47,800	227.00	2017	0	930
Viking Star	47,800	227.00	2015	2	930
Vision of the Seas	78,340	279.00	1998	19	2,435
Voyager	15,396	151.00	1990	27	540
Wind Surf	14,745	187.00	1990	27	312
Zuiderdam	82,305	285.00	2002	15	1,848

Total Vessels	AVG GT:	AVG LOA:	AVG Age	AVG Age	AVG PAX
91	**42,014.33**	**192.34**	**1995**	**22**	**1,135**

Average data of vessels <240m

Vessel Name	GT	LOA	Year of build	Age	PAX
Viking Sky	47,800	227.00	2017	0	930
Seven Seas Explorer	54,000	224.00	2016	1	750
Viking Sea	47,800	227.00	2016	1	930
Viking Star	47,800	227.00	2015	2	930
Europa 2	42,830	226.00	2013	4	706
Le Soleal	10,992	142.10	2013	4	264
Variety Voyager	1,593	66.00	2012	5	70
Marina	66,084	238.00	2011	6	1,250
Seabourne Quest	32,477	198.00	2011	6	450
Le Boreal	10,944	142.00	2010	7	264
Silver Spirit	36,009	196.00	2009	8	540
Spitsbergen	7,025	98.00	2009	8	335
Fram	11,647	114.00	2007	10	600
Midnatsol	16,151	135.00	2003	14	674
Nat. Geographic Orion	3,984	103.00	2003	14	106
AidaVita	42,289	202.00	2002	15	1,266
Adonia	30,277	180.00	2001	16	798
Silver Whisper	28,258	167.00	2001	16	750
Azamara Journey	30,277	181.00	2000	17	777
Nautica	30,277	181.00	2000	17	684
Sea Cloud II	3,849	106.00	2000	17	94
Europa	28,890	179.00	1999	18	408
Pacific Princess	30,277	181.00	1999	18	688
Seven Seas Navigator	28,803	171.00	1999	18	750
Deutschland	22,400	175.00	1998	19	520
Rotterdam	61,849	238.00	1997	20	1,360
AIDAcara	38,531	193.00	1996	21	1,180
Hamburg	15,067	144.13	1996	21	423
Minerva	12,892	122.00	1996	21	2,790
Crystal Symphony	51,044	238.00	1995	22	922
Silver Wind	17,235	155.00	1995	22	296
Silver Cloud	16,927	137.00	1994	23	296
Island Sky	4,200	91.00	1992	25	200

Vessel Name	GT	LOA	Year of build	Age	PAX
Ocean Nova	2,183	50.00	1992	25	80
Star Legend	9,961	135.00	1992	25	212
Amadea	29,008	192.00	1991	26	620
Hanseatic	8,378	122.00	1991	26	184
Hebridean Sky	4,200	91.00	1991	26	200
Bremen	6,752	111.00	1990	27	184
Corinthian	4,077	88.00	1990	27	110
Voyager	15,396	151.00	1990	27	540
Wind Surf	14,745	187.00	1990	27	312
Silver Explorer	6,130	108.00	1989	28	150
Prinsendam	39,051	204.00	1988	29	793
Star Pride	9,975	134.00	1988	29	212
Astor	20,704	176.00	1987	30	578
Magellan	46,052	222.00	1985	32	1,860
Polar Pioneer	1,753	71.00	1985	32	54
Artania	44,656	231.00	1984	33	700
Thomson Celebration	33,933	214.00	1984	33	1,254
Gann	6,257	109.00	1982	35	120
Nat. Geographic Explorer	6,471	112.00	1982	35	148
Saga Pearl II	18,627	164.00	1981	36	450
Saga Sapphire	37,049	200.00	1981	36	700
Berlin	10,550	139.00	1980	37	450
Albatros	28,518	206.00	1973	44	812
Boudicca	28,388	205.00	1973	44	856
Aegean Odyssey	11,906	141.00	1972	45	420
Black Watch	28,613	205.00	1972	45	891
Expedition	6,334	104.00	1972	45	140
Ocean Majesty	10,417	135.00	1966	51	623
Marco Polo	22,080	176.00	1965	52	850
Hebridean Princess	2,112	72.00	1964	53	50
Serenissima	2,598	87.00	1960	57	120
Astoria	15,614	160.00	1948	69	580
Statsraad Lehmkuhl	1,516	99.00	1914	103	200

Total Vessels	AVG GT:	AVG LOA:	AVG Age	AVG Age	AVG PAX
66	20,061	142.54	1991	26	583

Average data of vessels >240m

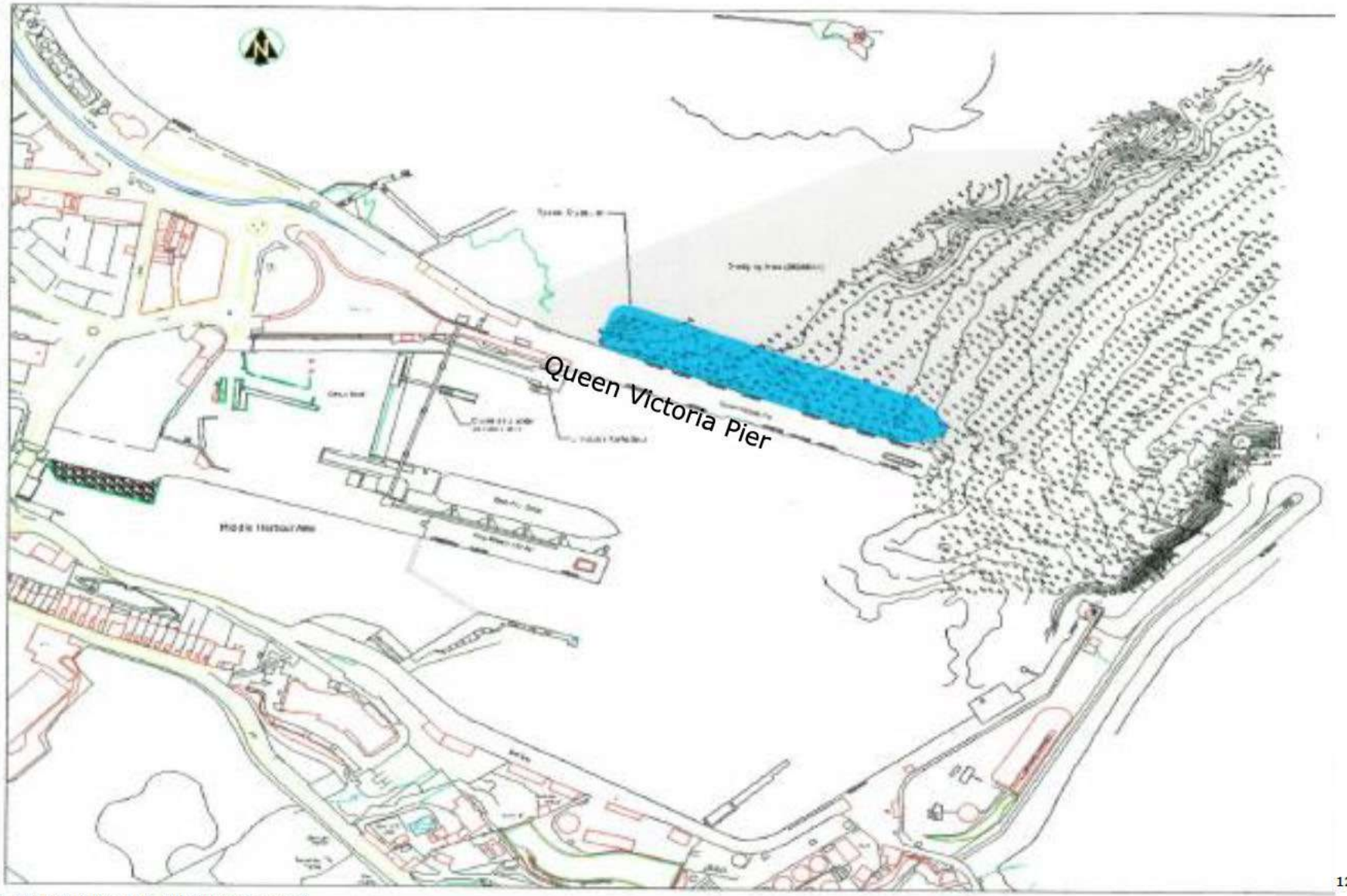
Vessel Name	GT	LOA	Year of build	Age	PAX
Britannia	143,730	330	2015	2	4,324
Mein Schiff 4	99,526	294	2015	2	1,870
Mein Schiff 3	99,526	293	2014	3	1,870
MSC Preziosa	139,072	333	2013	4	4,345
AIDAsol	71,300	252	2011	6	2,174
Celebrity Silhouette	122,210	315	2011	6	2,886
Azura	115,055	290	2010	7	3,597
Celebrity Eclipse	121,878	317	2010	7	2,852
Queen Elizabeth	90,901	294	2010	7	2,068
AIDAluna	69,203	252	2009	8	2,100
Ventura	116,017	291	2008	9	3,597
AidAdiva	69,203	252	2007	10	2,100
Crown Princess	113,561	288	2006	11	2,926
Norwegian Jade	93,558	294	2006	11	2,400
Arcadia	84,342	290	2005	12	2,556
Caribbean Princess	112,894	290	2004	13	3,599
Costa Magica	102,587	271	2004	13	3,470
Zuiderdam	82,305	285	2002	15	1,848
Aurora	76,152	270	2000	17	1,874
Disney Magic	83,338	300	1998	19	2,809
Vision of the Seas	78,340	279	1998	19	2,435
Mein Schiff 1	76,998	264	1996	21	1,870
Oriana	69,840	260	1995	22	1,928
Columbus	63,786	247	1989	28	1,817
Pacific Pearl	63,500	247	1989	28	1,516

Total Vessels	AVG GT:	AVG LOA:	AVG Age	AVG Age	AVG PAX
25	**94,353**	**283.92**	**2005**	**12**	**2593**

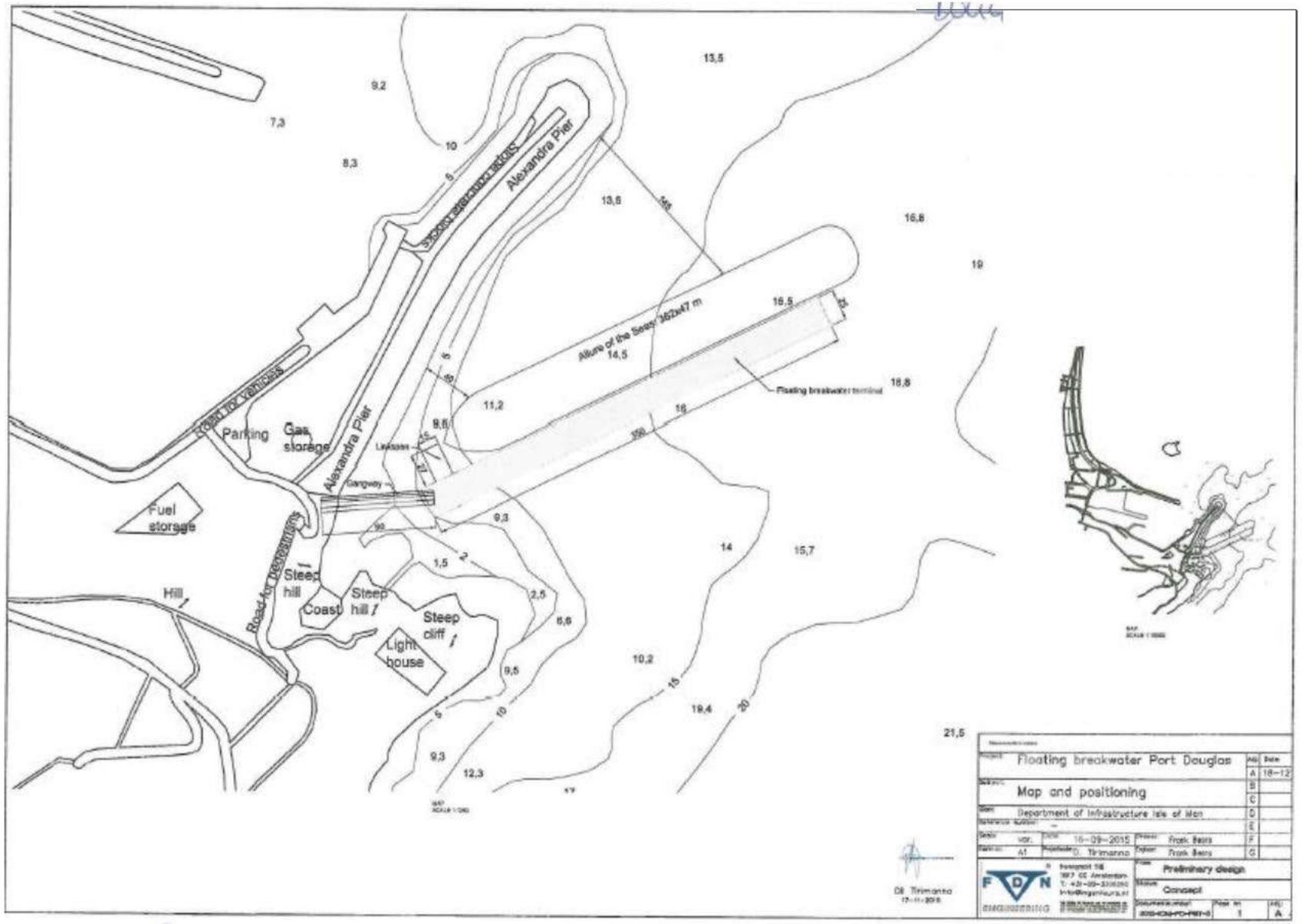
Overall: Total Vessels	Overall: AVG GT:	Overall: AVG LOA:	Overall: AVG Age	Overall: AVG Age
91	42,014	192.34	1995	22

Appendix 3
Outline plans

DOI Proposal of an extension to 240m berth, 8 metre draft on existing Queen Victoria Pier

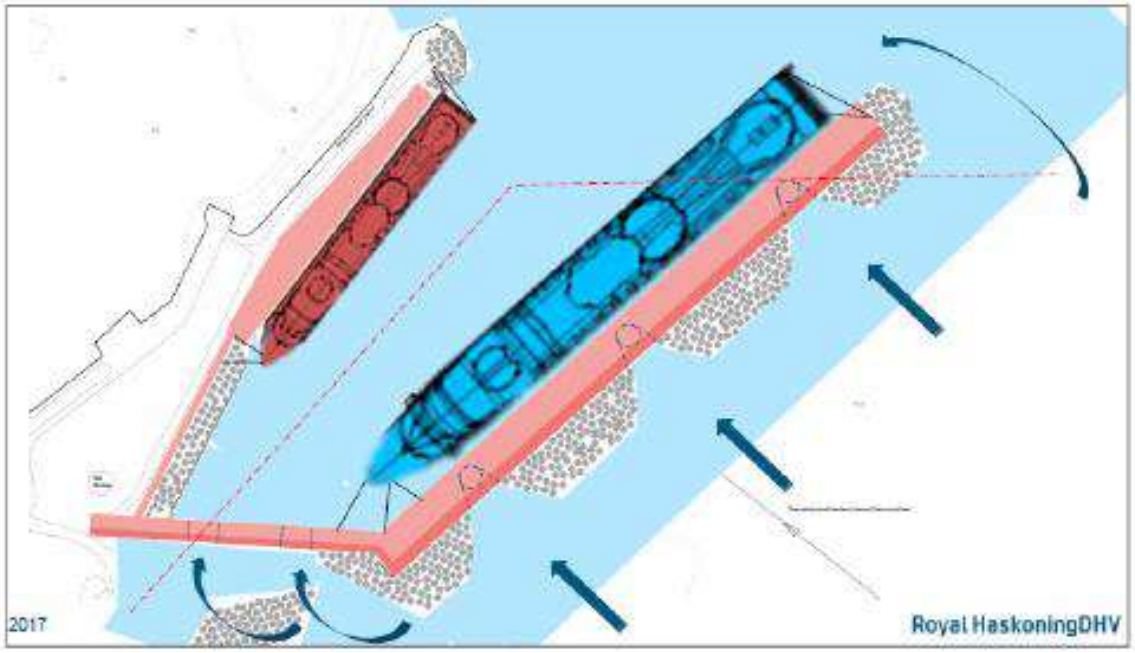


FDN Proposal of a 350m floating concrete breakwater in Douglas



450m breakwater – part of a harbour plan including the 250m option

Caissons structure



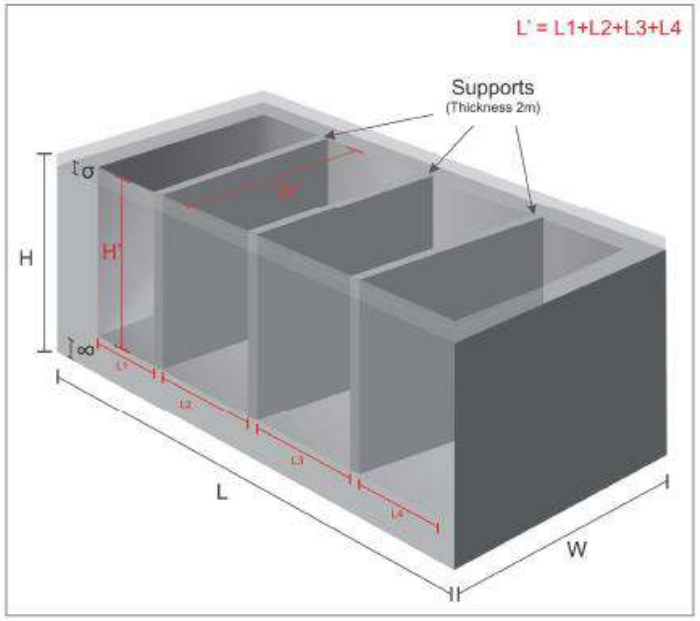
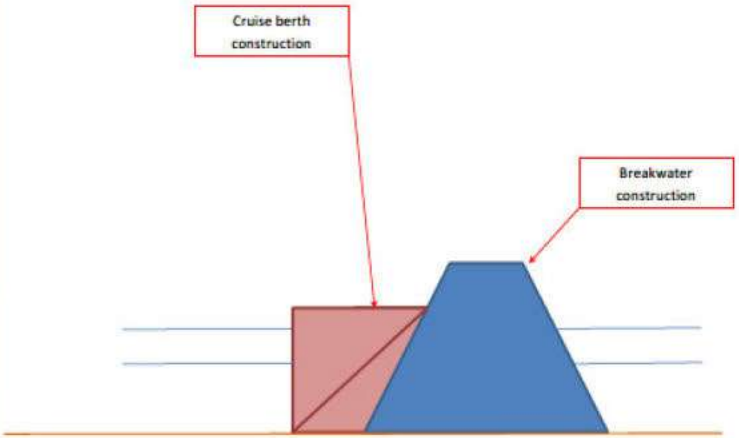


Figure 3.2 – Schematic diagram of proposed caisson

Source: Isle of Man Shipping Association Conceptual Design Considerations report, March 2017

450m breakwater
Concrete structure



Royal HaskoningDHV
Enhancing Society Together

Appendix 4

Cruise Call schedules – comparable islands

Guernsey Cruise Calls Schedule 2017

ST PETER PORT AND BAILIWICK CRUISE SHIP VISITS 2017

TOTAL VISITS:	GUERNSEY	111
	HERM	3
	SARK	9
	ALDERNEY	3

Issue 7 : 03 April 2017

DATE	SHIP	PORT OF REGISTRY	PAX	TIME	ARRIVAL FROM	DEPARTURE TO	TIME	AGENT
MARCH								
TUE 21	AIDAVITA	Italy	1266	0800	Falmouth	Dover	1700	AC
APRIL								
TUE 04	ASTORIA	Madeira - Portugal	560	0700	Amsterdam	St Marys	1800	AC
SUN 16	SAGA SAPPHIRE	Valletta - Malta	720	0800	Cherbourg	Le Havre	1800	AC
FRI 21	FRAM	Tromso - Norway	600	0800	Cancelled - change to itinerary		1500	AC
FRI 21	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
SAT 22	VIKING SKY	Bergen - Norway	930	0800	Cancelled - change to itinerary		1800	AC
SAT 22	AZURA	Hamilton - Bermuda	3597	0800	La Coruna	Southampton	1800	C
TUE 25	LE SOLEAL	France	264	1200	Portsmouth	St Marys	1900	AC
FRI 28	MARCO POLO	Nassau - Bahamas	800	0800	St Marys	Honfleur	1900	AC
SAT 29	SAGA SAPPHIRE	Valletta - Malta	720	0800	Dover	Leixoes	1600	AC
MAY								
TUE 02	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
TUE 02	OCEAN NOVA	Nassau - Bahamas	80	0700	Portsmouth	Alderney	1200	AC
TUE 02	OCEAN NOVA at ALDERNEY	Nassau - Bahamas	80	1400	Guernsey	St Agnes	1800	AC
Tue 02	MINERVA at SARK	Nassau - Bahamas	441	0700	Brest	Rouen	1700	AC
FRI 05	ASTORIA	Madeira - Portugal	560	0700	St Marys	Honfleur	1800	AC
FRI 05	SAGA PEARL II	Valletta - Malta	602	0700	Falmouth	Dover	1700	AC
SAT 06	VISION OF THE SEAS	Nassau - Bahamas	2435	0700	Lisbon	Le Havre	1700	AC
SUN 07	LE SOLEAL	France	264	0800	Scilly Iles	Portsmouth	1500	AC
SUN 07	CROWN PRINCESS	Hamilton - Bermuda	3599	0700	Southampton	Bordeaux	1800	AC
MON 08	CELEBRITY ECLIPSE	Valletta - Malta	2850	0700	Southampton	Cobh	1700	AC
MON 08	HEBRIDEAN SKY	Nassau - Bahamas	114	0700	Portsmouth	Herm	1230	AC
MON 08	HEBRIDEAN SKY at HERM	Nassau - Bahamas	114	1300	Guernsey	St Agnes	1800	AC
THU 11	AURORA	Hamilton - Bermuda	*****		Conference Call			C
FRI 12	AURORA	Hamilton - Bermuda	*****		Conference Call		1800	C
FRI 12	ORIANA	Hamilton - Bermuda	1928	0800	Southampton	Bruges	1700	C

ST PETER PORT AND BAILIWICK CRUISE SHIP VISITS 2017

TOTAL VISITS: GUERNSEY 111
HERM 3
SARK 9
ALDERNEY 3

Issue 7 : 03 April 2017

DATE	SHIP	PORT OF REGISTRY	PAX	TIME	ARRIVAL FROM	DEPARTURE TO	TIME	AGENT
SAT 13	SERENISSIMA	St Vincent- Gren	100	0600	Portsmouth	Sark	1230	AC
SAT 13	SERENISSIMA at SARK	St Vincent- Gren	100	1330	Guernsey	Penzance	1830	AC
SUN 14	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
THU 18	QUEEN ELIZABETH	Hamilton - Bermuda	2200	0800	Leixoes	Southampton	1700	C
THU 18	MV VOYAGER	Nassau - Bahamas	540	0700	Portsmouth	Bordeaux	1600	AC
SAT 20	ORIANA	Hamilton - Bermuda	1928	0700	Santander	Southampton	1700	C
SAT 20	ARTANIA	Hamilton - Bermuda	1260	1100	Oporto	Dover	1800	C
SAT 20	OCEAN NOVA	Nassau - Bahamas	80	0700	Isles of Scilly	Alderney	1230	AC
SAT 20	OCEAN NOVA at ALDERNEY	Nassau - Bahamas	80	1430	Guernsey	Portsmouth	1930	AC
MON 22	OCEAN NOVA	Nassau - Bahamas	80	0700	Portsmouth	Herm	1300	AC
MON 22	OCEAN NOVA at HERM	Nassau - Bahamas	80	1400	Guernsey	Tresco	1800	AC
TUE 23	NORWEIGEN JADE	Nassau - Bahamas	2402	0830	Southampton	Portland	1800	AC
THU 25	ASTORIA	Madeira - Portugal	560	1600	St Helier	Falmouth	2200	AC
FRI 26	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
SUN 28	SILVER EXPLORER	Valletta - Malta	150	0800	Bordeaux	St Malo	1200	C
MON 29	MV VOYAGER	Nassau - Bahamas	540	1200	Honfleur	St Malo	2100	AC
TUE 30	ALBATROS	Nassau - Bahamas	1000	1100	Lorient	Dover	1700	C
JUNE								
THU 01	VISION OF THE SEAS	Nassau - Bahamas	2435	1000	Dublin	Amsterdam	2000	AC
SAT 03	BRITANNIA	Hamilton - Bermuda	4372	0800	La Rochelle	Southampton	1800	C
MON 05	CELEBRITY ECLIPSE	Valletta - Malta	2852	0700	Southampton	Cherbourg	1800	AC
MON 05	PRINSENDAM	Rotterdam - Netherlands	837	0800	Amsterdam	Milford Haven	1800	AC
TUE 06	SILVER CLOUD	Valletta - Malta	296	0800	Bordeaux	St Malo	2300	C
WED 07	SAGA SAPPHIRE	Valletta - Malta	720	0800	Dover	Cobh	1800	AC
WED 07	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
THU 08	ARCADIA	Hamilton - Bermuda	2556	0800	Southampton	Bruges	1800	C
THU 08	HEBRIDEAN SKY	Nassau - Bahamas	114	0630	Portsmouth	Sark	1300	AC
THU 08	HEBRIDEAN SKY at SARK	Nassau - Bahamas	114	1400	Guernsey	Penzance	1900	AC
FRI 16	AZAMARA JOURNEY	Valletta - Malta	702	1600	Lisbon	Cherbourg	2200	AC
FRI 16	SEA CLOUD 2	Valletta - Malta	96	1300	St Malo	Dartmouth	1800	AC
MON 19	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
WED 21	ADONIA	Hamilton - Bermuda	777	0800			1800	C
THU 22	VENTURA	Hamilton - Bermuda	3597	0800	Santander	Southampton	1800	C
FRI 23	SILVER SPIRIT	Nassau - Bahamas	540	0800	St Malo	Rouen	1400	C
SAT 24	MV VOYAGER	Nassau - Bahamas	540	0800	Tresco	Portsmouth	1800	AC
MON 26	MV VOYAGER	Nassau - Bahamas	540	0800	Portsmouth	La Coruna	1700	AC

ST PETER PORT AND BAILIWICK CRUISE SHIP VISITS 2017

TOTAL VISITS:	GUERNSEY	111
	HERM	3
	SARK	9
	ALDERNEY	3

Issue 7 : 03 April 2017

DATE	SHIP	PORT OF REGISTRY	PAX	TIME	ARRIVAL FROM	DEPARTURE TO	TIME	AGENT
TUE 27	SILVER SPIRIT	Nassau - Bahamas	540	1200	Rouen	St Malo	2359	C
TUE 27	COLUMBUS (ex Pacific Pearl)	Nassau - Bahamas	1400	0700	St Marys	Honfleur	1800	AC
FRI 30	AEGEAN ODYSSEY	Panama	400	1500	Tilbury	Portsmouth	2000	AC
FRI 30	ORIANA	Hamilton - Bermuda	1928	0700	La Coruna	Southampton	1700	C
FRI 30	MINERVA at SARK	Nassau - Bahamas	441	0800	Tresco	Falmouth	1700	AC
JULY								
SAT 01	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
SAT 01	AZURA	Hamilton - Bermuda	3597	0800	Southampton	Southampton	1800	C
THU 06	SAGA SAPPHIRE	Nassau - Bahamas	720	0800	TBA	TBA	1600	AC
FRI 07	VISION OF THE SEAS	Nassau - Bahamas	2435	1000	Cork	Amsterdam	2000	AC
SAT 08	ADONIA	Hamilton - Bermuda	777	0800			1800	C
WED 12	CMV MAGELLAN	Valletta - Malta	1250	0700	Rouen	St Marys	1800	AC
THU 13	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
THU 13	QUEEN ELIZABETH	Hamilton - Bermuda	2200	0800	Liverpool	Southampton	1700	C
FRI 14	AEGEAN ODYSSEY	Panama	400	1500	Tilbury	Falmouth	2000	AC
FRI 14	COLUMBUS (ex Pacific Pearl)	Nassau - Bahamas	1400	0700	Honfleur	St Martys	1900	AC
SAT 15	ARCADIA	Hamilton - Bermuda	2556	0800	Southampton	Southampton	1700	C
SAT 15	ISLAND SKY	Nassau - Bahamas	114	0600	St Malo	Sark	1100	AC
SAT 15	ISLAND SKY at SARK	Nassau - Bahamas	114	1300	Guernsey	Tilbury	2300	AC
THU 20	CELEBRITY SILHOUETTE	Valletta - Malta	2886	0700	Amsterdam	Liverpool	2000	AC
THU 20	AZAMARA JOURNEY	Valletta - Malta	702	0800	Southampton	Cobh	1300	AC
FRI 21	BRITANNIA	Hamilton - Bermuda	4372	0700	Bilbao	Southampton	1800	C
MON 24	MINERVA	Nassau - Bahamas	441	0700	Fishguard	Honfleur	1700	AC
TUE 25	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
THU 27	MINERVA	Nassau - Bahamas	441	0700	Portsmouth	Waterford	1700	AC
THU 27	ADONIA	Hamilton - Bermuda	777	0800			1800	C
SAT 29	ORIANA	Hamilton - Bermuda	1928	0800	El Ferrol	Southampton	1700	C
AUGUST								
THU 03	ADONIA	Hamilton - Bermuda	777	0800			1800	C
SUN 06	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
THU 10	ORIANA	Hamilton - Bermuda	1928	0700	Coby	Southampton	1700	C
THU 10	VENTURA	Hamilton - Bermuda	3597	0800	Leixoes	Southampton	1800	C
FRI 11	CRYSTAL SYMPHONY	Nassau - Bahamas	940	1200	Tilbury	Honfleur	1800	C
SAT 12	VENTURA	Hamilton - Bermuda	3597	0800	Southampton	Bruges	1800	C
SUN 13	SAGA SAPPHIRE	Valletta - Malta	720	0800	Dover	Cherbourg	1800	AC

ST PETER PORT AND BAILIWICK CRUISE SHIP VISITS 2017

TOTAL VISITS:	GUERNSEY	111
	HERM	3
	SARK	9
	ALDERNEY	3

Issue 7 : 03 April 2017

DATE	SHIP	PORT OF REGISTRY	PAX	TIME	ARRIVAL FROM	DEPARTURE TO	TIME	AGENT
TUE 15	CRYSTAL SYMPHONY	Nassau - Bahamas	940	0800	Honfleur	Waterford	1600	C
WED 16	PRINSENDAM	Rotterdam - Netherlands	837	0800	Dorset	Amsterdam	1700	AC
FRI 18	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
SAT 19	ADONIA	Hamilton - Bermuda	777	0800			1800	C
SUN 20	AZURA	Hamilton - Bermuda	3597	0800	Southampton	Southampton	1700	C
MON 21	MEIN SCHIFF 1	Valletta - Malta	2232	0700	Le Havre	Brest	1900	AC
THU 24	QUEEN ELIZABETH	Hamilton - Bermuda	2200	0800	Bruges	Southampton	1700	C
THU 24	MARCO POLO	Nassau - Bahamas	800	0700	St Marys	Honfleur	1900	AC
FRI 25	SEA CLOUD II	Valletta - Malta	96	1200			1900	AC
MON 28	CRYSTAL SYMPHONY	Nassau - Bahamas	940	0800	Honfleur	St Malo	1800	C
WED 30	FTI BERLIN	Valletta - Malta	412	0700	Tresco	Southampton	1700	AC
WED 30	CARIBBEAN PRINCESS	Hamilton - Bermuda	3796	0600	Southampton	Cobh	1400	AC
WED 30	HEBRIDEAN SKY	Nassau - Bahamas	114	0700	Tresco	Herm	1400	AC
WED 30	HEBRIDEAN SKY at HERM	Nassau - Bahamas	114	1430	Guernsey	Portsmouth	1900	AC
SEPTEMBER								
FRI 01	HEBRIDEAN SKY	Nassau - Bahamas	114	0600	Portsmouth	Sark	1300	AC
FRI 01	HEBRIDEAN SKY at SARK	Nassau - Bahamas	114	1400	Guernsey	Leith	2100	AC
TUE 05	AZAMARA JOURNEY	Valletta - Malta	702	0800	Southampton	Bordeaux	1400	AC
WED 06	COLUMBUS (ex Pacific Pearl)	tba	1856	0700	Honfleur	St Marys	2000	AC
THU 07	NG ORION at ALDERNEY	Nassau - Bahamas	106	0700	Dartmouth	Sark	1130	AC
THU 07	NG ORION at SARK	Nassau - Bahamas	106	1400	Alderney	Portsmouth	2300	AC
FRI 08	AZURA	Hamilton - Bermuda	3597	0800	La Coruna	Southampton	1800	C
MON 11	CARIBBEAN PRINCESS	Hamilton - Bermuda	3599	0600	Southampton	Cobh	1400	AC
THU 14	ISLAND SKY	Nassau - Bahamas	114	1500	Tilbury	St Malo	2130	AC
FRI 15	ADONIA	Hamilton - Bermuda	777	0800			1800	C
SAT 16	VENTURA	Hamilton - Bermuda	3597	0800	Southampton	Southampton	1800	C
SAT 16	MS EUROPA	Valletta - Malta	408	2100	St Helier	Sark	1300 (17th)	AC
SUN 17	MS EUROPA at SARK	Valletta - Malta	408	1400	Guernsey	Falmouth	1900	AC
SUN 17	MIDNATSOL	Norway	600	1000			2000	AC
SUN 17	FRAM	Norway	600	1000			2000	AC
THU 21	ASTOR	Nassau - Bahamas	578	0600	St Malo	Bremerhaven	1400	AC
SUN 24	ALBATROS	Nassau - Bahamas	1100	0700	Falmouth	Harwich	1400	C
MON 25	FRAM	Norway	600	1500	Cancelled - change in interneray		2000	AC
TUE 26	ISLAND SKY	Nassau - Bahamas	114		St Malo	Sark		AC
TUE 26	ISLAND SKY at SARK	Nassau - Bahamas	114		Guernsey	Tilbury		AC

ST PETER PORT AND BAILIWICK CRUISE SHIP VISITS 2017

TOTAL VISITS:	GUERNSEY	111
	HERM	3
	SARK	9
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Issue 7 : 03 April 2017

DATE	SHIP	PORT OF REGISTRY	PAX	TIME	ARRIVAL FROM	DEPARTURE TO	TIME	AGENT
OCTOBER								
THU 05	ARCADIA	Hamilton - Bermuda	*****		Conference Call			
FRI 06	ARCADIA	Hamilton - Bermuda	*****	0800	Conference Call		1800	C
SAT 07	EUROPA II	Valletta - Malta	516	1200	Tilbury	St Malo	2300	AC
SUN 08	BLACK WATCH	Nassau - Bahams	758	0830	Rouen	Lorient	1800	AC

***** = Customs Clearance only

More than one vessel on the same day

List E&OE at time of issue. For latest information on cruise ship arrivals see Arrivals section on Guernsey Harbours' website www.harbours.gg Alternatively, please call agents direct.

List of Cruise Calls into St Helier 2017

PORTS OF JERSEY
YOUR ISLAND GATEWAY

Date	Vessel	Arrive	Depart	Position	Image	Description
Saturday 22 April 2017	MV Viking Sky	08:00	18:00	Anchorage		▪ Launches 2014 ▪ Holds up to 930 passengers
Find out more about the MV Viking Star via Viking Cruises website.						
Sunday 23 April 2017	MS Hamburg	07:00	12:30	Anchorage		▪ Built in 1997 ▪ Holds 420 passengers
Find out more about the MS Hamburg via Plantours website.						
Thursday 25 May 2017	MV Astoria	08:00	13:00	Anchorage		▪ Built in 1945 ▪ Holds 550 passengers
Find out more about the MV Astoria via the Cruise & Maritime Voyages website.						
Sunday 04 June 2017	Silver Explorer	08:30	18:00	Anchorage		▪ Built in 1989 ▪ Refurbished 2008 ▪ Holds 130 passengers
Find out more about the Silver Explorer via the Silversea website.						

List of Cruise Calls into St Helier 2017

PORTS OF JERSEY
YOUR ISLAND GATEWAY

Date	Vessel	Arrive	Depart	Position	Image	Description
Tuesday 11 July 2017	Voyager	07:00	19:00	Anchorage		▪ Built in 1989 ▪ Holds up to 540 guests
Find out more about the Voyager via Voyages of Discovery's website.						
Friday 04 August 2017	Silver Explorer	08:30	16:30	Anchorage		▪ Built in 1989 ▪ Refurbished 2008 ▪ Holds 130 passengers
Find out more about the Silver Explorer via the Silversea website.						
Sunday 06 August 2017	MS Aegean Odyssey	12:00	18:00	Anchorage		▪ Built in 1973 ▪ Refit in 2010 ▪ Holds up to 380 guests
Find out more about the MS Aegean Odyssey via Voyages to Antiquity's website.						
Sunday 06 August 2017	MS Europa 2	N/A	N/A	Anchorage		▪ Launched in 2013 ▪ Holds 516 passengers
Find out more about the MS Europa 2 via Hapag-Lloyd Cruises website.						

List of Cruise Calls into St Helier 2017

PORTS OF JERSEY
YOUR ISLAND GATEWAY

Date	Vessel	Arrive	Depart	Position	Image	Description
Sunday 13 August 2017	MS Pacific Princess	08:00	15:00	Anchorage		▪ Launched 1999 ▪ Refurbished 2010 ▪ Holds 672 passengers
Find out more about the MS Pacific Princess via Princess Cruises website.						
Monday 21 August 2017	MS Pacific Princess	08:00	17:00	Anchorage		▪ Launched 1999 ▪ Refurbished 2010 ▪ Holds 672 passengers
Find out more about the MS Pacific Princess via Princess Cruises website.						
Monday 28 August 2017	MV Astoria	13:00	19:00	Anchorage		▪ Built in 1945 ▪ Holds 550 passengers
Find out more about the MV Astoria via the Cruise & Maritime Voyages website.						
Saturday 16 September 2017	MS Europa	10:00	18:00	Anchorage		▪ Built in 1999 ▪ Holds up to 400 guests
Find out more about the MS Europa via Hapag-Lloyd Cruises website.						

List of Cruise Calls into St Helier 2017

PORTS OF JERSEY
YOUR ISLAND GATEWAY

Date	Vessel	Arrive	Depart	Position	Image	Description
Thursday 28 September 2017	SS Navigator	10:00	20:00	Anchorage		▪ Built in 1999 ▪ Refurbished 2016 ▪ Holds 400 guests ▪ Up to 340 Crew
Find out more about the SS Navigator via the Regent Seven Seas Cruises website.						

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CRUISE SHIP SCHEDULE 2017

Ship name	Port	Date	ETA	Date	ETD	LOA	Draft exp	GRT	Pax	Crew
LE SOLEAL	DOUGLAS	29-Apr	08:00	29-Apr	18:00	142.00	4.70	10,992	209	142
MIDNATSOL	DOUGLAS BAY	29-Apr	08:00	29-Apr	18:00	135.80	4.90	16,151	638	74
LE SOLEAL	DOUGLAS	03-May	08:00	03-May	19:00	142.00	4.70	10,992	209	142
HEBRIDEAN SKY	PEEL	13-May	07:00	13-May	21:00	90.60	4.20	4,200	120	72
SILVER WHISPER	DOUGLAS BAY	29-May	08:00	29-May	23:00	186.00	6.00	28,258	382	295
SILVER WHISPER	DOUGLAS BAY	06-Jun	12:00	06-Jun	23:00	186.00	6.00	28,258	382	295
HEBRIDEAN SKY	DOUGLAS	12-Jun	06:00	12-Jun	22:00	90.60	4.20	4,200	120	72
SILVER WHISPER	DOUGLAS BAY	12-Jun	14:00	12-Jun	22:00	186.00	6.00	28,258	382	295
SILVER EXPLORER	DOUGLAS	13-Jun	07:00	13-Jun	17:00	108.11	4.38	6,130	132	115
STAR PRIDE	DOUGLAS BAY	13-Jun	08:00	13-Jun	16:00	133.40	5.20	9,975	208	164
WIND SURF	DOUGLAS BAY	25-Jun	08:00	25-Jun	16:00	187.00	5.20	14,745	280	190
STAR PRIDE	DOUGLAS	27-Jun	09:00	27-Jun	17:00	133.40	5.20	9,975	208	164
HEBRIDEAN PRINCESS	PEEL/DOUGLAS	29-Jun	20:00	29-Jun	13:00	72.00	3.00	2,112	50	38
STAR PRIDE	DOUGLAS	29-Jun	09:00	29-Jun	16:00	133.40	5.20	9,975	208	164
AEGEAN ODYSSEY	DOUGLAS	20-Jul	08:00	20-Jul	17:00	140.50	6.47	12,094	380	180
DEUTSCHLAND	DOUGLAS BAY	22-Jul	07:00	22-Jul	13:00	175.30	5.80	22,496	600	260
SAGA SAPPHIRE	DOUGLAS BAY	04-Aug	07:00	04-Aug	18:00	199.60	8.40	37,049	629	437
SILVER WIND	DOUGLAS	07-Aug	08:00	07-Aug	18:00	155.80	5.70	17,000	296	212
SEABOURN QUEST	DOUGLAS BAY	13-Aug	08:00	13-Aug	18:00	198.15	6.50	32,346	209	142
GANN	DOUGLAS	23-Aug	11:30	27-Aug	19:00	108.00	4.70	4,072	210	32
ROTTERDAM	DOUGLAS BAY	25-Aug	08:00	25-Aug	16:00	238.00	8.30	61,849	1,404	600
HEBRIDEAN SKY	DOUGLAS	26-Aug	07:00	26-Aug	22:00	90.60	4.20	4,200	120	72
STAR PRIDE	DOUGLAS	01-Sep	09:00	01-Sep	17:00	133.40	5.20	9,975	208	164
WIND SURF	DOUGLAS BAY	09-Sep	09:00	09-Sep	17:00	187.00	5.20	14,745	280	190
SAGA PEARL II	DOUGLAS BAY	11-Sep	08:00	11-Sep	17:00	164.35	6.30	18,627	450	252
ALBATROS	DOUGLAS BAY	20-Sep	07:00	20-Sep	12:00	205.46	7.53	28,518	1,000	472
HANSEATIC	DOUGLAS	29-Sep	12:00	29-Sep	18:00	122.80	4.81	8,378	157	122
									9,471	**5,357**

Isle of Mull Cruise Calls 2017

Cruise Port	Arrival Date	Cruise Ship	Arrive	Depart
Tobermory	Monday, 15 May, 2017	Boudicca	07:00	18:00
Tobermory	Thursday, 15 June, 2017	Star Pride		
Tobermory	Tuesday, 27 June, 2017	Wind Surf	08:00	16:00
Tobermory	Saturday, 01 July, 2017	Star Pride		
Tobermory	Monday, 03 July, 2017	Black Watch	07:00	18:00
Tobermory	Friday, 07 July, 2017	Boudicca	07:00	18:00
Tobermory	Saturday, 22 July, 2017	Boudicca	11:00	18:00
Tobermory	Thursday, 24 August, 2017	Seabourn Quest	10:00	18:00
Tobermory	Wednesday, 30 August, 2017	Star Pride		
Tobermory	Thursday, 07 September, 2017	Wind Surf	08:00	21:00
Tobermory	Thursday, 14 September, 2017	Black Watch	07:00	18:00

Faroe Islands Cruise Calls 2017

Ferðamannskip til Tórshavnar havn - 2017									Dagfest		31-03-2017
Nr	FRÁBOÐAÐ	MEKL	SKIPANAVN	Kemur frá	Ávegis til	L.O.A.	DÝBG.	DAGUR	KL.	DAGUR	KL.	VIÐM.
1	05-10-2016	FS	Spitsbergen	Kirkwall	Eiði	98,00	5,30	16-05-2017	12.00	16-05-2017	23-59	Týsdag, Vónakei
2	10-05-2016	Tor	Hebridean Sky	Sula Sgeir	Vágar	90,60	4,20	21-05-2017	10.00	22-05-2017	05.00	Sunnudag/mánadag
3	15-10-2015	Tor	Amadea	Eskifjørður	Lerwick	193,00	6,80	05-06-2017	13.00	05-06-2017	19.00	Mánadagur
4	02-03-2016	Tor	Magellan	Lerwick	Seyðisfjørður	221,50	7,75	18-06-2017	09.00	18-06-2017	17.00	Sunnudag/Kollafjørð
5	24-02-2016	Tor	Marco Polo	Hull	Eskifjørður	176,00	8,60	19-06-2017	13.30	19-06-2017	19.00	Mánadagur
6	23-07-2015	FS	Mein Schiff 1	Reykjavik	Kirkwall	260	7,7	22-06-2017	07.00	22-06-2017	17.30	Hósdag
7	21-08-2015	Tor	Silver Explorer	Lerwick	Mykines	108	4,4	23-06-2017	14.30	23-06-2017	23.59	Fríggjadag
8	08-09-2016	Tor	Hebridean Sky	Papa Stour	Vágar	90,6	4,2	25-06-2017	12.30	26-06-2017	05.30	Sunnudag/mánadag Vónakai
9	21-09-2015	FS	Azura	Reykjavik	Kirkwall	290	8	26-06-2017	08.00	26-06-2017	17.00	Mánadagur
10	05-01-2017	Tor	Nat.G.Orion	Vestmanna	Mykines	102,7	3,8	26-06-2017	14.00	27-06-2017	09.30	Mánadag/Týsdag Vónakai
11	09-03-2016	Tor	Columbus	Invergordon	Seyðisfjørður	245,6	8,1	02-07-2017	09.30	02-07-2017	16.00	Sunnudag/Kollafjørð
12	01-12-2015	Tor	Black Watch	Stornoway	Seyðisfjørður	205	7,5	05-07-2017	08.30	05-07-2017	15.30	Mikudag
13	20-10-2015	FS	Star Legend			135	5,2	05-07-2017	06.00	05-07-2017	14.00	Mikudag
14	21-09-2016	FS	Gann			108,6	4,75	08-07-2017	10.00	09-07-2017	16.00	Leygardag/sunnudag Vónakai
15	04-05-2016	Tor	Aegean Odyssey	Húsavik (ÍS)	Lerwick	140,5	6,5	10-07-2017	08.00	10-07-2017	13.00	Mánadag
16	23-07-2015	FS	Mein Schiff 3	Reykjavik	Skagen	293	8,05	12-07-2017	07.00	12-07-2017	19.30	Mikudag
17	13-01-2016	Tor	Saga Pearl II		Lerwick	165	6,3	12-07-2017	08.00	12-07-2017	13.00	Mikudag/Oyrareingir
18	13-01-2016	Tor	Astor			176,5	6,1	12-07-2017	06.00	12-07-2017	15.00	Mikudag/Kollafjørð
19	24-02-2016	Tor	Marco Polo	Rosyth	Seyðisfjørður	176,00	8,60	14-07-2017	07.00	14-07-2017	17.00	Fríggjadag/Oyrareingir
20	02-05-2016	FS	Star Pride	Molde	Reykjavik	133,4	5,2	15-07-2017	06.00	15-07-2017	14.00	Leygardag/Oyrareingir
21	07-10-2014	Tor	Azamara Journey	Reykjavik	Southampton	180	5,8	16-07-2017	08.00	16-07-2017	18.00	Sunnudag, skal innum
22	03-03-2016	Tor	Magellan	Kirkwall	Lerwick	221,50	7,75	19-07-2017	09.00	19-07-2017	17.00	Mikudag
23	01-12-2015	Tor	Nautica	Lerwick	Akureyri	181	5,95	19-07-2017	10.00	19-07-2017	21.00	Mikudag
24	21-07-2015	FS	Mein Schiff 4	Reykjavik	Kirkwall	293	8,05	21-07-2017	07.00	21-07-2017	17.30	Fríggjadag
25	02-03-2016	Tor	Magellan	Dundee	Seyðisfjørður	221,5	7,75	25-07-2017	07.00	25-07-2017	17.00	Týsdag
26	12-05-2016	Tor	Astoria	Lerwick	Seyðisfjørður	160	7,60	27-07-2017	09.00	27-07-2017	13.00	Hósdag
27	01-12-2015	Tor	Seven Seas Explorer	Dublin	Akureyri	224	7,1	29-07-2017	08.00	29-07-2017	19.00	Leygardag/Kollafjørð
28	25-01-2016	FS	Ocean Majesty	Heimey	Invergordon	135,3	6,4	01-08-2017	14.00	01-08-2017	17.00	Týsdag, Vónakei
29	20-10-2015	FS	Star Legend			135	5,2	06-08-2017	13.00	06-08-2017	20.00	Sunnudag/Oyrareingir
30	18-02-2016	Tor	Astor	Reykjavik	Bremerhaven	176,5	6,1	06-08-2017	06.30	06-08-2017	11.30	Sunnudag/Langasand

Faroe Islands Cruise Calls 2017 (continued)

Ferðamannskip til Tórshavnar havn - 2017									Dagfest			31-03-2017
Nr	FRÁBOÐAÐ	MEKL	SKIPANAVN	Kemur frá	Ávegis til	L.O.A.	DÝBG.	DAGUR	KL.	DAGUR	KL.	VIÐM.
31	04-01-2016	Tor	Thomson Celebration	Reykjavík	Lerwick	215	7,7	07-08-2017	08.00	07-08-2017	17.00	Mánadag/týsdag
32	01-12-2015	Tor	Black Watch			205	7,5	07-08-2017	00.01	08-08-2017	15.00	Mánadag
33	21-09-2015	FS	Queen Elisabeth	Reykjavík	Kirkwall	294	8	08-08-2017	08.00	08-08-2017	17.00	Týsdag
34	01-12-2015	Tor	Seven Seas Explorer			224	7,1	13-08-2017	08.00	13-08-2017	17.00	Sunnudag/Langasand
35	02-05-2016	FS	Star Pride	Reykjavík	Molde	133,40	5,20	16-08-2017	13.00	16-08-2017	20.00	Mikudag
36	21-08-2015	Tor	Silver Wind	Húsavík (ÍS)	Lerwick	156	5,7	17-08-2017	08.00	17-08-2017	16.00	Hósdag/Oyrareingir
37	24-02-2016	Tor	Marco Polo	Kirkwall	Portree	176,00	8,60	17-08-2017	08.00	17-08-2017	14.00	Hósdag/Kollafjørð
38	02-05-2016	Tor	Aegean Odyssey	Húsavík (ÍS)	Lerwick	140,50	6,50	19-08-2017	08.00	19-08-2017	13.00	Leygardag/Kollafjørð
39	21-09-2015	FS	Oriana	Akureyri	Kirkwall	260	7,9	20-08-2017	09.00	20-08-2017	18.00	Sunnudagur
40	18-08-2015	Tor	Prinsendam			205,5	7,2	21-08-2017	08.00	21-08-2017	16.00	Mánadagur
41	05-01-2017	Tor	Nat.G.Orion	Vestmanna	Kirkwall	102,7	3,8	22-08-2017	15.15	22-08-2017	22.30	Týsdag
42	12-05-2016	Tor	Astoria	Reykjavík	Lerwick	160	7,60	24-08-2017	09.00	24-07-2017	14.00	Hósdag
43	25-01-2016	FS	Ocean Majesty	Heimey	Kiel	135,3	6,4	26-08-2017	15.00	26-08-2017	21.00	Leygardag
44	05-10-2016	FS	Spitsbergen	Reykjavík	Lerwick	98	5,3	31-08-2017	10.00	31-08-2017	17.00	Hósdag, Vónakei
45	09-03-2016	Tor	Columbus	Kirkwall	Lerwick	245,6	8,1	31-08-2017	09.00	31-08-2017	17.00	Hósdag
46	16-06-2015	Tor	Seven Seas Navigator	Akureyri		216	6,4	05-09-2017	08.00	05-09-2017	23.00	Týsdag
47	04-03-2016	Tor	Viking Sky	Lerwick	Reykjavík	227,2	6,4	12-09-2017	09.00	12-09-2017	18.00	Týsdag
48	04-03-2016	Tor	Viking Sea	Lerwick	Reykjavík	227,2	6,4	20-09-2017	09.00	20-09-2017	18.00	mikudagur

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