MARITIME TERMINAL

SOUTHAMPTON

CAPACITY EVALUATION

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 This paper was commissioned by DB Schenker Rail (UK) Ltd to provide a detailed assessment of the capacity of Freightliner's Maritime Terminal at the Port of Southampton. It focuses on the recent investment in the terminal, the resources and capacity that are available today and potential for increased capacity in the future.

1.2 The detail of the brief was as follows:

- An assessment of the current terminal plan and terminal operation;
- What (if any) buffer/flex appears to be in the terminal plan;
- Whether any additional services might be accommodated at the terminal, particularly Monday-Friday;
- Whether there are any operating constraints (physical, procedural etc) that inhibit the most effective terminal operation – and if so, any ideas on how these might be addressed and what the impact on terminal capacity might be;
- Whether the increase in terminal capacity FLL apparently predicted after the investment in the new cranes has been realised, and if not any ideas as to why not.

2. BACKGROUND

2.1 Intermodal Terminals at the Port of Southampton

2.1.1 There are three intermodal Terminals at the Port of Southampton.

2.1.2 DB Schenker operate a small and restricted terminal to the east of the Container Terminal at Herbert Walker Avenue. It has limited capacity, mainly due to space constraints and the unavoidable use of inefficient handling equipment. In addition, the transit distance between the Container Terminal and Herbert Walker Avenue results in increased costs which impacts on the competitiveness of the facility.

2.1.3 Freightliner operate the other two intermodal terminals. The Millbrook Terminal also has limited capacity. It has two ageing cranes with access to only 3 working sidings of 320 metres and limited reception siding capacity. The site is also restricted in that containers must be transported from the Container Terminal via the public road network to Millbrook. This significantly increases the cost of transit.

2.1.4 The third intermodal terminal is the Maritime Terminal which is the subject of this study.

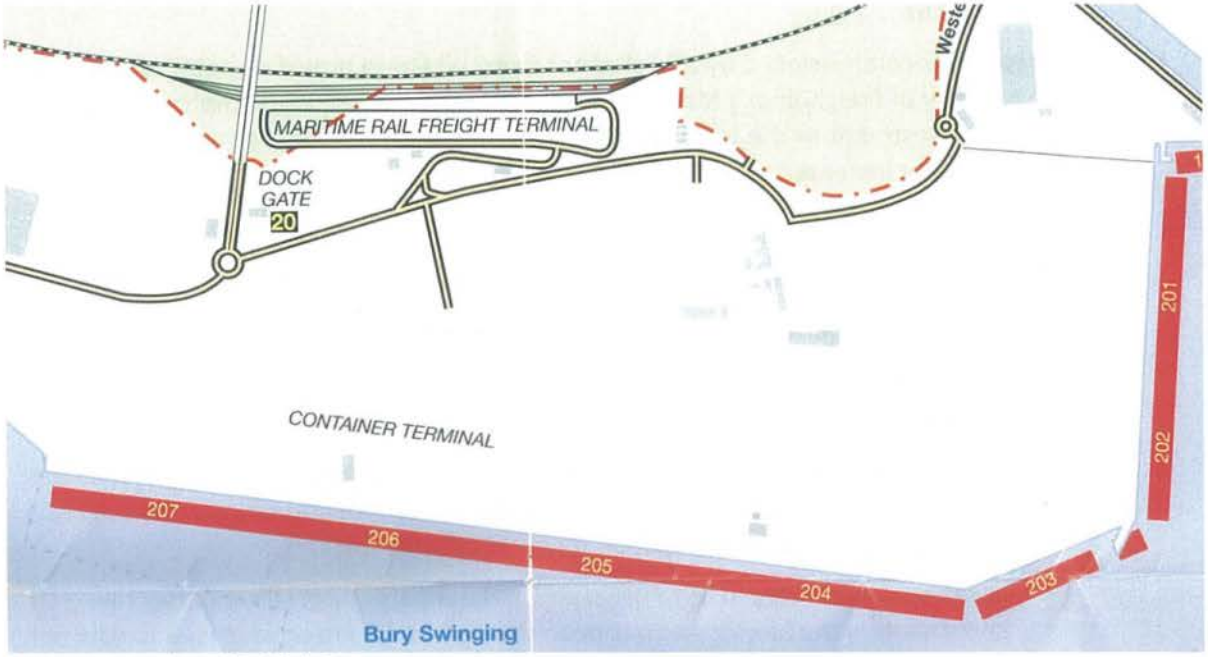
2.2 The Maritime Terminal - Location

2.2.1 The Maritime Terminal is located in the northern part of Associated British Port's (ABP's) Western Docks in the Port of Southampton. It is adjacent to the port's Container Terminal jointly owned by DP World Southampton (DPWS) and ABP; to the east of Dock Gate 20 and to the north of Western Avenue.

2.2.2 The terminal is situated partly on dock land, owned by ABP and leased to Freightliner and partly on land owned by the Freightliner Group. The plan at Figure 1 below, shows the land boundary dotted red, with the ABP land shown in white.

2.2.3 Rail access is directly from the Southampton to Bournemouth Line between Redbridge and Millbrook Stations, immediately to the north of the terminal and in both easterly and westerly directions.

Maritime Terminal Land Plan Figure 1



Source: Associated British Ports

2.3 Recent Developments

2.3.1 The most significant recent improvement to rail capacity from the Port of Southampton in recent years has been gauge enhancement. In April 2011 the main route from Southampton to the West Midlands was opened to W10 at a cost of £62m and in April 2013 the Laverstock diversion was also opened to W10.

2.3.2 On the port in March 2014, ABP officially opened SCT 5 the new deep water container facility at berths 201 and 202 at DPWS. As part of the extended landside capacity necessary to support this £100m investment, Freightliner had already planned the replacement of their two aged rail mounted gantry cranes (RMGs) at the Maritime Terminal.

2.3.3 The Freightliner press release issued when the two new cranes were launched in October 2012 stated:

.....The £9m investment in the new cranes, together with the associated groundwork, represents the largest single-item capital investment by Freightliner in terminal or ports infrastructure since the privatisation of the business in 1996.....

The new cranes which are the largest and most efficient rail terminal cranes in the UK were erected over the August bank holiday in a record three days. This investment represents another clear example of Freightliner's commitment to the intermodal container market and a willingness to invest for the long-term, even in such challenging economic times. The crane investment complements other broader schemes and developments which have transformed the rail service offering from the Port of Southampton, including gauge clearance for the larger 9'6" containers from Southampton to the Midlands, North West and Scotland which has seen the hi-cube movements increase by 76 per cent from Southampton Maritime since commencement.....

Adam Cunliffe, Managing Director, Freightliner Ltd commented, ".....As the new berth 201 and 202 are completed Freightliner can provide up to 13 roads under the cranes to continue providing any required services as volumes increase. The new cranes will eventually increase lift capacity by up to 80 per cent, although the overall capacity will be increased in stages. The initial increase will meet the demand which was driven by gauge clearance."

2.3.4 Whilst this investment in the Maritime Terminal was both timely and necessary it further focussed control of intermodal rail operations at Southampton into the hands of Freightliner. With no common user intermodal terminal available at the port and with Freightliner controlling both the Maritime and Millbrook Terminals a near monopoly situation has developed.

2.3.5 The DB Schenker facility at Herbert Walker Avenue, as already stated, is limited and can provide less than 25% of the port's intermodal capacity thereby combining to exclude other Freight Operating Company's access the port to provide intermodal services.

2.3.6 Freightliner's controlled investment in capacity at the Maritime Terminal is clearly stated in the press release of October 2011. It will "be increased in stages" presumably to meet the demands of the Freightliner customers but not the needs of the port or of other FOCs.

2.3.7 With such limited capacity for the other FOCs and with ever growing demand from their Southampton customers much intermodal potential from the port is being lost. DPWS and ABP have both stated the need for increased intermodal competition for traffic from the port's container terminal.

3. INFRASTRUCTURE AND EQUIPMENT

3.1 General Description

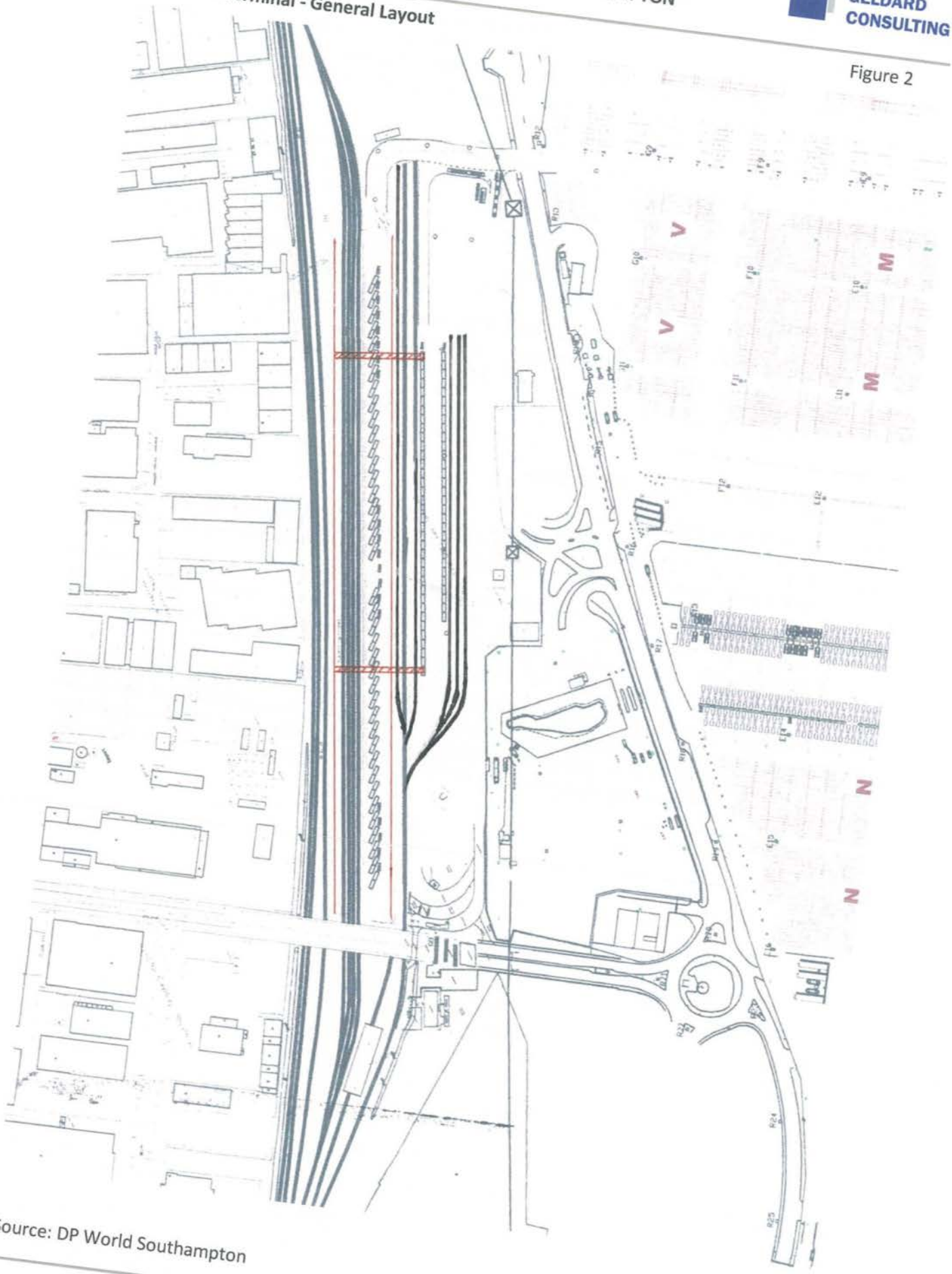
3.1.1 In this section the infrastructure and equipment deployed at the Maritime Terminal are described in detail. Comments are not included at this stage but are covered in paragraph 6.

3.1.2 The Maritime Terminal occupies a site of approximately 13.5 hectare (33 acre). The adjoining maintenance depot offers reception sidings whilst the main terminal operating area provides four working sidings under the cranes with three further working sidings in the back-reach area. Wagon repair and stabling are also available.

3.1.3 The plan at Figure 2 shows the general layout of the Maritime Terminal including some of the more recent Freightliner infrastructure improvements. See paragraph 3.2 below. The two new RMGs and the crane rails are shown in red, clearly illustrating how the cranes span the four main working sidings and the three secondary sidings under the crane back reach, see paragraph 3.4.

Maritime Terminal - General Layout

Figure 2



Source: DP World Southampton

3.1.4 The general view of the terminal is shown in Figure 3.

Figure 3

3.2 Rail Infrastructure

3.2.1 The main rail infrastructure under the cranes comprises four sidings of 480 metres with additional siding length beyond the cranes in both easterly and westerly directions. These sidings can accept trains of up to 30 FEA wagons in length. See Figure 4.

3.2.2 The secondary sidings comprise three sidings of c400 metres positioned beneath the back-reach of the cranes. Site configuration restricts the length of these sidings as can be seen in figure 5. These sidings are shown in full on the General Layout at Figure 2.

Figure 4

3.2.3 To the southern part of the site are three additional sidings used for stabling and the handling of non-intermodal traffic. See Figure 5 and 6. These sidings are also shown on the General Layout at Figure 2.

3.3 Non-rail Infrastructure

3.3.1 The main operating infrastructure is the hard standing to the south of the four working sidings between the crane legs. This area provides space for the prepositioning of containers prior to loading to the train and for containers after discharge from the train. See Figure 5.

Figure 5

3.3.2 To the north of the working sidings, also under the crane legs and close to the northern boundary fence is a further area of hard standing used for container storage. See Figure 4.

3.3.3 Between the secondary sidings and the stabling sidings is a part surfaced area providing access for vehicles and reachstacker operations. See Figure 6.

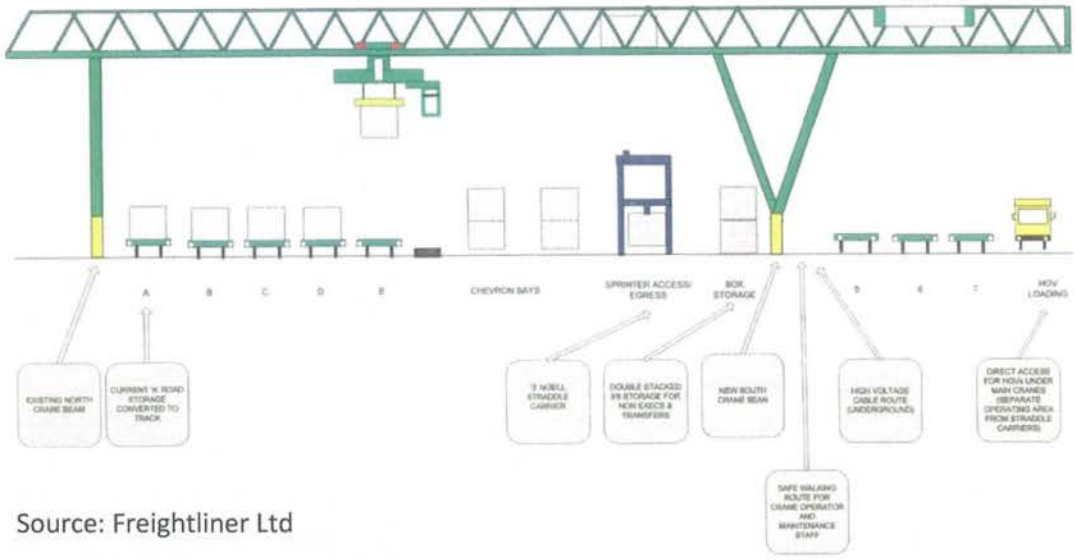
Figure 6

3.3.4 The fenced water storage area clearly shown in the foreground of Figure 6 appears to limit the extent to which the secondary sidings or the stabling sidings can be extended.

3.4 Equipment

3.4.1 The most significant pieces of MHE deployed on the Maritime Terminal are the two recently installed Liebherr rail mounted gantry cranes. These cranes, now in service for two years are shown in detail at Figure 7. As can be seen the cranes provide a three over one capacity on a 0 - 10 - 4 design with a span of 42 metres. The crane lift height is 16.9metres with a safe working load of 40 tonnes beneath a rotating Bromma telescopic spreader.

Southampton Rail Mounted Gantry Crane Figure 7



Source: Freightliner Ltd

3.4.2 At the time of installing the new cranes and in line with the Freightliner press release it was clearly stated that a third crane would be added as demand required.

3.4.3 The other key item of MHE deployed at the Maritime Terminal is the fleet of ten straddle carriers. These are provided and operated by DPWS from within the main Container Terminal resources. This equipment can operate in a one over three configuration which was not possible with the old RMGs where the sprinter straddle carriers operated at one over two. See Figure 8.

Figure 8

4. OPERATIONS

4.1 General

4.1.1 Information gathered from sources in the preparation of this report indicate sub-optimum performance in a number of areas of terminal operations. These will be described in detail and comment added where appropriate. Some of this information will also be included in the Observations and Comment section at the end of this report.

4.2 Terminal layout

4.2.1 The long siding length under the crane allows for easy loading and discharge operations without the need to split trains. Some shunting using the mainline locomotive can be performed without difficulty. The use of the Ecofret wagons has helped to optimise train capacity within the set train lengths.

4.2.2 The northern lane, under the crane legs, is used for container storage, see Figure 4. This seems an unnecessary waste of potential siding capacity. As shown in Figure 7 this development appears to be part of the subsequent phased investment by Freightliner.

4.2.3 The remaining containers pre-positioned for train loading are delivered under the crane in chevron bays of up to 3 high. As shown on both Figure 5 and Figure 7, this arrangement requires space for straddle carrier manoeuvring and takes up much of the valuable under-crane-leg capacity. In-line storage may be more suitable.

4.3 Crane Performance

4.3.1 The crane was published to operate at 29-30 moves per hour. In reality only 20-21 moves per hour is being achieved. This is difficult to explain as it is generally acknowledged that the Liebherr crane is an excellent piece of equipment. Several explanations are offered:

4.3.2 Firstly the rotating of the spreader to accommodate the chevron pre-load stacks causes delay. In reality this should not be the case as hoist, traverse and rotate operations should be possible concurrently. It is believed that this part of the operation is improving. See Figure 9.

Figure 9

4.3.3 A second explanation is that the Freightliner crane drivers are under-performing. This could relate to suitability through either aptitude, age or attitude. Whatever the cause it appears that operator performance could be reducing moves per hour by up to 30%.

4.4 Straddle Carrier Operation

4.4.1 The Container Terminal has a dedicated stack for containers due to or from the Maritime Terminal. This is stack "V" which is clearly shown on Figure 2 and is the closest stack to the Maritime Terminal. From this stack the straddle carrier operator crosses the automated barrier crossing on Western Avenue to enter the terminal. Containers are then positioned in the chevron pre-load stacks up to three high. See Figure 10.

Figure10

4.4.2 DPWS appear to have made significant improvements in their operation of the straddle carriers. The yard is now well organised with robust operating systems.

4.4.3 Furthermore, DPWS indicate that they give this operation priority in terms of straddle carriers and operators across the whole Container Terminal. If the allocation of ten dedicated carriers needs to be increased to deal with short term demand then this situation is accommodated.

4.4.4 Train planning between Freightliner and DPWS takes place on a daily basis to ensure pre-positioning of containers can be accomplished for each rail service. This part of the operation requires improvement. There is a need to strengthen communications, provide early notification of required containers, plan two days ahead for each service and minimise empty running.

5. SERVICES

5.1 General Path Allocation

5.1.1 Network Rail has provided the following data relating to path availability from the Port of Southampton. This includes paths to the WCML which are set to increase to 39 per day by 2030:

- 23 paths for Freightliner northbound (intermodal Traffic)
- 12 to 14 paths for DB Schenker northbound (mixed intermodal and other traffic)
- 4 paths for all FOCs westbound via Didcot (intermodal and other traffic)

5.2 Freightliner Timetables

5.2.1 Freightliner's current import timetable is as follows:

Southampton Customer Timetable

Effective from 5th October 2014

IMPORTS	Departure Time & Day		First Lift		Port Clearance and Information Cut-off time
Leeds	1901	Mon-Fri	0300		1000
	2320	Mon-Fri	0715	Tue-Sat	1200
	0215	Mon-Fri	1000	Mon-Fri	1400
Trafford Park	0348	Mon-Fri	1115	Mon-Fri	1500
	1254	Mon-Fri	2045	Mon-Fri	1800
	1657	Mon-Fri	0015	Tue-Sat	0900
	2034	Mon-Fri	0330	Tue-Sat	1100
Birmingham	0855	Mon-Fri	1330	Mon-Fri	1800
	1914	Mon-Fri	0030	Tue-Sat	1000
	0431	Saturday	1000	Saturday	1500 Fri
	2253	Mon-Fri	0445	Tue-Sat	1200
Daventry	0058	Tue-Sat	0700	Tue-Sat	1200
Liverpool	0348	Mon-Fri	1845	Mon-Fri	1500
	0216	Saturday	0930	Saturday	1400 Fri
	1800	Mon-Fri	0230	Tue-Sat	1000
Hams Hall	1412	Mon-Fri	2100	Mon-Fri	1800
	1300	Saturday	1830	Saturday	1800 Fri
Ditton	0932	Mon-Fri	0600	Tue-Sat	1800
Coatbridge	0932	Mon-Fri	0300	Tue-Sat	1800
Cardiff	0312	Mon-Fri	0715	Mon-Fri	1700
	0508	Saturday	0930	Saturday	1800 Fri
Bristol	0213	Saturday	0700	Saturday	1400 Fri
Cleveland	0215	Tue-Thu	1315	Tue-Thu	1400

5.2.2 Clearly some of these services are linked for example Leeds and Cleveland departing at 02:15. Some services are also Saturday only. It therefore follows that Freightliner are operating 16 daily week day services from Southampton of which it is believed four operate from the Millbrook Terminal and twelve from the Maritime Terminal.

5.2.3 Freightliner's current export timetable follows the same pattern and is shown on the following page.

5.2.4 The same criteria apply for the calculation of daily paths and the split between the Maritime and Millbrook Terminals.

Southampton Customer Timetable

Effective from 5th October 2014

EXPORTS	Departure Time		First Lift	
Birmingham	1548	Mon-Fri	2145	Mon-Fri
	0240	Tue-Fri	0815	Tue-Sat
	0350	Mon-Fri	1000	Mon-Fri
	1211	Saturday	1830	Sunday
	0503	Saturday	1100	Saturday
Ditton	0650	Tue-Sat	1630	Tue-Sat
Coatbridge	1921	Mon-Fri	2000	Tue-Fri
	1734	Mon-Thu	1630	Tue-Fri
		Friday	0530	Saturday
Cardiff	0958	Mon-Fri	1630	Mon-Fri
	1057	Saturday	1830	Sunday
Liverpool	0752	Mon-Fri	2000	Mon-Fri
	1313	Saturday	1400	Monday
	0540	Tue-Fri	1630	Tue-Fri
		Saturday	1330	Saturday
Hams Hall	1126	Monday	1630	Monday
	0743	Tue-Sat	1400	Tue-Sat
Daventry	2019	Mon-Fri	0215	Tue-Sat
Trafford Park	1018	Mon-Fri	2000	Mon-Fri
	1518	Mon-Fri	0100	Tue-Sat
	2207	Mon-Thu	0600	Mon-Fri
		Friday	1530	Saturday
	0147	Tue-Sat	0900	Tue-Sat
Leeds	1212	Tue-Fri	2230	Tue-Fri
	0527	Saturday	1530	Saturday
	2018	Mon-Fri	0500	Tue-Sat
	0612	Mon-Fri	1630	Mon-Fri
Bristol	1100	Friday	1615	Friday
Cleveland	1435	Tue-Thu	0500	Wed-Fri

5.2.5 The purpose of this section of the report is to give a clear indication of terminal usage which can be used to estimate any possible unused capacity. See below.

Comparison of published services April 2011 to October 2014

5.2.6 The tables are repeated below showing the comparison of services operated by Freightliner from Southampton from both the Maritime and Millbrook Terminals in April 2011, which was before the installation of the new Maritime cranes, and as are operated today.

5.2.7 Contrary to the expectations expressed by Freightliner there appear to be relatively few additional daily services operating since the new cranes were installed. These are marked *.

5.2.8 It must be pointed out however, that train lengths have increased and a number of the 24 wagon trains have been extended up to 30 wagon trains. This has been possible because of the improvements to infrastructure associated with the new cranes.

Southampton Customer Timetables compared

IMPORTS	Effective 5th Oct 2014		Effective 3rd Apr 2011	
Leeds	1901	Mon-Fri	1901	Mon-Fri
	2320	Mon-Fri	0001	Tue-Sat
	0215	Mon-Fri	0214	Mon-Fri
			2030	Sunday
Trafford Park	0348	Mon-Fri	0348	Mon-Fri
	1254	Mon-Fri	1255	Mon-Fri
	1657	Mon-Fri	1702	Mon-Fri
	2034	Mon-Fri	2034	Mon-Fri
			2320	Sunday
Birmingham	0855	Mon-Fri	0858	Mon-Fri
	1914	Mon-Fri	2255	Mon-Fri
	0431	Saturday		
	2253	Mon-Fri*		
Daventry	0058	Tue-Sat	0056	Tue-Sat
Liverpool/Barton Dock Road	0348	Mon-Fri	1800	Mon-Fri
	0216	Saturday	0934	Mon-Fri
	1800	Mon-Fri*		
Hams Hall/Birch Coppice	1412	Mon-Fri	1455	Mon-Fri
	1300	Saturday	0254	Saturday
Ditton	0932	Mon-Fri*		
Coatbridge	0932	Mon-Fri	0934	Tue-Sat
Cardiff	0312	Mon-Fri	0300	Mon-Fri
	0508	Saturday	0508	Saturday
Bristol	0213	Saturday		
Cleveland	0215	Tue-Thu		

EXPORTS	Effective 5th Oct 2014		Effective 3rd Apr 2011	
Birmingham	1548	Mon-Fri	1544	Mon-Fri
	0240	Tue-Fri	0319	Tue-Fri
	0350	Mon-Fri	1111	Saturday
	1211	Saturday		
	0503	Saturday		
Ditton	0650	Tue-Sat*		
Coatbridge	1921	Mon-Fri	2000	Tue-Fri
	1734	Mon-Thu	1921	Mon-Thu
		Friday		Friday
Cardiff	0958	Mon-Fri	1000	Mon-Fri
	1057	Saturday	1244	Saturday
Liverpool/Barton Dock Road	0752	Mon-Fri	0100	Tue-Sat
	1313	Saturday		
	0540	Tue-Fri	0540	Tue-Fri
		Saturday		Saturday
Hams Hall/Birch Coppice	1126	Monday	0959	Monday
	0743	Tue-Sat	0700	Tue-Sat
Daventry	2019	Mon-Fri	2015	Tue-Sat
Trafford Park	1018	Mon-Fri	1017	Mon-Fri
	1518	Mon-Fri	1518	Mon-Fri
	2207	Mon-Thu	2209	Mon-Thu
		Friday		Friday
	0147	Tue-Sat	0147	Tue-Sat
Leeds	1212	Tue-Fri	1215	Tue-Fri
	0527	Saturday	1417	Saturday
	2018	Mon-Fri	2020	Mon-Fri
	0612	Mon-Fri	0613	Mon-Fri
Bristol	1100	Friday		
Cleveland	1435	Tue-Thu		

6. OBSERVATIONS AND COMMENT

6.1 Current Maritime Capacity

6.1.1 From the details shown above it appears that at only twelve services per day the Maritime Terminal is operating below its current capacity. This statement must be judged against the restrictions on mainline path availability which are known to exist. Never-the-less the predicted increase in terminal capacity after the investment in the new cranes does not appear to have been realised.

6.1.2 Contrary to the press statements of the time and as shown in the table at paragraphs 5.2.6 to 5.2.8, there only appears to have been a small increase in services since the new cranes were installed.

6.1.3 However, the efficiency measures listed in paragraph 6.2 give some tangible examples of measures that could be easily implemented to increase the terminal capacity by perhaps a further 3 to 4 services per day, a 25% to 30% capacity increase in daily services between Monday and Friday.

6.1.4 It should also be noted that Freightliner themselves may be unable to maximise the capacity of services operated at the Maritime Terminal due to group-wide limits in resource availability including drivers, locomotives and wagons which are known to exist.

6.1.5 The following paragraphs illustrate how increased capacity can be achieved through measures grouped under No Cost/Low Cost Operations and Further Investments.

6.2 No Cost/Low Cost Operational Improvements

Train Planning

6.2.1 Train planning between Freightliner and DPWS needs to be reviewed. A better and more timely flow of information would improve the efficiency of the movement of containers between DPWS and the Maritime Terminal. Asset deployment would also be enhanced through better planning.

6.2.2 Forward planning to identify containers for rail at an early stage would also enhance the DPWS Container Terminal operation to the benefit of rail. Communications need to be improved and the timely flow of information must take place.

Straddle Carrier Operations

6.2.3 The chevron positioning of containers under the crane needs to be reassessed. It is likely that an in-line formation would increase capacity and maximise space. Also see crane operations below.

6.2.4 There is a need to minimise empty running of straddle carriers.

Crane Operations

6.2.5 The performance of the cranes must improve. The quoted capacity of the crane, 30 moves per hour, must be achieved. This requires a review of the operators.

6.2.6 The rotation of the spreader may also be contributing to the poor crane performance. This limitation could be nullified if containers were stacked in line as described above.

Train Stabling

6.2.7 It is not clear if limited stabling capacity at the Maritime Terminal is impacting on terminal efficiency. If this were to be the case the use of the DB Schenker facilities at Eastleigh could provide valuable additional capacity.

6.2.8 Stabling away from the loading area is common practice within the industry. The Port of Immingham through the use of the Barnetby Sidings and the Port of Felixstowe using the

Ipswich Yard are good examples of this practice which assists in the maximising loading capacity at busy terminals.

Optimising Terminal Facilities

6.2.9 There are certain areas of the site, especially on the southern side, where the terminal could be better used. This need not involve significant capital expenditure but may provide ways in which operations could be conducted more efficiently.

6.3 Further Investments

Infrastructure

6.3.1 The fifth loading rail under the crane legs is a scheduled Freightliner investment to increase capacity "as demand dictates". This is clearly required.

6.3.2 The lengthening of the secondary sidings under the crane back reach would also increase operating siding capacity allowing the accommodation of full length trains in this area.

6.3.3 The overall length of the sidings could also be considered especially to the east of the site where the headhunt is located. It may be possible to extend the sidings and/or consider the installation of locomotive traversers, as recently installed at the Felixstowe North Terminal.

6.3.4 The area between the secondary sidings and the stabling sidings is clearly in need of some refurbishment. This area could become productive through the use of reachstackers to handle containers in the area.

The Third Crane

6.3.5 The greatest means of achieving a step change in capacity would be the installation of the third RMG crane. This fact is acknowledged by all the interested parties and must be a major consideration. ABP has indicated that, subject to acceptable commercial terms with Freightliner, they would be willing to consider investment in the third crane.

Straddle Carriers

6.3.6 Here there appears to be no need for additional capacity as DPWS has allocated sufficient resource.

6.4 Overall capacity

6.4.1 From the information shown above, it is easy to see how with some operational improvements and further investment, overall capacity could be increased and more services accommodated at the Maritime Terminal.

6.4.2 An increase of 80% in capacity as quoted by Freightliner appears to be perfectly possible although some of this increase is undoubtedly based around investment in the third crane and other infrastructure improvements as detailed in paragraph 6.3.

6.4.3 A realistic estimate in the split of capacity growth would be 30% due to operational improvements and 50% due to the third crane and associated infrastructure.

6.4.4 These statistics are clearly based on path availability on the national network.

C J Geldard
16th November 2014