Adran yr Economi a'r Seilwaith
Department for Economy and Infrastructure

Llywodraeth Cymru
Welsh Government

This document is an update to the 'Proof of Evidence – Shipping' document WG1.22.1. It contains an update following the addition of the bridge protection measures in the DRAFT AMENDMENT (NO.2) SCHEME ORDER and a general update on the works to address the allegation of serious detriment upon Newport Docks by Associated British Ports (ABP).

Scheme Evidence Update

Jonathan Vine, MNI

Welsh Government, Shipping

Document Reference: WG 1.22.5

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1. INTRODUCTION

1.1 Author

1.1.1 I am Jonathan Paul Vine. I am employed by Global Maritime Consultancy Ltd as Manager of the Ports and Shipping department (Eagle Lyon Pope). My professional qualifications and experience are detailed in my main Proof of Evidence and are not repeated in this updated evidence.

1.1.2 The evidence that I have provided in this Proof of Evidence has been prepared and is given in accordance with the guidance of my professional institutions and I confirm that the opinions expressed are my true and professional opinions.

1.1.3 My role in the proposed Scheme has been to provide expertise on matters relating to shipping and the potential impact on shipping within the port of Newport as a result of the Scheme. I was not involved in the design of either of the proposed bridges spanning the Newport Docks and the River Usk, nor was I involved with the selection of the route for the Scheme. I was not involved in previous shipping analysis carried out by Global Maritime / Eagle Lyon Pope for the Welsh Government.

1.2 References

1. ABP Acceptance tables for Newport Docks and the river Usk
2. ABP Newport Dock Chart
3. DNV H202 Standard Offshore Standard DNV-OS-H202 (October 2015) Sea Transport Operations
4. Newport Docks Plan PTS015/ND/000
5. Newport Harbour Commissioners Policy and Strategic Objectives Document (January 2012).
6. Port Marine Safety Code (March 2015)
7. Guide to Good Practices on Port Marine Operations (March 2015)

8. NP 37 West Coast of England and Wales Pilot (19th Edition 2014)
9. NP 201 – Admiralty Tide Tables Volume 1 - 2016
10. BA Chart 1176 Severn Estuary – Steep Holm to Avonmouth (11th Edition 2016)
11. National Oceanography Centre – National Tidal and Sea Level Facility www.ntslf.org (Accessed 19/09/2016)
12. Tsinker.G.P (2004) Port Engineering – Planning, Construction, Maintenance and Security
13. Chris Cheetham & Max Heinimann (2001) European River Sea Ships

2. SCOPE AND PURPOSE OF THIS PROOF OF EVIDENCE

2.1 Scope

2.1.1 This Proof of Evidence provides updated evidence for the Welsh Government's Scheme as modified by the August 2017 draft Orders Supplement.

2.1.2 The Welsh Government has worked with ABP to develop a solution based on physical and operational mitigation measures that are designed to reduce the level of risk of a ship impact on the River Usk Crossing where it crosses Newport Docks at the Junction Cut. The measures are included in the August 2017 draft orders.

2.1.3 The Welsh Government also propose to carry out further accommodation works within the South Dock, including the refurbishment of quay space at the coal terminal and the construction of an extension to the west of the existing North Quay within the South Dock.

2.1.4 The purpose of the proposed refurbishment of the existing quayside and the construction of new quayside is to allow any vessel potentially prevented from entering the North Dock because of the restrictions introduced by the Scheme to be accommodated within the South Dock.

2.1.5 The Welsh Government consider the above measures, amongst others that will be commented on by other witnesses, address any serious detrimental impact that the Scheme may have on ABP's undertaking at the Docks.

2.2 Structure

2.2.1 In light of the Welsh Government's proposals, this updated evidence is to replace the following sections of my main proof of evidence which are now withdrawn:

Jonathan Vine Shipping Main Evidence (WG 1.22.1)

1. Section 5.3 – Percentage of visits impeded
2. Section 5.4 – Percentage of unique vessels impeded
3. Section 5.5 – Restrictions on Cargo carrying capacity
4. Section 6 – Assessment of berth occupancy
5. Section 9 - Conclusion

Jonathan Vine Shipping Main Evidence Appendices (WG 1.22.2)

1. Section 2.1 – Restrictions on North Dock Traffic
2. Section 2.2 – South Dock Berth Occupancy
3. Section 3 – Conclusion

2.2.2 Aspects of my evidence interface with the evidence of other witnesses as listed below:

1. Mr. Matt Jones (Welsh Government) – Chief Witness
2. Ben Sibert (Arup) – Engineering
3. Andrew Meaney (Oxera) – Economic impact of the Scheme
4. Paul Canning (Atkins) - The effect climate change would have on the height of sea levels
5. Barry Woodman (Costain) – Construction
6. John Davies (Welsh Government) Planning and Sustainable Development

2.2.3 For the sake of simplicity, the following abbreviations will be used:

1. ABP – Associated British Ports
2. ACD – Admiralty Chart Datum
3. ADC – Air draft clearance
4. JC – Junction Cut
5. ODN – Ordnance Datum Newlyn
6. SHA – Statutory Harbour Authority
7. WG - Welsh Government

2.2.4 My evidence is presented in the following structure, with a detailed contents provided at the start of the document.

1. Author
2. Scope and Purpose of this Proof of Evidence
3. Scheme Evidence Update

3. Proposed Construction Works

3.1 Coal Terminal Quay Refurbishment

3.1.1 The Welsh Government propose to fund or refurbish 250m of quayside at the Coal Terminal on the south side of the South Dock so as to accommodate vessels that would use the new facilities proposed for Dowds, Origin and others to the south side of the South Dock. The refurbishment work, inter alia, would involve the removal/relocation of the concrete cargo retaining blocks and improvements to the surface in order to allow the operation and transit of mobile harbour cranes on the quay.

3.2 Phased Extension of the North Quay in the South Dock

3.2.1 The Welsh Government also plans to fund or construct a further 303m of quay space in the South Dock on the north side, immediately adjoining and continuous (in terms of vertical and horizontal alignment and electric/water supplies) to Section 7 of the North Quay so as to accommodate vessels that would, absent the Scheme, be intended for the North Dock which may be impeded by the Scheme. Construction of the new length of quay in his area, is proposed to take place in two phases.

3.2.2 Phase One of the works would include the construction of the first 150m of new quay (including quay apron) and required dredging works adjacent to the North Quay in the South Dock. This new length of quay and the refurbished 250m length of quay are to be available for use by ABP by:

a) The time the height restriction as the result of construction of the proposed bridge across the Junction Cut first comes into force (North Dock height restriction date).

b) The time narrowing of the width of the Junction Cut takes place.

3.2.3 Phase Two of the proposed works would include the construction of the remaining 153m of quayside to complete the proposed total of 303m in the South Dock.

3.2.4 The proposed work would also include dredging operations within the South Dock. Dredging of the dock is necessary to allow vessels to transit and berth safely at the newly created quayside on the North side of the South Dock. The WG propose to dredge the South Dock to a level that is consistent with the present dredged maintenance level of 0.9m above the South Dock Gauge Zero / 2.24m above ACD / 3.57m below ODN.

3.2.5 Based on the current dock water level of 13.55m above ACD this would provide a depth of water at the new berth of 11.31m. Once ABP have carried out lock gate replacement works and the new dock water level of 14.21m above ACD is achieved then the depth of water would be 11.97m.

4. Newport Docks Risk and Geometric Assessments

4.1 Geometric Assessments

4.1.1 Since I drafted my original proof of evidence, the Welsh Government have been engaged in talks with ABP aimed at agreeing the principles of the bridge protection measures and the methodology used to risk assess the proposed bridge over Newport Docks.

4.1.2 In order to assist in the risk assessment process, I have carried out a number of geometric assessments, where 3D modelling was used to identify a number of potential impact scenarios with the proposed bridge using a number of vessel types and sizes. The geometric assessment identified that there was a plausible risk of hard impact from vessels with the bridge.

4.1.3 The vessels modelled included, a cruise ship, warship, handymax bulk carriers and general cargo vessels. This work made clear, that if left unprotected, the bridge could potentially be at risk of being hit by the superstructure of large vessels, smaller vessels contacting with their masts and errant vessels that may uncontrollably collide with the bridge.

4.2 Quay Extension

4.2.1 The WG have proposed to extend the quayside on either side of the Junction Cut into the South Dock to approximately 50m in order to prevent errant vessels making contact with the proposed bridge piers and/or bridge structure. The proposed build-out would have the effect of extending the Junction Cut into the South Dock and would comprise of a backfilled combi-pile wall(s). The run-in and sides of the newly formed Junction Cut are to be fendered in order to prevent damage to the quay walls and the vessels transiting through, please see drawing M4CaN-DJV-SBR-Z3_GEN-SK-CB-0051 for further details in Appendix A.

4.2.2 In his evidence, Matthew Jones (WG1.1.8) describes the supplementary orders required to confer powers on the WG to construct and maintain the proposed bridge protection measures within the Docks.

4.2.3 In his evidence, Ben Sibert (WG 1.5.7) explains how the newly proposed structure would mitigate the risks and adverse effects of a ship impact with the River Usk Crossing.

4.3 Narrowing of the Junction Cut Entrance

4.3.1 ABP and GMC have independently carried out analysis using historical data of vessel visits to the North Dock that showed that a relationship between vessel beam and air draught can be used as the basis of a bridge protection measure. In brief, a vessel's air draughts increase with an increase in beam, therefore introducing a physical restriction on the beam of vessels also introduces a limit on the air draughts of ships capable of transiting Junction Cut. This analysis was reported in draft technical note GM-47252-TN3, provided to AAJV, and summarised below:

4.3.2 The analysis showed that introducing a physical beam restriction of 11m would eliminate the possibility of vessels with a maximum air draught of 26.2m or greater from transiting the Junction Cut. This beam restriction effectively eliminates the risk of a vessel colliding with the proposed bridge.

4.3.3 The analysis also showed that introducing a physical beam restriction of 13.5m would limit possible vessel collision scenarios to mast impacts only i.e. this width restriction would prevent vessels capable of striking the bridge with their superstructure when transiting the Junction Cut, however a potential mast impact may still be plausible.

4.3.4 To be physically capable of contacting the bridge with its superstructure, a vessel's solid air draught, which refers to the vertical dimension between the waterline and the top of the superstructure, would need to exceed 26.2m. To obtain the maximum air draught of such a vessel, the height of the main mast (on top of the vessel superstructure) must be estimated.

4.3.5 The general arrangement plans of a number vessels known to have visited the North Dock have been scrutinised and the main mast heights measured using CAD software. Mast heights of the sample of vessels considered were found to range between 6.0m and 9.8m in height form the upper deck. The average mast height was estimated to be 7.42m. Airing on the side of caution, 5m was assumed as a typical mast height.

4.3.6 Applying this assumption, a vessel capable of contacting the bridge with its superstructure would need to have a total air draft exceeding 31.2m (26.2m + 5m). This corresponds to a beam of 13.5m, as previously mentioned.

4.3.7 A probabilistic risk assessment has been carried out by the AAJV for a physical width limitation of 13.5m together with a virtual trip wire system for vessels locking into the South Lock prior to entry into the Docks. The assessments showed that these measures would mitigate the risk to an acceptable level. Ben Sibert (Engineering Design) discusses this topic in his proof of evidence (WG 1.5.7).

4.3.8 The purpose of the virtual trip wire system is to determine whether a vessel has an air draught more than the stated acceptance criteria for vessel entry into the North Dock. The system would also be used to ensure that the vessel has additional clearance to navigate under the bridge once it has discharged all its cargo in the North Dock.

4.3.9 The probabilistic risk assessment identified several additional mitigation measures that include air draught/beam restrictions on vessels entering the North Dock, with stipulated air draught and beam safety clearances for vessels bound for the North Dock. ABP as the SHA may also introduce a general direction to shipping to clear decks as far as reasonably practicable of ship's crew when vessels pass under the proposed bridge.

4.3.10 The WG propose to introduce the vessel beam restriction through the quay build out discussed in Section 4.2 by narrowing the entrance of the Junction Cut from the eastern side. The width of the original Junction Cut would remain unchanged. The build-out structure would be able to withstand the impact of an errant vessel from inadvertently colliding with the bridge.

4.3.11 The draft supplementary CPO shows the extended Junction Cut narrowed to 11m however, collaborative work is still ongoing between the WG and ABP to further consider the 13.5 m width option. The August 2017 Scheme Orders have been published with the maximum narrowing of the Junction Cut entrance (11m) in mind.

4.3.12 The bridge protection measures would need to be in place prior to any Scheme construction works being carried out that may impose an air draught restriction on vessels entering the North Dock. The purpose of which is to ensure that the bridge works are properly protected at all times and to ensure the safety of vessels, their crews, dock users, ABP personnel and WG contractor personnel.

4.3.13 Following the narrowing of the Junction Cut, a vessel's beam would be the ruling restriction on entry to the North Dock and ABP as the SHA would have to stipulate the maximum beam acceptance criteria. For a Junction Cut width of 11.0m, allowing for a reasonable 0.4m safety clearance (as per the requirement presently for the South Lock) the maximum beam of vessels entering the North Dock would be 10.6m. For a Junction Cut width of 13.5m the maximum beam would be 13.1m.

4.3.14 In terms of assessing the level of risks to people (such as, mariners, dockworkers and third parties) Ben Sibert in his updated proof of evidence (WG 1.5.7) details the guidance found in the Eurocodes and DMRB guidelines.

4.4 WG Rights to Construct and Maintain Bridge Protection Measures

4.4.1 Rights to construct and maintain an access route through the South Dock lock and South Dock to the site of the bridge protection measures have been included in the draft supplementary (No.3) CPO. This is to allow the WG, and whoever it nominates as its agents and/or contractors, access rights through the South Lock and from the waters forming South and North Docks and Junction Cut for the purposes of:

a) Conducting site investigation works at the location of the proposed bridge protection measures. This requires access by work barge and other construction equipment in order to drill and take samples from the dock bottom.

b) Carrying out the construction of the proposed bridge protection measures, requiring access by jack-up barges and associated construction equipment capable of driving sheet and circular piles into the dock bottom. Harbour tugs would also be required to manoeuvre the jack-up. The in-fill behind the sheet piles would require materials brought into the Docks and deposited by seagoing dredgers, also requiring access.

c) Regular monitoring and maintenance of the protection measures would also be required. This would require access by navigable vessels which can directly access the wet side of the protection measures in order to carry out annual inspections.

d) Conduct emergency repairs to the proposed bridge protection measures if required which may involve the use of equipment referred to in b) above

4.4.2 For a) to d) it would also be necessary for the WG and its nominated agents to also have land vehicular access via ABP's local road network to the proposed the site of the bridge protection measures.

4.4.3 It is completely recognised that those persons and organisations using the access rights must comply with the directions of the SHA with regards to the safety of navigation within the Docks and the Junction Cut.

5. RESTRICTIONS IMPOSED BY THE PROPOSED SCHEME

5.1 Overview

5.1.1 In this section, I present my updated analysis of the historical vessel movements within the Docks in order to establish the extent of any restrictions to vessel movements as a result of the proposed Scheme. In carrying out this analysis, as in my main proof of evidence, I used shipping data provided by ABP to the Welsh Government on 29th April 2016. I have also used commercially available information on the vessels to help with my assessment and where required, made private enquiries to validate the ABP data, as set out in my main proof.

5.1.2 The data provided by ABP covers the period from 9th December 2004 until 31st December 2015 (approximately 11 years and one month) and contains 26,771 entries. The data covers the Newport Docks and also the berths, docks and wharves on the River Usk. The data recorded includes the name of the vessel, the vessel IMO number, the vessel movement (IN or OUT), the date of record, the location within the port, the vessel particulars (vessel length, beam and the Gross Tonnage), vessel draught, air draught, the ship type, ship category and 'Berth Original', which gives extra information on the berthing location of the vessel. This data allowed for an assessment to be made on the potential impact of the proposed Scheme on vessel operations at the ABP Newport Docks and in the River Usk.

5.1.3 The ABP data received did not provide the vessel deadweight, therefore in order to allow for a better understanding of any form of restriction that the Scheme may impose on vessels in terms of their cargo carrying capacity, I have populated the dataset with the vessel deadweight from a commercially available source (IHS Maritime Sea-web database). The database used contains critical information on over 180,000 vessels.

5.1.4 In order to focus my assessment on cargo ships, I have excluded working vessels such as tugs, UKD dredgers etc. from the ABP data.

5.1.5 Table 5-1 shows a summary of the vessel movement data for the different locations within the Docks. In summary, the table below shows the movements of vessels to and from different parts of the Docks and is presented to show 'working vessels' and cargo vessels.

Location	Including working vessels					Excluding working vessels				
	Total	IN	OUT	SHIFT	NA	Total	IN	OUT	SHIFT	NA
North Dock	3,052	1,440	1,610	1	1	1,007	525	481	1	0
South Dock	12,361	6,104	6,253	4	0	8,944	4,475	4,465	4	0
River Usk	7,299	3,707	3,588	4	0	3,762	1,914	1,844	4	0
NA	3,276	1,643	1,593	40	0	46	4	2	40	0
Unknown	720	380	338	0	2	1	1	0	0	0
Docks Unknown	63	37	26	0	0	0	0	0	0	0
Totals	26,771	13,311	13,408	49	3	13,760	6,919	6,792	49	0

Table 5-1 Breakdown of movement records

5.1.6 During the vessel data recording period, there were 525 'IN' movements and 481 'OUT' movements for the North Dock. Of these movements, 431 complete records could be matched. 92 visits had an 'IN' entry and were missing an 'OUT' entry. 50 visits had an 'OUT' entry and were missing an 'IN' entry. Therefore, the total number of vessel visits to the North Dock, as extracted from the data is 573 (431+92+50).

5.1.7 For the South Dock, there were 4475 'IN' movements and 4465 'OUT' movements. 3727 complete records could be matched. 801 visits had an 'IN' entry and were missing an 'OUT' entry. 795 visits had an 'OUT' entry and were missing an 'IN' entry. Therefore, the total number of vessel visits to the South Dock was 5323 (3727+801+795).

5.1.8 The numbers of visits to the North and South Docks for each year are tabulated below. The year 2004 was not included in the table as the data only covered the month December of that year. As can be observed in Table 5-2, the North Dock handles significantly less vessels than the South Dock.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
South Dock	603	653	583	531	445	399	387	389	382	458	465
North Dock	67	85	78	52	49	39	43	25	34	41	55

Table 5-2 Annual Visits

5.1.9 The **568** visits to the North Dock during the period tabulated were made by a total of **313** unique vessels. Some vessels visited the North Dock more than once.

5.1.10 A list of vessels that have been recorded by ABP as having visited the North Dock during the data recording period is appended to this proof of evidence.

5.1.11 As in my main proof, there are two distinct scenarios which would affect the vertical clearance and air draught limit of vessels wishing to navigate to the North Dock. It is understood that ABP propose to increase the height of the South Lock gates, which would therefore allow them to increase the dock water level. I have therefore carried out my assessment for the two separate scenarios as shown below:

a) A 25.2m air draught limit based on potential future dock water level of 8.40m AOD.

b) A 25.86m air draught limit based a current dock water level of 7.74m AOD.

5.2 Air Draught Data

5.2.1 A parameter crucial to this assessment is the vessel's air draught. As defined in my main proof of evidence, the air draught of a ship is the distance from the waterline to the uppermost part of the ship (on a cargo vessel this is likely to be the main mast which is usually situated atop the accommodation and wheelhouse superstructure). The air draught would change depending on the extent to which the ship is loaded and the density of the water. The most relevant air draught is that when the ship has unloaded its cargo, as the air draught would be at its maximum.

5.2.2 As set out in my main proof, I do not agree with all the air draught values provided by ABP in the historical vessel data and carried out my independent verification of the air draught of vessels that have previously visited the North Dock. My verification method consisted of consisted of researching each of the vessels for their specification and, when public information was not available, vessel operators were contacted directly. My exclusion percentage estimates and my conclusion in my main proof of evidence were founded on the verified air draft data.

5.2.3 Post submission of my main proof of evidence, discussions were held on 10th April between the WG and ABP and as a result I have revised some of the conclusions on vessel air draughts made previously in my main proof.

5.2.4 I have now revised the verified air draught figures of 15 vessels out of the 313 unique vessels that have visited the North Dock. I have concluded that the air draughts of 286 previously verified vessels are correct. There remain 12 vessels, that I cannot make a firm conclusion on the air draughts, therefore I have conservatively assumed that these vessels would be impeded by the Scheme irrespective of air draught clearance or dock water level.

5.2.5 I have now adopted the revised air draughts for all assessments presented in this proof of evidence update.

5.3 Percentages of Vessel Visits Impeded by the Proposed Scheme

5.3.1 Using the updated methodology, I have presented my analysis on the potential exclusion of vessel visits because of the Scheme, for dock water levels of 13.55m ACD (present level) and 14.21m ACD (possible future level) for vessel visits and for air draught clearances of 1m and 2m.

5.3.2 As previously discussed in my main proof of evidence, I believe that an air draught clearance of 2m is unreasonable and should not be applied, but I acknowledge that it is for ABP as SHA to perform their own risk assessment, to determine a reasonable air draught clearance.

5.3.3 I present my results for three different widths of Junction Cut.:

a) Junction Cut width = 19.5m (Current width of Junction Cut with 17m vessel beam restriction)
b) Junction Cut width = 11m (Maximum narrowing width under consideration, resulting in a 10.6m beam restriction)
c) Junction Cut = 13.5m (Minimum narrowing width potentially under consideration, resulting in a 13.1m beam restriction)

19.5m Junction Cut

5.3.4 For a Junction Cut width of 19.5m, using 1m air draught clearance, the analysis shows that based on a dock water level of 13.55m ACD, a total of 17% of visits would be impeded by the Scheme. Based on a dock water level of 14.21m ACD this figure rises to 27%.

5.3.5 Compared to the estimates in my main proof, the percentages have increased from 24% to 27% for the future dock water level. For the present dock water level, the change in percentage is negligible.

Assessment of potentially impeded vessel visits Junction Cut Width = 19.5m , Air Draft Clearance = 1m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Number of vessel visits	67	85	78	52	49	39	43	25	34	41	55	568
Present dock level (13.55m ACD)												
Number of visits impeded	7	17	18	8	7	6	2	4	6	11	10	96
Percentage Impeded	10%	20%	23%	15%	14%	15%	5%	16%	18%	27%	18%	**17%**
Future dock level (14.21m ACD)												
Number of visits impeded	12	19	25	15	15	8	11	11	7	15	15	153
Percentage Impeded	18%	22%	32%	29%	31%	21%	26%	44%	21%	37%	27%	**27%**

Table 5-3 Impeded Vessel Visits JC Width =19.5m, ADC=1m

5.3.6 For an air draught clearance of 2m, the analysis shows that based on a dock water level of 13.55m ACD a total of 26% of visits would be impeded by the Scheme, based on a dock water level of 14.21m ACD this figure rises to 35%.

Assessment of potentially impeded vessel visits Junction Cut Width = 19.5m , Air Draft Clearance = 2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Number of vessel visits	67	85	78	52	49	39	43	25	34	41	55	568
Present dock level (13.55m ACD)												
Number of visits impeded	11	22	25	15	12	7	10	11	7	15	13	148
Percentage Impeded	25%	38%	50%	50%	47%	31%	33%	60%	38%	49%	44%	**26%**
Future dock level (14.21m ACD)												
Number of visits impeded	15	28	28	17	18	13	14	12	10	22	23	200
Percentage Impeded	22%	42%	51%	52%	53%	44%	37%	64%	47%	63%	55%	**35%**

Table 5-4 Impeded Vessel Visits JC Width =19.5m, ADC=2m

11m Junction Cut

5.3.7 For a narrowed Junction Cut width of 11m, using 1m air draught clearance, the analysis shows that based on a dock water level of 13.55m ACD, 97% of visits would be impeded by the Scheme. The vessel beam restriction introduces a significant impact on shipping traffic. For a dock water level of 14.21m ACD the percentage is unchanged, indicating that the vessel beam (and no longer the air draught) is the governing factor for vessel acceptance in to the North Dock.

Assessment of potentially impeded vessel visits Junction Cut Width = 11m, Junction Cut Beam Restriction = 10.6m , Air Draft Clearance = 1m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Number of vessel visits	67	85	78	52	49	39	43	25	34	41	55	568
Present dock level (13.55m ACD)												
Number of visits impeded	63	84	71	50	48	39	42	24	34	40	55	550
Percentage Impeded	94%	99%	91%	96%	98%	100%	98%	96%	100%	98%	100%	**97%**
Future dock level (14.21m ACD)												
Number of visits impeded	63	84	71	50	48	39	42	24	34	40	55	550
Percentage Impeded	94%	99%	91%	96%	98%	100%	98%	96%	100%	98%	100%	**97%**

Table 5-5 Impeded Vessel Visits JC Width =11m, ADC=1m

5.3.8 For an air draught clearance of 2m, the percentages are again unchanged, confirming that the 11m width is the governing factor for vessels acceptance in the North Dock.

Assessment of potentially impeded vessel visits Junction Cut Width = 11m, Junction Cut Beam Restriction = 10.6m , Air Draft Clearance = 2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Number of vessel visits	67	85	78	52	49	39	43	25	34	41	55	568
Present dock level (13.55m ACD)												
Number of visits impeded	63	84	71	50	48	39	42	24	34	40	55	550
Percentage Impeded	25%	38%	50%	50%	47%	31%	33%	60%	38%	49%	44%	**97%**
Future dock level (14.21m ACD)												
Number of visits impeded	63	84	71	50	48	39	42	24	34	40	55	550
Percentage Impeded	94%	42%	51%	52%	53%	44%	37%	64%	47%	63%	55%	**97%**

Table 5-6 Impeded Vessel Visits JC Width =11m, ADC=2m

13.5m Junction Cut

5.3.9 For a narrowed Junction Cut width of 13.5m, using an air draught clearance of 1m, the analysis shows that, based on a dock water level of 13.55m ACD, a total of 43% of visits would be impeded by the Scheme. Based on a dock water level of 14.21m ACD, this figure is 47%.

Assessment of potentially impeded vessel visits Junction Cut Width = 13.5m, Junction Cut Beam Restristion = 13.1m , Air Draft Clearance = 1m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Number of vessel visits	67	85	78	52	49	39	43	25	34	41	55	568
Present dock level (13.55m ACD)												
Number of visits impeded	19	29	40	23	23	12	13	13	18	22	34	246
Percentage Impeded	28%	34%	51%	44%	47%	31%	30%	52%	53%	54%	62%	**43%**
Future dock level (14.21m ACD)												
Number of visits impeded	20	30	42	27	25	13	17	16	19	25	34	268
Percentage Impeded	30%	35%	54%	52%	51%	33%	40%	64%	56%	61%	62%	**47%**

Table 5-7 Impeded Vessel Visits JC Width =13.5m, ADC=1m

5.3.10 For an air draught clearance of 2m, the percentages increase to 48% for 13.55m ACD dock water level and 54% for a water level of 14.21m ACD.

Assessment of potentially impeded vessel visits Junction Cut Width = 13.5m, Junction Cut Beam Restriction = 13.1m , Air Draft Clearance = 2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Number of vessel visits	67	85	78	52	49	39	43	25	34	41	55	568
Present dock level (13.55m ACD)												
Number of visits impeded	21	32	43	27	25	13	17	16	19	25	34	272
Percentage Impeded	25%	38%	50%	50%	47%	31%	33%	60%	38%	49%	44%	**48%**
Future dock level (14.21m ACD)												
Number of visits impeded	23	36	43	28	28	17	19	17	22	31	40	304
Percentage Impeded	34%	42%	51%	52%	53%	44%	37%	64%	47%	63%	55%	**54%**

Table 5-8 Impeded Vessel Visits JC Width =13.5m, ADC=2m

5.4 Percentages of Unique Vessels Impeded by the Scheme

5.4.1 Using the updated methodology, I have presented my analysis on the potential exclusion of unique vessels as a result of the Scheme, for dock water levels of 13.55m ACD (present level) and 14.21m ACD (possible future level) for vessel visits and assuming air draught clearances of 1m and 2m.

5.4.2 As previously discussed in my main proof of evidence, I believe that an air draught clearance of 2m is unreasonable and should not be applied, but I acknowledge that it is for ABP to perform their own risk assessment, to determine a reasonable clearance.

5.4.3 I present my results for three different widths of Junction Cut.:

a) Junction Cut width = 19.5m (Current width of Junction Cut with 17m vessel beam restriction)
b) Junction Cut width = 11m (Maximum narrowing width under consideration)
c) Junction Cut = 13.5m (Minimum narrowing width under consideration)

19.5m Junction Cut

5.4.4 For the present Junction Cut width of 19.5m, using 1m air draught clearance, the analysis shows that based on a dock water level of 13.55m ACD a total of 19% of unique vessels would be impeded by the Scheme. Based on a dock water level of 14.21m ACD, this figure rises to 27%.

5.4.5 Compared to the estimates in my main proof, the percentages have increased from 23% to 27% for the future dock water level. For the present dock water level, the change in percentage is negligible.

Assessment of potentially impeded vessels Junction Cut Width = 19.5m , Air Draft Clearance = 1m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2005-2015**
Number of unique vessels	54	75	61	44	35	28	35	16	21	28	40	313
Present dock level (13.55m ACD)												
Number of vessels impeded	6	15	17	8	5	5	2	3	3	7	8	59
Percentage Impeded	11%	20%	28%	18%	14%	18%	6%	19%	14%	25%	20%	**19%**
Future dock level (14.21m ACD)												
Number of vessels impeded	11	17	23	12	11	7	7	5	4	9	13	86
Percentage Impeded	20%	23%	38%	27%	31%	25%	20%	31%	19%	32%	33%	**27%**

Table 5-9 Impeded Unique vessels JC Width =19.5m, ADC=1m

5.4.6 For an air draught clearance of 2m, the analysis shows that based on a dock water level of 13.55m ACD a total of 25% of vessels would be impeded by the Scheme. Based on a dock water level of 14.21m ACD this figure rises to 34%.

Assessment of potentially impeded vessels Junction Cut Width = 19.5m , Air Draft Clearance = 2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2005-2015**
Number of unique vessels	54	75	61	44	35	28	35	16	21	28	40	313
Present dock level (13.55m ACD)												
Number of vessels impeded	10	19	24	12	8	6	6	5	4	9	11	78
Percentage Impeded	19%	25%	39%	27%	23%	21%	17%	31%	19%	32%	28%	**25%**
Future dock level (14.21m ACD)												
Number of vessels impeded	14	24	26	14	12	10	9	6	6	15	18	107
Percentage Impeded	26%	32%	43%	32%	34%	36%	26%	38%	29%	54%	45%	**34%**

Table 5-10 Unique vessels JC Width =19.5m, ADC=2m

11m Junction Cut

5.4.7 For a narrowed Junction Cut width of 11m, using 1m air draught clearance, the analysis shows that based on a dock water level of 13.55m ACD a total of 96% of unique vessels would be impeded by the Scheme. Based on a dock water level of 14.21m ACD, this figure is unchanged. This is because the vessel beam is the governing factor for acceptance into the North Dock.

Assessment of potentially impeded vessels Junction Cut Width = 11m , Air Draft Clearance = 1m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2005-2015**
Number of unique vessels	54	75	61	44	35	28	35	16	21	28	40	313
Present dock level (13.55m ACD)												
Number of vessels impeded	50	74	57	42	34	28	34	15	21	27	40	299
Percentage Impeded	93%	99%	93%	95%	97%	100%	97%	94%	100%	96%	100%	**96%**
Future dock level (14.21m ACD)												
Number of vessels impeded	50	74	57	42	34	28	34	15	21	27	40	299
Percentage Impeded	93%	99%	93%	95%	97%	100%	97%	94%	100%	96%	100%	**96%**

Table 5-11 Unique vessels JC Width =11m, ADC=1m

5.4.8 For an air draught clearance of 2m, the percentages are again unchanged, confirming that the 11m width is the governing restriction for vessels to enter the North Dock.

Assessment of potentially impeded vessels Junction Cut Width = 11m , Air Draft Clearance = 2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2005-2015**
Number of unique vessels	54	75	61	44	35	28	35	16	21	28	40	313
Present dock level (13.55m ACD)												
Number of vessels impeded	50	74	57	42	34	28	34	15	21	27	40	299
Percentage Impeded	93%	99%	93%	95%	97%	100%	97%	94%	100%	96%	100%	**96%**
Future dock level (14.21m ACD)												
Number of vessels impeded	50	74	57	42	34	28	34	15	21	27	40	299
Percentage Impeded	93%	99%	93%	95%	97%	100%	97%	94%	100%	96%	100%	**96%**

Table 5-12 Unique vessels JC Width =11m, ADC=2m

13.5m Junction Cut

5.4.9 For a narrowed Junction Cut width of 13.5m, using 1m air draught clearance, the analysis shows that based on a dock water level of 13.55m ACD a total of 41% of unique vessels would be impeded by the Scheme. Based on a dock water level of 14.21m ACD this figure is 42%.

Assessment of potentially impeded vessels Junction Cut Width = 13.5m , Air Draft Clearance = 1m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2005-2015**
Number of unique vessels	54	75	61	44	35	28	35	16	21	28	40	313
Present dock level (13.55m ACD)												
Number of vessels impeded	13	25	32	19	15	9	12	7	8	13	22	129
Percentage Impeded	24%	33%	52%	43%	43%	32%	34%	44%	38%	46%	55%	**41%**
Future dock level (14.21m ACD)												
Number of vessels impeded	14	26	34	21	16	10	13	8	9	14	22	132
Percentage Impeded	26%	35%	56%	48%	46%	36%	37%	50%	43%	50%	55%	**42%**

Table 5-13 Unique vessels JC Width =13.5m, ADC=1m

5.4.10 For an air draught clearance of 2m, the percentages increase to 43% for 13.55m ACD dock water level and 46% for a water level of 14.21m ACD.

Assessment of potentially impeded vessels Junction Cut Width = 13.5m , Air Draft Clearance = 2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2005-2015**
Number of unique vessels	54	75	61	44	35	28	35	16	21	28	40	313
Present dock level (13.55m ACD)												
Number of vessels impeded	15	28	35	21	16	10	13	8	9	14	22	134
Percentage Impeded	28%	37%	57%	48%	46%	36%	37%	50%	43%	50%	55%	**43%**
Future dock level (14.21m ACD)												
Number of vessels impeded	17	31	35	22	17	12	14	9	11	19	25	144
Percentage Impeded	31%	41%	57%	50%	49%	43%	40%	56%	52%	68%	63%	**46%**

Table 5-14 Unique vessels JC Width =13.5m, ADC=2m

5.4.11 The analysis presented in the tables clearly show that a narrowed Junction Cut would have a significant effect on the number of vessels physically capable of accessing the North Dock.

5.5 Restrictions on Cargo Carrying Capacity

5.5.1 In order to assess the restriction in terms of cargo carrying capacity, I have examined the impeded vessel visits in more detail. In particular, I have examined a breakdown of the vessels visits at the North Dock in terms of their deadweight tonnage (DWT). The vessel deadweight information was not contained within the ABP vessel movement data, I have therefore populated the vessel data with deadweight figures using proprietary vessel data sources.

5.5.2 In the following tables, I show a breakdown of the number of vessel visits that would be impeded and unimpeded by the proposed Scheme, for a range of deadweights. The values are presented for a future dock level of 14.21m ACD and an air draught clearance of 1m, i.e. an air draught restriction of 25.2m. This has been carried out for three widths of Junction Cut (19.5m, 11m and 13.5m).

19.5m Junction Cut

5.5.3 For a Junction Cut with of 19.5m, the analysis clearly shows that the vast majority vessels up to a deadweight of 3,000 tonnes would not be impeded from entering the North Dock by the proposed Scheme.

5.5.4 Between a deadweight range of 3,000 - 4,000 tonnes, there is a slightly higher proportion of vessels that are impeded, however 62% of vessels would be unimpeded.

5.5.5 For vessels above 4,000 – 5,000 DWT, most of the vessels would be prevented from entering the North Dock because of the Scheme. Based on this observation, I conservatively conclude that vessels above 4,000 tonnes to transit the Junction Cut with the Scheme in place. This is a conservative assumption as the values, although low, do show that a percentage of vessels above 4,000 tonnes, would be unimpeded by the Scheme.

Breakdown by Deadweight (Vessel Visits), Junction Cut Width = 19.5m Air Draft Clearance = 1m, Dock Water level = 14.21m ACD						
Deadweight range in tonnes	**No of visits in deadweight range**	**No. of visits impeded**	**No. of visits unimpeded**	**% Visits impeded**	**% Visits unimpeded**
0 - 1000	2	0	2	0%	100%
1000 - 2000	71	2	69	3%	97%
2000 - 3000	154	16	138	10%	90%
3000 - 4000	218	62	156	28%	72%
4000 - 5000	91	50	41	55%	45%
5000 - 6000	22	16	6	73%	27%
6000 - 7000	8	5	3	63%	38%
7000 - 8000	1	1	0	100%	0%
8000 - 9000	1	1	0	100%	0%
Total	568	153	415	27%	73%

Table 5-15 Breakdown by DWT (JC Width = 19.5m)

11m Junction Cut

5.5.6 For a Junction Cut with of 11m, the breakdown tables are shown below. Considering an air draught clearance of 1m and a future dock water level of 14.21m ACD, it is clear, all or nearly all vessels over 2,000 tonnes in deadweight would be impeded.

Breakdown by Deadweight (Vessel Visits), Junction Cut Width = 11m Air Draft Clearance = 1m, Dock Water level = 14.21m ACD					
Deadweight range in tonnes	**No of visits in deadweight range**	**No. of visits impeded**	**No. of visits unimpeded**	**% Visits impeded**	**% Visits unimpeded**
0 - 1000	2	1	1	50%	50%
1000 - 2000	71	57	14	80%	20%
2000 - 3000	154	154	0	100%	0%
3000 - 4000	218	217	1	100%	0%
4000 - 5000	91	89	2	98%	2%
5000 - 6000	22	22	0	100%	0%
6000 - 7000	8	8	0	100%	0%
7000 - 8000	1	1	0	100%	0%
8000 - 9000	1	1	0	100%	0%
Total	568	550	18	97%	3%

Table 5-16 Breakdown by DWT (JC Width = 11m)

13.5m Junction Cut

5.5.7 For a Junction Cut width of 13.5 m, a dock level of 14.21 m ACD, and a reasonable safety clearance of 1m the analysis shows that most vessels within a deadweight range of 0 – 3,000 tonnes would be unimpeded from entering the North Dock by the proposed Scheme.

5.5.8 Between 3,000 and 4,000 tonnes deadweight, 42% of vessels would be unimpeded. However, the analysis also shows that 97% of vessels between 4,000 and 5,000 tonnes deadweight would be impeded by the proposed Scheme. I conclude that with a Junction Cut width of 13.5m, the North Dock would be able to accept vessels up to 3,000 tonnes in deadweight.

Breakdown by Deadweight (Vessel Visits), Junction Cut Width = 13.5m Air Draft Clearance = 1m, Dock Water level = 14.21m ACD						
Deadweight range in tonnes			**No of visits in deadweight range**	**No. of visits impeded**	**No. of visits unimpeded**	**% Visits impeded**	**% Visits unimpeded**
0	-	1000	2	0	2	0%	100%
1000	-	2000	71	2	69	3%	97%
2000	-	3000	154	19	135	12%	88%
3000	-	4000	218	127	91	58%	42%
4000	-	5000	91	88	3	97%	3%
5000	-	6000	22	22	0	100%	0%
6000	-	7000	8	8	0	100%	0%
7000	-	8000	1	1	0	100%	0%
8000	-	9000	1	1	0	100%	0%
Total			568	268	300	47%	53%

Table 5-17 Breakdown by DWT (JC Width = 13.5m)

6 ASSESSMENT OF BERTH OCCUPANCY

6.1 Overview

6.1.1 In this section, I provide a detailed assessment of the historical utilisation of the ABP Common User Berths within Newport Docks. The objective is to assess whether there is sufficient berth capacity within the South Dock to accommodate vessels that would be unable to access the North Dock as a result of the Scheme.

6.1.2 In my main proof of evidence, my assessment assumed that vessels over 5,000 tonnes deadweight would need to be redirected to the South Dock. This was done as my assessment had shown that alternative charter arrangements could be made for vessels with air draughts of less than 25.2m within that deadweight range. ABP have expressed concerns over the possibility of chartering alternative vessels with a low enough air draught. Issues of availability of vessels with a low air draught and increased chartering costs are among the reasons put forward by ABP. Although I am of the opinion that alternative chartering arrangements can be made, and vessels with a low air draught, drop down mast etc. are readily available and are commonly used, I have adapted my methodology in the present assessment to address ABP's concerns. For the purposes of this analysis, I make the conservative assumption that alternative chartering arrangements cannot be made. Since this methodology would increase the required reallocation, the conclusions drawn would be conservative.

6.1.3 As in my main proof, I conducted my assessment using three approaches, as detailed below:

1. My first approach was to estimate the historical berth occupancy for each common user berth in South Dock by analysing the historical vessel movement data. This does not take into account the length of the quay and the possibility that more than one vessel can berth at the same quay, and only considered existing berth space.

2. My second approach was to quantify the unused length of quay frontage for the common user berths in the South Dock. I expressed this length in terms of the number of vessels typical to the North Dock that can be accommodated in the free space. I produced separate estimates for the North and South Quays in the South Dock as this would be the preferred location for redirected vessels. I then estimate the 'demand' for this quay space from North Dock vessels by studying the historical berth occupancy of the North Dock.

3. My third approach was to consider the scenario where during the study period (2005-2015), vessels which would be impeded by the Scheme, are relocated to the South Dock and I then test whether they can be accommodated.

6.1.4 Note that my assessment considers the availability of berth frontage only and does not cover onshore considerations such as storage space and crane availability etc.

6.2 ABP Common User Berths

6.2.1 The Newport Docks consist of several 'leased' and 'common user' berths. The leased berths are exclusive to the tenant and have therefore been excluded from this assessment. The common user berths currently total 833m of berth space in the South Dock and 739m of berth space in the North Dock. The common user berths are managed and owned by ABP and provide the 'pool' of quay frontage available for cargo vessels loading or discharging various cargoes at the Docks. Please refer to Appendix B.

6.2.2 ABP common user berths in the North Dock cover Sections 21 and 22 (informally referred to as Dowd's North Dock) and Sections 23, 24, 25 and 26 (informally referred to as Jewson's').

6.2.3 In the South Dock, the common user berths are Sections 1- 4 (ABP South Quay Steel) and Sections 7-9 (ABP North Quay).

6.2.4 Sections 11 and 12 in the South Dock are commonly referred to as 'Middle Quay' and are managed by ABP. I am aware that this berth space is not used for cargo handling. The berth is primarily used for laying up vessels or berthing cruise vessels and warships.

6.2.5 As described in Section 3, The Welsh Government has offered to provide extra lengths of common user berths in the South Dock as follows:

a) Refurbishment of 250m of quay on the south side of the South Dock (at the eastern end of the coal terminal to support the relocation of Origin Fertilisers operation and W.E. Dowds (Shipping) operation (in Shed 10)
b) Phased creation of approximately 303m of quay space in the north side of the South Dock, immediately adjoining and continuous with the section of the North Quay currently in use. Phase 1 consists of 150m of quay space and Phase 2 would add an additional 153m of quay space, making a total of 303m.

6.2.6 If a vessel which is intended to berth at one of the common user berths in the North Dock (Sections 21-26), is impeded by the proposed bridge over the Junction Cut, then the vessel would have to be accommodated at one of the common user berths in the South Dock (Sections 1-4, 7-9 or on a new section of quay space).

6.2.7 The lengths of berth space relevant to this assessment, including the new quay space proposed by the Welsh Government are tabulated below in Table 5-18

Section	Berth name	Dock	Length (m)
Sections 21, 22	Dowds	North Dock	275
Sections 23 - 26	Jewson	North Dock	464
Sections 1 - 4	ABP South Quay	South Dock	604
Sections 7-9	ABP North Quay	South Dock	290
New Section	ABP North Quay Extension	South Dock	150 (Phase 1) 303 (Phase 2)
New Section	Refurbished ABP Coal Section	South Dock	250

Table 5-18 Quay Space

6.3 Vessel movement Data

6.3.1 I have again used the historical vessel movement data provided by ABP to conduct the analysis detailed below.

6.3.2 The analysis is based on the data tabulated in Table 5-19. 'IN' entries refer to inward vessel movements and I have assumed that it refers to the time when the berth becomes occupied. 'OUT' refers to outward vessel movements and I have assumed that it refers to the time at which the berth is released and free for use by another vessel.

6.3.3 Complete visit records refer to cases where an IN movement could be matched to an OUT movement, therefore providing complete information on a particular vessel visit.

6.3.4 Incomplete visit records refer to entries where an OUT movement could not be matched to an IN movement and vice versa.

Berth	Total number of entries	Number of "IN" entries	Number of "OUT" entries	Number of complete visit records	Number of incomplete visit records	Number of vessel visits
ABP South Quay	2079	1017	1062	886	307	1193
ABP North Quay	1874	966	908	806	262	1068
Dowds	459	247	211	193	73	266
Jewsons	545	275	270	247	51	298

Table 5-19 Vessel Movement 2005 – 2015

6.3.5 For the 'incomplete visit records', an assumption had to be made as to the vessel's duration of stay at the berth so that a complete record could be constructed.

6.3.6 The data on vessels' time alongside from the 'complete visit records' to the ABP Common User berths provided a means to estimate the time alongside for vessels of different sizes. Average visit duration periods were calculated for vessels of differing deadweight ranges and tabulated as follows:

Deadweight Range (tonnes)		Average visit duration (days)
0	1000	3
1000	2000	3
2000	3000	3
3000	4000	3
4000	5000	4
5000	6000	4
6000	7000	4
7000	8000	4
8000	9000	5
9000	10000	5
10000	15000	5
15000	20000	6
20000	25000	6
25000	30000	6
30000	35000	7
35000	40000	8

Table 5-20 Average vessel visit durations

6.4 Berth Occupancy

6.4.1 Using the data for the eleven-year period, it was possible to determine the amount of time, during which a vessel was berthed at each of the four common user berths. This information is presented as percentages in the table and graph below**Error! Reference source not found.**.

Berth Occupancy (%)											
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
ABP South Quay	88%	88%	80%	69%	65%	50%	54%	50%	43%	81%	57%
ABP North Quay	72%	77%	67%	60%	53%	64%	70%	57%	59%	78%	71%
Dowds	28%	37%	41%	25%	18%	15%	17%	4%	0%	5%	15%
Jewson	22%	19%	16%	13%	17%	15%	17%	15%	24%	28%	30%

Table 5-21 Berth Occupancy (%)

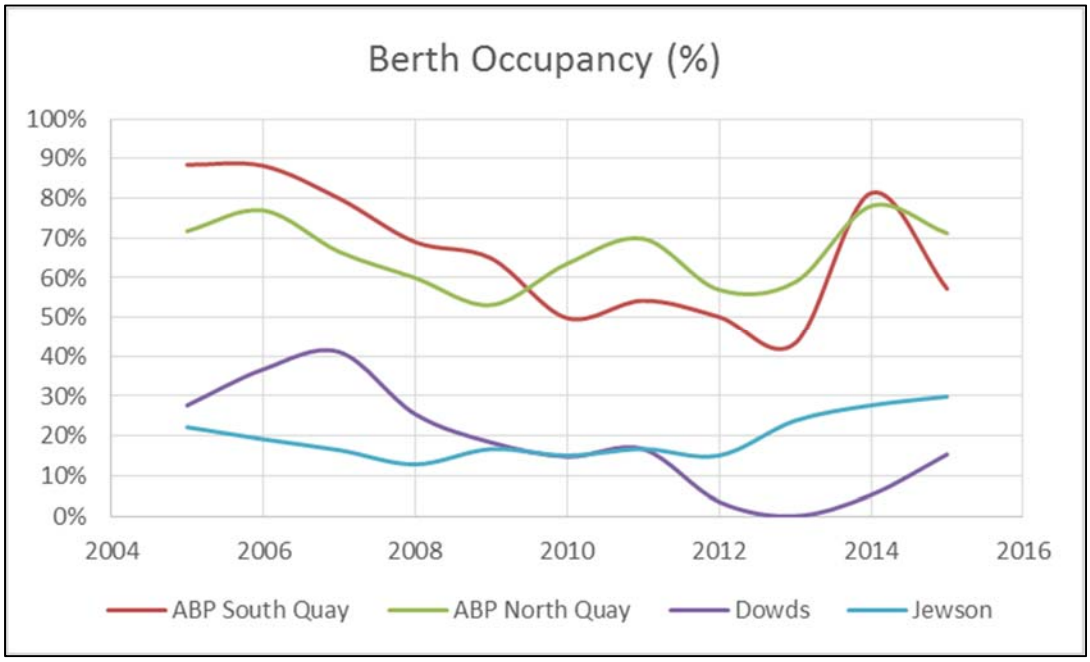

Figure 5-1 Berth Occupancy

6.4.2 Since the berth occupancy calculated here does not take into account the length of the berthed vessel, it does not give an entirely accurate indication of the current availability of quay space. It nevertheless provides some insight into the operations at the ABP common user berths within the Docks.

6.4.3 It can be seen that the occupancy of the Dowds' and Jewson berths within the North Dock are relatively low compared to the occupancy of the berths within the South Dock. This would indicate that the ships using North Dock would be likely to be able to be accommodated within the South Dock, once the new berth space proposed by the Welsh Government is completed.

6.5 Availability of Berth Space within the South Dock

6.5.1 This section quantifies the unused lengths of berth space at the ABP common user North and South Quays.

6.5.2 In order to estimate the unoccupied length of berth space required on any given day during the study period, an assumption was made as to the length of berth required by any vessel. It was assumed that each vessel requires 1.2 x LOA of the vessel as per Ref 12. This figure provides an allowance for vessel moorings, for example, a 200m long vessel would require 240m (200m x 1.2) of berth space. If the same vessel is berthed at ABP South Quay, which is 604m long, then the unused space, available for other vessels, would be 364 m (604m - 240m).

6.5.3 In order to relate the berth space to North Dock traffic, an assumption was also made as to how much berth space a vessel typical of the North Dock would require. The longest vessel to have visited the North Dock during the data collation period, was the Katja (IMO 9235490). This vessel had a length overall (LOA) of 129.5 m. On a precautionary basis, using this length as a representative of the berth space required, factoring in the additional length of quay space required for moorings, it was estimated, that a quay length of 155 m would be sufficient to accommodate one vessel typical of those having visited the North Dock. Similarly, 310 m of quay space would be able to accommodate two vessels, and so on.

6.5.4 The tables below present the percentage of time when the common user berths in the South Dock would have been able to accommodate a certain number of 'North Dock' vessels. I have carried out the exercise on a theoretical basis as to the number of ships that could have been accommodated assuming North Dock was not available with the level of space within South Dock as currently available (Table 5-22) and also with the level of space within South Dock including Phase 1 (Table 5-23) and Phase 2 (Table 5-24) of the Welsh Government accommodation works. The availability of berth space has been expressed in terms of the number of North Dock vessels that can be accommodated (in multiples of 155m). For example, with the current common berth space at Newport Docks (Table 5-22), during the year 2012, 96% of the time, there was enough space to berth two vessels with the current configuration of berths. With the increase in available berth space in Phase 1 and Phase 2, the percentage of time that a certain number of ships can be accommodated increases.

Table 5-22 Quay Space availability (Current)

Quays space availability for North Dock Vessels (Current)											
No of vessels	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
1	95%	89%	94%	99%	98%	99%	99%	98%	100%	94%	96%
2	77%	70%	82%	92%	93%	96%	94%	96%	99%	77%	85%
3	51%	43%	57%	71%	80%	81%	78%	82%	81%	45%	59%
4	20%	17%	24%	40%	45%	39%	36%	42%	47%	10%	26%
5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 5-23 Quay Space Available (Phase 1)

Quays space availability for North Dock Vessels (Phase 1)											
No of vessels	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
2	98%	96%	98%	100%	99%	100%	100%	99%	100%	98%	99%
3	90%	83%	90%	98%	97%	98%	96%	98%	99%	89%	94%
4	72%	63%	75%	87%	90%	90%	88%	93%	96%	69%	78%
5	47%	36%	49%	65%	73%	72%	65%	77%	73%	40%	49%
6	20%	17%	24%	40%	44%	39%	36%	42%	46%	10%	26%
7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 5-24 Quay Space availability (Phase 2)

Quays space availability for North Dock Vessels (Phase 2)											
No of vessels	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
3	98%	96%	98%	100%	99%	100%	100%	99%	100%	98%	99%
4	90%	82%	89%	97%	97%	98%	96%	98%	99%	89%	94%
5	71%	62%	75%	86%	89%	90%	88%	93%	95%	66%	77%
6	46%	35%	49%	64%	71%	70%	63%	73%	71%	37%	47%
7	17%	16%	21%	35%	41%	35%	32%	38%	42%	8%	24%

6.5.5 The average percentage availability of berth space during the different phases of quay completion for a different number of vessels is presented in Table 5-25 below:

Quay Space (No of vessels)	**Availability (%)**		
	Current	**Phase 1**	**Phase 2**
1	97%	100%	100%
2	87%	99%	100%
3	66%	94%	99%
4	32%	82%	94%
5	0%	59%	81%
6	0%	31%	57%
7	0%	0%	28%

Table 5-25 Availability

6.5.6 It is understood that the North Quay would be the preferred location for vessels intended to use the North Dock but impeded by the Scheme as their cargo would be destined for the northern part of the North Dock. To investigate the possibility of accommodating this preference, I have considered the availability of the North Quay and the South Quay separately below in Table 5-26 and Table 5-27.

6.5.7 A proportion of the traffic currently visiting to the North Quay would be redirected to the new 250m of refurbished quay in the South Dock intended for the relocation of the WE Dowd and Origin facilities. It is not possible to know the exact proportion that would be redirected from the North Quay in the absence of detailed information on each vessel intended for Origin or Dowds that have berthed at the North Quay during the study period. Therefore, two scenarios have been considered (zero allocation and full reallocation) and the average between the two scenarios was adopted as indicator of the availability.

Availability (%) of North Quay for redirected vessels						
Quay Space (No of vessels)	No reallocation of Dowds and Origin traffic		Full reallocation of Dowds and Origin traffic		Average	
	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
1	84%	100%	100%	100%	92%	100%
2	55%	83%	100%	100%	78%	92%
3	0%	50%	0%	100%	0%	75%
4	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%
6	0%	0%	0%	0%	0%	0%
7	0%	0%	0%	0%	0%	0%

Table 5-26 Availability of North Quay

Availability (%) of South Quay for redirected vessels						
Quay Space (No of vessels)	No reallocation of Dowds and Origin traffic		Full reallocation of Dowds and Origin traffic		Average	
	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
1	100%	100%	95%	95%	98%	98%
2	94%	94%	84%	84%	89%	89%
3	79%	79%	61%	61%	70%	70%
4	52%	52%	20%	20%	36%	36%
5	0%	0%	0%	0%	0%	0%
6	0%	0%	0%	0%	0%	0%
7	0%	0%	0%	0%	0%	0%

Table 5-27 Availability of South Quay

6.5.8 As can be seen in Table 5-26 , the North Quay would have up to 78% availability to accommodate two vessels displaced from North Dock at Phase 1 of the WG's accommodation works and up to 75% availability to accommodate three vessels at Phase 2.

6.5.9 For vessels that cannot be accommodated at the North Quay in the South Dock, there would also be availability on the South Quay with up to 70% availability to accommodate three vessels displaced from the North Dock.

6.5.10 In order to assess the ability of the South Dock to accommodate North Dock vessels impeded by the Scheme, it was important to obtain an understanding of the potential 'demand' for the available berth space in the South Dock at any one time.

6.5.11 I have analysed the data on vessel visits to the Dowds' and Jewson's berths within the North Dock to produce the demand estimates. As with the previous analysis, I have considered three scenarios (Junction widths of 19.5m, 11m and 13.5m) with an air draught clearance of 1m at 14.21m ACD dock water level (25.2m air draught restriction). (See Table 5-28 below). The table shows that there was rarely more than one vessel which would have been impeded by the Scheme berthed in the North Dock. The 'demand' for berth space in the South Dock from these vessels is therefore low.

Demand for quay space in South Dock						
No of vessels	Junction Cut Width = 19.05m		Junction Cut Width = 11m		Junction Cut Width = 13.5m	
	Occurrence (days)	Percentage (%)	Occurrence (days)	Percentage (%)	Occurrence (days)	Percentage (%)
0	3626	90%	2688	67%	3281	81%
1	394	10%	1089	27%	706	17%
2	19	0%	220	5%	52	1%
3	1	0%	37	1%	1	0%
4	0	0%	5	0%	0	0%
5	0	0%	0	0%	0	0%

Table 5-28 Demand for quay space

6.5.12 Table 5-29 , Table 5-30 and Table 5-31 show a summary of the demand and availability for Junction Cut widths of 19.5m, 11m and 13.5m. The probability of not being able to accommodate vessels, presented as a percentage (% Not accommodated) was calculated as follows: %Not accommodated = Demand(%) x (100- Availability(%)).

Summary of Demand and Availability (Junction Cut Width =19.05m , Air Draft limit = 25.2m)									
No of vessels	Demand (%)	Availability (%)						% Not accomodated	
		Phase 1			Phase 2			Phase 1	Phase 2
		North Quay	South Quay	Combined	North Quay	South Quay	Combined		
1	10%	92%	98%	100%	100%	98%	100%	0.00%	0.00%
2	0%	78%	89%	99%	92%	89%	100%	0.00%	0.00%
3	0%	0%	70%	94%	75%	70%	99%	0.00%	0.00%
4	0%	0%	36%	82%	0%	36%	94%	0.00%	0.00%
5	0%	0%	0%	59%	0%	0%	81%	0.00%	0.00%
6	0%	0%	0%	31%	0%	0%	57%	0.00%	0.00%
7	0%	0%	0%	0%	0%	0%	28%	0.00%	0.00%

Table 5-29 Demand and Availability (Junction Cut Width = 19.5m)

6.5.13 It can be observed in Table 5-29 that with a Junction Cut of 19.5m wide, there is a demand for quay space from one vessel 10% of the time and 100% of the time, the South Dock can accommodate the vessel.

Summary of Demand and Availability (Junction Cut Width =11m , Air Draft limit = 25.2m)									
No of vessels	Demand (%)	Availability (%)						% Not accomodated	
		Phase 1			Phase 2			Phase 1	Phase 2
		North Quay	South Quay	Combined	North Quay	South Quay	Combined		
1	27%	92%	98%	100%	100%	98%	100%	0.00%	0.00%
2	5%	78%	89%	99%	92%	89%	100%	0.05%	0.00%
3	1%	0%	70%	94%	75%	70%	99%	0.06%	0.01%
4	0%	0%	36%	82%	0%	36%	94%	0.00%	0.00%
5	0%	0%	0%	59%	0%	0%	81%	0.00%	0.00%
6	0%	0%	0%	31%	0%	0%	57%	0.00%	0.00%
7	0%	0%	0%	0%	0%	0%	28%	0.00%	0.00%

Table 5-30 Demand and Availability (Junction Cut Width = 11m)

6.5.14 Table 5-30, shows there is demand for space from one vessel 27% of the time. At Phase 1, 100% of the time there would be space in the South Dock to accommodate the vessel. 92% of the time the vessel can be berthed at the North Quay. At Phase 2, 100% of the time there would be space in the South Dock to accommodate the vessel. At Phase 2, 100% of the time, the vessel can be berthed at the north quay.

6.5.15 There is a demand for space for two vessels 5% of the time. Following construction Phase 1, there would be space in the South Dock to accommodate the vessels 99% of the time. 78% of the time both vessels would be able to berth at the North Quay. Following construction Phase 2, there would be space in the South Dock to accommodate the vessel 100% of the time. Also following construction Phase 2, both vessels can be berthed at the North Quay 92% of the time.

6.5.16 If one vessel needed to be reallocated, then it be would accommodated 100% of the time. There is a 0.05% (low) probability of not being able to accommodate two vessels at the same time after construction Phase 1. Following construction Phase 2, two vessels would be accommodated. Following construction Phase 1 there is a 0.06% (low) probability of not being able to accommodate three vessels at the same time. Following construction Phase 2, there is a 0.01% (low) probability of not being able to accommodate three vessels. Overall, the probability of not being able to reallocate any potentially impeded vessels to the South Dock is very low.

Summary of Demand and Availability (Junction Cut Width =13.5m , Air Draft limit = 25.2m)									
No of vessels	Demand (%)	Availability (%)						% Not accomodated	
		Phase 1			Phase 2			Phase 1	Phase 2
		North Quay	South Quay	Combined	North Quay	South Quay	Combined		
1	17%	92%	98%	100%	100%	98%	100%	0.00%	0.00%
2	1%	78%	89%	99%	92%	89%	100%	0.01%	0.00%
3	0%	0%	70%	94%	75%	70%	99%	0.00%	0.00%
4	0%	0%	36%	82%	0%	36%	94%	0.00%	0.00%
5	0%	0%	0%	59%	0%	0%	81%	0.00%	0.00%
6	0%	0%	0%	31%	0%	0%	57%	0.00%	0.00%
7	0%	0%	0%	0%	0%	0%	28%	0.00%	0.00%

Table 5-31 Demand and Availability (Junction Cut Width = 13.5m)

6.5.17 If one vessel needs to be reallocated, then it would be accommodated 100% of the time. There is a 0.01% chance of not being able to accommodate a vessel following construction Phase 1. Following construction Phase 2, the South Dock would be fully capable of accommodating all the traffic.

6.5.18 From the three scenarios assessed above, it is clear that Newport Docks would be able to accommodate the majority of displaced vessel visits from North Dock with minimum disruption to vessel berthing requirements following Phase 1 and all the displaced vessel visits from North Dock following Phase 2.

6.6 Berth Reallocation

6.6.1 To further assess the ability of the common user berths in the South Dock to accommodate vessel traffic intended for the North Dock, a further analysis was carried out. This involved a hypothetical scenario, where vessels visiting the North Dock during the period 2005 to 2015, which would have been impeded by the proposed Scheme, were reallocated to the South Dock. This enabled me to assess whether the ABP common user berths and the proposed new quay space in the South Dock would have been able to accommodate all the vessels.

6.6.2 The assumption that 155m of berth space is required to accommodate one vessel typical of the North Dock was again adopted for this assessment and again, on a precautionary basis, this represents the longest length of vessel to have entered the North Dock during the data collation period.

6.6.3 It is understood that a proportion of the traffic currently berthing at the North Quay (Sections 7-9) would be redirected to the proposed 250m of refurbished quay in the South Dock which is intended for the relocation of Dowds and Origin facilities. However, it is not possible to determine the exact proportion of traffic that would be redirected from the North Quay in the absence of detailed information on each vessel intended for either Origin or Dowds. For this study, two scenarios have been considered:

1. Full reallocation of traffic from Sections 7-9 to the newly refurbished 250m space
2. No reallocation of traffic from Sections 7-9 to the newly refurbished 250m space

6.6.4 It is understood that vessels carrying cargo bound for the north side of the port would have a preference for berthing on the North Quay (Sections 7-9 with additional berth). This was modelled by prioritising of berth space as follows:

1. North Quay
2. Refurbished 250m
3. Existing steel berth

6.6.5 The following table shows the percentage of time during the eleven-year period, when all the vessels relocated from the North Dock could be berthed at the South Dock common user berths. The analysis was carried out for three widths of the Junction Cut (19.5m, 11m and 13.5m), with a future dock water level of 14.21m ACD, an air draught clearance of 1m and an air draught restriction of 25.2m.

19.5m Junction Cut

6.6.6 With the currently available berth space, the results on Table 5-32 suggest that on average 95% of the time when vessels need to be redirected from the North Dock, they could be accommodated in the South Dock.

Reallocaton Results - Current Junction Cut Width = 19.5m, Air Draft Limit = 25.2m												
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Totals
No. of days reallocation is needed	30	50	80	48	34	17	20	38	26	33	37	413
No. of days reallocation is possible	30	39	80	46	34	17	20	37	26	32	33	394
Percentage	100%	78%	100%	96%	100%	100%	100%	97%	100%	97%	89%	95%

Table 5-32 Reallocation results - JC Width 19.5m (Current)

6.6.7 Following construction Phase 1, the two scenarios tested show that redirected vessels would have been accommodated 100% of the time.

Reallocaton Results - Phase 1 (250m refurbished South Quay + 150m North Quay) Junction Cut Width = 19.5m, Air Draft Limit = 25.2m, Section 7-9 traffic not redirected												
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Totals
No. of days reallocation is needed	30	50	80	48	34	17	20	38	26	33	37	413
No. of days reallocation is possible	30	50	80	48	34	17	20	38	26	33	37	413
Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-33 Reallocation results - JC Width 19.5m (Phase 1)

Reallocaton Results - Phase 1 (250m refurbished South Quay + 150m North Quay) Junction Cut Width = 19.5m, Air Draft Limit = 25.2m, Section 7-9 traffic redirected to refurbished 250m quay												
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Totals
No. of days reallocation is needed	30	50	80	48	34	17	20	38	26	33	37	413
No. of days reallocation is possible	30	50	80	48	34	17	20	38	26	33	37	413
Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-34 Reallocation results - JC Width 19.5m (Phase 1) (Section 7-9 traffic redirected)

6.6.8 Following Phase 2, the two scenarios tested showed that redirected vessels would have been accommodated 100% of the time.

Reallocaton Results - Phase 2 (250m refurbished South Quay + 303m North Quay) Junction Cut Width = 19.5m, Air Draft Limit = 25.2m, Section 7-9 traffic not redirected												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	30	50	80	48	34	17	20	38	26	33	37	413
No. of days reallocation is possible	30	50	80	48	34	17	20	38	26	33	37	413
Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-35 Reallocation results - JC Width 19.5m (Phase 2)

Reallocaton Results - Phase 2 (250m refurbished South Quay + 303m North Quay) Junction Cut Width = 19.5m, Air Draft Limit = 25.2m, Section 7-9 traffic redirected to refurbished 250m quay												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	30	50	80	48	34	17	20	38	26	33	37	413
No. of days reallocation is possible	30	50	80	48	34	17	20	38	26	33	37	413
Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-36 Reallocation results - JC Width 19.5m (Phase 2) (Section 7-9 traffic redirected)

11m Junction Cut

6.6.9 With the currently available berth space, the results suggest that on average 91% of the time, the vessels redirected from the North Dock can be accommodated.

Reallocaton Results - Current Junction Cut Width = 11m, Air Draft Limit = 25.2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	157	173	186	124	106	90	106	66	87	117	135	1347
No. of days reallocation is possible	138	134	171	115	103	88	105	61	86	105	121	1227
Percentage	88%	77%	92%	93%	97%	98%	99%	92%	99%	90%	90%	91%

Table 5-37 Reallocation results - JC Width 11m (Current)

6.6.10 Following Phase 1, the two scenarios tested showed that redirected vessels would have been accommodated 99% of the time.

Reallocaton Results - Phase 1 (250m refurbished South Quay + 150m North Quay) Junction Cut Width = 11m, Air Draft Limit = 25.2m, Section 7-9 traffic not redirected												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	157	173	186	124	106	90	106	66	87	117	135	1347
No. of days reallocation is possible	155	167	184	124	106	90	106	65	87	115	135	1334
Percentage	99%	97%	99%	100%	100%	100%	100%	98%	100%	98%	100%	99%

Table 5-38 Reallocation results - JC Width 11m (Phase 1)

Reallocaton Results - Phase 1 (250m refurbished South Quay + 150m North Quay) Junction Cut Width = 11m, Air Draft Limit = 25.2m, Section 7-9 traffic redirected to refurbished 250m quay												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	157	173	186	124	106	90	106	66	87	117	135	1347
No. of days reallocation is possible	156	168	185	123	106	90	106	66	87	117	135	1339
Percentage	99%	97%	99%	99%	100%	100%	100%	100%	100%	100%	100%	99%

Table 5-39 Reallocation results - JC Width 11m (Phase 1) (Section 7-9 traffic redirected)

6.6.11 Following Phase 2, redirected vessels are accommodated virtually all the time.

Reallocaton Results - Phase 2 (250m refurbished South Quay + 303m North Quay) Junction Cut Width = 11m, Air Draft Limit = 25.2m, Section 7-9 traffic not redirected												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	157	173	186	124	106	90	106	66	87	117	135	1347
No. of days reallocation is possible	156	170	186	124	106	90	106	66	87	117	135	1343
Percentage	99%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-40 Reallocation results - JC Width 11m (Phase 2)

Reallocaton Results - Phase 2 (250m refurbished South Quay + 303m North Quay) Junction Cut Width = 11m, Air Draft Limit = 25.2m, Section 7-9 traffic redirected to refurbished 250m quay												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	157	173	186	124	106	90	106	66	87	117	135	1347
No. of days reallocation is possible	157	172	186	124	106	90	106	66	87	117	135	1346
Percentage	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-41 Reallocation results - JC Width 11m (Phase 2) (Section 7-9 traffic redirected)

13.5m Junction Cut

6.6.12 With the currently available berth space, the results suggest that on average 95% of the time, the vessels redirected from the North Dock can be accommodated.

Reallocaton Results - Current Junction Cut Width = 13.5m, Air Draft Limit = 25.2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	58	71	127	84	72	36	49	49	53	67	90	756
No. of days reallocation is possible	53	56	126	81	72	36	49	45	53	64	81	716
Percentage	91%	79%	99%	96%	100%	100%	100%	92%	100%	96%	90%	95%

Table 5-42 Reallocation results - JC Width 13.5m (Current)

6.6.13 At Phase 1, the two scenarios tested showed that redirected vessels would have been accommodated 100% of the time.

Reallocaton Results - Phase 1 (250m refurbished South Quay + 150m North Quay) Junction Cut Width = 13.5m, Air Draft Limit = 25.2m, Section 7-9 traffic not redirected												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	58	71	127	84	72	36	49	49	53	67	90	756
No. of days reallocation is possible	58	71	127	84	72	36	49	49	53	67	90	756
Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-43 Reallocation results - JC Width 13.5m (Phase 1)

Reallocaton Results - Phase 1 (250m refurbished South Quay + 150m North Quay) Junction Cut Width = 13.5m, Air Draft Limit = 25.2m, Section 7-9 traffic redirected to refurbished 250m quay												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	58	71	127	84	72	36	49	49	53	67	90	756
No. of days reallocation is possible	58	71	127	84	72	36	49	49	53	67	90	756
Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-44 Reallocation results - JC Width 13.5m (Phase 1) (Section 7-9 traffic redirected)

6.6.14 Following Phase 2, the two scenarios tested showed that redirected vessels would have been accommodated 100% of the time.

Reallocaton Results - Phase 2 (250m refurbished South Quay + 303m North Quay) Junction Cut Width = 13.5m, Air Draft Limit = 25.2m, Section 7-9 traffic not redirected												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	58	71	127	84	72	36	49	49	53	67	90	756
No. of days reallocation is possible	58	71	127	84	72	36	49	49	53	67	90	756
Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-45 Reallocation results - JC Width 13.5m (Phase 2)

Reallocaton Results - Phase 2 (250m refurbished South Quay + 303m North Quay) Junction Cut Width = 13.5m, Air Draft Limit = 25.2m, Section 7-9 traffic redirected to refurbished 250m quay												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Totals**
No. of days reallocation is needed	58	71	127	84	72	36	49	49	53	67	90	756
No. of days reallocation is possible	58	71	127	84	72	36	49	49	53	67	90	756
Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5-46 Reallocation results - JC Width 13.5m (Phase 2) (Section 7-9 traffic redirected)

7 RESPONSE TO OBJECTORS

7.1 Associated British Ports (ABP)

7.1.1 ABP have made two separate objections to the proposed Scheme. In a letter dated 29th April 2016, Winckworth Sherwood acting on behalf of ABP, issued a formal objection to the draft Orders and in a letter dated 29th April 2016, ABP made a representation to the Secretary of State for Transport under section 16 of the Acquisition of Land Act 1981 objecting to the proposed Scheme. ABP also made similar objections to the publication of the draft Supplementary (No. 3) CPO to both the Welsh Government and the Secretary of State for Transport.

7.1.2 ABP's representation to the Secretary of State for Transport included the following points:

a) 'The Port is a facility that […] forms a significant component within the transport and economic infrastructure of Wales […] which has either been ignored or fundamentally misunderstood by Welsh Government'.
b) 'the proposed M4 Relief Road scheme would […] have a critically serious and detrimental impact upon the Port in terms of current and future operational viability'.

7.1.3 My response covers the impact of the Scheme on ABP's marine operations. The potential economic implications as a result of the propose Scheme are addressed by Andrew Meaney (Port Economics 1.4.1).

7.1.4 Analysis of ship movement data provided by ABP covering the period 2005 to 2015 and based on an 11m Junction Cut width, showed that 97% of the vessels visiting the North Dock during the period would have been impeded by the restrictions introduced by the Scheme. If, following discussions between WG and ABP, the width of the Junction Cut is increased to 13.5m, then this percentage would reduce to 47%.

7.1.5 Having studied the breakdown of impeded vessels by deadweight I estimate that, with a Junction Cut width of 11m, the North Dock would be able to accept vessels up to 2,000 tonnes. If, following discussions between WG and ABP, the width of the Junction Cut is increased from 11m to 13.5m, then this threshold would increase to 3,000 tonnes. ABP would still be able to use the North Dock, albeit for smaller vessels.

7.1.6 A berth occupancy study covering three scenarios (Junction Cut widths of 11m, 13.5m and 19.5m, with a future dock level of 14.21m ACD and an air draught clearance of 1m) has confirmed that vessel traffic currently visiting the North Dock which would be impeded by the Scheme can reasonably be accommodated in the South Dock.

7.1.7 I conclude that with the 303m quay extension and the refurbishment of 250m of berth space in the South Dock offered by the Welsh Government, from a marine operations perspective, the ABP Newport Docks would be able to, with some operational modifications, maintain the current number of vessels visits.

7.1.8 The two proposed sections of quay space would be part of ABP's common user berth and can be used by ABP to accommodate vessels other than those redirected from the North Dock.

7.2 Newport Harbour Commissioners (NHC)

7.2.1 In a letter dated the 22nd April 2016 the Newport Harbour Commissioners (NHC) also made a formal objection to the proposed Scheme. Their objection was based on their belief '*that the constructing of a motorway across a major Welsh infrastructure asset would have a deleterious effect on the local economy. For instance, the costs of administering this organisation, which is none profit making, would have to be covered by the remaining stakeholders*'.

7.2.2 They seem to assume that the number of vessels visiting Newport Docks would reduce and that consequently, in order to continue as an organisation, the harbour dues charged to vessels visiting the Port would need to be increased. They conclude their objection with the statement '*Generally, the proposed restrictions on foreign trade would not assist Newport to thrive'*.

7.2.3 NHC derive revenue from two sources. In relation to ships transiting NHC jurisdiction to ABP's Newport Docks, I have shown above that these vessel visits can remain at current levels with the Scheme proposals and mitigation measures proposed in place.

7.2.4 In relation to shipping movements to and from the wharfs on River Usk, analysis of the ship movement data showed there would be no vessels impeded by the proposed bridge over the River Usk. We can therefore conclude that the berths and wharfs on the river Usk would be unaffected by the proposed bridge over the river and NHC's revenues would not be impacted upon.

7.2.5 It is my view that given the limited impact on the Newport Docks, NHC's activities would not be affected.

7.3 Jewsons Limited and Saint-Gobain Building Distribution Limited

7.3.1 In a letter dated 4th May 2016, Gerald Eve acting on behalf of Jewson Ltd. and Saint-Gobain Building Distribution Ltd, made a formal objection to the proposed Scheme, citing amongst other things not connected with shipping and the proposed Scheme the following:

'[…] and the subsequent construction of the proposed motorway further to the road orders, would also prevent or significantly impede access to the Newport Docks by ships. Without the ability to continue to import timber by ship the Newport facility of Jewson and Saint-Gobain would be unable to operate'.

7.3.2 The ship movement data previously used to establish the restriction on shipping and to carry out the berth occupancy analysis was again adopted to study the impact of the Scheme on the marine operations of Jewsons and Saint Gobain.

7.3.3 Jewson Saint Gobain uses Sections 23 - 26 on the western side of the North Dock for the unloading of timber. It is to be noted that the above berths are ABP's common user berths. I understand that Jewsons and Saint Gobain do not lease any berths within the Newport Docks.

7.3.4 The visits to Sections 23-26 during the eleven-year period (2005 to 2015) were analysed in order to establish the number of potentially impeded vessels. This is shown in Table 7-2 , Table 7-2 and Table 7-3 for Junction Cut widths of 19.5m, 11m and 13.5m respectively.

Jewsons Impeded Visits (Junction Cut Width = 19.5m, Air Draft Restriction = 25.2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
No of visits	29	25	26	21	25	20	24	23	34	35	35	297
No of visits impeded	2	4	6	8	8	3	7	11	7	13	10	79
Percentage impeded	7%	16%	23%	38%	32%	15%	29%	48%	21%	37%	29%	27%

Table 7-1 Jewsons Impeded Visits (JC 19.5m)

Jewsons Impeded Visits (Junction Cut Width = 11m, Air Draft Restriction = 25.2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
No of visits	29	25	26	21	25	20	24	23	34	35	35	297
No of visits impeded	29	25	26	21	25	20	24	22	34	34	35	295
Percentage impeded	100%	100%	100%	100%	100%	100%	100%	96%	100%	97%	100%	99%

Table 7-2 Jewsons Impeded Visits (JC 11m)

Jewsons Impeded Visits (Junction Cut Width = 13.5m, Air Draft Restriction = 25.2m												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
No of visits	29	25	26	21	25	20	24	23	34	35	35	297
No of visits impeded	11	7	17	12	15	7	12	15	19	23	25	163
Percentage impeded	38%	28%	65%	57%	60%	35%	50%	65%	56%	66%	71%	55%

Table 7-3 Jewsons Impeded Visits (JC 13.5m)

7.3.5 With the Junction Cut at its current width of 19.5m, 27% of the visits to Jewsons North Dock would be impeded. With the Junction Cut narrowed to 11m, 99% of the visits made to Jewsons North Dock would have been impeded. With a Junction Cut width of 13.5m, 55% of the visits made to Jewsons North Dock would have been impeded.

7.3.6 I therefore conclude that the Scheme with a Junction Cut narrowed to 11m would prevent Jewsons from unloading vessels in the North Dock. This means that the unloading of Jewsons cargo would need to take place at the berths within the South Dock and transported to a suitable storage area.

7.3.7 The analysis on berth occupancy for both a Junction Cut width of 11m and 13.5m has shown that spare berth capacity exists in the South Dock which is capable of accommodating vessels potentially restricted from entering the North Dock as result of the Scheme.

7.3.8 I understand that ABP is responsible for transporting cargo to Jewsons/St Gobain's premises from wherever it is discharged and that the unloading of vessels in North Dock does not create a financial burden on their business. I further understand that ABP's increased costs of delivering cargo from South Dock to Jewson/St Gobains premises are to be compensated by the Welsh Government.

7.3.9 Considering the above, I am of the view that the impact on the marine operations at Newport Docks as a result of the proposed Scheme would not affect the business operation of Jewsons as it would still be able to service the number of vessels required for its operation within the South Dock, at no financial detriment to their business.

7.4 WE Dowds Shipping Ltd

7.4.1 In a letter dated 26th April 2016 Graham Dickinson acting on the behalf of WE Dowds Shipping Ltd. made a formal objection to the proposed Scheme, citing amongst other things not connected with the shipping aspects of this proof of evidence the following:

'*The proposed bridge height above the entrance to North Dock is inadequate to accommodate the larger vessels currently serviced by the Company in that part of the dock. As shipping traffic has built up, leading to congestion in South Dock, it is understood that ABP are actively considering enlarging the entrance to allow even larger vessels to use North Dock. The latter otherwise has the necessary quay lengths and water depth to handle much*

larger ships. The height restriction imposed by the current road design would curtail some existing business and forestall the prospect of such enlargement'.

7.4.2 The ship movement data previously used to establish the restriction on shipping in the North Dock and to carry out the berth occupancy analysis was again adopted to study the impact of the Scheme on the marine operations of WE Dowds Shipping Ltd.

7.4.3 The company uses the ABP common user berths, Sections 21-22 located on the eastern side of the North Dock. It is my understanding that the company does not lease any quay space within Newport Docks.

7.4.4 The visits to Sections 21-22 during the eleven-year period (2005 to 2015) were analysed in order to establish the number of potentially impeded vessels. As with the previous analyses in this proof of evidence, I present the results for three Junction Widths (19.5m, 11m and 13.5m). These are shown in Table 7-4, Table 7-5 and Table 7-6.

Dowds North Dock Impeded Visits (Junction Cut Width = 19.5m, Air Draft Restriction = 25.2m)												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
No of visits	35	57	49	32	24	19	19	2	0	6	21	264
No of visits impeded	8	13	17	8	4	4	2	0	0	1	3	60
Percentage impeded	23%	23%	35%	25%	17%	21%	11%	0%	0%	17%	14%	23%

Table 7-4 Dowds Impeded visits (JC 19.5m)

Dowds North Dock Impeded Visits (Junction Cut Width = 11m, Air Draft Restriction = 25.2m)												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
No of visits	35	57	49	32	24	19	19	2	0	6	21	264
No of visits impeded	31	56	43	30	23	19	18	2	0	6	21	249
Percentage impeded	89%	98%	88%	94%	96%	100%	95%	100%	0%	100%	100%	94%

Table 7-5 Dowds Impeded visits (JC 11m)

Dowds North Dock Impeded Visits (Junction Cut Width = 13.5m, Air Draft Restriction = 25.2m)												
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
No of visits	35	57	49	32	24	19	19	2	0	6	21	264
No of visits impeded	9	20	25	16	10	6	5	1	0	2	9	103
Percentage impeded	26%	35%	51%	50%	42%	32%	26%	50%	0%	33%	43%	39%

Table 7-6 Dowds Impeded visits (JC 13.5m)

7.4.5 With the Junction Cut with its current width of 19.5m, 23% of the visits made to Dowds North Dock would have been impeded. With the Junction Cut narrowed to 11m, 94% of the visits made to Dowds North Dock would have been impeded. With a Junction Cut width of 13.5m, 39% of the visits made to Dowds North Dock would have been impeded.

7.4.6 The Scheme with a Junction Cut narrowed to 11m would prevent W.E Dowds from operating in the North Dock. This means that Dowds operation would need to be fully relocated to the South Dock. With a Junction Cut width of 13.5m, a partial reallocation would be required.

7.4.7 The analysis on berth occupancy has shown that spare berth capacity exists in the South Dock which is capable of accommodating vessels potentially restricted from entering the North Dock as result of the Scheme.

7.4.8 I understand that replacement facilities for Dowds are proposed in the current shed 10 (the size of which would be reduced as a result of the Scheme) together with alternative further space to the South of South Dock. Berths close to either of these locations can accommodate these vessels.

7.4.9 Considering the above, I am of the view that the impact on the marine operations at Newport Docks as a result of the proposed Scheme would not affect the business operation of WE Dowds Shipping Ltd as it would still be able to service the number of vessels required for its operation.

7.5 TU Agencies Ltd

7.5.1 In a letter dated 14th April 2016, TU Agencies Ltd. made a formal objection to the proposed Scheme on the basis of:

‘The proposed route of the M4 passes over Newport Docks on a line which separates the North Dock from the South Dock. This would mean that the North Dock would no longer be accessible for many vessels now using the facilities of the North Dock.’

7.5.2 The impact of the Scheme on the North Dock has been thoroughly examined using vessel movement data provided by ABP, and it has been concluded that, the marine operations at Newport Docks are unlikely to be severely affected. It is therefore unlikely that the business of TU Agencies Ltd would be severely affected.

7.6 Origin Fertilisers

7.6.1 In a letter dated 4th May 2016, Origin UK Operations Limited formerly objected to the proposed Scheme. Their objection to the proposed Scheme included inter alia that:

'The subsequent construction of the proposed motorway would also prevent or significantly impede access to the dock by ship, so that it may no longer be possible to import raw materials. Without the ability to import materials by ship Origin's Newport facility would be unable to operate. Alternative products could potentially be sourced for the South Wales region and beyond, but this could be at increased prices due to additional costs of haulage and Origin would then be likely to be undercut in prices by its competitors'.

7.6.2 Origin UK Operations Limited currently operate a fertiliser processing terminal at no.9 and no. 9A shed. The terminal is serviced by cargo vessels discharging the raw materials required to produce their fertiliser products. The vessels currently berth at no.7 section (ABP common user berth) on the North Quay. It is understood that the WG propose to relocate Origin UK Operations Limited on a like for like basis to the south side of the South Dock. A hazardous substances consent application has been sent to Newport City Council who would consult the Health and Safety Executive prior to approval.

7.6.3 The WG also propose to refurbish 250m of existing quay space at sections 5 and 6 (the Coal Terminal) in order to accommodate vessels that would discharge cargo to the new facilities proposed for Dowds, Origin and others to the south side of the South Dock. The refurbishment work, inter alia, would involve the removal/relocation of the concrete cargo retaining blocks and improvements to the surface in order to allow the operation and transit of mobile harbour cranes on the new quay. The position of the new terminal has been developed in consultation between the WG, ABP and Origin and is conveniently located close to the proposed refurbished 250m length of quay.

7.6.4 From a marine/navigation perspective I can see no reason why the construction of the proposed Scheme would have any effect on the operation, arrival and departure of vessels with cargo bound for the proposed Origin UK Operations Limited facility on the south side of the South Dock and the proposed refurbished quay.

8. CONCLUSIONS

8.1 Bridge Protection

8.1.1 Analysis of the historical vessel movement data, by both the WG and ABP shows that there were no vessels with a beam less than 11m that had a corresponding air draught of 26.2m or greater. Therefore, the narrowing of the width of the Junction Cut to 11.0m was found to be a suitable width to prevent vessels hitting the proposed bridge over the Docks and this figure has now been adopted by the WG. 'Tall Ships' such as vessels like the Winston Churchill may fall outside of this assessment and separate port safety management procedures would be used by the SHA to, for example, ensure that such vessels were not berthed close to the proposed bridge, thus reducing the risk of ship impact.

8.1.2 Analysis of the historical vessel data further shows that a Junction Cut width of 13.5m is a suitable width to prevent a hard (superstructure) impact with the bridge. In order to maximise utilisation of the North Dock work is ongoing at the time of writing this evidence between the WG and ABP to agree a suitable width for the Junction Cut.

8.1.3 The newly proposed quayside extension from the Junction Cut into the South Dock would be designed to withstand vessel impacts and would fully mitigate the potential for large vessels from making any contact with the proposed bridge.

8.1.4 Further mitigations would include vessel acceptance criteria to be promulgated by the SHA to all vessels, owners, shippers, agents etc. providing them with the limiting beam and air draught restrictions for entering the North Dock. The SHA may also introduce a general direction to shipping to clear decks as far as reasonably practicable of ship's crew when vessels pass under the bridge.

8.1.5 Should a 13.5m wide Junction Cut be progressed then Ben Sibert explains that a virtual trip wire system would be provided to independently verify that a vessel meets the height acceptance criteria for passage beneath the River Usk Crossing into the North Dock.

8.2 Restrictions imposed by proposed scheme

8.2.1 My analysis of the historical vessel movement data, using the verified air draught data, shows that for a Junction Cut width of 11m, based on a maximum air draught of 25.86 m for the present dock level of 13.55m ACD, 550 vessel visits out of a total of 568 would have been impeded by the Scheme. This equates to 97%. Based on a maximum air draught of 25.2m for the future dock level of 14.21m ACD, 550 vessel visits out of a total of 568 visits would have been impeded by the Scheme. This again equates to 97%. This percentage is unchanged as the beam restriction is the governing restriction. If the Junction Cut width is increased to 13.5m, the exclusion percentage for the present dock level would be 43%. For a future dock water level, the percentage rises to 47%. Narrowing the Junction Cut from 19.5m to 11m or 13.5m therefore introduces a significant restriction of shipping.

8.2.2 Having assessed the breakdown of impeded vessels by deadweight, I estimate that if the Junction Cut is maintained at its current width of 19.5m with an air draught restriction of 25.2m, the North Dock would be able to accept vessels of up to 4,000 tonnes in deadweight. With the Junction Cut narrowed to 11m, the North Dock would still be able to accept vessels up to 2,000 tonnes. If, following discussions between WG and ABP, the width of the Junction Cut is increased from 11m to 13.5m, then this threshold would increase to 3,000 tonnes. These showed that with the Scheme in place, the North Dock can still be used for smaller vessels, the size of which would depend on the final width of the Junction Cut.

8.3 Assessment of berth occupancy

8.3.1 I have conducted an assessment to determine whether there is spare berth capacity in the South Dock to accommodate vessels that are potentially unable to access the North Dock. The phased construction of the 303m of quay space and the refurbishment of the 250m of quay was considered. This assessment showed that there is high level of berth availability in the South Dock compared to a relatively low 'demand' for this space

8.3.2 A hypothetical reallocation of all vessels during the period 2005-2015 which would have been impeded by the Scheme was conducted. It showed that at Phase 2 of the WG proposed works, vessels impeded by the Scheme would be able to berth in the South Dock virtually all the time.

8.3.3 These approaches suggest that the Newport Docks would be able to accommodate all vessel traffic should the Scheme go ahead. The approaches do however suggest that berth space does need to be made available before there is any restriction on Junction Cut, and I understand that is accommodated within the Welsh Government programme for delivery of Phase 1 of the new wharf and refurbishment of the existing coal wharf, so as to avoid any impacts on ABP.

8.4 Impact on individual businesses/organisations

8.4.1 **Associated British Ports (ABP)** – The Scheme would prevent ABP's tenants WE Dowds and International Timber from operating in the North Dock. WG has proposed the phased construction of 303m of new quay space and refurbishment of 250m of quay, making a total of 553m of quay space in total. Both organisations would be able to use the new quay space and my berth reallocation analysis has shown this to be feasible. The new quay space would be part of ABP's common user berths so ABP would be able to use the space for berth other larger vessels. With the Scheme, the North Dock would still be functional, but for smaller vessels, the size of which would depend on the final width of Junction Cut.

8.4.2 **WE Dowds Shipping Ltd** – With the Scheme, WE Dowds would no longer be able to service its current vessels in the North Dock and would need to use the South Dock. My analysis has shown that redirection of vessels to the South Dock is feasible with WG's proposed new quay space. Moreover, I understand that WG would be implementing measures to mitigate the impact on the land based operation of WE Dowds Ltd (See Mathew Jones' evidence WG 1.1.8).

8.4.3 **Jewsons Limited and Saint-Gobain Building Distribution Limited** - With the Junction Cut reduced to 11m wide, International Timber would no longer be able to service its current vessels in the North Dock and would need to use berths in the South Dock. My analysis has shown that redirection of vessels to the South Dock is feasible with WG's proposed new and refurbished quay space. Moreover, I understand that WG would be implementing measures to mitigate the impact on the onshore operation of International Timber (See Mathew Jones' evidence WG 1.1.8).

8.4.4 **Origin Fertilisers** – In terms of the impact the proposed Scheme may have on Origin UK Operations Limited marine operations within the South Dock, it is my understanding that the WG have proposed to move their operation to a new shed on the south side of the South Dock. The new facility would be close to the newly refurbished quay at sections 5 and 6 where their vessels can berth and discharge the raw materials required for their operation which is well away from the Scheme construction works. From a marine/navigation perspective I can see no reason why the construction of the proposed Scheme would have any effect on the operation, arrival and departure of vessels with cargo bound for the proposed refurbished coal terminal berth on the south side of the South Dock.

8.4.5 **Newport Harbour Commissioners (NHC)** - In relation to ships transiting NHC jurisdiction to ABP's Newport Docks, I have shown above that these vessel visits can remain at current levels with the scheme proposals and mitigation measures proposed in place. It is my view that given the limited impact on the Newport Docks, NHC's activities would not be affected.

9. STATEMENT OF TRUTH

9.1 My Proof of Evidence includes all facts which I regard as being relevant to the opinions which I have expressed and the Inquiry's attention has been drawn to any matter which would affect the validity of that opinion.

9.2 I believe the facts I have stated in this Proof of Evidence are true and that the opinions expressed are correct.

9.3 I understand my duty to the inquiry to assist it with matters within my expertise and I believe that I have complied with that duty.