KEY ENVIRONMENTAL ISSUES

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9.0 Rail

This chapter provides an assessment of the potential impacts of the proposed modification on rail transport.

9.1 Existing Environment

9.1.1 Regional Rail Network

Overview

The two main railway lines serving Port Kembla are the Illawarra to South Coast line and the Moss Vale to Unanderra Line. The Illawarra to South Coast line links Sydney with the NSW South Coast while the Moss Vale to Unanderra line provides an east-west connection from Port Kembla through the Illawarra escarpment to the Southern Highlands and the Main South Line. From the Main South Line it is possible to access either Sydney's west by travelling north or Melbourne by travelling south.

There is also a proposed rail link being considered between Maldon and Dombarton which would provide shorter rail access to Wollongong and Port Kembla from the west of Sydney by comparison to the Moss Vale to Unanderra line. The Maldon-Dombarton Rail Link is already partially constructed and a Feasibility Study was commissioned by the Federal Government to examine the potential to complete the rail link. The Maldon-Dombarton Rail Link Feasibility Study was completed by Hyder and ACIL Tasman in 2011 and further engineering and environmental investigations are currently being undertaken to have the project 'shovel ready' should it be decided to proceed.

A schematic plan of the regional rail network is attached as **Figure 9-1**.

Illawarra and South Coast Line

The Illawarra and South Coast line provides the principal rail link between Sydney and Wollongong for both passenger and freight rail operations. The passenger line operates as a separate entity within the metropolitan network providing access to Bondi Junction via Sydney CBD. The Illawarra and South Coast Line is under the control of RailCorp.

Rail freight movements on the Illawarra line include various products such as coal, steel, flour, grain and stone. These freight services focus on Port Kembla as one of the main destinations or origins.

As they approach Sydney, rail freight movements diverge from the Illawarra line to the Metropolitan Freight Network (MFN) at Meeks Road Junction in Sydenham. Through freight trains proceed north, west and south and terminating trains proceed to Rozelle, Enfield, Chullora, Clyde or other freight destinations.

Based on information contained in the Maldon-Dombarton Rail Link Feasibility Study (2011), and recent discussions with RailCorp, it appears that there are only a limited number of train paths available each day on the Illawarra and South Coast line. Given the competition with passenger services and the limited potential to economically upgrade the line to increase capacity (because of unfavourable geography), it seems unlikely that the line would be available to transport significant freight volumes in the future.

Moss Vale to Unanderra Line

The Moss Vale to Unanderra line provides an east/west connection between the Main South line and the Illawarra South Coast line. The line is dedicated to freight and provides an alternative route between Sydney and Wollongong. It is under the control of ARTC.

The Moss Vale to Unanderra line consists of a 53-kilometre single track section from Moss Vale to Dombarton and an 8-kilometre double track section between Dombarton and the interface with the RailCorp network at Unanderra. The line has four existing short loops at Calwalla, Robertson, Mt. Murray and Summit Tank.

A key feature of the line is the long continuous descent between Summit Tank and Unanderra which features an average grade of 1 in 30 and extensive curved sections of track which restrict downhill trains to speeds of 25 kilometres per hour due to braking issues. Given the grade there are no loops on this steep section and as a result this section of track becomes the key limitation for the corridor.

At its western end, the connection to the Main South line at Moss Vale is by way of a triangle junction allowing access from both the north and south. At its eastern end, the connection to the Illawarra South Coast line at Unanderra is a single junction facing north. Freight trains heading to Port Kembla share the RailCorp network for some 3.2 kilometres before diverging onto the Port Kembla lines for the Inner Harbour and Outer Harbour near Coniston. This is a complex junction which is currently grade separated between the Inner and Outer Harbours with no direct connection between the two.

Trains using the Moss Vale to Unanderra line transport a range of products including coal, grain, limestone, flour and ore with the product destined for Port Kembla Inner Harbour or Outer Harbour. There are also a small number of heritage passenger services using the line each week.

The Maldon-Dombarton Rail Link Feasibility Study (2011) reported that with its current configuration, capacity on the line is limited to 14.6 paths (in each direction) per day. In 2011, contracted train services were consuming an average of 5.3 paths per day, leaving 9.3 paths per day available for new traffic. For an operationally intense bulk traffic like coal or iron ore it was considered prudent to assume that only 75 percent of available paths are able to be utilised over the course of a year, giving an average 7 spare paths per day.

More recent advice obtained from ARTC indicates that in 2013 contracted train services were consuming an average of 10 paths per day, leaving 4.6 paths per day available for new traffic. It was noted that in reality a number of contracted services do not run and, over the past 12 months an average of 7.7 trains per day have run in each direction.

It is important to note that not all contracted services are actively used. In the Maldon-Dombarton Feasibility Study (2011) ARTC indicated that many of the allocated paths were not being used and up to 50 percent of these allocated paths were available. ARTC regularly reviews allocated paths and would look to change the access arrangements should the demand for paths increase. The new access arrangements would be a ‘take and pay’ scheme which would take back any unused paths for use by other services where required.

9.1.2 Local Rail Network

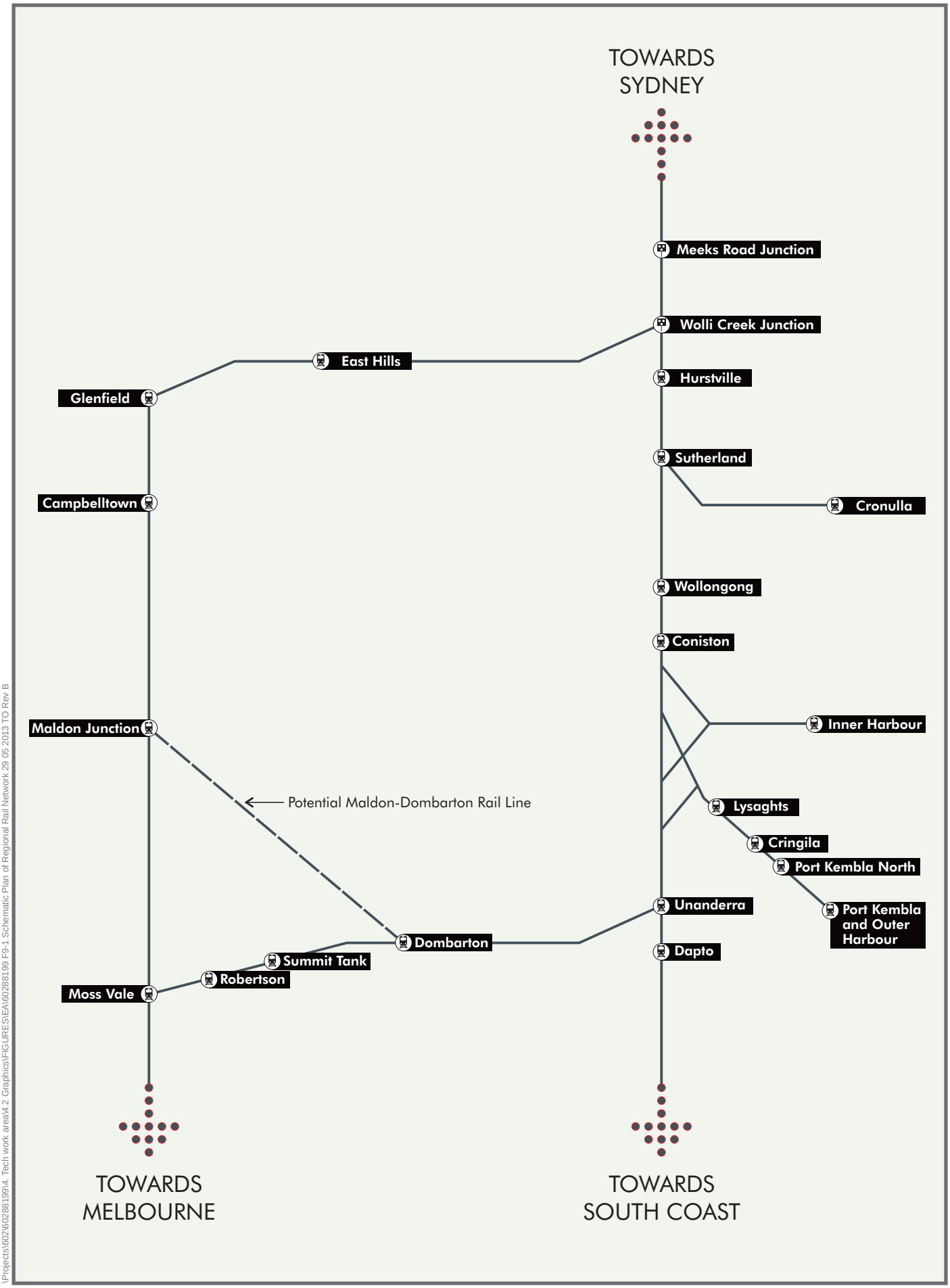
Near Coniston there are two separate spur lines which diverge from the Illawarra South Coast line to service the Port Kembla Inner Harbour and Outer Harbour. There is also a RailCorp passenger service which runs between Wollongong and Port Kembla and which shares the same rail corridor with the Outer Harbour freight line. There are four rail stations on this section of the passenger line including (from north to south) Lysaghts, Cringilla, Port Kembla North and Port Kembla. This passenger service is currently not well utilised.

Port Kembla Port Corporation took control of all of the freight rail assets in the vicinity of the Outer Harbour from RailCorp in 2007. PKOPL is now responsible for rail operations in this area and has entered into an arrangement with an accredited rail operator (Pacific National) to manage the rail operations. These rail assets interface directly with the RailCorp passenger line. A plan of the local rail network in the vicinity of Port Kembla Outer Harbour is included as **Figure 9-2**.

An existing freight rail loop (the balloon loop) runs from Port Kembla North station to the south and east and services existing sidings at BlueScope Steel to the west of Old Port Road and the Port Kembla Gateway Jetty adjacent to the proposed multi-purpose terminal. It is understood that BlueScope Steel currently operates two trains per day and the Port Kembla Gateway Jetty operates one train per day on average on the balloon loop.

Two rail yards are connected to the balloon loop, the North Yard which is currently not in active service and the South Yard which is operated by Pacific National and is primarily used to support BlueScope Steel. The longest siding in the North Yard is approximately 460 metres and the longest in the South Yard is 680 metres. The two existing rail sidings for the Port Kembla Gateway Jetty are approximately 460 metres.

The balloon loop crosses Old Port Road at two locations. The northern crossing is a rail bridge over the road with a maximum clearance height under the bridge of 4.5 metres. The southern crossing is an at-grade crossing which operates with automated flashing lights but is not controlled by boom gates.

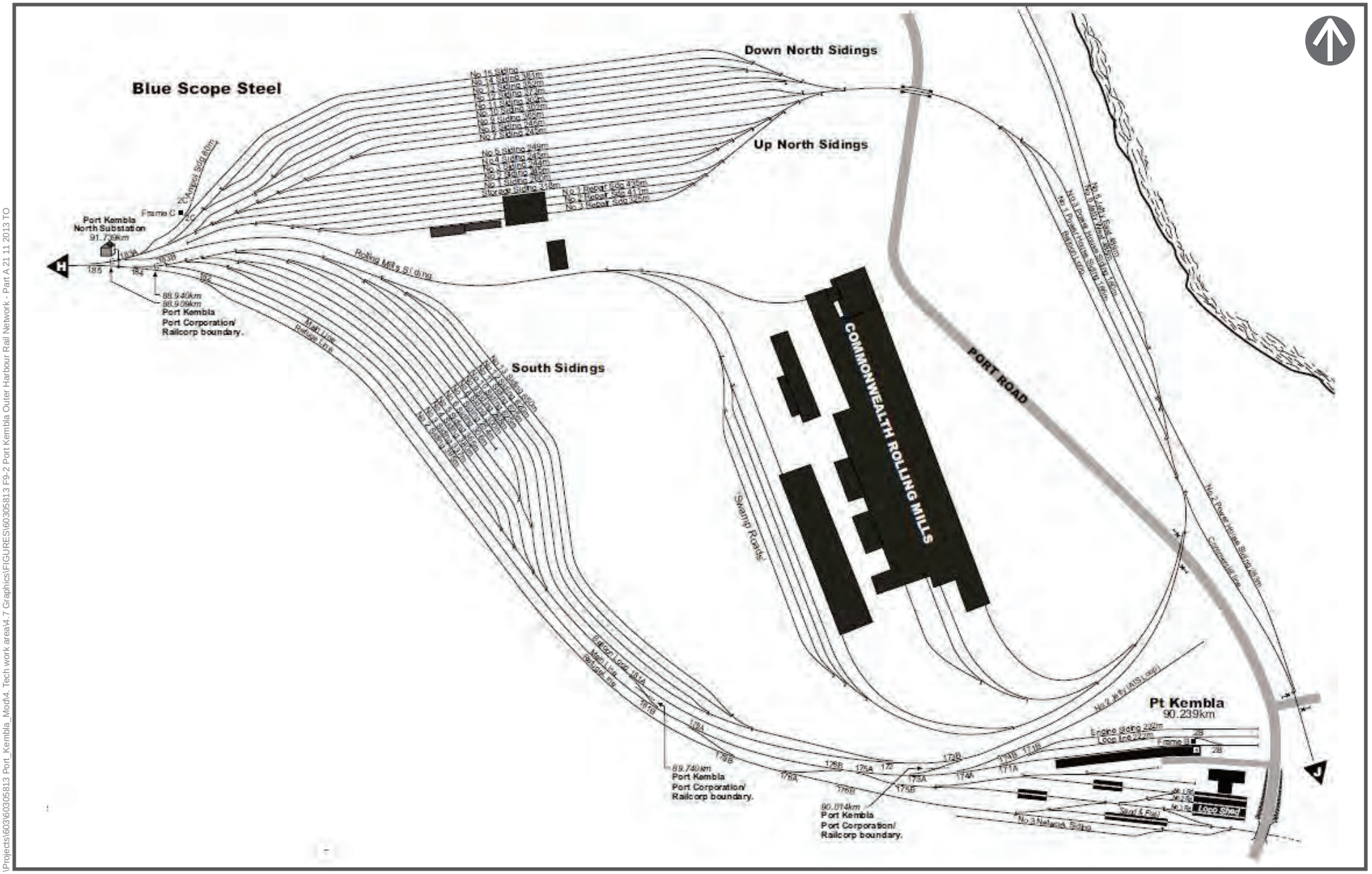


\Projects\60216028819914. Tech work area\4.2 Graphics\FIGURES\EA\60288199 F9-1 Schematic Plan of Regional Rail Network 29 05 2013 TO Rev B

AECOM

REGIONAL RAIL NETWORK
Port Kembla Outer Harbour Development
Environmental Assessment

FIGURE 9-1



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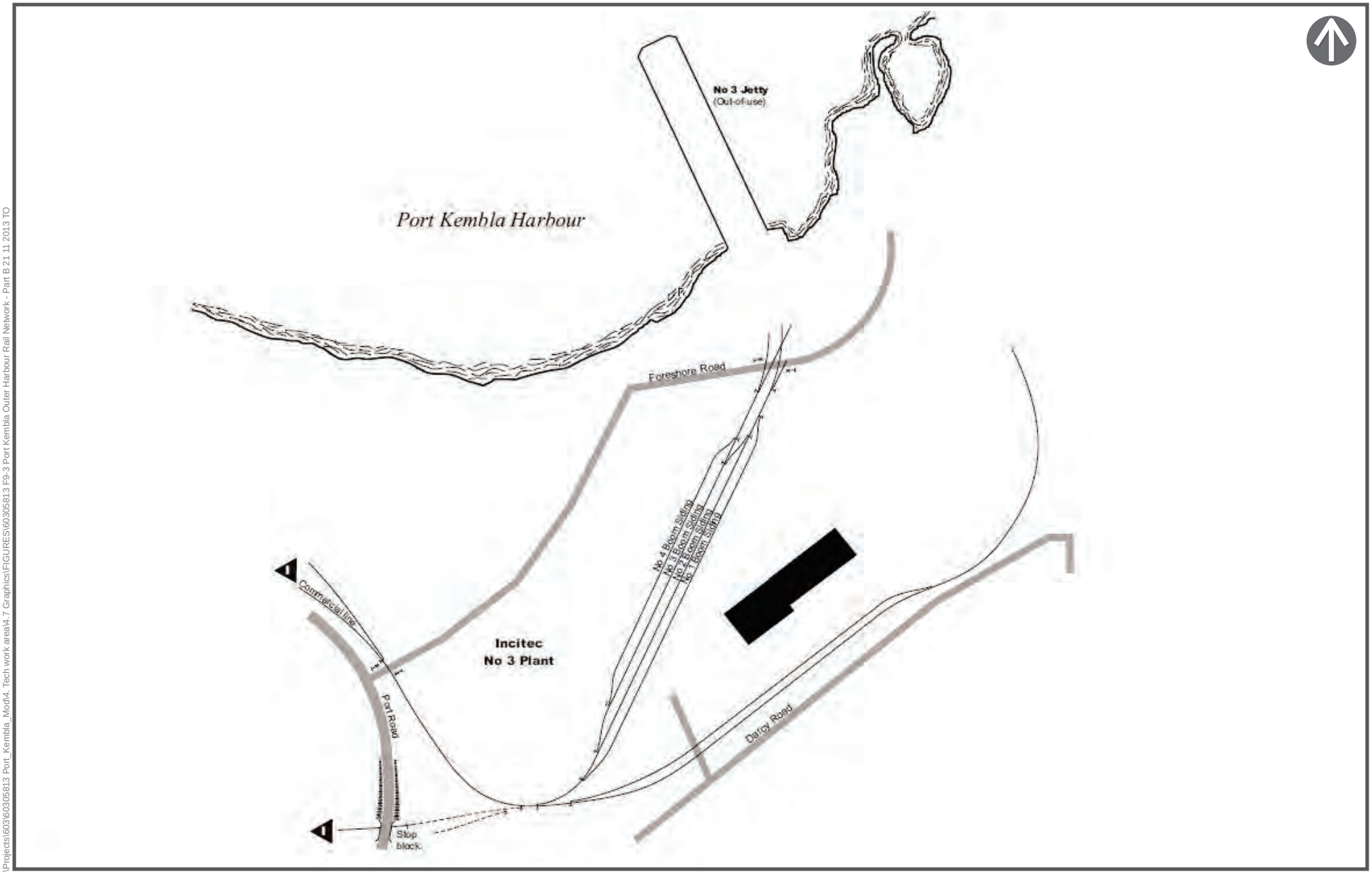
PORT KEMBLA OUTER HARBOUR RAIL NETWORK - PART A

Port Kembla Outer Harbour Development
Environmental Assessment

Source: RailCorp, 2012

FIGURE 9-2



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PORT KEMBLA OUTER HARBOUR RAIL NETWORK - PART B

Port Kembla Outer Harbour Development
Environmental Assessment

Source: RailCorp, 2012

FIGURE 9-3

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There are a number of other rail lines and sidings (active and inactive) which service the Outer Harbour. The main infrastructure of relevance includes:

- Rail sidings (known as the Power House sidings) which extend off the balloon loop in a south easterly direction and are located adjacent to the Port Kembla Gateway Jetty sidings. These sidings are serviceable but not in daily use.
- A rail line and sidings (known as the Boom sidings) which continue east and north east from near Port Kembla station to Foreshore Road and which previously serviced Jetty No.3.
- A rail line and siding which extend off the above line running adjacent to Darcy Road.

9.1.3 Approved Outer Harbour Development

Rail Capacity - Operations

As part of the previous Environmental Assessment for the Outer Harbour Development (AECOM 2010) a rail assessment was undertaken to determine the capacity of the existing rail network to accommodate additional rail movements associated with the Concept Plan and Major Project during both construction and operation. This assessment is detailed in Chapter 19 of the previous Environmental Assessment.

The assessment was based on a number of assumptions relating to issues such as:

- likely origin/destination of cargo freight
- modal split of cargo freight (road vs rail)
- maximum train lengths, configurations and loads
- percent of export and import of containers.

The freight task and forecast number of trains per day for the approved Outer Harbour Development is summarised in **Table 9-1**. This shows that the Major Project (Stage 1) approval would generate in the order of 4.3 trains per day and the Concept Plan (Stages 1, 2 and 3) approval would generate in the order of 21.7 trains per day.

Table 9-1 Rail operations for approved Outer Harbour Development

Cargo type and Stage	Total Annual Cargo Volume	Assumed Modal Split	Annual Cargo Volume by Rail	Trains per Day
Bulk – Stage 1	4.25 Mtpa	65 percent rail[3]	2.76 Mtpa	4.3
General Purpose – Stages 2 and 3	2.0 Mtpa	20 percent rail	0.4 Mtpa	1.0
Container – Stages 2 and 3	1.2 million TEUs	90 percent rail	1.08 million TEUs[2]	16.4
Total				**21.7**

1 - Rail assessment was based on a conservative modal split of 65 percent by rail, whereas the road assessment was based on a modal split of 50 percent by road.
2 - It was assumed that 60 percent of container handling would be in one direction and 40 percent in the other direction.

Based on consultation with RailCorp and ARTC at that time, it was assumed that all freight rail movements to the Outer Harbour would occur on the Moss Vale to Unanderra line.

It was considered that there was adequate available capacity on this line to accommodate the bulk cargo volumes associated with the Major Project (Stage 1) approval. However, there was likely to be the need for creation of additional rail capacity post-2020 when Stages 2 and 3 of the Outer Harbour Development, and the container terminals in particular, become operational.

Based on consultation with the rail agencies at that time, two options were identified to provide this additional capacity:

- Upgrade the Moss Vale to Unanderra line by lengthening existing passing loops, reducing track gradients or double tracking some sections of the line.
- Complete the Maldon-Dombarton Rail Link.

The upgrade of the Moss Vale to Unanderra line was considered to be the more economical solution of the two options.

The approval for the Concept Plan recognised the need to further assess rail capacity and rail infrastructure upgrades for Stages 2 and 3 by requiring the preparation and approval of a Rail Master Plan in consultation with the relevant rail agencies and rail operators. Unless otherwise agreed, the Rail Master Plan must be submitted to the Director-General prior to the construction of Stage 1 B and 1C (principally these stages involve reclamation works for the container terminal) and prior to the submission of project applications for Stages 2 and 3.

Rail Capacity - Construction

During construction it was estimated in the previous Environmental Assessment that some 3.4 million cubic metres of imported fill would be required for the reclamation area and that this imported fill would be delivered to the site by a combination of road, rail and barge transport.

The previous rail assessment carried out in 2010 assumed that approximately 1.1 million cubic metres of fill would be delivered to the site by rail progressively over seven years. The fill was to be sourced from major construction projects in the Sydney metropolitan region such as the Sydney Metro project which has since been cancelled. This was equivalent to a total of 1,722 fully loaded trains over seven years or 246 trains per year. Allowing for closures which would restrict operation of the line to 315 days per year, this was equivalent to 0.8 trains per day on average.

It was recognised that there was some potential for the delivery of fill by rail for the reclamation area to overlap with the Stage 1 bulk cargo operations for the multi-purpose terminal. However, it was considered that there was adequate rail capacity on the rail network to accommodate this scenario.

Rail Operations

The previous rail assessment indicated that trains carrying bulk cargo (4.3 trains per day) would access the multi-purpose terminal by using the existing balloon loop which is also currently used by the Port Kembla Gateway Jetty and BlueScope Steel. Bulk trains would unload at a dump station located on the loop and would not need to be broken. Bulk product would then be delivered via conveyor to open stockpile areas on the terminal.

To accommodate the possibility that more than one train may be in the loop at any one time it was recommended that a siding be created to allow for a train to be held. This was to be achieved by extending one of the existing roads in the South Yard by approximately 120 metres.

Trains carrying general cargo (1.0 trains per day) would access the multi-purpose terminal by using the existing balloon loop and then transfer to the Port Kembla Gateway Jetty rail sidings. As these trains are longer than the sidings, they would need to broken up into two halves before entering and reassembled before exit.

Trains carrying container cargo (16.4 trains per day) would use a new entry and exit road between Port Kembla North Station and the container terminals. Two new long sidings would be created in the South Yard to hold container trains. The 1,016-metre-long trains would be broken into two halves on entry to the sidings and each half would be run from the South Yard to the shorter rail sidings on the terminal. On exit trains would be reassembled in the reverse manner.

The operation would require two entry/exit roads, two long sidings in the South Yard and four shorter sidings on the terminal. It was proposed that a concept design for this infrastructure and a supplementary rail assessment should be undertaken as part of the project approval that would be required for operation of the container terminals in Stages 2 and 3 of the Concept Plan.

9.1.4 Maldon Dombarton Rail Link

History of the Rail Link

During the 1980's, the NSW government commenced construction of a new 35-kilometre-long freight rail link between Maldon (near Picton on the Main South line) and Dombarton on the Moss Vale to Unanderra line. The rail link would provide an alternative to the two existing lines (the Main South line and the Illawarra South Coast line) which provide for the movement of freight to and from Port Kembla.

The rail link would provide a shorter and more direct route for freight between Western Sydney and Port Kembla. It would also provide a more direct route to the Western Coalfields and Central and North Western NSW. The link would help alleviate road and rail congestion associated with potential increases in freight cargos and would reduce noise and pollution impacts. It would also encourage investment including at the industrial port area of Port Kembla.

Most of the ground work for the Maldon-Dombarton Rail Link has been completed but some of the more expensive elements including a four-kilometre-long tunnel, major bridges and road underpasses have not been constructed. Work was discontinued in the late 1980s due to changing economic circumstances and a change in the NSW government.

2011 Feasibility Study

Since the previous environmental assessment was carried out there has been additional work commissioned to assess the potential to upgrade capacity on the regional rail network including both the Moss Vale to Unanderra line and the Maldon-Dombarton Rail Link.

The most notable piece of work carried out since the approval of the Outer Harbour Development in early 2011 has been the Maldon-Dombarton Rail Link Feasibility Study which was completed by Hyder and ACIL Tasman in September 2011. The Study was financed by the Federal Government and its scope was to:

- examine the current and future demand for the line
- determine the most appropriate alignment and technical (engineering and land use/environmental) requirements for the line
- provide a detailed costing for construction of the line
- provide advice and options on the most appropriate means of funding construction of the line.

Some of the main findings of the Study which are of relevance to the Port Kembla Outer Harbour Development are summarised below:

- The Feasibility Study recognised that the rail link could accommodate a range of bulk freight from regional NSW including coal from the western coalfields. In the longer term it could also accommodate some container freight if there was overflow from Port Botany.
- The rail link would include construction of two 1,500-metre-passing loops which would enable the link to accommodate up to 12.5 paths (25 trains movements) per day. If a third passing loop was constructed capacity would be significantly increased beyond this figure.
- The minimum transit time for a freight train would be 55 minutes with a maximum loaded operating speed of 80 kilometres per hour and a maximum axle load of 30 tonnes.
- It estimated that construction of the link would cost between $624 to $667 million and take in the order of three to four years.
- The Illawarra South Coast line is congested with passenger and freight services and there is little scope to increase capacity.
- The complex Coniston to Unanderra Junction is operating at about 50 percent of its capacity and so can handle increased freight before work is required.
- The Moss Vale to Unanderra line has spare capacity and could be upgraded to handle more frequent and longer trains for much less cost than the Maldon-Dombarton Rail Link. This would mean that there is not a capacity issue unless there is an extremely large increase in freight demand.
- Under a range of scenarios examined, the Maldon-Dombarton Rail Link was not expected to generate sufficient benefits to cover its costs.
- Although the project is technically feasible, there is insufficient freight demand forecast to warrant its construction in the near future.
- It would not be prudent to build capacity for demand which might not eventuate or which might eventuate but many years later.
- It would be prudent to preserve the existing easement to maintain the option of constructing the line should it be required in the future.

It is relevant to note that the Feasibility Study identifies the potential of the Maldon-Dombarton Rail Link to provide useful additional rail freight capacity in the longer term to cater for the growth that may be required beyond the capacity created by upgrades of the Moss Vale to Unanderra line. This would be of benefit to the Outer Harbour Development and in particular to the container terminal operations proposed in Stages 2 and 3 of the development.

Since completion of the Feasibility Study in 2011 the Federal Government has commissioned further engineering and environmental investigations to ensure that the project is 'shovel ready' should a decision be made to complete the rail link at some time in the future. These investigations are currently on-going.

As part of these investigations it is understood that Transport for NSW has commissioned an access study which amongst other things will review the capacity of the Coniston to Unanderra Junction in light of forecast demand for freight and passenger services. This study is due for completion in late 2013. This study will assess the need to upgrade the junction to accommodate additional freight capacity. Transport for NSW will ultimately be responsible for identifying opportunities to upgrade the junction as required to meet demand.

9.2 Methodology

The DGRs for the modification require the following rail transport issues to be addressed:

- An assessment of the capability of the existing rail network to effectively accommodate increased freight movements, including network operational and infrastructure implications of the proposed modification in the short, medium and long term.
- Revised assessment of the interaction and integration with existing and planned transport infrastructure (e.g. Maldon to Dombarton rail link) and services.
- Impacts associated with the upgrade of the Old Port Road level crossing.

In preparing the rail assessment for the modification the following documents have been reviewed:

- The original Environmental Assessment for the Port Kembla Outer Harbour Development (AECOM, March 2010) and Chapter 19 of this document in particular.
- The Revised Submissions report for the Port Kembla Outer Harbour Development (AECOM, October 2010).
- *Maldon-Dombarton Rail Link Feasibility Study* (Hyder and ACIL Tasman, 2011).
- *Rail Options Study for Port Kembla Outer Harbour Development* (AECOM, March 2011) and a Supplementary Report to this Study (AECOM, August 2012).

In addition, consultation was undertaken with representatives of Transport for NSW, RailCorp and ARTC during March, April and May 2013 to discuss the proposed modification and obtain feedback in respect to issues of rail capacity on the regional rail network, both existing and with planned upgrades.

9.3 Impact Assessment

9.3.1 Construction

Initial reclamation works associated with the approved Stage 1 have been carried out on site and this has involved the delivery of some 671,250 cubic metres of imported fill to the site for use in the reclamation area for part of the multi-purpose terminal.

As part of the modified Stage 1 application, a total of 1.87 million cubic metres of imported fill still remains to be delivered to the site for the reclamation area. For the purposes of the rail assessment it has been indicatively assumed that up to 500,000 cubic metres of this imported fill would be delivered to the site by rail with the balance delivered by road. The imported fill would be sourced from a range of remote construction projects, most likely in the Sydney metropolitan region.

The fill would be transported to the Outer Harbour opportunistically as it becomes available in response to construction programs and then stockpiled on site for use in the reclamation area. For this reason it is likely that the fill would be delivered more intensively over a shorter time period (on a campaign basis) rather than delivered in a consistent manner over a longer Stage 1 construction timeframe as originally assumed.

As a result this assessment has calculated likely construction rail traffic in accordance with the variables outlined in **Table 9-2**. Note that the variables in this table are similar to those used in the previous Environmental Assessment (AECOM, 2010) with the only exceptions being the volume of fill to be delivered by rail and the timeframe for delivery.

Table 9-2 Assessment of construction rail traffic for proposed modification (Stage 1)

Variable	Proposed Modification
Total imported fill still to be delivered to site[1]	1.87 million m^3
Imported fill transported by rail	500,000 m^3
Length of train	516m
No. of locos	2
No. of Wagons	32
Average wagon load	20 m^3 (90 percent capacity)
Total no. of trains	781 over 3 years
Trains per year	260
Track utilisation	315 days/year
Trains per day	0.8

1 - Note that 671,250 cubic metres of fill has already been delivered to site for the initial Stage 1 reclamation works.

The assessment indicates that on average there will be 0.8 trains per day required to deliver imported fill to the Outer Harbour during the construction phase of Stage 1. This is a similar level of construction rail traffic to that originally assessed as part of the Major Project approval. There is adequate capacity on the regional rail network to accommodate this number of trains without any need to upgrade capacity.

Trains delivering fill to the Outer Harbour would use the existing balloon loop and from there access the sidings for the Port Kembla Gateway Jetty before depositing the fill adjacent to the designated stockpile areas near Darcy Road drain. Empty trains would then exit in a similar manner. This is a similar arrangement to that previously assessed as part of the Major Project approval.

9.3.2 Operation

Overview

The focus of the modification is on the proposed increase in bulk cargo capacity for the multi-purpose terminal in the Major Project (Stage 1) approval. The modification proposes to increase the bulk cargo capacity from 4.25 Mtpa to 16 Mtpa, and approximately 14 Mtpa of this figure would be transported by rail.

The modification does not propose to change the cargo volumes, train numbers and rail operations for general purpose cargo and container cargo associated with Stages 2 and 3 of the Concept Plan. As a result there is no need to revisit the assessment carried out for these cargo types in the previous Environmental Assessment (AECOM, 2010). Further project approval is required for Stages 2 and 3 of the Concept Plan and detailed rail assessments will be required to support such applications in the future.

As a result this rail assessment will focus primarily on the bulk train movements associated with the multi-purpose terminal in the Major Project (Stage 1).

Key Assumptions

The following key assumptions have been adopted in assessing the bulk rail operations for the modified Outer Harbour Development:

- A total of 14 Mtpa of bulk product would be delivered to the Outer Harbour by rail and the balance (2 Mtpa) by road.
- All bulk product being delivered to the Outer Harbour by rail would use the Moss Vale to Unanderra line and not the Illawarra South Coast line.

- All bulk product would be for export meaning that loaded trains would travel east down the hill toward Unanderra and empty wagons would travel west back up the hill toward Moss Vale.
- Indicatively bulk product being delivered to the Outer Harbour by rail would principally comprise coal (50 percent), bauxite (25 percent) and iron ore (25 percent).
- It is assumed that coal product originates from the western coalfields near Lithgow, bauxite originates from Goulburn and iron ore originates from Cobar.
- A maximum train length of 850 metres is assumed given the constraints which exist on the wider rail network and at the Outer Harbour to limit longer trains. Train lengths would depend on the length of passing loops on the Moss Vale to Unanderra line and the most efficient train load to locomotive/wagon ratio for each bulk product.
- The train configuration assumed is one that is consistent with current gradients on the wider NSW rail network considering the likely origin of product. Maximum operating gradients are 1:30 for loaded trains.
- Maximum axle load is assumed to be 25 tonnes but will vary depending on the type of bulk product and its origin.
- Average train load is assumed to be 90 percent of capacity.
- Allowing for closures and servicing, a track utilisation of 315 days per year is assumed.
- It is assumed that there are no path availability issues beyond the Moss Vale to Unanderra line.
- Trains would enter and exit the Outer Harbour according to the availability of train paths on the wider rail network but assume they could enter and exit potentially at any time over a full 24 hour period.
- Bulk unloader facilities at the Outer Harbour could indicatively include a bottom dump unloader and/or a tippler unloader. Train unloading would generally take in the order of 40 minutes for each train.

Assessment of Modified Rail Operations

Based on the above assumptions the freight task for the proposed modification relating to Stage 1 bulk rail operations has been estimated based on the calculations contained in **Table 9-3** below.

Table 9-3 Assessment of Stage 1 bulk rail operations

Variable	Coal	Iron Ore	Bauxite	Total
Annual cargo by rail	7 Mtpa	3.5 Mtpa	3.5 Mtpa	**14 Mtpa**
Length of train	849m	748m	660m	
Axle load (tonnes)	25 TAL	19 TAL	25 TAL	
No. of wagons	45	60	56	
No. of locos	4	4	2	
Average wagon load	90 percent	90 percent	90 percent	
Average load per train	3,159 tonnes	3,132 tonnes	4,133 tonnes	
Assumed track utilisation	315 days/year	315 days/year	315 days/year	
Trains per day	7.0	3.5	2.7	**13.2**

It should be noted that the above assessment of Stage 1 rail operations at the Outer Harbour is based on assumptions relating to the type of bulk product and the likely origin of bulk product. As a result it differs slightly from the capacity assessment carried out as part of the Maldon-Dombarton Rail Link Feasibility Study (2011) which was based on more generic bulk trains and without consideration of the likely origin of product.

It is estimated that a total of 13 trains per day would be required to service a bulk cargo throughput of 14 Mtpa. These calculations are based on relatively conservative assumptions regarding train lengths and average loads per train which take into account the assumed volume and origin of each of the bulk products.

The freight task for the modified Stages 1, 2 and 3 rail operations has been estimated in **Table 9-4**. This table adopts the bulk rail calculations outlined above, and then also includes the estimates of rail traffic generation for general purpose cargo and container cargo as contained in the previous Environmental Assessment, as these cargo volumes have not changed.

Table 9-4 Assessment of Stages 1, 2 and 3 rail operations

	Stage 1	Stage 2	Stage 3	Total
Bulk Cargo by Rail	14 Mtpa			
Bulk Trains per Day	13.2			13.2
General Purpose Cargo by Rail		0.2 Mtpa	0.2 Mtpa	0.4 Mtpa
General Purpose Trains per Day		0.5	0.5	1.0
Container Cargo by Rail		540,000 TEUs	540,000 TEUs	1.08 million TEUs
Container Trains per Day		8.2	8.2	16.4
Total Trains per Day	**13.2**	**8.7**	**8.7**	**30.6**

It is estimated that a total of 30.6 trains per day would be required to service the combined bulk, general purpose and container cargo volumes for Stages 1, 2 and 3 of the Concept Plan. The vast majority of these trains are associated with the transport of bulk cargo and container cargo. The modification would result in an additional nine trains per day all of which are bulk trains during Stage 1.

To adequately service this number of train movements the regional rail network would need to be upgraded to provide additional capacity. Such improvements would likely include one or more of the following:

- Upgrade in capacity of the Moss Vale to Unanderra line.
- Completion of the Maldon-Dombarton Rail Link.
- Upgrade of rolling stock to include the introduction of alternating current (AC) traction locos and electronically controlled pneumatic (ECP) braking which would improve train handling and travel times. This type of rolling stock is currently used by trains which are part of the Hunter Valley Coal Chain.

Given the extended timeframe envisaged for the full implementation of the Concept Plan, and the container terminal in particular, it is considered that such upgrades are feasible. Significant additional work has been carried out over the past 2 to 3 years to document the feasibility of upgrading the rail network and to provide the confidence that additional freight capacity on the network can be achieved. This network capacity issue is assessed further in the following sections.

In the existing Concept Plan approval there a number of mechanisms in place to ensure there is greater certainty about the available capacity on the regional rail network before Stages 2 and 3 can proceed. Condition 2.4 notes that projects in Stages 2 and 3 are subject to further assessment and approval and that one of the specific issues to be assessed will include a Traffic and Transport Assessment (including a rail assessment).

In addition Condition 2.6 requires the preparation and submission of a Rail Master Plan prior to commencing construction of Stage 1B and 1C (principally these stages involve reclamation works for the container terminal) and prior to the submission of project applications for Stages 2 and 3.

Capacity on Regional Rail Network - Moss Vale to Unanderra Line

During the preparation of the *Maldon-Dombarton Rail Link Feasibility Study* (2011) a range of alternatives to completion of the Maldon-Dombarton Rail Link were considered, including potential to upgrade capacity on the Moss Vale to Unanderra line. The ARTC prepared a submission which outlined an analysis of capacity on the Moss Vale to Unanderra line and the submission is included as Appendix F of the Feasibility Study.

The ARTC analysis included identification of a range of options to increase capacity on the Summit Tank to Dombarton section of the line which is considered to be the most constrained section. The proposed upgrades aim to increase either the load carrying capacity of each train or to improve travel time thereby creating additional train paths.

The ARTC analysis of proposed upgrades together with an estimate of cost is detailed in **Table 9-5**. In this table comment is also provided on the improvement that could be expected from each proposed upgrade and the feasibility of each option.

Table 9-5 ARTC options for upgrading capacity on the Moss Vale to Unanderra line

Proposed Upgrade	Resulting Improvement	Estimated Cost	Comment on Feasibility
Do nothing scenario	Relies solely upon existing capacity (spare paths) available on the line	$0 million	N/A
Extending the four existing loops to accommodate trains of 850 m length	Improves the load carrying capacity of each train	$20 million	Feasible
Extending the four existing loops to accommodate trains of 1,350 m length	Further improves the load carrying capacity of each train	$53 million	Unlikely to be of benefit to the Outer Harbour as neither the wider rail network nor the Outer Harbour can handle trains of this length.
Extending the Summit Tank loop by 1.2 km down the hill toward Dombarton	Improves travel time and creates additional train paths	$15 million	Feasible
Extending the Summit Tank loop a further 3.4 km down the hill toward Dombarton	Further improves travel time and creates additional train paths	$50 million	Feasible
Full double track between Summit Tank and Dombarton	Further improves travel time and creates additional train paths	Not costed	Unlikely to be feasible. Complex and large cost.
Upgrading rolling stock by incorporating AC traction locos and ECP braked wagons	Further improves travel time and creates additional train paths	Not costed	Feasible. Note that such rolling stock is currently in use as part of the Hunter Valley Coal Chain.
Upgrading rail line to accommodate 30 tonne axle loads (TAL)	Improves the load carrying capacity of each train	Not costed	Unlikely to be feasible as it would require the wider NSW rail network to also be upgraded to this standard which is a complex and expensive exercise.

After identifying the options for upgrading rail capacity, the ARTC analysis identified the potential bulk cargo capacity (Mtpa) that could be achieved associated with each option. This analysis considered the potential number of available train paths and the train sizes that might take advantage of these paths.

The ARTC capacity analysis from the 2011 Feasibility Study has been used as the basis for examining four scenarios, each of which reflect a number of different assumptions relating to spare train paths, lengths of trains and increased tonnage limits. The detailed analysis associated with each of these four scenarios is presented in a series of tables contained in **Appendix H**.

The first two scenarios are discussed below:

- **Scenario 1** - ARTC analysis based on 2011 Feasibility Study and assuming existing capacity of 7 spare train paths per day, 1,350 metres length trains and ultimately 30 TAL trains (2011 ARTC analysis).
- **Scenario 2** - as per the 2011 ARTC analysis in all respects but modified to reflect recent ARTC advice regarding existing capacity of 4.6 spare train paths per day (modified 2013 ARTC analysis).

It was considered that the ARTC analysis under Scenarios 1 and 2 may have been optimistic in respect of train lengths and tonnage limits. At the current time it is not realistic in the context of the Major Project (Stage 1) bulk rail operations to assume operation of 1,350-metre-length freight trains based on constraints which exist on the wider rail network and the limited opportunity to accommodate these longer trains at the Outer Harbour.

However, it should be noted that in the context of the container rail operations proposed in Stages 2 and 3 of the Concept Plan that longer trains are feasible (1,016-metre-length container trains for the Outer Harbour have been assumed).

In addition, the option of upgrading the rail line to accommodate 30 TAL is also not currently considered realistic as it would require other sections of the wider NSW rail network to also be upgraded to this standard, which is a complex and expensive exercise. In this context it is noted that the 2011 ARTC analysis was restricted to the Moss Vale to Unanderra line and did not examine the wider NSW rail network or the likely origin of bulk trains.

Accordingly the analysis has been revised to reflect a more conservative train length of 850 metres and the option of upgrading the line to achieve a 30 TAL has been removed. Two further scenarios were then examined which were considered to be more conservative and appropriate for the Outer Harbour Development.

These additional two scenarios are discussed below:

- **Scenario 3** - as per the ARTC 2011 analysis but revised to reflect 850 metres train lengths and maximum 25 TAL trains (2011 ARTC analysis – revised).
- **Scenario 4** - as per the modified 2013 ARTC analysis but revised to reflect 850-metre train lengths and maximum 25 TAL trains (modified 2013 ARTC analysis – revised).

The theoretical train path and bulk cargo capacity achieved under each of these four scenarios is discussed in the following sections.

Scenario 1 – 2011 ARTC Analysis

Scenario 1 is based on the 2011 ARTC analysis which indicated that, without improvement, 7 spare train paths per day were available on the corridor with an estimated capacity of 6.5 Mtpa.

Assuming a series of improvements, the ARTC analysis showed that 11.4 spare train paths per day can be created for trains up to 1,350 metres in length by extending loops and introducing upgraded rolling stock (AC traction locos and ECP braked wagons). This would generate capacity of 25.5 Mtpa.

If the line could be upgraded to cater for trains with 30 TAL then capacity would further increase to 32.1 Mtpa.

Scenario 2 – Modified 2013 ARTC Analysis

Scenario 2 is based on the modified 2013 ARTC analysis which indicated that, without improvement, the number of available train paths on the corridor had reduced to 4.6 paths per day with an estimated capacity of 4.3 Mtpa.

Assuming a series of similar improvements to Scenario 1, the modified analysis showed that up to 9 spare train paths per day can be created for trains up to 1,350 metres in length by extending loops and introducing upgraded rolling stock. This would generate capacity of 20.2 Mtpa.

If the line could be upgraded to cater for trains with 30 TAL then capacity would further increase to 25.3 Mtpa.

Scenario 3 – 2011 ARTC Analysis (Revised)

The Scenario 3 analysis, based on the 2011 ARTC analysis but assuming shorter train lengths and reduced tonnage limits, is presented in **Table 9-6**.

Table 9-6 Rail capacity analysis – scenario 3

Description	No. of Spare Train Paths	No. of Wagons	No. of Locos	Train Length (m)	Bulk Cargo Capacity (Mtpa)
Existing capacity	7.0	34	3	641	6.5
Extend loops to allow trains of 850 m length	7.0	45	4	849	8.6
Extend Summit Tank Loop by 1.2 km	8.1	45	4	849	10.0

Description	No. of Spare Train Paths	No. of Wagons	No. of Locos	Train Length (m)	Bulk Cargo Capacity (Mtpa)
Further extend Summit Tank Loop by 3.4 km	9.4	45	4	849	11.6
AC traction locos with ECP braked wagons	11.4	45	4	849	14.3

The analysis shows that 11.4 spare train paths per day can be created for trains up to 850 metres in length and this would generate capacity of 14.3 Mtpa.

Scenario 4 – Modified 2013 ARTC Analysis (Revised)

The Scenario 4 analysis, based on the modified 2013 ARTC analysis but assuming shorter train lengths and reduced tonnage limits, is presented in **Table 9-7**.

Table 9-7 Rail capacity analysis – scenario 4

Description	No. of Spare Train Paths	No. of Wagons	No. of Locos	Train Length (m)	Bulk Cargo Capacity (Mtpa)
Existing capacity	4.6	34	3	641	4.3
Extend loops to allow trains of 850 m length	4.6	45	4	849	5.7
Extend Summit Tank Loop by 1.2 km	5.7	45	4	849	7.0
Further extend Summit Tank Loop by 3.4 km	7.0	45	4	849	8.6
AC traction locos with ECP braked wagons	9.0	45	4	849	11.3

The analysis shows that 9 spare train paths per day can be created for trains up to 850 metres in length and this would generate capacity of 11.3 Mtpa.

Based on the conservative assumptions detailed in Scenarios 3 and 4, it can be demonstrated that progressive upgrades of the Moss Vale to Unanderra line can deliver a bulk cargo capacity of between 11.3 and 14.3 Mtpa. This capacity would either meet, or go most of the way to meeting, the proposed rail capacity required for the modified Stage 1 of the Outer Harbour Development.

ARTC will allocate rail paths on a competitive, commercial basis and according to market demand. The customers of the Outer Harbour Development will need to compete with other existing and future rail users to secure access to these rail paths.

Based on the analysis undertaken by ARTC, the majority of this upgraded capacity on the Moss Vale to Unanderra line can be delivered for an estimated cost of less than $140 million (excluding the cost of rolling stock improvements). This is significantly less than the estimated $650 million cost of the Maldon-Dombarton Rail Link.

In its submission to the Feasibility Study (2011) the ARTC made the following comment:

ARTC will work with potential customers and their rail operators to develop an optimised solution and, subject to satisfactory commercial arrangements, will undertake the investment necessary to ensure that the capacity is made available if required.

Capacity on Regional Rail Network – Maldon to Dombarton Rail Link

The 2011 Feasibility Study details that the rail link would provide the following capacity depending on its ultimate configuration:

- 8.5 train paths per day (17 train movements) with no loops.
- 9.5 train paths per day (19 train movements) with one loop.
- 12.5 train paths per day (25 train movements) with two loops.
- 30 train paths per day (60 train movements) with three loops noting that this also assumes introduction of AC traction locos and ECP braking wagons.

It is understood that these figures reference saleable train paths which have been adjusted to reflect that only 75 percent of available train paths can be utilised over the course of a year.

Using the same conservative bulk train length and loading assumptions to those adopted in Scenarios 3 and 4 above, it is estimated that the Maldon-Dombarton Rail Link could deliver in its own right bulk capacity of:

- 10.6 Mtpa (8.5 paths and no loops)
- 11.9 Mtpa (9.5 paths and one loop)
- 15.6 Mtpa (12.5 paths and two loops)
- 37.5 Mtpa (30 paths and three loops).

On this basis it can be demonstrated that, either in its own right, or as an extension of the proposed upgrades on the Moss Vale to Unanderra line, the Maldon-Dombarton Rail Link would comfortably provide sufficient capacity to accommodate the bulk train movements to be generated by the modified Stage 1 Outer Harbour Development.

In conjunction with the upgrades on the Moss Vale to Unanderra line, the rail link would potentially provide sufficient capacity for all stages of the Outer Harbour Development. However, further work will be required as part of the Rail Master Plan for the Outer Harbour and as part of the assessments for Stage 2 and 3 project applications to confirm this potential capacity.

Trigger for Preparation of the Rail Master Plan

The existing Concept Plan approval (Condition 2.6) requires the preparation of a Rail Master Plan in consultation with transport agencies, rail and intermodal operators. The Plan is to provide a strategic framework for development and implementation of rail infrastructure and upgrades necessary to support Stages 2 and 3 of the Concept Plan.

Unless otherwise agreed the Rail Master Plan must be submitted to the Director-General prior to the construction of Stage 1 B and 1C (principally these stages involve reclamation works for the container terminal) and prior to the submission of project applications for Stages 2 and 3.

It is considered that the trigger for submission of the Rail Master Plan should be amended to delete reference to the construction of Stage 1A and 1B. Instead the trigger should focus solely on the submission of project applications for Stages 2 and 3. There are a number of reasons for suggesting this change in approach.

Firstly, significant additional work has been carried out by PKOPL and government transport agencies since the original approvals for the Outer Harbour Development were issued in respect of rail capacity both within the Outer Harbour and on the wider rail network. This includes assessments of the capacity of the two key rail corridors (Moss Vale to Unanderra and Maldon-Dombarton) and this work is continuing. This gives far greater confidence that additional network capacity can be delivered to support the rail operations associated with the modified Outer Harbour Development by comparison with some 2 to 3 years ago.

Secondly, in late 2012 the NSW government has released the draft *NSW Freight and Ports Strategy* which clearly defines the intended roles for the three key NSW ports including Port Kembla. This has identified the important strategic role of Port Kembla, and in particular the Outer Harbour, as the location for development of a container terminal to augment the capacity of Port Botany when required.

The Strategy also identifies the need to establish corridors to better meet the freight needs of NSW and to better separate freight and passenger rail movements. This includes specific reference to the Maldon-Dombarton Rail Link recognising its role in supporting the continued growth and expansion of Port Kembla.

Thirdly from a sustainability perspective it is important to acknowledge the important link between the dredging and reclamation works proposed in Stage 1. The construction strategy is based around the beneficial re-use of dredged spoil within the reclamation area for the container terminal. To minimise environmental impacts such as odour and potential acid sulphate soils (PASS) it is essential that dredged spoil is quickly transferred to the reclamation area.

To potentially delay the construction of the reclamation area by linking it to submission of the Rail Master Plan would result in the need to consider other disposal options for dredged spoil such as stockpiling on site or disposal to landfill facilities most likely involving transport by road. Use of the dredged spoil also minimises the need to transport large volumes of imported fill to the site most likely by road. This would have implications for the local and regional road network and for noise and air quality emissions associated with road traffic.

It is also important to maintain maximum flexibility around the timing of the reclamation works to take advantage of the availability of fill sources from other construction projects which are likely to arise opportunistically over the period of the Stage 1 construction. In this respect, the Outer Harbour Development is providing a high value beneficial re-use option for construction excavation or tunnelling spoils and for industrial wastes of suitable quality such as steelmaking slag and coal washery waste.

For all of the above reasons it is considered appropriate to link preparation of the Rail Master Plan to the submission of project applications for Stages 2 and 3 of the Outer Harbour Development.

Local (Outer Harbour) Rail Operations

Bulk trains would enter the new loops in a clockwise direction, entering via the North Yard, then travelling through the bulk unloaders and exiting via the South Yard. This direction of travel is preferable from both an operational and noise impact perspective. Importantly the proposed bulk rail configuration has been designed to accommodate 850-metre-length trains thereby avoiding the need to split trains or to carry out shunting movements.

It may be necessary to hold trains for a period of time if the bulk unloaders are occupied or temporarily out of service, if trains associated with BlueScope Steel or the Port Kembla Gateway Jetty are constraining access to the loops or until paths are available on the regional rail network. As a result sidings are to be provided in the North and South Yards capable of holding an 850-metre-length train either on entry or exit.

It is estimated that a total of 13 bulk trains per day would be required to handle bulk cargo throughput of 14 Mtpa. While unloading, trains would travel through the loop at a speed of less than 2 kilometres per hour and the unloading process may take in the order of 40 minutes per train.

Depending on the type of bulk cargos being delivered to the Outer Harbour, it is likely that a second bulk loop could be required once train movements exceed 7 to 8 trains per day. This is to ensure that bulk materials can be transferred from the trains to the multi-purpose terminal with maximum efficiency.

The unloaders would likely comprise either:

- a bottom dump unloader - where doors at the bottom of each wagon open to release the bulk material (typically used for coal product), or
- a tippler - where each group of 2 to 3 wagons are rotated in a frame to tip the product out (typically used for iron ore and bauxite products).

There are no changes to the approved rail operations for the general purpose cargo and container cargo under Stages 2 and 3 of the Concept Plan. These operations are as discussed in the original Environmental Assessment (AECOM, 2010) and as summarised in **Section 9.1.3** of this report.

Further project approval is required for Stages 2 and 3 of the Concept Plan and detailed rail assessments will be required to support such applications in the future.

Local Rail Infrastructure

To service the increased number of bulk trains (13 trains per day) the following additional rail infrastructure is recommended:

- two new bulk rail loops running parallel to the existing balloon loop
- two new bulk rail unloaders located to the north of Salty Creek and adjacent to the multi-purpose terminal
- sidings in the North Yard and South Yard to hold 850-metre length bulk trains if necessary before entering, or on exiting, the unloaders.

The proposed rail infrastructure detailed above is shown on **Figure 9-4**.

As the bulk freight task for the Outer Harbour grows over time, the rail infrastructure would be provided progressively in response to the volume of cargo being delivered and the number of trains required.

KEY
BULK
BALLOON LOOP
CONTAINER
TRACK WORK
EXISTING TRACK
AREA OF POTENTIAL LAND ACQUISITION

SHELL AUSTRALIA LAND ACQUISITION INSET
ROAD
PROPOSED RAIL CORRIDOR BOUNDARY

GATEWAY SIDINGS
GATEWAY SIDINGS REALIGNMENT REQUIRED
NEW UNDERBRIDGE REQUIRED FOR OLD PORT ROAD
OLD PORT ROAD
BULK LOOP 2
SIDING 2
SIDING 1
BULK LOOP 1
BALLOON LOOP
NORTH YARD
DIRECTION OF BULK OPERATION
FLINDERS STREET
PORT KEMBLA NORTH STATION
SECOND TRACK (DOWN) REQUIRED FOR CONTAINER AND BULK OPERATIONS
BALLOON LOOP
BULK LOOP 1
SIDING 1
SIDING 2
BULK LOOP 2
SIDING 1
CONTAINER LINE 1
SOUTH YARD
CONTAINER LINE 2
SIDING 2
SOUTH YARD SIDINGS RECONFIGURED TO RETAIN ACCESS FROM BULK LOOP 2
DIRECTION OF BULK OPERATION
COMMONWEALTH ROLLING MILL
OLD PORT ROAD
POSSIBLE GRADE SEPARATION OF ROAD AND RAIL AT OLD PORT ROAD
BULK HANDLING DEPOT 2 BOTTOM DUMP (COAL)
BULK HANDLING DEPOT 1 TIPPLER (IRON-ORE/BAUXITE)
PROPOSED PORT ACCESS ROAD

BULK UNLOADER FACILITY INSET
40.000
30.000
SALTY CREEK

PORT KEMBLA STATION
POSSIBLE GRADE SEPARATION OF ROAD AND RAIL AT FORESHORE ROAD
FORESHORE ROAD
POSSIBLE BRIDGE RECONSTRUCTION REQUIRED
DOWNER LOCO FACILITY
FINE ISLANDS ROAD
DARCY ROAD

PIPE AND ENGINEERING LAND ACQUISITION INSET
137.470
3.045
PIPE AND ENGINEERING
3.441

0 150 300m

AECOM

OUTER HARBOUR RAIL NETWORK (AS MODIFIED)

Port Kembla Outer Harbour Development
Environmental Assessment

FIGURE 9-4

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The rail infrastructure works recommended above can largely be undertaken within the existing rail reservation controlled by PKOPL. The only exceptions to this are:

- Upgrade/widening of the rail bridge over Old Port Road which may impact on a small area of land owned by Shell Australia on the north west side of the rail bridge
- New bulk rail loops which may impact on a small area of land currently owned by Pipe and Engineering on the south side of the balloon loop to the west of Old Port Road.

PKOPL has held preliminary discussions with both landowners in respect of the proposed rail infrastructure works. Further discussions would be held as the detailed design of the rail infrastructure is progressed and, if required, landowner agreements would be reached prior to the commencement of rail construction works for Stage 1.

As a result of the rail infrastructure upgrades outlined above there would also be associated changes to road infrastructure on Old Port Road including:

- upgrade and widening of the existing rail bridge over Old Port Road
- upgrade and widening of the existing at-grade rail crossing on Old Port Road.

These works would be carried out in a manner which ensures minimal disruption to traffic using Old Port Road and appropriate management measures would be detailed in the Construction Traffic Management Plan (which is required by Condition C37b) of the Major Project approval.

A number of options for the treatment of the existing at-grade rail crossing on Old Port Road have been identified. In evaluating options, one of the important considerations would be the need to address the potential safety considerations associated with operation of an at-grade railway crossing particularly as the number of rail loops and train movements through the crossing would increase as a result of the modification. This issue could potentially be addressed by the installation of boom gates, by closure of the road or by grade separation of the road and rail line.

A single option or a combination of options may be the most appropriate. The issues associated with each of these options are discussed in more detail in the road traffic assessment in **Chapter 10.0** and would be subject to further investigations and discussions with RMS and local industrial premises that may potentially be impacted.

9.4 Mitigation and Management Measures

The following management measures are proposed to address the rail related issues arising in connection with the proposed modification:

- To service the increased number of bulk trains (13 trains per day) in Stage 1 the following additional rail infrastructure is recommended:
  - two new bulk rail loops running parallel to the existing balloon loop
  - two new bulk rail unloaders located to the north of Salty Creek and adjacent to the multi-purpose terminal
  - sidings in the North Yard and South Yard to hold 850-metre length bulk trains if necessary before entering, or on exiting, the unloaders.
- For any rail infrastructure works located outside of the rail reservation under its control, PKOPL would continue to consult with landowners as detailed design of these works is progressed, to secure landowner agreements prior to the commencement of construction works for Stage 1.
- PKOPL would consult with other existing users of the Outer Harbour rail infrastructure and the rail operator regarding the proposed bulk rail operations for Stage 1 to ensure that their existing operations are suitably accommodated.
- A number of options for the treatment of the existing at-grade rail crossing on Old Port Road have been identified and would need to address potential safety considerations. The issues associated with each of these options should be subject to further investigations and discussions with RMS and local industrial premises that may potentially be impacted, before selection of a preferred option(s).

- As per the existing conditions of the Concept Plan approval (Condition 2.6), PKOPL would prepare a Master Plan for the Outer Harbour to assess issues relating to regional rail network capacity and rail infrastructure upgrades required to service the proposed container terminal rail operations prior to the commencement of Stage 2 of the Concept Plan.
- PKOPL would continue to consult with rail infrastructure providers and rail agencies to promote the planning for, and timely delivery of, regional rail network capacity to service customers seeking rail access to the Outer Harbour Development.

9.5 Conclusion

In summary, it is estimated that the proposed increase in bulk throughput proposed as part of the proposed modification would generate up to 13 trains per day during Stage 1. These trains can be accommodated at the Outer Harbour by developing local rail infrastructure including two new bulk loops, two bulk unloaders and sidings in the North and South Yards.

The modification does not propose to change the cargo volumes, train numbers and rail operations for general purpose cargo and container cargo associated with Stages 2 and 3 of the Concept Plan. As a result there is no need to revisit the assessment carried out for these cargo types in the previous Environmental Assessment (AECOM, 2010). At full development it is estimated that the Concept Plan would generate a total of approximately 30 to 31 train movements per day.

Significant work has been carried out in relation to the options for creating additional capacity on the regional rail network servicing Port Kembla since the original approval of the Outer Harbour Development. In this assessment recent work carried out by ARTC as part of the *Maldon-Dombarton Rail Link Feasibility Study* (2011) has been revised to reflect more conservative assumptions regarding train lengths likely to be suitable for the Outer Harbour and axle loads for the rail line.

This revised analysis has provided sufficient confidence that adequate capacity can be provided on the regional rail network for this number of train movements through any one, or a combination, of the following:

- progressive upgrades to the Moss Vale to Unanderra line
- completion of the Maldon-Dombarton Rail Link
- upgrade of rolling stock to include the introduction of AC traction locos and ECP braking.

The relevant rail agencies have indicated that they will work with potential customers to develop an optimal solution and, subject to satisfactory commercial arrangements, will undertake the necessary investment to ensure that the capacity is made available.

Further project approval is required for Stages 2 and 3 of the Concept Plan and detailed rail assessments will be required to support such applications in the future. In addition the existing conditions of approval for the Concept Plan require the preparation of a Rail Master Plan in consultation with relevant rail agencies and rail operators.

For a number of reasons discussed above it is considered more appropriate to link the trigger for submission of the Rail Master Plan to submission of project applications for Stages 2 and 3 of the Outer Harbour Development. Condition 2.6 of the Concept Plan approval would need to be modified to reflect this change of approach.