Brookfield

DBCT MANAGEMENT

A GLOBAL ASSET MANAGEMENT COMPANY
Focused on Property and Infrastructure Assets

DBCT Management - Master Plan 2018

Expansion Opportunities at the Dalrymple Bay Coal Terminal

Document Control					
Rev No	**Date**	**Revision Details**	**Author**	**Verifier**	**Approver**
1	29/03/2018	Submission Document	PW	JK	AT

Document Owner	Next revision date
Jesse Knight	31/03/2019

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1 Executive Summary

The Bowen Basin experienced strong production and demand growth for coal in the first decade of the 2000s. In order to accommodate this demand, DBCT Management Pty Limited ("DBCTM") responded by undertaking numerous capacity expansions. The DBCT 7X project was the most recent expansion and lifted terminal capacity to 85 million tonnes per annum (Mtpa), underwritten by long term take or pay contracts with the world's biggest mining companies.

Since commissioning the new capacity in 2009, throughput has slowly increased in line with global demand During and after delivery of DBCT's 7X expansion, global coal markets experienced a period of rapid expansion, followed by oversupply and ultimately rationalisation of surplus production capacity. Due to a combination of high global steel production and consistent global metallurgical supply disruptions, the price of hard coking coal (HCC) has been close to US$200mt FOB since late 2016. Demand for DBCT's capacity has again returned to the market, and DBCT Management is signing new Access Agreements to service both greenfield and brownfield metallurgical coal mine developments.

DBCT Management is obliged by the Port Services Agreement (PSA) and the Access Undertaking (AU) to accommodate the actual and reasonably anticipated future demand for the use of DBCT's Users and access seekers. Accordingly, DBCTM has continued to plan post 85 Mtpa expansions to take DBCT's nameplate capacity up to a maximum of 136 Mtpa.

While metallurgical coal demand growth is occurring and widely anticipated to continue, the timing of demand for expansions has historically proven difficult to forecast. The next wave of mine development is expected to be approached in a more measured way than during the previous "mining boom". This measured approach will increasingly lead to a demand for incremental expansion capacity. This and the previous Master Plan both outline an incremental expansion pathway for DBCT while recognising the regulatory hurdles that need to be cleared prior to commencing any development works.

This Master Plan takes into account recent regulatory changes which now set a higher bar for planning and executing expansion. The Master Plan reviews the preferred expansion pathway to meet the requirements of future capacity demand, without trying to predict when those individual expansion options might be activated.

1.1 DBCT Background (Chapter 2)

Chapter 2 reviews DBCTM's involvement in the terminal and describes the asset relevant to land use and geographical location, including a brief history of the terminal and the progression to DBCT's current configuration. Various elements of DBCT's operations are discussed, including a description of the major plant, machinery and infrastructure that allow the terminal to deliver 85 Mtpa of capacity. The region encompassing the terminal, in addition to the land leases that make up the terminal footprint are outlined for ease of reference.

The chapter also deals with the Master Planning process and DBCT Management's alignment with the Whole of System Master Planning function of the Integrated Logistics Company (ILC). The regulatory framework is outlined in detail in this chapter, as is the current contractual position of the terminal.

Further, Chapter 2 briefly summarises the Access Regime in place for DBCT and highlights recent changes to the Access Undertaking which has introduced some additional hurdles to further development at DBCT.

1.2 Current Operations (Chapter 3)

This chapter provides an overview of the current operations of DBCT, including; cargo assembly and hybrid stockpiling, an overview of the remnant zone, and a summary of the independent capacity modelling results.

Additional topics addressed in this chapter include the impact of service provision, including non-common blending ratios, breakdowns, maintenance and smaller vessels that can all erode terminal and supply chain capacity.

1.3 Future Supply/Demand (Chapter 4)

This chapter assesses global demand and supply prospects in the context of triggering further expansions at DBCT. Previous forecasts, based on leading industry analysis have been unreliable, due to a range of factors including the global financial crisis and more recently, changes in Chinese government policy and the volatility of global coal markets.

DBCT Management expects stability in growth from the usual supply regions including Japan and South Korea, continued swing purchasing from China, while India and South-East Asia drive further growth for coal handled by DBCT.

Competing suppliers do pose a threat to DBCT's demand, particularly Mozambican and Indian domestic coal production, however these regions are not expected to materially impact the long-term growth of the Bowen Basin. Continuing demand out of the Bowen Basin is expected to drive demand for expansion capacity at DBCT and other coal terminals. While there is no way to reliably predict the timing of expansions, DBCT Management has developed this Master Plan with the intent of having a clearly outlined development pathway that it can be triggered when demand exceeds available capacity.

1.4 DBCT Expansion Options (Chapter 0)

This chapter outlines the proposed expansion pathway for DBCT. The expansion pathway has not been modified since the previous Master Plan. It is still DBCTM's view that to satisfy the likely and foreseeable demand, 3 projects would be required. These projects are referred to as Zone 4, 8X and 9X. The Zone 4 project, coupled with the Hybrid Operating mode, alleviates current system operating constraints limiting the system to a capacity below 85 Mtpa and then delivers an additional 4 Mtpa beyond 85 Mtpa to take the System Capacity to 89 Mtpa. The 8X Project would be implemented in 2 phases and would ultimately take the system capacity to 102 Mtpa. 8X expands the current stockyard to its full potential, meaning any capacity requirement beyond 102 Mtpa would necessitate the development of a new stockyard, supported by a 4th inloading system and a 4th outloading system. Development beyond 8X is referred to as 9X. The relative viability of the expansion steps is explored in this chapter and the additional hurdles introduced by the 2017 Access Undertaking have been explored.

1.5 Environment (Chapter 6)

This chapter outlines the pertinent environmental issues relevant to the expansion projects identified, including dust and noise forecasts associated with the Zone 4 and 8X expansions.

It aligns with leading practice guidelines and policy settings by the Commonwealth & State Governments by ensuring early consideration of environmental values for development along the coast adjacent to the Great Barrier Reef.

It demonstrates that the preferred expansion options outlined in Chapter 5 do not significantly compromise the anticipated environmental outcomes for terminal operations including existing Environmental Authorities, however advanced engineering work and re-modelling is recommended. Further, the enhancement of port environmental buffers will be a critical 'port-protection' issue for consideration during formal State Master Planning work (currently underway).

1.6 Stakeholder Consultation (Chapter 7)

Chapter 7 details how DBCTM has and will interface with stakeholders in terms of current operations and future expansion of the terminal.

2 Introduction and Background

2.1 Background to DBCT

DBCT was established in 1983 by the Queensland Government as a common user coal export facility. In 2001, the Queensland Government, represented by Ports Corporation of Queensland ("PCQ") and DBCT Holdings P/L, awarded a long-term lease over DBCT (a 50-year term with a 49-year renewal option) to a consortium collectively known as Coal Logistics–North Queensland (CL-NQ). Following a change of ownership in 2009 to Brookfield Infrastructure Partners (BIP), DBCT Management (DBCTM) has held management responsibility for the DBCT assets as the Secondary Lessee. For the purposes of this document, DBCTM collectively stands for the leaseholder and related entities responsible for fulfilling the duties related to the DBCT lease, the obligations contained in the Port Services Agreement (PSA) and any of the head leasing agreements.

The Port of Hay Point is approximately 38 kms south of Mackay and consists of two coal terminals - DBCT and Hay Point Services ('HPS') (Figure 1).

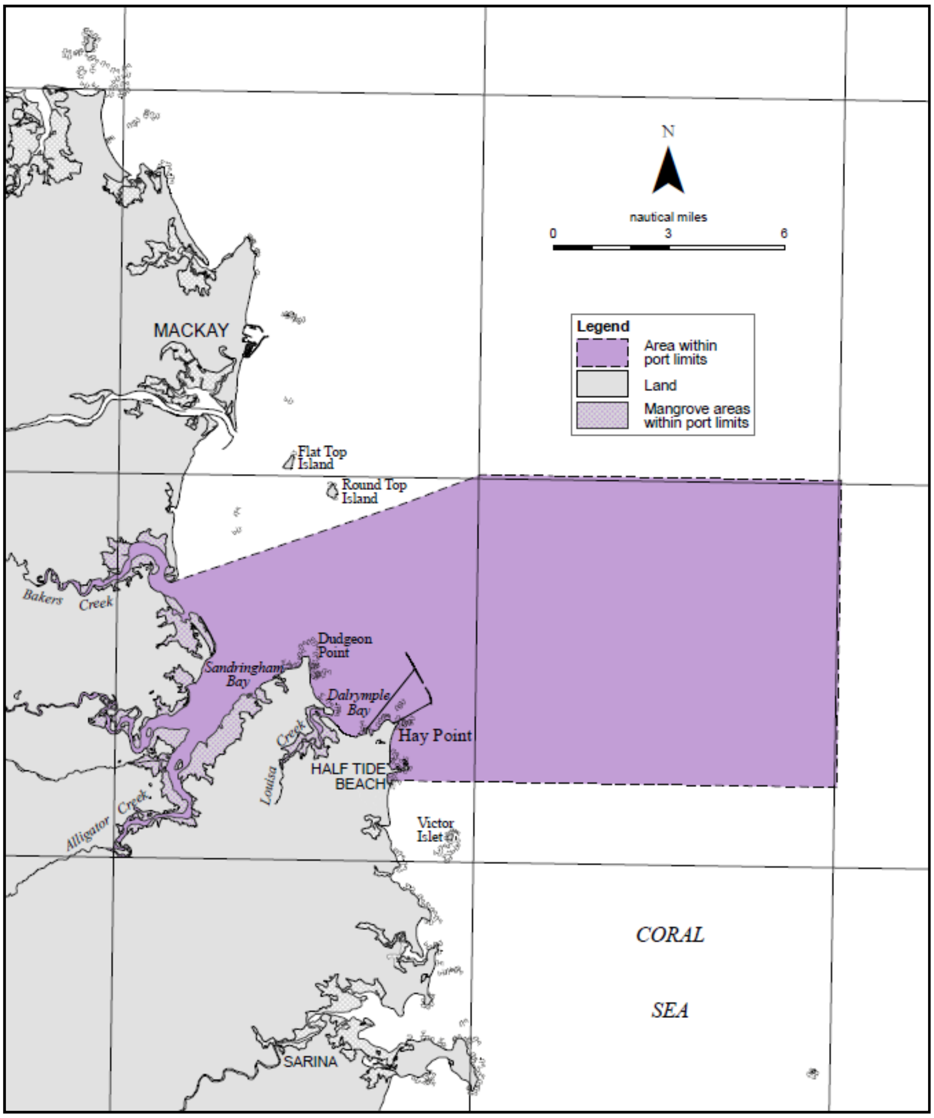

Figure 1: Port of Hay Point Port Limits – (Department Transport and Main Roads, 2013)

The port is administered by North Queensland Bulk Ports (NQBP) as the statutory Port Authority and strategic port land owner. The terminals are linked to the Bowen Basin coalfields (Figure 2) by the electrified Goonyella rail system operated by Aurizon Network. Figure 3 shows DBCT in the foreground.

Figure 2: Bowen Basin coalfields – (DNRME, 2016)

Figure 3: Port of Hay Point

DBCT is a bulk export coal terminal which is owned by the State of Queensland. The daily terminal operations and maintenance activities are undertaken by Dalrymple Bay Coal Terminal Pty Ltd ("DBCT P/L"), a 3rd party service provider owned by 5 of DBCT's Access Holders. Terminal operations and maintenance activities are undertaken by DBCT Pty Ltd under an Operations & Maintenance Contract ("OMC").

Additional information is available from these websites http://www.dbctm.com.au and http://www.dbct.com.au

The land use surrounding the port is a mix of agricultural, rural/residential and urban. The residential communities neighbouring DBCT (Figure 4) are the communities of Louisa Creek, Half Tide, Timberlands, the Droughtmaster Drive area and Salonika Beach. Responsible and ongoing interaction with these communities is an important element of DBCT Management's master planning and development process.

Figure 4: Position of DBCT relative to the local area – (DBCT Management, 2016)

2.2 Current Asset Description

2.2.1 Basic Configuration

DBCT's basic configuration can be described as: 3 rail receiving stations; a stockyard; and 4 off-shore wharves; all connected by a series of conveyor systems. DBCT is situated on approximately 214 hectares of strategic port land and 160 hectares of off-shore sea-bed lease, primarily described by the following lots:

- Lot 126 on SP123776
- Lot 130 on SP105841

- Lot 131 on SP136318
- Lot 133 on SP136320
- Lot 134 on SP185573
- Lot 135 on SP185580
- Lot 41/42 on SP136319
- Lot 43 on SP185559

Lot Part of 132 on SP136318 (Lease C on SP185554 and Lease D on SP185555)

The site stretches for more than 2.38 kms from the rail inloading stations to the land side end of the jetty, with the wharves a further 3.8 kms off-shore. The total rated terminal capacity is 85 Mtpa, making it Queensland's largest standalone coal export terminal. Including the capacity of HPS (55 Mtpa) the Port of Hay Point is one of the largest bulk export coal ports in the world.

DBCT is a common-user facility, handling a wide variety of coal types from eight coal producers. DBCT processes 3 commercial coal categories, including: coking coal, Pulverised Coal Injection (PCI) coal, and thermal coal. Coals can be further blended from the terminal's stockpiles to create many different "blended" products. The majority of DBCT's exports are shipped on a Free on Board (FOB) basis. The customers of DBCT's Producers (i.e. the coal buyers) are responsible for organising and paying for sea transport. Coupled with the available stockyard capacity, the high number of products drives a cargo assembly and hybrid operating mode in the terminal.

DBCT makes use of the following plant and equipment to achieve an 85 Mtpa nameplate capacity:

- 3 rail receival stations - 2 x 5,500 tph (IL1 & 2); 1 x 8,100 tph (IL3)
- 4 stackers - 1 x 5,500 tph; 1 x 6,000 tph; 2 x 8,100 tph
- 3 reclaimers – 1 x 4,250 tph; 2 x 5,300 tph
- 5 stacker-reclaimers - various stack rates from 4,250 - 5,500 tph and various reclaim rates from 3,700 tph – 5,300 tph
- 8 stockpile rows, each approximately 1,100 m in length (note that row 8 is a half row). Maximum designed volumetric yard capacity (static – meaning if every pile was full) is approximately 2.3 million tonnes of coal
- 3 outloading systems (OL1, OL2 and OL3) and 3 shiploaders – 1 x 7,200 tph (SL1); 1 x 7,600 tph (SL2); and 1 x 8,650 tph (SL3)
- 4 berths capable of receiving cape size vessels
- SL1 can serve berths 1 and 2; SL2 can serve berths 1 and 2 and SL3 serves berths 3 and 4

OL1 serves SL1 and SL3; OL2 can serve SL2 and SL3; and OL3 can serve SL1, SL2 and SL3 Inloading

DBCT has three inloading stations, feeding three inloading conveyor systems which deliver coal to the DBCT stockyard. The inloading stations can accept a number of different train configurations and wagon types from any one of three above rail haulage operators (Pacific National, Aurizon National and BMA Rail). The coal wagons are bottom dump type, with the coal falling out of the wagons and into the rail receival pits for transfer via inloading conveyor to the stockyard. Any of the inloading stations can feed coal to the stackers or stacker reclaimers in any part of the DBCT stockyard. This configuration gives DBCT's operator ultimate flexibility when planning the location of stockpiles in the DBCT stockyard.

2.2.2 Stockyard

The stockyard (Figure 5) consists of eight machinery bunds which support twelve yard machines and seven and a half stockpile rows. These rows are each divided into three "cells" containing stockpiles (separated by drainage pits). The twelve yard machines include four stackers, three reclaimers and five stacker/reclaimers laid out as per the following diagram:

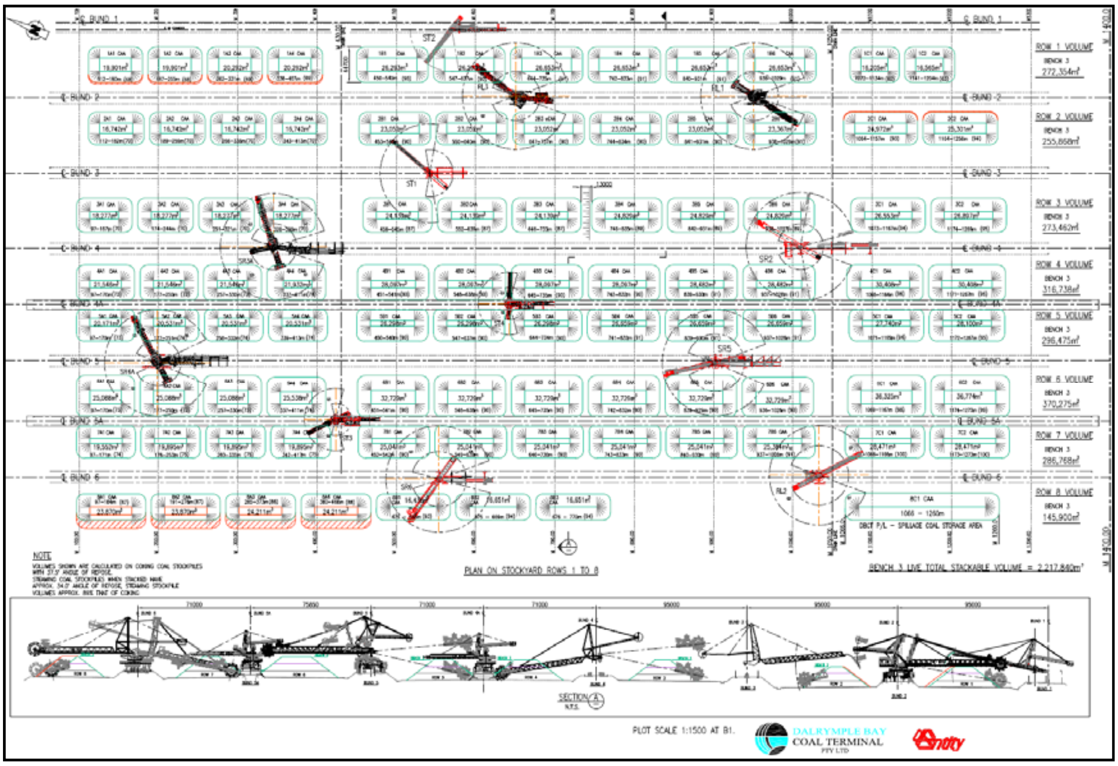

Figure 5: Stockyard layout of DBCT delivering 85 Mtpa – (DBCT Pty Ltd 2016)

The volumetric capacity of each of the stockyard rows is shown in table 1 below. The actual working capacity of the rows at any time will be determined by the number of stockpiles in each row and their sizes:

	DBCT Stockyard Capacity								
Stockpile Row	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6	Row 7	Row 8	Total
Capacity (m^3)	272,354	255,868	273,462	316,738	296,475	370,275	286,768	145,900	2,217,840

Table 1: DBCT yard row volumes – (DBCT Pty Ltd, 2016)

The stockyard has delinked inloading and outloading systems, meaning each arriving train can usually be stacked without interrupting or impeding vessel loading activities. The yard configuration and operating strategy maximises outloading performance by making two reclaiming machines available to each outloading system. Under normal operating circumstances, two reclaiming machines dig from two stockpiles simultaneously to complete one loading activity into the vessel. If the product is not a blend, both stockpiles will contain the same product.

Individual yard machine rates are as follows:

	ST1	ST2	ST3	ST4	RL1	RL2	RL3	SR2	SR3A	SR4A	SR5	SR6
Average stack Rate	5,500	6,000	8,100	8,100				4,250	5,500	5,500	5,500	5,500
Average reclaim rate					5,300	5,300	4,250	3,700	5,300	5,300	4,500	4,300
average throughload rate						5,500	4,250	4,250	5,500	5,500	5,500	5,500

Table 2: DBCT yard machine rates – (DBCT Pty Ltd, 2016)

Operationally, the DBCT stockyard is divided into four independent zones, which are usually paired with a single outloading system and generally operate under the following configuration:

- Zone one includes the southern end of stockyard rows three, four, five and six, and normally feeds the first outloading system. Zone one is shown in brown in Figure 6.
- Zone two includes stockyard rows one and two, and normally feeds the second outloading system. Zone two is shown in green in Figure 6.
- Zone three includes the northern end of stockyard rows three, four, five and six, and normally feeds the high rate third outloading system. Zone three is shown in blue in Figure 6.
- Zone four includes row seven and the half row eight (shown in yellow in Figure 6). This zone contains only remnant stockpiles and can feed any of the outloading systems. The remnant zone and strategy is explained in further detail later in this Master Plan (Chapter 3).

Figure 6: **DBCT zonal configuration Zones.**

Zones one to three are referred to as the dynamic zone, while zone four is referred to as the static zone. The dynamic zone is shown in Figure 7 in blue, while the static zone is shown in Figure 7 in yellow.

Figure 7: DBCT static and dynamic zones

2.2.3 Outloading

Each of the outloading conveyor systems is predominantly paired with a rate-matched shiploader. In this configuration, the pair of reclaiming machines, the outloading conveyor system and the shiploader have matched speeds to maximise individual machine utilisation.

From time to time (usually during maintenance outages), the outloading systems can be reconfigured to feed different shiploaders. Generally, the following outloading systems feed the corresponding shiploaders:

- Outloading system one feeds coal to shiploader one.
- Outloading system two feeds coal to shiploader two.
- The high rate outloading system three feeds coal to the high rate shiploader three.

Shiploader one and two are normally dedicated to berths one and two respectively with shiploader three loading coal into vessels on both berths three and four.

2.2.4 Water Management Infrastructure

The water management infrastructure on the site includes the following:

- An Industrial Dam (ID) with a capacity of 421 ML, which receives all run-off from the stockyard catchment area. The ID contains a series of concrete pits and containment cells designed to detain and remove coal fines that settle out from the stormwater inflows. Coal fines are periodically recovered and shipped from the terminal. A dedicated system of High Flow Transfer Pumps is also located at the ID to transfer incoming stormwater inflows to the Quarry Dam (QD) via an 800 mm pipeline through the stockyard. As a management objective, the ID is kept as close to empty as possible to maximise the available buffer storage, and minimise the likelihood of an uncontrolled stormwater discharge to the local Sandfly Creek area.
- A Quarry Dam (QD) with a capacity of 837 ML, which receives the majority of its stored water as pumped flow from the ID, with only minor site run-off from the small catchment area local to the QD. The QD serves as the primary operational water storage dam at the terminal, and has a floating pontoon pump system to transfer operational water to the site as required.
- A Rail Loop Dam (RLD) within the rail loop area that has a capacity 847 ML. It receives no run-off with the majority of its inflow via a gravity fed 800 mm pipeline from the QD during times when excess water is harvested from the ID during sustained heavy rainfall. Transfer pumps can also return water from the RLD through the same pipeline back to the QD in the dry season for operational reuse.
- A Rail Receival Dam (RRD) with a capacity of 22 ML, which stores and recycles the operational return water from the train unloading facilities and the local catchment.
- An additional dam known as Spindler's Dam, with a capacity of 59 ML, which receives runoff from the local catchment between the train unloading facilities and the stockyard that includes the three inloading conveyors. Water can be returned to the stockyard for reuse via a small diesel pump and pipeline system.
- A dedicated 2 ML industrial water storage tank and pump system located at the southern end of the stockyard provides a source of industrial and fire water to the entire site.
- A dedicated 1 ML industrial water storage tank and pump system located at the train unloading facilities to provide a source of moisture addition and dust suppression water to three unloading sheds.
- A Flocculent plant located near the ID to treat stormwater inflows entering the ID to further improve the coal fines sedimentation and recovery process.

2.3 Contractual Framework

2.3.1 Requirement for a Master Plan

The Port Services Agreement (PSA) requires DBCT Management (DBCTM) to submit a Master Plan to DBCT Holdings addressing any changes in circumstances, demand, technology or other relevant matters, no later than 31 March each year. Due to the uncertain timing of demand to trigger terminal expansion, there can be long periods where no expansion activity is required. DBCTM has therefore requested an amendment to the PSA to allow it to only submit a master plan, where DBCTM determines that (acting reasonably):

i. substantive changes are required to be made to the Master Plan; or

ii. the current Master Plan has been developed to its ultimate extent.

The Master Plan has been drafted to:

i. ensure that DBCT is developed in accordance with Access Seeker applications for terminal capacity, infrastructure planning best practice, principles of environmental sustainability, applicable laws and the balanced interests of its stakeholders;

ii. ensure the PSA requirement for any expansion to be both economic and reasonable is satisfied, noting also the need to have regard to environment laws and the principles of environmental sustainability;

iii. ensure a responsible alignment of supply chain partner infrastructure based on a supply chain “cargo assembly/hybrid” methodology;

iv. ensure compliance with contractual commitments and statutory obligations for master planning which meet the requirements of the PSA;

v. ensure a continued ‘leading practice’ approach to port/terminal planning within the coastal zone, particularly within the GBRWHA.

This Master Plan presents three incremental terminal expansions to accommodate uncertain future demand. These 3 expansions are designed to be developed sequentially. The industry practice of using Front End Loading (FEL) engineering to assess the various levels of feasibility has been employed in the engineering studies that underpin this plan. Only the first expansion step outlined in this Master Plan (Zone 4) has been studied to a level of certainty that is commonly referred to as FEL3 or a Feasibility Study level. It is anticipated that the Zone 4 expansion would provide a further 4.1 Mtpa of terminal capacity above the existing 85 Mtpa terminal capacity.

FEL1 studies (concept only) have also been undertaken for the other 2 incremental expansions 8X and 9X. Pre-feasibility and Feasibility work will ultimately be required to better understand these expansions.

The second stage in the expansion pathway (8X) involves terminal inloading upgrades, yard machine upgrades, stockyard enhancements and outloading upgrades. This expansion is expected to add between 12 and 13 Mtpa above that of Zone 4, taking terminal capacity from 89.1 to around 102 Mtpa. 9X is the third stage of the expansion pathway. The 9X expansion would introduce a 2nd stockyard to supplement the existing DBCT stockyard. The new stockyard would likely be located on the western side of the existing terminal, subject to land availability.

2.3.2 Whole of System Master Planning

The Integrated Logistics Company (ILC) produces integrated, 10 year Master Plans (MP) for the Goonyella Coal Chain encompassing; All Mines in the Goonyella and Newlands System:

- The Below rail infrastructure and operating methods and principles.
- Dalrymple Bay Coal Terminal infrastructure and operating methods.

- Hay Point Coal Services Terminal infrastructure and operating methods.
- Adani Abbot Point Terminal and operating methods.
- Port Channel and vessel movement practices.

To prevent misalignment of infrastructure development, the ILC Master Plans (MP) seeks to align future supply chain infrastructure expansions across all asset owners and operators by:

i. the development of a common set of inputs and assumptions for the determination of system capacity
ii. the development and maintenance of an integrated full system simulation model, which is used as a tool to assess system capacity and evaluate future capacity requirements, and
iii. aligning and assessing alternative infrastructure expansion options in the Dalrymple Bay Coal Chain

The development and implementation of the ILC's MP was part of a longer term solution to the address the historical underperformance of the Goonyella supply chain.

To ensure planning alignment within the Goonyella Coal Chain, DBCTM uses the ILC System Capacity Model for its capacity planning purposes. DBCTM has engaged the ILC Master Planning group to model the existing system in addition to various expansion scenarios to quantify capacity benefits and production losses during implementation. The modelling results have guided the development of this Master Plan.

The ILC's modelling establishes the pre-expansion system capacity as 83.8 Mtpa with the current terminal capacity at 85 Mtpa.

2.3.3 Contractual Position

Access to DBCT is contracted in accordance with the provisions of the Access Undertaking. The Standard Access Agreement (SAA) forms a part of the AU and underpins negotiations for contracting capacity at DBCT. In order to secure evergreen five year extension options, the Access Seeker is required to enter into a minimum 10 year Access Agreement. Within 12 months of the end of the initial term, the Access Holder has an option to nominate up to a five year extension for all or part of the contract tonnage. Because of this mechanism, the contract expiry profile can at times appear to be imminent and substantial. Historically the majority of expiring contracts have been extended prior to expiry of the extension option. Recently miners have shown a propensity towards reducing take or pay obligations, leading to some contracts not being extended and additional capacity being made available to Access Seekers.

The contractual volumes, as at February 2016 and March 2018, are shown in **Figure 8: Contractual Position February 2016 (DBCT Management, 2016)** and Figure 8 respectively.

2.3.4 Contractual Position February 2016

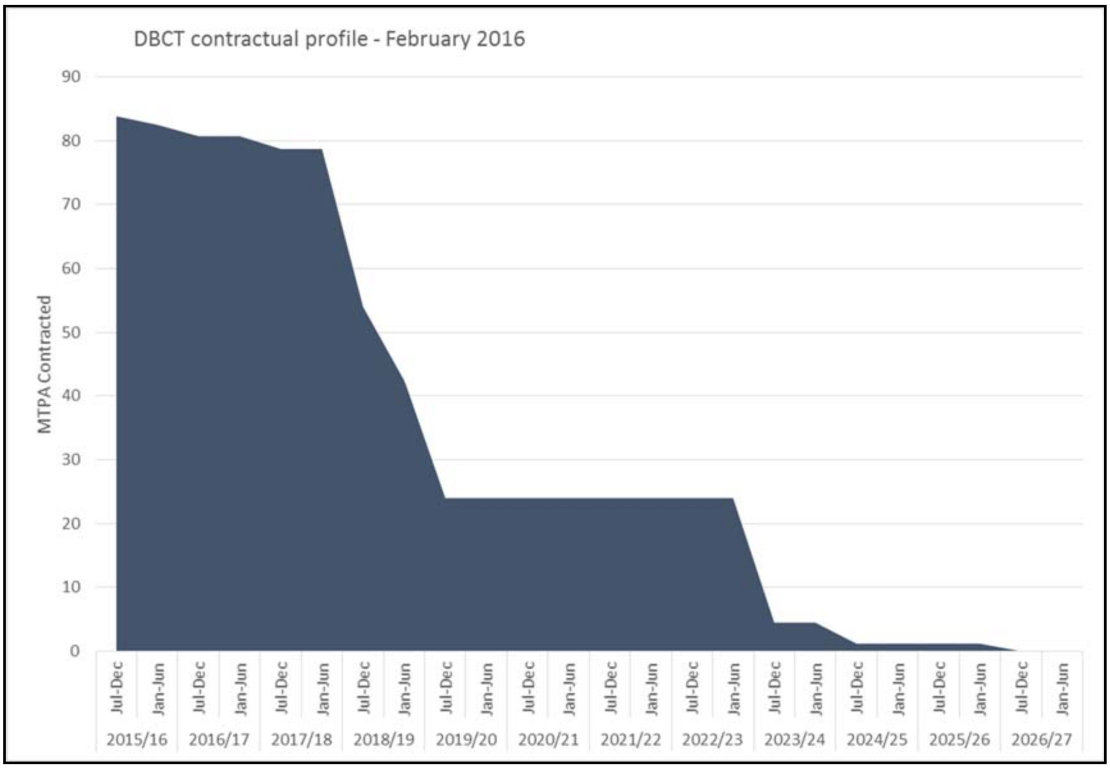

Figure 8: Contractual Position February 2016 (DBCT Management, 2016)

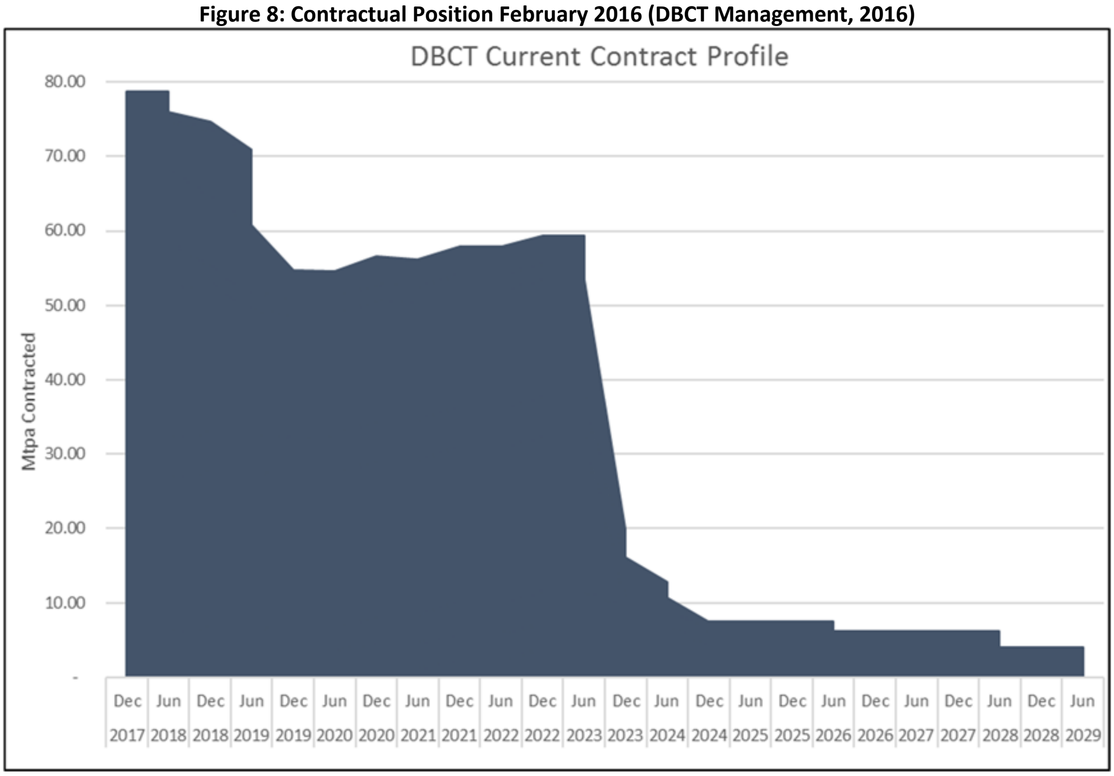

Figure 8: Contractual Position March 2018

2.4 Government Legislation

2.4.1 Government Legislation

In July 2011, the UNESCO World Heritage Committee requested the Australian Government undertake a comprehensive strategic assessment of the Great Barrier Reef World Heritage Area (GBRWHA) and develop a long-term plan for sustainable development that will protect the region's outstanding universal values. The assessment was completed by the Federal and Queensland Government and resulted in the development of the *Reef 2050 Long Term Sustainability Plan* ('*Reef 2050'*).

The Queensland Government has responsibility for protection of the State waters and is therefore committed to a number of *Reef 2050* initiatives relating to port development. In 2015 the Queensland Government introduced new legislation, the *Sustainable Ports Development Act (2015)* which sets out the blueprint for port planning and management for certain ports in Queensland. The act aligns with the Commonwealth and State Government commitments under *Reef 2050* developed in response to recommendations of the UNESCO World Heritage Committee.

This legislation outlines a number of initiatives including:

- identification of the Port of Abbot Point, Port of Gladstone, Ports of Hay Point & Mackay and the Port of Townsville as 'priority ports' which require formal 'Port Master Plans' to regulate development consistent with principles of 'ecologically sustainable development'
- introduction of statutory 'Port Overlays' to implement the master planning objectives
- protection of greenfield landside and marine areas through the prohibition of certain future development
- prohibition of certain capital dredging along the Queensland coastline, and
- prohibition of sea-based disposal of capital dredge material within the GBRWHA

Formal 'Port Master Plans' will be prepared by the State in consultation with port entities, relevant local governments and other state entities such as State Development and the Department of Environment & Heritage Protection.

DBCTM views this Terminal Master Plan as a critical input into the Long Term Development Plan being prepared by NQBP and subsequently into the formal State 'Port Master Planning' process, as shown in Queensland Planning ProcessFigure 9 .

Figure 9: Queensland Planning Process

2.4.2 Proposals for Land Use and Site Development

Under the *Transport Infrastructure Act 1994* (TIA), a Port Authority is required to develop and review a Land Use Plan to ensure the appropriate and sustainable development of strategic port land. As the Port Authority for the Port of Hay Point, NQBP has the responsibility of preparing and revising the Land Use Plan and administering all 'Assessment Manager' functions pursuant to the *Sustainable Planning Act, 2009* (SPA) for all assessable development on areas classified as 'Strategic Port Land' at the port.

The current Port of Hay Point Land Use Plan was approved in July 2010 and provides an overall framework for the appropriate regulation and management of the development of strategic port land. The Land Use Plan was prepared in accordance with the statutory provisions of the (TIA). It sets out NQBP's planning and development intents for its strategic port land at the Port of Hay Point, while giving careful consideration to core matters relevant to the local and regional area including environmental, economic and social sustainability.

As a point of reference, Figure 10 shows the current off-shore and on-shore areas defined as Strategic Port Land at the Port of Hay Point. Figure 11 shows DBCT more specifically.

It is anticipated that the existing LUP will be amended following (or concurrently with) the preparation of the formal State Port Master Plan under the *Sustainable Ports Development Act, 2015.*

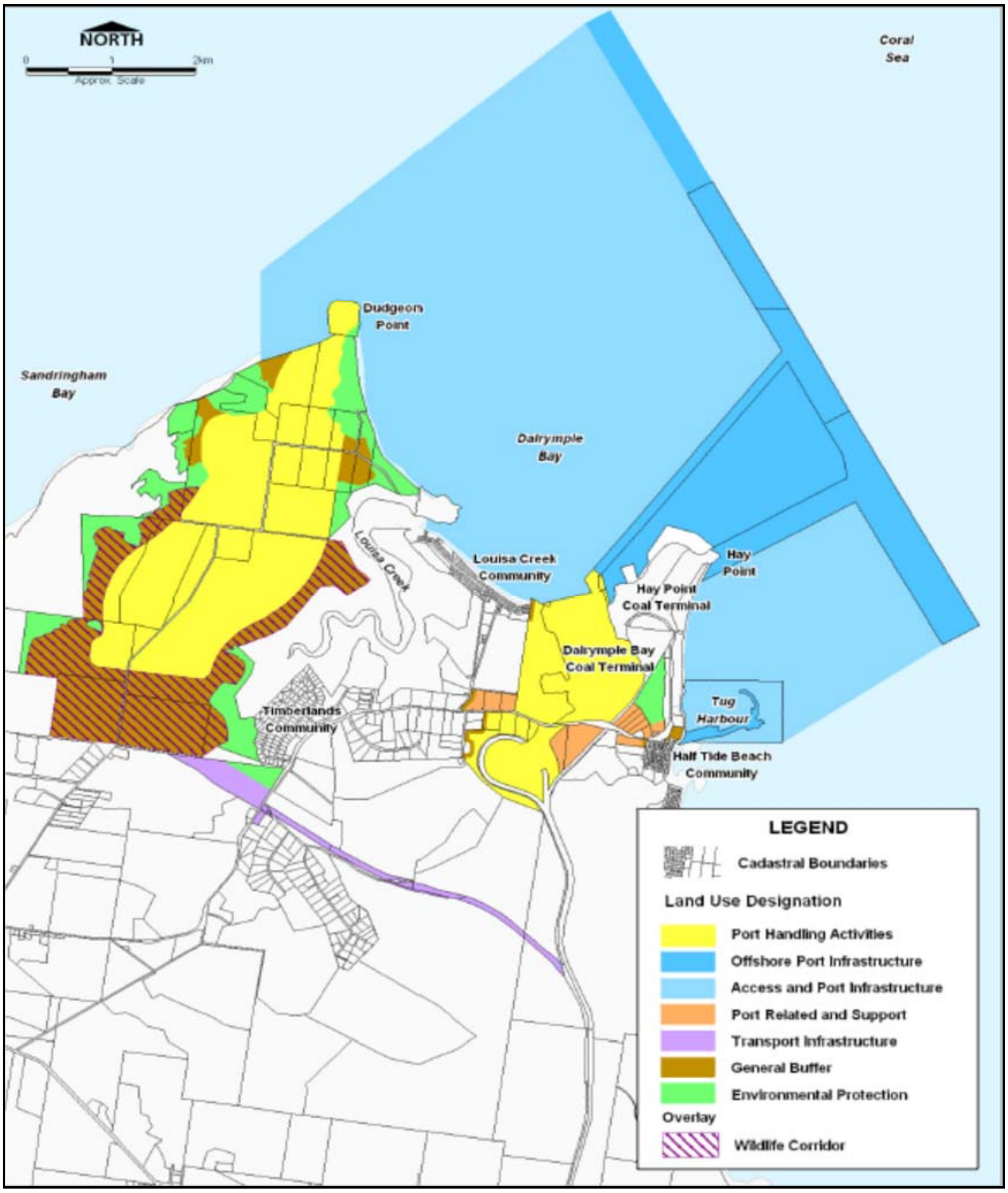

Figure 10: NQBP Strategic Port Land and Offshore Port Infrastructure Hay Point

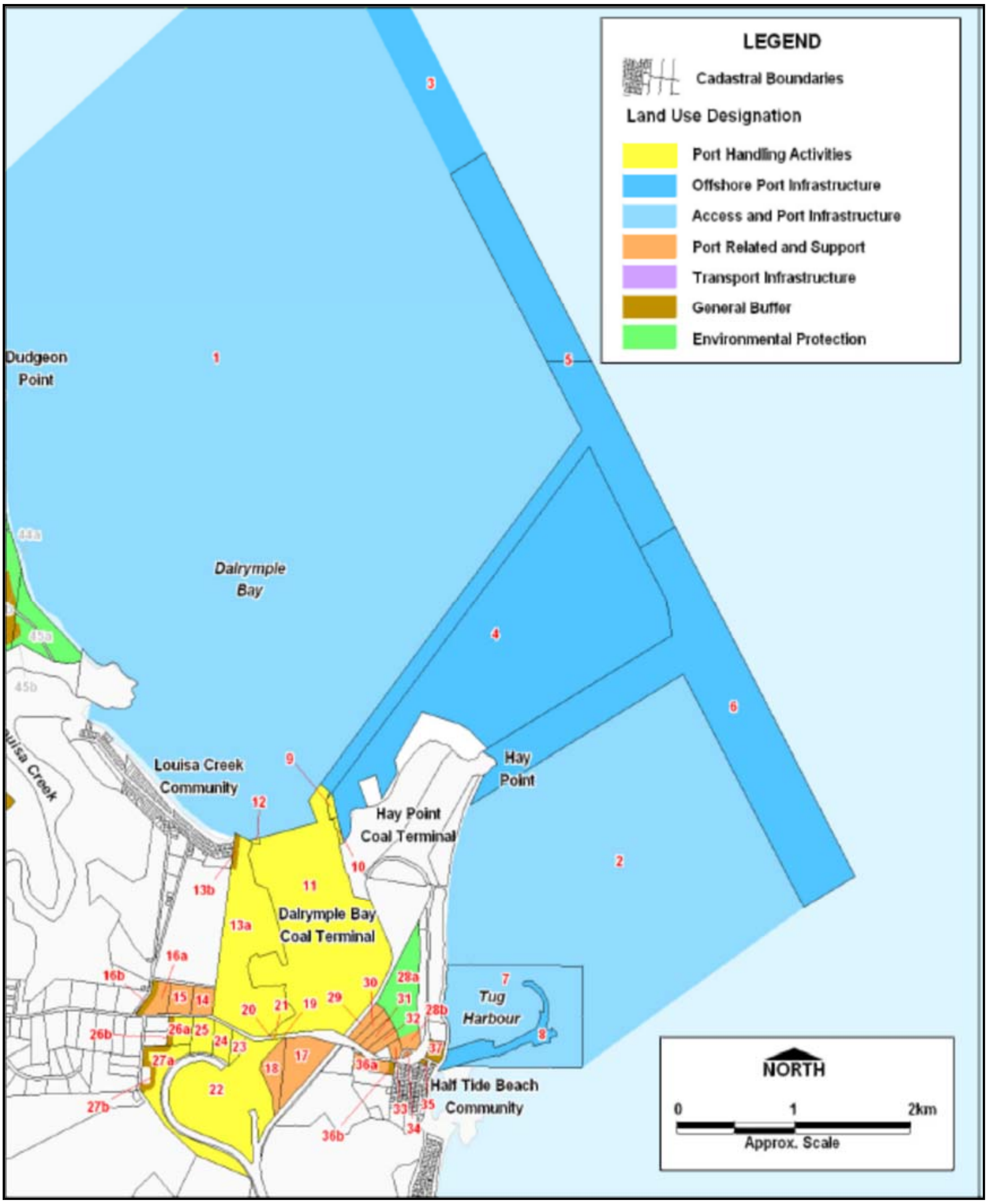

Figure 11: DBCT development on Strategic Port Land

Any future expansions of DBCT will need to be developed to meet the land use provisions of the 'Port of Hay Point Land Use Plan – Port Handling Activities Area and/or Offshore Port Infrastructure'. The land will be used for the purpose of loading, unloading and transport of commodities (bulk coal) to support the Central Queensland Coal Industry. Aspects of the preferred site development are contained in Chapters 5 and 6 of this Master Plan.

2.5 Access Regime

DBCT is declared for third party access under the Queensland Competition Authority Act 1997 (Qld) (QCA Act). An Access Undertaking (AU) details the terms and conditions (including the tariff that can be charged) under which third parties can access DBCT's services.

After the approval of the first AU (2006 AU), the existing Terminal User Agreements were replaced with a Standard Access Agreement (SAA). The SAA forms part of and is based on, the terms and conditions set out in the AU. The revenue cap approach and the risk profile proposed in the QCA's final decision, are reflected in subsequent approved AU's and SAA's as follows:

- The 2006 AU (including a new SAA) was approved on 15 June 2006 and backdated to 1 July 2004.
- The 2006 AU expired on 31 December 2010, and was replaced with the 2010 AU agreed with stakeholders and approved by the QCA in 2010.
- The 2010 AU expired on 30 June 2016, and was replaced with the 2017 AU which was approved by the QCA in February 2017 and backdated to 1 July 2016.

As required for the first time by the 2010 AU, DBCTM has moved away from the concept of contracting standalone terminal capacity, in favour of contracting only available system capacity[1]. In support of this principle, the terminal Master Plan is integrated with the System Master Plan, which is the framework for expansion of the System in the most logical and efficient way, determined collaboratively by all system participants.

2.5.1 Access Applications

Access Applications are a mechanism that provide the Access Seeker with an option to access DBCT capacity which may become available in the future. When capacity does become available, either due to expansion, an expiring contract, or a terminated contract, DBCTM must offer the capacity to the DBCT Access Queue (access queue). The access queue is formed when available capacity is not sufficient to satisfy the capacity requirements of one or more Access Seekers.

Capacity is offered and contracted in accordance with Section 5.4 of the DBCT Access Undertaking. The 2017 AU was the first to introduce a mechanism to remove an Access Seeker from the access queue where an offer of available capacity is declined by that Access Seeker. After receiving an Indicative Access Proposal and declining the offer of capacity, the Access Seeker's Access Application will be deemed to have lapsed and the Access Seeker will be removed from the queue. The intent of this mechanism is to ensure that an access queue doesn't exist at times when there is system capacity available for contracting.

If an access seeker does intend to contract the available capacity, the access seeker is required to sign an Access Agreement (AA). If an access seeker does execute an AA

[1] System Capacity is the maximum reasonably achievable capacity of the system, being the components of the Goonyella Coal Chain infrastructure relating to transport of coal from mines whose coal is handled by DBCT

to contract for access to DBCT, the access seeker's Access Application will be reduced by the tonnage specified in the schedule of the AA. The Access Seeker will retain its position in the access queue, assuming the remaining tonnage under the access application is greater than zero and there is not sufficient available capacity to service this remaining tonnage.

2.5.2 Expansion pricing under the 2017 Access Undertaking

The Port Services Agreement requires the principle of average pricing to prevail for expansions of DBCT. It requires DBCTM to seek to have future Access Undertakings maintain Common User Charges (socialised pricing). In 2013, the QCA released a paper on Capacity Expansion and Access Pricing for Rail and Ports. In that paper, the QCA identified "key propositions based on economic efficiency, fairness and governance principles which constituted an averaging down/incremental up approach to expansion pricing".[2] The QCA required DBCTM to incorporate these principles in the 2017 AU.

With respect to expansion pricing, the 2017 AU includes the following[3]:

- Where Socialisation of a Terminal Capacity Expansion would decrease the Reference Tariff for users of the Existing Terminal, the Terminal Capacity Expansion should be treated as forming part of the Existing Terminal, such that a single Reference Tariff and Annual Revenue Requirement shall apply to the Existing Terminal (including the Terminal Capacity Expansion) (a Socialised Expansion).
- Where Socialisation of a Terminal Capacity Expansion would increase the Reference Tariff for users of the Existing Terminal (a Cost Sensitive Expansion), subject to Section 11.13(c), the Terminal Capacity Expansion should be treated as a separate Terminal Component, with its own Regulated Asset Base, Reference Tariff and Annual Revenue Requirement (a Differentiated Expansion Component).
- A Cost Sensitive Expansion may be treated as forming part of the Existing Terminal (and therefore, not treated as a Differentiated Expansion Component) where circumstances exist that justify Socialisation. In determining whether there are circumstances that warrant Socialisation, consideration shall be given to:
    1. the materiality of the increase in the Existing Terminal's Reference Tariff that would be affected by socialising the Cost Sensitive Expansion
    2. the extent to which assets or infrastructure the subject of the Cost Sensitive Expansion will operate wholly or partly, in an integrated way with the Existing Terminal or as a stand-alone development
    3. the extent to which the Cost Sensitive Expansion is likely to benefit users of the Existing Terminal (for example, such as through higher efficiency, reliability or flexibility of the Existing Terminal)

[2] QCA, Capacity Expansion and Access Pricing for Rail and Ports April 2013 p. iv

[3] Dalrymple Bay Coal Terminal Access Undertaking

4. any differences in the risks of providing Access to users of the Existing Terminal in respect of additional Terminal Capacity created by the Cost Sensitive Expansion, and
5. any other factor that the QCA considers relevant

The introduction of differential pricing will potentially have an impact on the viability of further expansions of DBCT. This issue is addressed in greater detail in Chapter 5.

2.5.3 Expansion timing under the 2017 Access Undertaking

The 2017 Access Undertaking introduced for the first time a detailed definition of Front End Loaded engineering (FEL) studies. This definition is more onerous than what is widely accepted within the industry thus requiring a greater level of detail than would normally be undertaken. The Access Undertaking also introduced constraints around the funding of feasibility studies. Coupled with the delays associated with determination of expansion pricing, the net effect is that the current Access Undertaking introduces material delay to future expansions which did not exist in prior Undertakings. This actual impact is addressed in more detail in Chapter 5.

3 Current Operations

3.1 Mode of Operation

Bulk supply chains can be operated in a variety of configurations, however Australian coal terminals generally operate under one of three methodologies:

- cargo assembly
- dedicated stockpiling
- hybrid (a combination of dedicated stockpiling and cargo assembly)

The decision to choose one operating mode over the other will likely result from the number of discrete products which need to be accommodated and the available space for stockpiling the various coal products.

A dedicated stockpile port allows terminal users to stockpile large amounts of product at the port without:

- a vessel necessarily being waiting at the terminal load that product
- a vessel being in transit to the loading terminal

In a dedicated stockpiling export terminal, the miner will typically produce the coal and then rail that coal to the export terminal for loading when the next train is available. This in turn should lead to a predictable railing schedule and greater visibility as to when train services will be required. Track infrastructure in a dedicated stockpile operation is designed to suit the regular and consistent mix of trains required to meet contractual obligations. The receiving vessel arrives at the port to load the coal from a dedicated stockpile, as do subsequent vessels chartered to load the same coal product. The railing system replenishes the stockyard by railing product evenly from the mine to the export terminal.

Because of the irregular demand pattern for an individual product and DBCT's available storage space in the stockyard, it is impossible to maintain dedicated stockpiles for all products handled by DBCT. DBCT has evolved to operate under a cargo assembly logistics methodology. Unlike a dedicated stockpiling operation, a cargo assembly operation requires railings of products to meet the arrival of the vessel. In the DBCT cargo assembly operation, a vessel typically arrives and once all parcels to be loaded on the vessel are produced and available for railing, the above rail operators bring the coal to the terminal where it is assembled in a space allocated to the parcel in the DBCT stockyard. Railings to complete the vessel are subject to the availability of the mine load-out, DBCT stockyard space, above rail assets and below rail pathing

Under cargo assembly, the stockpile for each individual vessel and each parcel on that vessel needs to be separated from the other cargoes in the stockyard. This separation avoids product contamination between distinct parcels and cargoes. The space between individual products is unable to be utilised. To reduce stockpile separation and the resulting unutilised space in the stockyard, particularly when the same product is required for multiple vessels, limited dedicated stockpiling (hybrid) was introduced for high volume products. The hybrid operating methodology is covered later in this chapter.

3.1.1 DBCT Dedicated Stockpiling Option

Dedicated stockpiling in the existing DBCT footprint is not a viable option for the following reasons:

- The additional land required to support dedicated stockpiling would consume all current expansion options for DBCT, yet still provide less than 85 Mtpa of terminal capacity.
- The capital cost of such additional stockyard space would need to include new bunds and additional yard machines.
- Current Access Holders would have to bear the full cost of the current operation and the terminal expansion required to create dedicated stockpiles to service less than 85 Mtpa.

3.1.2 Hybrid

Recognising the improved stockyard space utilisation of a dedicated stockpiling operation and the storage efficiency of a pure cargo assembly model, the supply chain identified an opportunity to implement a combination of both operating modes to best utilise supply chain assets.

The hybrid operating mode was designed with two objectives in mind:

1. Pre-railing for selected parcel builds where efficiencies can be gained across the various assets of the supply chain.
2. Multiple parcel builds using the same stockpile space to improve the efficiency of the terminal stockyard.

By better utilising the space required to build cargoes for high volume products with the same coal characteristics, the supply chain can make better use of the available DBCT stockyard space. Pre-railing allows for a more even drawdown of cargo across the supply chain, therefore allowing a more efficient and effective use of all supply chain assets. In recognition of these potential benefits, involved stakeholders implemented a hybrid operating mode for the DBCT supply chain.

Under the hybrid operating mode, the supply chain planners look at upcoming demand and identify opportunities where the same product is required for multiple near-spaced vessels. Under cargo assembly, the stockyard planners would ordinarily plan to stack the cargoes for two vessels into distinct separated stockpiles. Under the hybrid system, the stockyard planners have the ability to plan for the same product (required for two or more vessels) to be stacked into a single stockpile. This removes:

- the need for the stockpile separation between similar products for multiple vessels
- the amount of time the stockpile footprint is allocated but unutilised while the terminal waits for train deliveries to fill that allocated space
- the need for a remnant space for that product. If demand continues for long enough to justify the reallocation of the remnant space to the dynamic zone, a remnant may not be required for the hybrid product. The remnant stockpile would only be replaced by a hybrid stockpile for as long as the hybrid stockpile is justified by continuous shipping demand.

The hybrid operating mode attempts to address the shortcomings of a pure cargo assembly operation and is intended to be used for at least two vessels, or a long succession of vessels. The supply chain only needs to consider the arrival of vessels requiring the same product soon after one another prior to building the hybrid stockpile. The duration of the existence of the hybrid stockpile is then only limited by the continuing, near-spaced shipping demand for that particular coal type.

Under both cargo assembly and the hybrid operating mode, the terminal operator needs a variety of vessels at its disposal in order to maximise berth utilisation. This may include vessels already waiting at the DBCT anchorage, or vessels which are on their way and soon to arrive. Should a mine be unable to produce coal for the next ship in the queue and where other vessels are available for loading, the terminal operator can promote another vessel. Utilising vessels further down the queue is preferential to foregoing the use of outloading capacity by allowing an unoccupied berth or an idle outloading system.

3.1.3 Remnant Management

To assist in vessel loading requirements, and without impacting the utilisation of the DBCT stockyard, the DBCT stockyard has been segregated into two distinct zones. Row seven and the half row eight are used for the exclusive purpose of managing remnant coal, this area is known as the 'static zone'. Each Access Holder is allocated a portion of the total volume of the static zone in accordance with its share of Aggregate Annual Contract Tonnage. The remaining six rows of the stockyard operate in full cargo assembly or hybrid mode, otherwise known as the 'dynamic zone'.

This vessel assembly strategy sees two cargo assembly or hybrid stockpiles allocated to each parcel in the dynamic stockyard zones (coloured blue in Figure 7: DBCT static and dynamic zones on page 17). The dynamic zone will ideally comprise one less than the total number of trains required to complete the parcel or cargo. Any remaining coal from the final train not required to complete the parcel or cargo will be stacked into the Access Holder's remnant stockpile.

If the Access Holder has suitable coal in its allocated remnant area, the amount of coal railed should ideally be less than the required parcel or cargo. The balance of the parcel is 'topped' up from the Access Holder's remnant stockpile. If there is insufficient coal in the remnant area to complete the vessel, the remainder of the coal in the last train used to complete the parcel will be stacked into the Access Holder's remnant area.

Each Access Holder is responsible for managing the quantity and quality of remnant coal in its dedicated area, including separation requirements for different products.

3.2 Operations

3.2.1 Service Provision

Terminal capacity is calculated considering historical service provision and shipping mix (the capacity model accounts for the impact of differing service requirements). However, if future service requirements evolve beyond the current demands, the rated terminal capacity could be adversely impacted. Any detrimental impact of terminal service demands can also impact the upstream coal chain, causing individual supply chain assets to operate below their rated capacity, in turn compromising the overall system capacity.

Because of product diversification catering for specific end-user preferences, DBCT is required to meet varying service requirements as is the case with all terminals servicing the Bowen Basin. Different coal types present different handling characteristics, requiring a variety of handling strategies to ensure the product can be handled by the terminal without compromising the coal quality. Reduction of normal equipment rates to cater for these individual products can impose a performance impact on terminal capacity.

Producers pay a common tariff per tonne of coal shipped, however different handling requirements will impact the terminal's performance (e.g. sticky coal, blending, dusty coal, wet coal). Some of these coal types and product blends consume more terminal capacity than others. The handling characteristics of individual coal types may also impact performance of the assets upstream of DBCT.

3.2.2 Vessel Trends

DBCT can load coal onto vessels ranging from 40,000 Dwt tonnes in size, up to approximately 220,000 Dwt. DBCT is primarily exposed to four classes of vessels: Large Cape Size (140,000-220,000 Dwt), Capes (100,000-140,000 Dwt), Panamax and Japmax (65,000-100,000 dwt) and Handimax (40,000-65,000 Dwt). Due to limited deballasting capability in small vessels, loading times are not proportionate to the size of the vessel as demonstrated in table 3, which outlines the comparative load rates by vessels loaded at DBCT in the 2016 and 2017 calendar years. The load rates show a clear bias towards fast loading performance into the larger vessels.

Vessel Type	Avg load rate (tph)	Avg load time	% of total vessels	# of vessels
VLC	4813	30.72	38%	502
Cape	4818	22.29	5%	67
Japmax	4831	16.78	37%	491
Panamax	4218	16.25	14%	179
Handimax	3359	13.85	6%	75

Table 3: DBCT ship arrivals 1 Jan 2016 – 31 December 2017

DBCT's outloading capability has been enhanced in the current decade by the industry trend towards larger vessels. Larger, newer vessels offer economies of scale and efficiency advantages to the charterer, while generally offering better deballasting performance for the loading terminal.

DBCT's average vessel size surpassed 100,000 Dwt in 2010 and has remained stable in subsequent years. Despite this consistent trend towards larger vessels, the arriving vessel mix can change from month to month in response to freight rate volatility. DBCTM must continually assess its terminal capacity assumptions using the latest vessel arrival size distribution data. Despite the month to month variations in freight rates for the various vessel classes, DBCT has consistently loaded vessels for days and weeks at rates well above the 85 Mtpa nameplate capacity.

3.2.3 Mine Load Points and Recharge Capability

The performance of individual train loading infrastructure at the various mines also contributes to overall system capacity. The capability of mine load-out infrastructure must be able to support the hybrid and cargo assembly requirements of the downstream supply chain assets. If the individual train load out capabilities do not allow for a hybrid/cargo assembly build rate of 85 Mtpa, the total system capacity is likely to be compromised. This occurs because delays in an under-performing mine load-out impact cargo build rates at the terminal.

Mine loadout performance in the DBCT coal chain is variable, with a combination of high performance and legacy mine loadouts in operation. Downstream supply chain infrastructure assets and operating strategies have necessarily been built to accommodate this wide variance in train load-out performance. Nevertheless, Access Seekers must demonstrate that proposed mine load out facilities and haulage arrangements will not degrade system capacity before contracting for access to DBCT. This assessment is undertaken in consultation with the ILC using the system capacity model.

4 Supply/Demand Expectations

The Port Services Agreement requires DBCTM to:

- assess the current and future needs of Producers for services and facilities, and
- provide projections for the demand for services at DBCT

4.1 Throughput Growth

DBCT's highest throughput in a financial year was 71.5 Million tonnes in 2014/15. While a gap still exists between DBCT's best 'year' of throughput, current throughput (approx. 70 Mtpa) and terminal capacity (85 Mtpa), this has generally resulted from sub-85 Mtpa levels of demand. While it is difficult to assess current mine capability, it is assumed that the take or pay nature of the DBCT Access Agreements have incentivised DBCT Users to contract port capacity sufficient to meet mine production, traditionally with some extra capacity contracted to provide logistical flexibility.

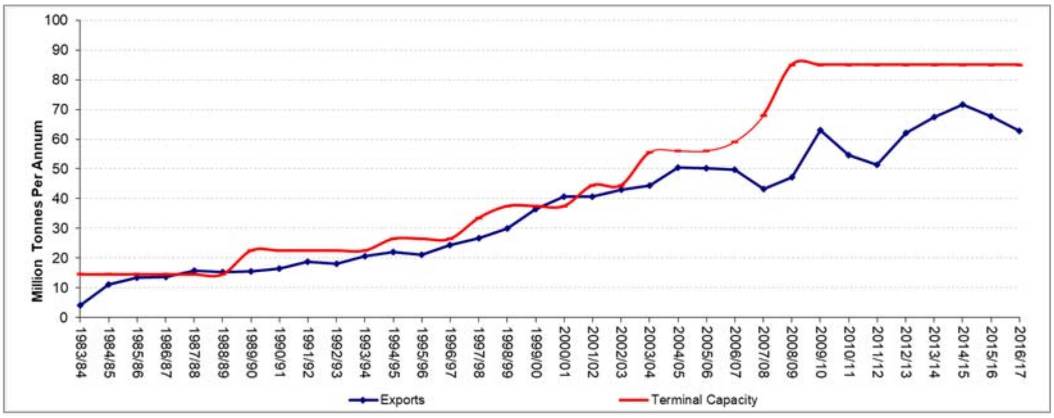

Figure 12: DBCT throughput and capacity growth history (DBCT Management, 2016)

In the depressed coal markets prior to late 2016, and with costs clearly under focus, miners undertook to relinquish any unnecessary take or pay obligations, particularly terminal capacity. There has been interest in some of this relinquished capacity from a combination of smaller brownfield and greenfield mine developers.

Unlike the previous "mining boom", DBCTM expects the next wave of coal mine development to occur in a much more measured and controlled fashion. It is also likely that spare capacity at other ports will be more attractive than expansion capacity at DBCT. This will occur because existing spare capacity will likely be available sooner than expansion capacity at DBCT and carries no approval, timing, or execution risks.

4.2 Metallurgical Coal History

DBCT's predominant export product is metallurgical coal (PCI and coking), accounting for approximately 84% of total throughput. DBCTM's master planning is primarily focused on the metallurgical coal demand and development, as this is the dominant resource within DBCT's catchment area.

Metallurgical coal is primarily used for steelmaking, with integrated steel mills requiring between 0.7 and 0.9 tonnes of metallurgical coal to produce one tonne of steel. Metallurgical coal prices trended down over most of the 1990's, but began to rise in 2001 before spiking in 2007 and 2008. Prices spiked again in 2011 as flooding reduced Queensland export volumes by approximately 13%. The price then began a gradual fall following the flooding event, culminating in a low contract price of US$81/mt FOB in the January 2016 quarter. Following government mandated rationalisation of Chinese coal production in 2016, coinciding with mine specific issues in Queensland and New South Wales, the spot HCC price again surpassed US$200/t FOB.4

More recently, tropical cyclone Debbie (TC Debbie) halted exports from the Central Queensland Coal Network (CQCN) for three weeks after crossing land in March 2017. In addition to a three-week interruption to railings to Hay Point and multi-week delays to railings in the Blackwater and Newlands coal networks, TC Debbie had long-lasting impacts on the DBCT supply chain for much of 2017. Spot prices spiked above US$300/mt following TC Debbie but have since returned to near $US200/t. The spot price has sustained at well above US$200/t for the first three months of 2018. This pricing history is shown in Figure 13 below.

A key change occurred in seaborne hard coking coal (HCC) markets immediately following TC Debbie, reportedly in response to the price volatility that resulted. After decades of resistance to index-linked pricing, Japanese coal end-users finally accepted a move away from negotiated contract pricing. A new mechanism was agreed between buyer and seller which was linked to key daily spot pricing indices. The new index linked quarterly pricing mechanism utilises the daily average prime HCC spot price from three major coal indices (Argus, Platts and TSI). The daily average HCC price from the three indices for the preceding three months are then used to calculate the current quarter's contract price. DBCTM is uncertain what impact this change might have on long term volatility in pricing and demand patterns. [5]

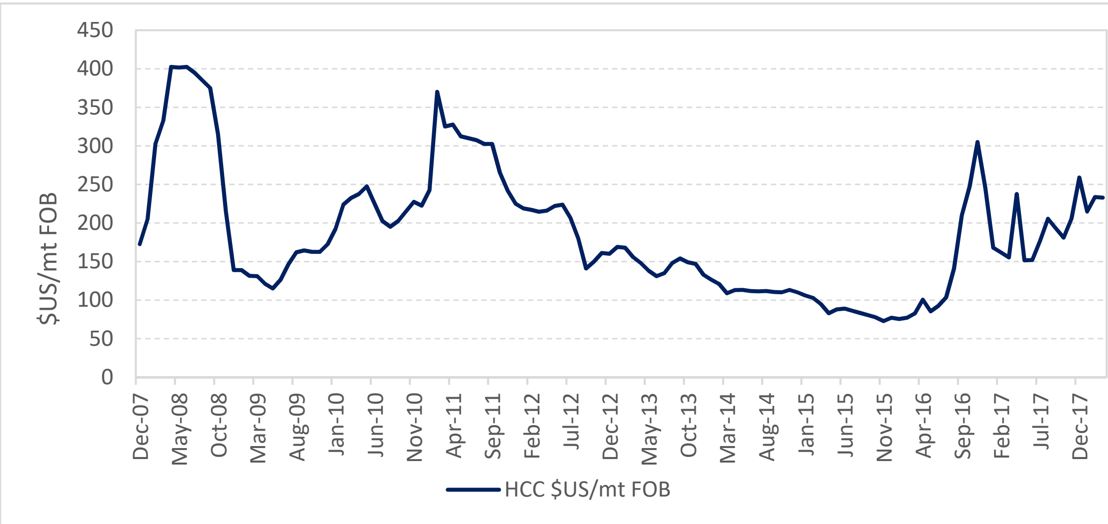

Figure 13: Spot FOB Newcastle Thermal and QLD met coal price history (Platts CTI & IHS, 2007-2018)

[4] Platts CTI and IHS Inside Coal

[5] Argus website (http://www.argusmedia.com/news/article/?id=1477863)

China is the world's largest consumer and producer of metallurgical coal. Australia and the US are the world’s other major producers, while Japan, India and Russia are the world’s other major coal consumers. Global metallurgical coal production is estimated at about 1,045 million tonnes per annum. Seaborne metallurgical coal trade was approximately 314 Mt in 2016 with the remainder of metallurgical coal supply coming from domestic production and imports over land.[9]

Australia is the dominant metallurgical coal exporter, holding 60% of the market, followed by the US which exported approximately 11% of global seaborne coal in 2016. Approximately 80% of Australia’s exports go to Asian markets, although Australian producers also ship significant volumes to Europe. Imports are much less concentrated than exports, however the Far East (combined) takes just less than half of global volumes, with China alone accounting for about 19% of the metallurgical coal exported in the seaborne market

China’s investment-led growth strategy saw its economy boom during the 2000s, driving up consumption of many raw commodities, particularly metallurgical coal and iron ore. From 2000 to 2013, the urban population in China grew by an average 20 million people per annum. This urbanisation process required massive volumes of steel to meet demand from infrastructure and building projects. Over the same period, Chinese steel production grew by an average of 50 Million tonnes annually, increasing from 129 Mt to 823 Mt, (representing 7 times the steelmaking capacity of the U.S). The boom in Chinese steel production coincided with a substantial expansion in Chinese domestic metallurgical coal production. Ultimately China needed to supplement domestic supply with imports, taking 126 Mt of coal in 2009.

Much of this growth in demand was met by North American and Australian production. Incentivised by the growth in the seaborne price, miners worked hard to rapidly expand production. This campaign to meet growing seaborne metallurgical coal demand resulted in substantial increases in the cash cost of coal production as miners sought to export the tonnes at any cost. The miners accepted this cash cost growth, expecting that the cost of production was likely to be lower than the sale price of coal. Many coal mining projects were commissioned and brought online around the world, lured by the expectation of continuing growth in Chinese demand.

Slowing Chinese economic growth after 2011, a corresponding drop in steel production and new coal mining capacity being brought online led to an oversupply of coal globally. Coal prices subsequently fell across the board between 2012 and 2016. Much of the supply in the US and Canadian markets was no longer profitable and was removed from the market, or was subject to some form of ownership restructuring. This oversupply situation culminated in US$81/t sale prices in the Jan-Mar quarter of 2016 Figure 13).

By September 2016, the Chinese government imposed 276 working day limits on all domestic coal mines to improve the profitability of China's coal mining industry. These working day limitations at coal mines occurred in the midst of the Chinese government executing its ambitious targets to rationalise Chinese coal and steelmaking production capacity. This rationalisation program was achieved through a variety of measures, including mine closures justified on the basis of safety concerns, consolidation of China's major mining companies and mandated shutdowns of small or illegal mining operations.

So far, this Chinese consolidation initiative has resulted in 473 Mtpa of coal mines (both thermal and metallurgical) leaving the market in 2016 and 2017, with a further 150 Mtpa of coal production to be closed in 2018. This has been a major contributor to the recent rebalancing of supply and demand in the global market. Due to the recently tightened supply situation, supply disruptions occurring in any metallurgical coal mining region have quickly resulted in seaborne coal price increases.

4.3 Supply

The supply of metallurgical coal into the seaborne market is currently dominated by four countries. In 2016, Australia held a 60% share of global exports, US based producers hold 11%, Canada holds 8% and Russia holds 7%. Queensland and Australian coal producers have a natural geographical advantage over many other metallurgical coal producers, which are generally located further away from DBCT's typical Asian buying regions.[9]

During the mid to late 2000s, in response to expected continuing high Chinese demand, global metallurgical coal production reached historically high levels through the introduction of new coal mines and capacity expansions at already operating mines. Since 2009, Australia has increased its exports by approximately 50 Mt.[9]

In response to subsequent falling coal prices between 2012 and 2016, many coal producers took the approach of reducing the unit cost of producing coal by maximising coal production rates. Increased production added extra coal supply to an already oversupplied market and depressed prices further. In the same period, focus shifted to achieving cost savings at coal mining operations to improve profitability and in some cases, survival. Cost savings were achieved in a number of ways, but the main focus areas were reducing the cost of labour and the exploration spend. DBCTM expects Australian producers to continue to benefit from cost reductions achieved in the downturn between 2012 and 2016.

During the recent downturn, many of the top tier coal producers in the US were forced to idle coal mines, or seek bankruptcy protection under Chapter 11 provisions. In response to a rebounding coal market, a number of these operations have since resumed production and re-joined the export market. US metallurgical coal exports increased 31% year on year in 2017, with almost half of all US metallurgical coal exports going to European ports. DBCTM expects that US coal suppliers will continue to provide swing capacity to the global seaborne markets.[9]

Mozambican coal production has also faced delays and extra costs to repair, upgrade and build coal transport infrastructure. The most advanced and significant coal mine (Moatize) and accompanying infrastructure project (Nacala) in Mozambique is majority owned by Vale. The Moatize mine exported 11.3 Mt of coal in 2017, 6.95 Mt of this was metallurgical coal.6 The Moatize mine project will export up to 18 Mtpa from Nacala Port at full capacity, utilising the Nacala Rail corridor for coal transportation. The Nacala rail corridor upgrade project secured financing in late 2017. This upgrade project will ultimately increase the Nacala rail corridor's coal export capacity to 22 Mtpa.7 Given its proximity to India and Europe, Mozambique's coal production has the potential to displace some demand for Australian metallurgical coals.

Although Mongolian miners have recently faced issues with cash flow and profitability, Mongolian coal developments have the potential to displace demand for Australian coal, particularly demand from Chinese importers. Mongolian miners exported approximately 18 Mt of coal in 2017, most of this was exported across the border to China. Infrastructure and border bottlenecks have recently constrained exports as Mongolian miners' ramped-up production in response to improved market conditions. Mongolian miners are still limited in their access to export markets other than China, meaning the sale price of Mongolian coal is usually well below the seaborne price.

After falling to US$81/t FOB in Q1 2016, HCC prices have been sustained above US$100/mt FOB since August/September 2016, and have been above US$200/t for the first quarter of 2018. These improved market conditions are likely the result of the recent rebalancing of supply and demand and seemingly consistent disruptions to supply around the world.8

Coinciding with sustained improving market conditions, DBCTM has observed an increase in interest for port capacity from a combination of greenfield and brownfield coal mine developers. This increased interest indicates that confidence in the market is returning and miners may be more willing to invest in coal mine developments in the Bowen Basin. Following years of cost cutting initiatives, combined with well-developed infrastructure and a natural proximity advantage to Asian import destinations, Australian miners are expected to maintain a substantial advantage over their global competitors.

Recent demand trends from DBCT's major coal import regions are shown in Figure 15.

4.3.1 Domestic Indian production growth

While India has abundant coal reserves and some of the lowest mining cash costs in the world, the coal reserves generally aren't in areas where the coal is consumed. Indian metallurgical coal also tends to be of lower quality and with higher impurities than Australian coals.

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[6] Vale Production & sales Q4 2017 (http://www.vale.com/EN/investors/information-market/Press-Releases/ReleaseDocuments/2017%204Q%20Production%20Report_i.pdf)

[7] African Development Bank – Nacala corridor resettlement (https://www.afdb.org/fileadmin/uploads/afdb/Documents/Environmental-and-Social-Assessments/Mozambique_-_NACALA_RAIL___PORT_PROJECT_-_Summary_RAP_%E2%80%93_10_2015.pdf)

[8] Platts Coal Trader International – Premium low vol. hard coking coal price (2007-2015). IHS Inside Coal – Australian prime hard coking coal (2015-2018)

India's seaborne demand will largely depend on the performance of its domestic coal industry. New coal mine developments have historically been subject to delays while waiting for land acquisition and the award of the mining lease. With only Bharat Coking Coal Limited current producing substantial quantities of metallurgical coal in India, combined with concerns about quality, Indian domestic metallurgical coal supplies are expected to increasingly struggle to keep pace with India's ambitious steel production expansion plans. Accordingly, DBCTM expects that India is likely to need to supplement its domestic metallurgical coal production with greater seaborne metallurgical coal or raw steel imports.

4.3.2 Chinese Domestic production

Chinese domestic producers accounted for 578 million tonnes of metallurgical coal supply in 2016.[9] Much of China's coal production prior to 2018 was reportedly running at a loss. These coal mines were supplying metallurgical coal to steel mills which were also struggling with profitability and low levels of utilisation. To combat this lack of profitability in domestic coal supply, the Chinese government imposed policies designed to protect Chinese coal producers from competition from imported coals in 2015.

The first of the key policies involved quality checks for trace elements, the second was a blanket tariff applied to imported coals which was subsequently removed. Both of these policies appear to have had little effect on longer term Australian coal exports to China. This is particularly true for coal exports from DBCT to China which were the highest on record in 2017 (15 Mt) (Figure 18).

The Chinese government subsequently mandated ambitious targets for rationalising unviable and unsafe domestic coal production. China's ambitious targets for coal and steel production rationalisation have largely been met or outperformed with 473 Mtpa of coal production being removed from the market in 2016 and 2017, with a further 150 Mtpa expected to be removed in 2018. Due to mandated reduction targets, development and investment in new Chinese coking coal mines has been limited and will be unable to offset the lost production capacity. This will likely lead to China increasingly entering the seaborne market to satisfy its coking coal needs.[10]

4.4 Drivers of demand

Global crude steel production grew from 1,343 million tonnes in 2008 to 1,691 million tonnes in 2017.11 DBCTM expects that India's infrastructure build program will continue to drive strong demand for DBCT's coal.

[9] Dept. of Industry, Innovation and Science (https://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/ResourcesandEnergyQuarterlyDecember2017/documents/Resources-and-Energy-Quarterly-December-2017.pdf)

[10] SXCoal website (http://www.sxcoal.com/news/4569671/info/en)

[11] World Steel Association Website (https://www.worldsteel.org/media-centre/press-releases/2018/World-crude-steel-output-increases-by-5.3--in-2017.htm)

China's expected growing dependence on seaborne coal will continue to drive healthy demand for coal exports from Queensland. Japan and South Korea's steel production is expected to remain stable, and not materially alter demand levels for Australian coal.

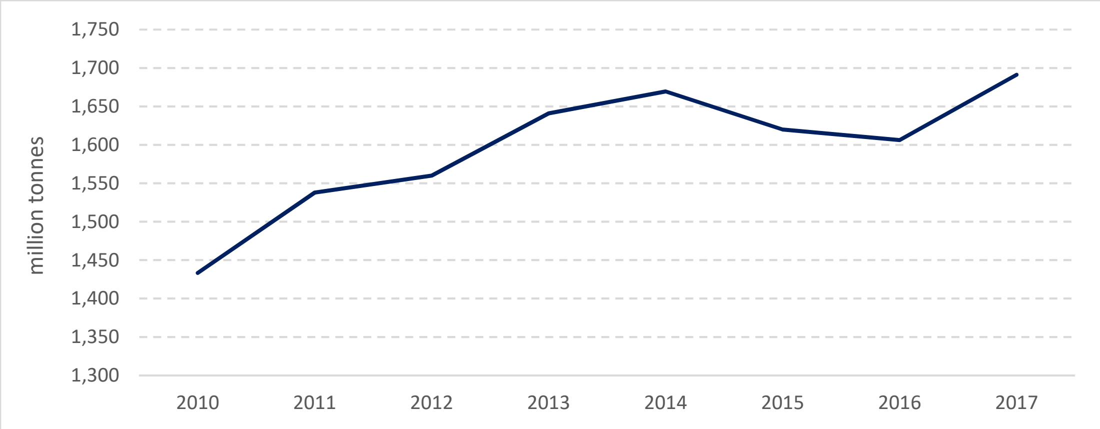

Figure 14: World crude steel production – World Steel Association, 2017

The comparatively mature economies of Japan, South Korea and Europe have well-developed steelmaking capacity, but are not endowed with substantial domestic metallurgical coal reserves. These economies experienced growth in their steelmaking industries well before the recent rise of China and India as steelmaking giants. South Korea and Japan experienced similar rapid growth in the early development phases of their economies, but have stabilised at approximately 70 Mtpa and 105 Mtpa of crude steel production respectively. Chinese and Indian steel production and coal demand has grown rapidly and is expected to eventually mature and stabilise like the Japanese and South Korean economies before them. It is uncertain when this stabilisation will occur and at what level of annual production this is likely to occur.12

Other factors such as increased usage of recycled steel, or technologies that replace traditional metallurgical coal and iron ore production processes, such as POSCO's FINEX technology may pose a risk to long term metallurgical coal demand.

[12] World Steel Association website (https://www.worldsteel.org/media-centre/press-releases/2018/World-crude-steel-output-increases-by-5.3--in-2017.html)

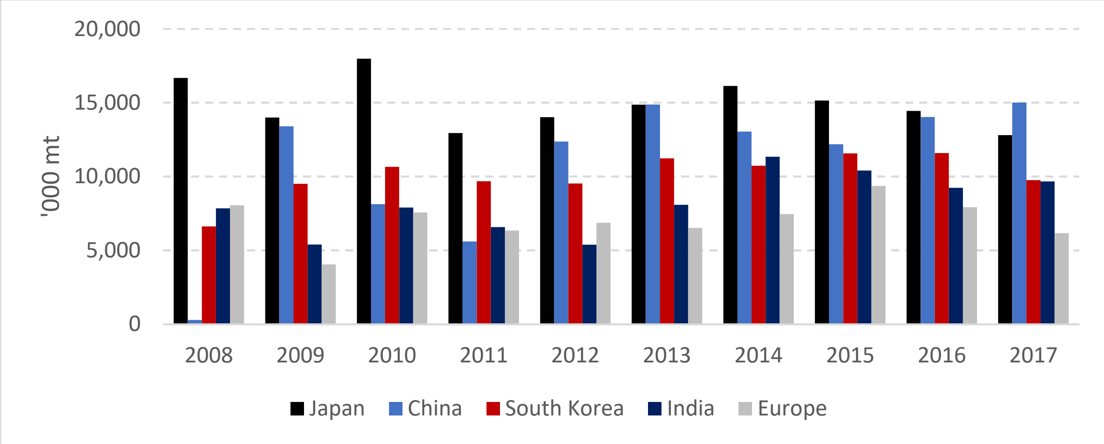

Figure 15: DBCT historical exports to key importing regions (DBCT Management, 2018)

4.4.1 India

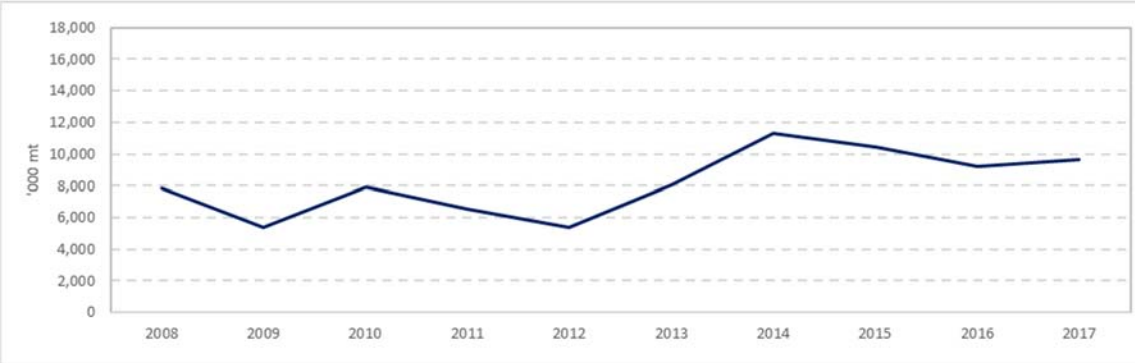

Figure 16: Indian imports from DBCT (DBCT Management, 2018)

Facing difficulties in obtaining supplies of high quality domestic coal production, India’s steel ministry wrote to the Indian government in early 2018 to request that tariffs on coking coal imports into India be removed. Despite the tariffs, Indian imports of metallurgical coal were 12% higher in 2017 (43.5 Mt) than 2016 (38.83 Mt), indicating that Indian demand for metallurgical coal is growing and that domestic metallurgical coal production cannot keep pace.13

India’s ambitions to increase domestic crude steel production from 100 Mtpa in 2017 to 300 Mtpa in 2025 is the most likely driver of seaborne met coal demand growth in the coming decade. India increased steel production by 6% in 2017, and for the first time surpassed 100 Million tonnes of crude steel production in a year.[14] A number of Indian steelmaking facilities are currently subject to expansion projects, however to reach the 300 Mtpa crude steel target by 2025, India will need to further streamline the approvals process for steel mill development.

[13] Dept. of Industry, Innovation and Science (https://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/ResourcesandEnergyQuarterlyDecember2017/documents/Resources-and-Energy-Quarterly-December-2017.pdf)

[14] World Steel Association website (https://www.worldsteel.org/media-centre/press-releases/2018/World-crude-steel-output-increases-by-5.3--in-2017.html)

With supply channels to India already well established between Queensland coal producers and various Indian customers, DBCT's exporters are well positioned to satisfy some of this Indian coal demand growth. DBCT has already seen significant growth to India as an export destination in the past decade, (Figure 16).

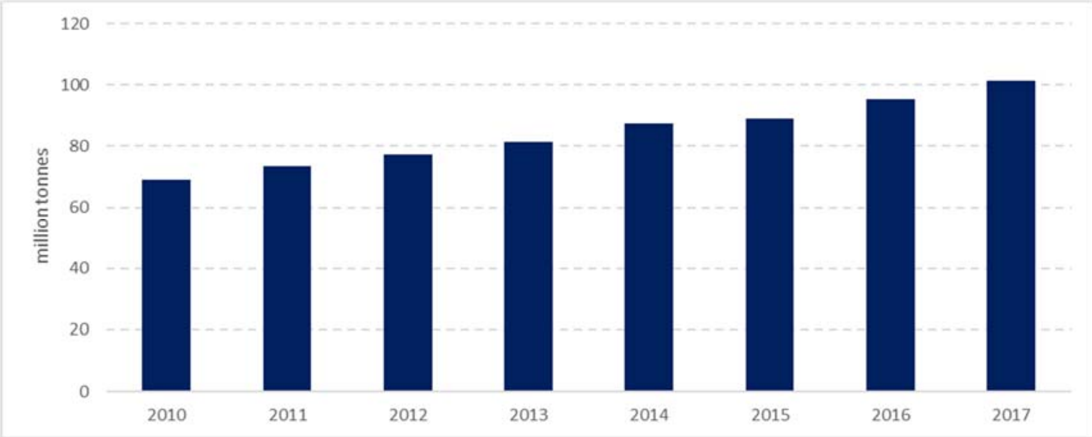

Figure 17: Indian crude steel production (World Steel Association, 2018)

4.4.2 China

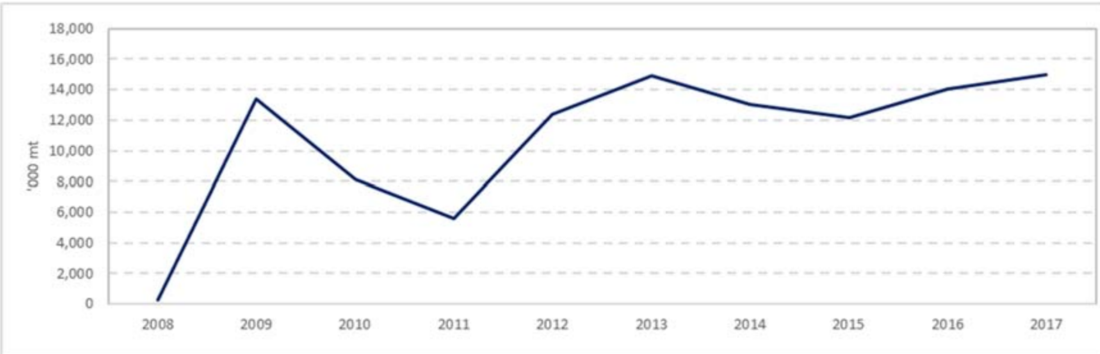

Figure 18: Chinese imports from DBCT (DBCT Management, 2018)

After entering the seaborne market as an importer in 2009, China's demand for metallurgical coal has grown and shrunk with the performance of its economy, steel producers and domestic metallurgical coal production. China's steelmakers are estimated to have imported 71 million tonnes of metallurgical coal in 2017.[15] Chinese steel producers recorded a decade or more of extraordinary crude steel production growth until 2014 (822 Mt), followed by a period of lower domestic consumption and growing crude steel exports in 2015 and 2016. Despite widespread capacity rationalisation in 2016 and 2017, Chinese crude steel production was the highest on record in 2017 (832 Mt).

[15] Dept. of Industry, Innovation and Science (https://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/ResourcesandEnergyQuarterlyDecember2017/documents/Resources-and-Energy-Quarterly-December-2017.pdf)

In addition to the reported removal of approximately 120 Mtpa of steel production capacity in 2016 and 2017, the Chinese government is targeting the reduction of another 30 Mtpa of steel production in 2018, bringing the three year total to approximately 150 Mtpa. The original mandate was for 100-150 Mtpa of steelmaking capacity to be removed between 2016 and 2020, meaning production cuts have been occurring in line with the targets set out in the 13th five year plan (2016). DBCTM expects this reduction in Chinese capacity to have a positive benefit on the global steel market and to improve steelmaking profitability in DBCT's other key export regions.[16]

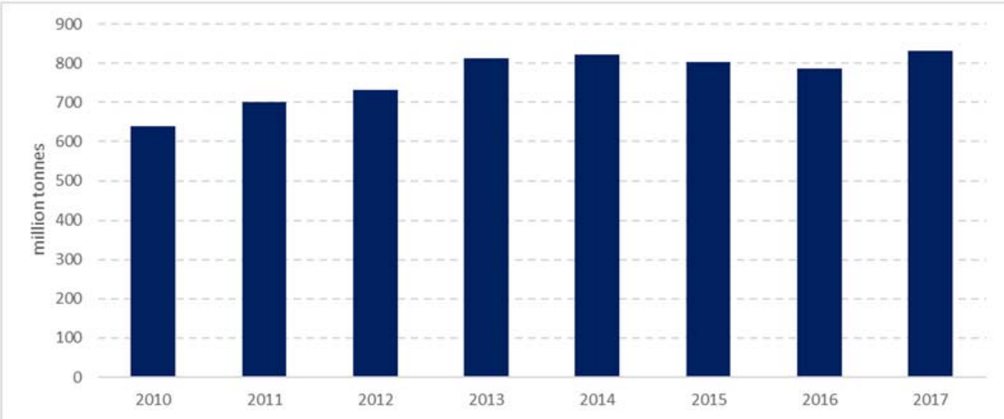

Figure 19: Chinese crude steel production (World Steel Association, 2018)

Despite Chinese steel exports reducing by approximately 31 percent between 2016 and 2017, anti-dumping measures have increasingly been applied in other steel-producing regions. These policies are designed to protect local industry against cheap Chinese steel imports. The US Government is attempting to implement trade tariffs on steel imports from a number of countries, including China. The EU had instituted similar tariffs on cheap Chinese steel imports in 2011 and these tariffs were extended for another five years in March 2018. These protectionist policies may become more prevalent in other regions with steelmaking industries in coming years, potentially reducing demand for Chinese steel exports.[17]

As can be seen in Figure 18, DBCT's exposure to Chinese imports has grown significantly over the past decade. Chinese buyers have typically only turned to imported coal when the price was lower than domestically delivered coal, meaning China's demand has been volatile and difficult to forecast. Chinese demand is uncertain, volatile and subject to a number of domestic policies, combined with the general outlook for the Chinese economy.

[16] SXCoal website (http://www.sxcoal.com/news/4569671/info/en)

[17] United States Trade Administration website (https://www.trade.gov/steel/countries/exports/china.asp)

4.4.3 South Korea and Japan

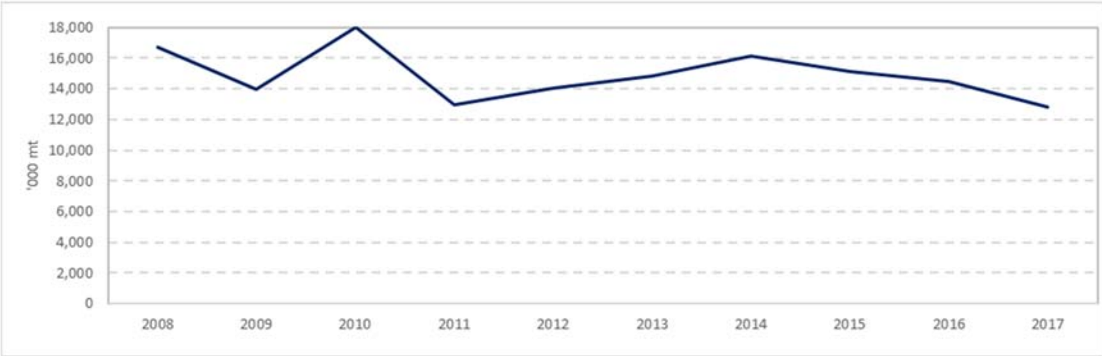

Figure 20: Japanese imports from DBCT (DBCT Management, 2018)

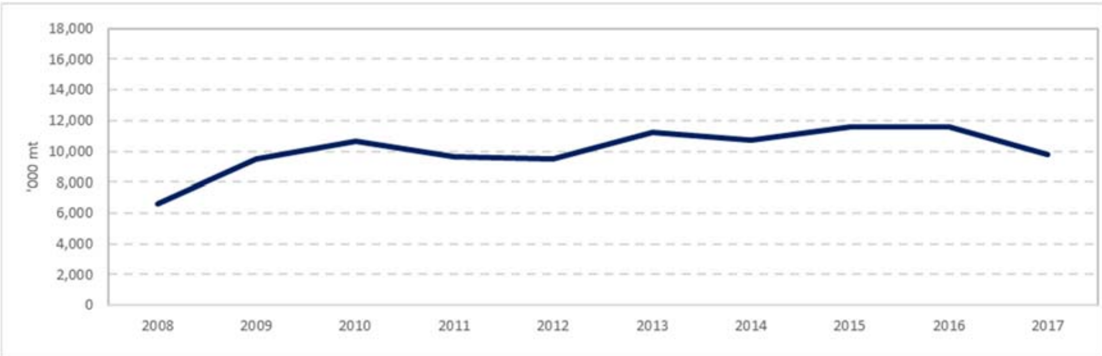

Figure 21: South Korean imports from DBCT (DBCT Management, 2018)

DBCTM views South Korea and Japan as stable destinations for DBCT's metallurgical coal exports. While these nations are not expected to provide material growth in metallurgical coal demand, these two regions are expected to continue taking a substantial percentage of DBCT's coal, as has been the case for at least the past ten years. Many of the mines that export through DBCT have varying levels of Japanese joint venture ownership, which is expected to continue the long-term sourcing of coal by Japanese buyers from these mines.

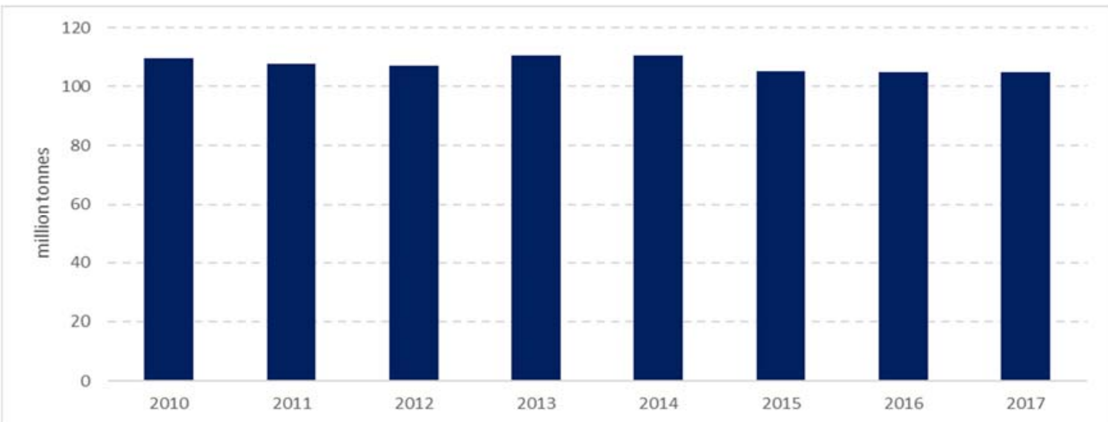

Figure 22: Japanese crude steel production (World Steel Association, 2018)

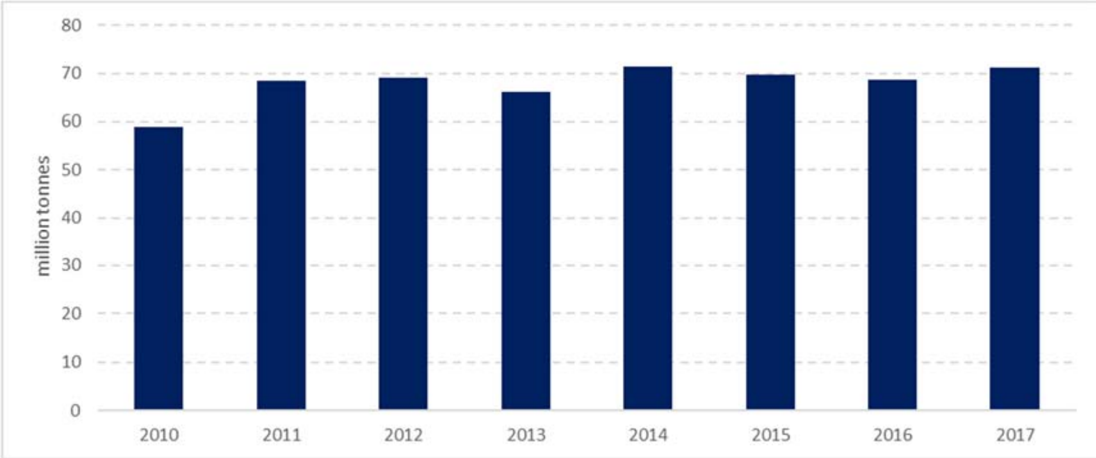

Figure 23: South Korean crude steel production (World Steel Association, 2018)

4.4.4 Europe

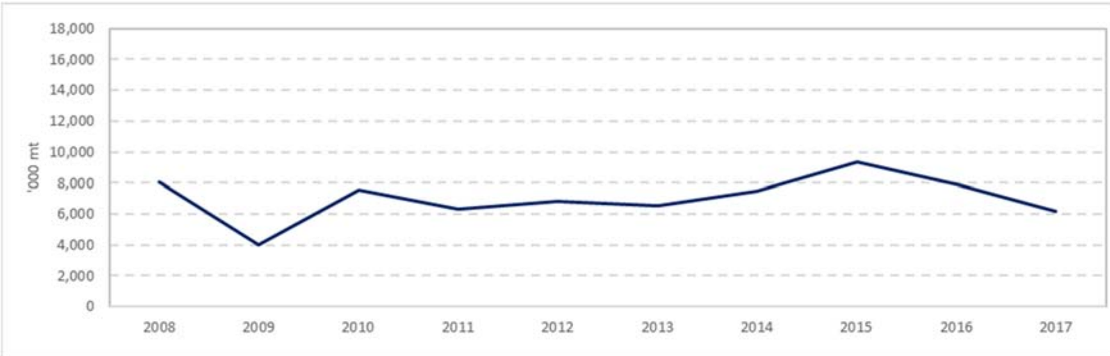

Figure 24: European imports from DBCT (DBCT Management, 2018)

There have been steelmaking facility closures in the past three to five years in some of DBCT's usual European export destinations, however these closures represent a small percentage of Europe's overall steelmaking capacity. Despite a reduction in crude steel output from 2012 to 2016, crude steel production from the EU has recovered to 168.7 Mt of output in 2017 (Figure 24).[18]

Historically low freight rates have likely been a factor in the increasing volumes of exports from DBCT to Europe over the past decade. Europe's appetite for DBCT coal will continue to be responsive to freight rate volatility and the exchange rates of various currencies against the US dollar. Both factors have the potential to impact the ability of DBCT exporters to maintain their recently established foothold in the European markets. Australian producers were able to displace US coal production into Europe as the coal markets deteriorated between 2012 and 2016. DBCTM is unsure if European buyers would increase imports from the US if the US dollar weakened, or freight rates rose.

[18] World Steel Association website (https://www.worldsteel.org/media-centre/press-releases/2018/World-crude-steel-output-increases-by-5.3--in-2017.html)

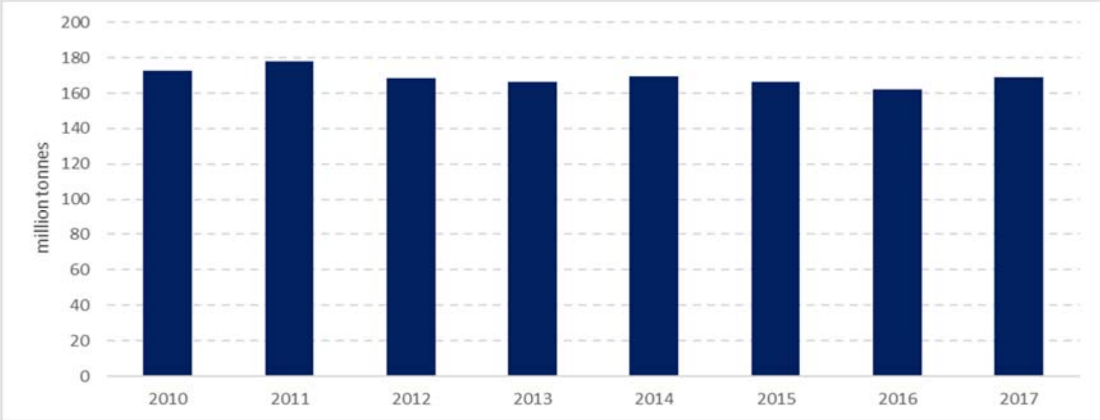

Figure 25: Eu-28 crude steel production (World Steel Association, 2018)

4.4.5 Thermal coal

While DBCT's thermal coal throughput comprises approximately 16% of total throughput in any single year, it is necessary to consider thermal coal as an integral element of DBCT's contracted capacity and a potential contributor to DBCT's capacity growth. Accordingly, DBCT Management expects demand for thermal coal exports out of Queensland to grow in the medium to long term. Demand for DBCT's thermal coal exports are expected to continue from traditional customers of the DBCT-exporting thermal mines. The growth in thermal coal demand from Queensland and DBCT is expected to increase with continuing economic development in India and the South East Asian regions. In the case of both regions, imports of thermal coal are expected to supplement domestic production.

Demand for new expansion capacity could conceivably come from thermal coal developments in the traditional Bowen Basin catchment area. Over time, DBCTM has received high numbers of Access Applications that related to thermal coal developments in the central Bowen Basin.

4.5 Mine Development Expansion Triggers

In the first quarter of 2016, coking coal prices were lower than they had been since prior to the mining boom of the late 2000's, coinciding with the publication of the 2016 DBCT Master Plan. At that time there was no demand for expansion capacity at DBCT and capacity was being relinquished for the first time in DBCT's history. By late 2016, metallurgical coal prices had surpassed US$100/mt and have remained well above that level ever since. In the previous master plan, DBCTM anticipated that there would be no further coal mine developments until coal prices were sustained above the incentive price. While DBCTM did not attempt to determine this incentive price, Deutsche Bank (September 2015) suggested this price globally was approximately US$127/mt.

DBCTM has seen an increase in Access Seeker activity during the second half of 2017 and into early 2018. DBCTM expects this indicated demand to be underpinned by mine development which will result in re-contracting of any relinquished capacity. DBCT Management does not believe the timing for terminal development can be forecast with any reliability and has avoided doing so in this or the previous master plan. DBCT Management instead approaches its master planning obligations by outlining an incremental development pathway that can be activated when real demand is presented and can be underwritten by access agreements.

5 DBCT Mtpa Expansion Options

5.1 Development Objectives for DBCT

DBCTM's development objectives for DBCT are as follows:

- Develop Master Plans that define strategies to ensure efficient and secure long-term operation of the DBCT facility to meet the needs of the existing terminal Users and Access Seekers.
- Develop an expansion pathway that is consistent with the Sustainable Ports Development Act and Reef 2050 Long Term Sustainability Plan by promoting the incremental development of the existing facility to satisfy the growth needs of the coal industry.
- Continue to build an alliance with all coal chain stakeholders in order to achieve mutually beneficial enhancements for the operation of the coal chain, including an equitable sharing of the costs and benefits of system improvements.
- Conduct the core business functions (treasury, financing, customer relations, regulatory relations, contracts management, etc.), while outsourcing technical and operating functions, to ensure that the DBCT facility continues to be managed, operated and maintained at a standard consistent with the obligations set out in the PSA.
- Realize additional system throughput through improved process efficiency at the terminal and within the Goonyella coal chain.
- Support community involvement and engage in ongoing meaningful stakeholder consultation.
- Ensure a continued 'leading practice' approach to port/terminal planning within the coastal zone, particularly within the GBRWHA.

DBCTM uses the following key drivers to guide the ongoing planning for expansions at DBCT:

- system capacity yield
- lowest whole of life costs (maintainability, operational flexibility etc.)
- minimising operational loss of capacity during construction
- minimisation of environmental impacts
- integration with existing infrastructure
- providing an incremental expansion pathway to maximise the potential of existing infrastructure and match the anticipated incremental growth of the coal chain
- realisation of terminal capacity against User contracted requirements, and
- future upgrade/optimisation potential.

Any terminal expansion is integrally linked to other supply chain infrastructure which has been illustrated in previous DBCTM Master Plans. DBCTM has been working closely with the ILC to match infrastructure expansions with the other system components to provide for the efficient use of infrastructure and ensure capacity expectations are met and delivered across the system.

DBCTM has a PSA obligation to accommodate the actual and reasonably anticipated future growth of demand for the use of DBCT by Access Holders and Access Seekers, as well as a regulatory obligation to address and accommodate Access Applications, subject to a reasonableness test. DBCTM has developed expansion options that address these obligations.

5.2 Expansion Studies

5.2.1 Recap of Master Plan 2016

Master Plan 2016 outlined an incremental expansion pathway that could take the terminal to an ultimate capacity of up to 136 Mtpa. The proposed expansion pathway is summarised in Table 4 below;

Stage		Description	Capacity (Mtpa)
Zone 4		Completion of Row 8, additional elevated stacker bund and additional Stacker (Bund 7/ST5), replacement of existing Reclaimer RL2 with new Reclaimer RL4 with extended reach into Row 8.	89
8X	Phase 1	Stockyard Augmentation Project (including vertical concrete walls on existing bunds 1 and 3), Stacker ST2 upgrade, Stacker ST1 upgrade and an upgrade of Conveyors R1 & R2	94
	Phase 2	Rail Receival Pit 4, Inloading Buffer Storage, Upgrade to Inloading 2 and Outloading 2	102
9X (Implemented over 3 phases)		Additional Stockyard at Louisa Ck, Upgrades to Inloading 1, additional Outloading System 4 and up to 2 berths to the north, including significant land reclamation to accommodate dredge spoil	Up to 136

Table 4: Proposed expansion pathway

This Master Plan is consistent with the previous Master Plan insofar as the incremental development pathway remains essentially unchanged. The only change with respect to the expansion pathway is the viability of the 3rd step (9X). The likelihood of conditions being favourable to underpin a 9X expansion project in the future has been diminished by 2 significant contributing factors.

1. The introduction of Differential Pricing in the 2017 AU, which raises doubts about whether such an expansion is capable of achieving the objectives of being economic or reasonable.
2. The perceived difficulty of securing permits to complete the dredging required for the berths required for 9X.

These issues are discussed further in Section 5.4.3

5.3 System Capacity Modelling

During 2015, DBCTM engaged the ILC to model various expansion scenarios before finalising the pre-feasibility study for the Zone 4 project. The ILC first established the pre-expansion capacity of the Goonyella System and then modelled the final configuration of the Zone 4 project.

The Pre-Zone 4 capacity was modelled at 83.8 Mtpa (Pre-Z4UP) and the modelled system capacity post Zone 4 was determined as 89.2 Mtpa as shown in Figure 26

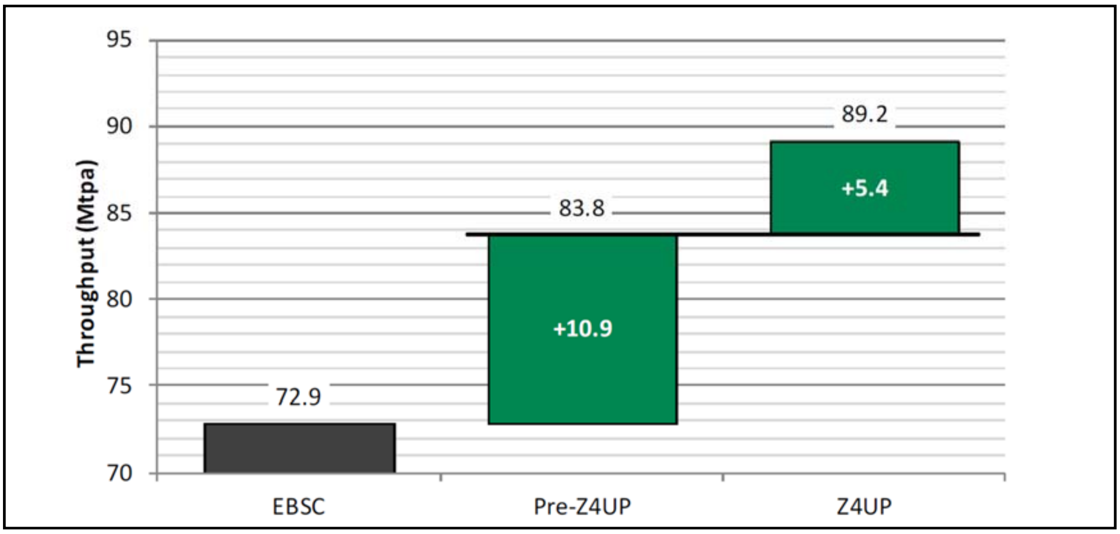

Figure 26: Zone 4 capacity modelling

The source of expansion tonnes within the Goonyella network are unknown, meaning the "model" was only able to be used to test the sensitivity of the result to various source mine locations within the network. Five separate 'assumed' mine locations were tested from various areas within the Goonyella network. In each case, it was assumed that the additional 4 Mtpa (from 85 to 89 Mtpa) would be sourced from a location on each of the following branch lines:

- North Goonyella branch
- Blair Athol branch
- Dysart branch (northern end)
- Dysart branch (southern end)
- Hail Creek branch

The worst modelled capacity result achieved for any of the scenarios was 89.2 Mtpa with some mine locations producing slightly better results.

The ILC intends to update the System Master Plan in the second half of 2018. Once that work has been completed, the Zone 4 modelling results will be revalidated. DBCTM does not currently expect the results to be materially different to previous modelling results.

During 2015, DBCTM engaged Ausenco, in parallel to the work being undertaken by the ILC on the Zone 4 project, to undertake system capacity modelling to assist with scenario testing for 8X and 9X concept development. Ausenco has had a long association with DBCT and modelling DBCT capacity, both on a standalone basis and within the context of the entire coal chain. Ausenco first modelled the existing system, followed by the Zone 4 expansion. After Ausenco's model was producing modelling results broadly consistent with the ILC's modelling, Ausenco's work was extended to include various 8X and 9X scenarios.

The capacity assessments for the 8X and 9X concepts included in this Master Plan were independently estimated by Aurecon Hatch. Aurecon Hatch initially estimated capacities using static modelling.

DBCTM and Aurecon then tested capacities using Ausenco's dynamic capacity modelling, which were ultimately considered sufficiently robust for concept level studies. Prior to progressing further with 8X studies, DBCTM would engage the ILC to verify the results using its latest dynamic system capacity model.

5.4 Expansion Pathway

5.4.1 Zone 4

The proposed Zone 4 Project involves expansion of the existing stockyard row 8 to enable both rows 7 and 8 to operate together as a 4th operating zone. The 4th zone would be utilised for storage of remnants and selected high-throughput coal types in dedicated stockpiles.

The project includes the following key components:

- Extension of Row 8 and the provision of a vertical walled bund (Bund 7) on the western side of the stockyard.
- Relocation of hybrid stockpiling (currently in use throughout the yard) with storage of selected high-volume products in dedicated piles in Zone 4 and another in a dedicated pile in Zone 2.
- Provision of an independent stacking path to Row 8 via the new Bund 7 and a new Stacker ST5 to improve the availability of the Zone 4 reclaim machines to attend to reclaim tasks.
- The replacement of the existing Reclaimer RL2 with a new Reclaimer with different geometry and a longer boom to ensure that it can reach all coal stored in Row 8 after the expansion.
- The relocation of the exiting Western Site Access Gate and the Western Access Road.

The above aspects of the Zone 4 Project are illustrated in Figure 27 below.

Figure 27: Extent of Works for Zone 4

The Zone 4 project delivers an increase in stockyard storage capacity and some minor improvements in stacking and reclaiming efficiency. Prior to Zone 4, simulation modelling undertaken by the ILC indicates that the existing Goonyella system capacity is constrained to approximately 83.8 Mtpa, despite the standalone nameplate capacity of DBCT of 85 Mtpa.

The Zone 4 expansion is not focused on provision of more coal handling equipment but instead focuses on increasing the storage volume available for Cargo Assembly and Hybrid Operations. This additional volume delivers an efficiency gain in the existing coal chain by allowing parcels to be sourced from more mine load outs and accommodated in the stockyard at any one time. This improved efficiency, in turn, provides additional system capacity by reducing the peaking congestion at points in the network. The infrastructure provided in Zone 4 will operate in a wholly integrated way with the existing facility, meaning that existing Users will necessarily have the same access to the facilities built as part of this expansion as expanding Access Seekers. The Zone 4 Project effectively closes the gap between Goonyella system capacity and nameplate DBCT capacity, while at the same time increasing overall system capacity to 89 Mtpa.

The proposed increase in the DBCT stockyard storage volume is to be achieved by an increase in width and length of row 8. The upgraded row 8 will feature a high retaining wall on the western side to allow greater storage efficiency than has been achieved in any other existing walled row.

The increased stockyard volume also facilitates an important change to the efficiency of the hybrid stockyard mode. In the context of the Zone 4 expansion project, the increased volume in Row 8 allows two of these dedicated product stockpiles to be moved out of the cargo assembly zones and into rows 7 and 8, coexisting with the remnant stockpiles. This allows rows 7 and 8 to be treated as a 4^{th} stockyard Zone that will handle the two dedicated high-throughput coal brands as well as all remnants. The products in the Zone 4 dedicated piles are then not required to be handled via any of the other three cargo assembly zones or outloading systems. Coal from Zone 4 can then be proportioned across the 3 outloading systems in a way that allows Zone 4 to act as an extension, at various times, of each of the other three zones.

The effective storage ratio for the cargo assembly portion of throughput is increased and the increase in storage ratio is distributed more evenly across the stockyard zones than can be achieved prior to implementation of the Zone 4 project.

Minor improvements in overall stacking and reclaiming performance are also achieved in the Zone 4 project via:

- replacement of the existing RL2 reclaimer with a longer boom RL4 reclaimer. RL4 will achieve higher average reclaim rates due to its ability to reclaim from wider stockpiles
- addition of a new high capacity stacker ST5 to facilitate independent stacking into row 8 without disrupting reclaim operations

These equipment improvements contribute to the overall throughput capacity gain that will be achieved as a result of the Zone 4 project.

The modelling results indicate that the Goonyella system capacity increases from 83.8 Mtpa to 89 Mtpa as a result of the Zone 4 project. The Zone 4 project releases system capacity between the currently modelled system capacity of 83.8 Mtpa and the currently contracted 85 Mtpa. Unlocking 1.2 Mtpa of system capacity will benefit the existing terminal users, while also provide Access Seekers with 4 Mtpa of additional capacity beyond 85 Mtpa.

The stockpile areas are proposed to be utilised as shown below (Figure 28).

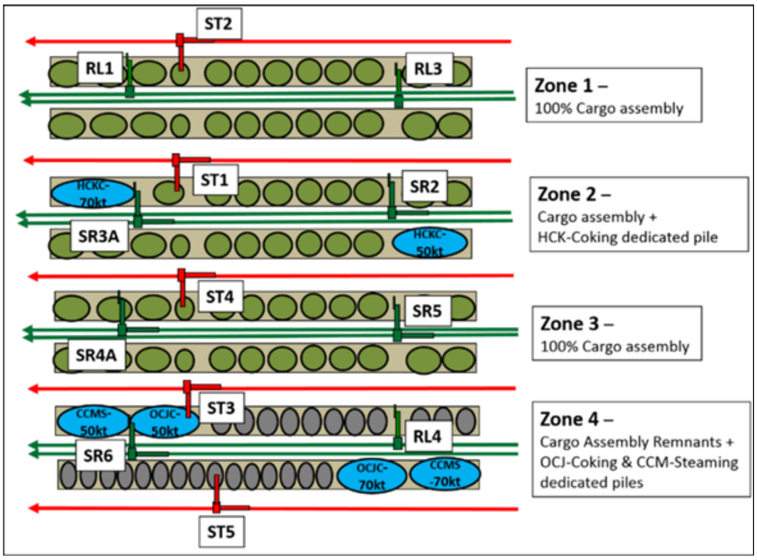

Figure 28: DBCT Stockyard following Zone 4 expansion

Use of the Zones can be described as follows:

- Zone 1 – This zone remains a cargo assembly zone.
- Zone 2 – This zone remains largely as a cargo assembly zone, but will also accommodate two dedicated stockpiles with total 120 kilotonne (kt) capacity for a high throughput coking coal (shown in blue). This is expected to handle the majority of the total throughput of this coal type.
- Zone 3 – This Zone remains a cargo assembly zone.
- Zone 4 – This zone, including Rows 7 and 8, was previously used only as a storage area for dedicated remnant stockpiles to support the cargo assembly operation. Following the extension of Row 8, this zone will now also accommodate 2 new dedicated stockpiles for each of two high throughput coal types.

The use of dedicated stockpiles allows cargoes destined for several vessels to be stacked together without separation between piles, meaning that these cargoes would consume much less stockyard area over time per tonne of throughput. This approach leaves more space for storage of other lower throughput coals that remain in separate cargo assembly stockpiles.

The Row 8 development within the Zone 4 project achieves a higher storage volume potential in Row 8 in comparison to other existing walled rows on the site. This occurs because of the increased height of the wall on the western side of Row 8 in comparison to the wall height on other rows at DBCT. This benefit is able to be utilised by the new large dedicated storage piles where significant length savings are achieved. Savings in stockpile length for the smaller remnant stockpiles are also possible, however the benefit is not as great as it would be for the larger, dedicated stockpiles. Further volume benefits are also achieved in Row 8, because being the western most stockyard row, there is no requirement for cross drains in Row 8 and no consequent loss of stockpile space.

5.4.1.1 Indicative cost of the Zone 4 project

A capital cost estimate was compiled for Zone 4 during the 2015 feasibility study in . Direct and indirect costs were generally compiled in detail with Material Take-offs

(MTOs) produced through engineering and applied to detailed unit rates. The estimate was prepared using CCS Candy software - an analytical, resource-based estimating system.

During the study, budget pricing was sought for approximately 75% of the direct costs which was included as the basis for the stacker, reclaimer, civil construction, structural steel supply and fabrication and mechanical supply estimates. Contingency was included in the capital estimate following a Quantitative Risk Analysis (QRA) at P90 confidence. Estimate accuracy has been evaluated at approximately -15% to +20% at 90% confidence intervals.

Description	AU $M
Direct Costs:	
Inloading	15.3
Stockyard	101.4
Yard machines	66.1
Site wide facilities	27.8
Indirect Costs	63.3
Contingency P90	82.2
Total AU$M	**356.1**

Table 5: Cost breakdown for Zone 4 Expansion

Contingency was established in the QRA process which ranged components of the estimate at a summarised level. The resulting estimate at a P50 confidence level is $308.8M with a contingency of AU$34.9M. The range around this is between AU$268.7 (P10) and $356.1M (P90).

The estimate base date is June 2015 with no allowance for forward escalation.

5.4.1.2 Regulatory approvals for Zone 4

Relevant State approvals have been gained for this expansion, namely:

- DBCT P/L as the terminal operator, holding an existing Environmental Authority ('EA') (Permit EPPR00504513), granted on 19 October 2015 and authorising the undertaking of ERA 50 (Bulk Material Handling up to 89 Mtp. This EA includes the proposed Zone 4 expansion and ERA 63 (Sewage Treatment (more than 100 but less than 1500 Equivalent Persons design capacity)); and
- DBCTM as terminal owner, holds an existing EA, granted on 27 April 2015, which authorises the undertaking of ERA 16 – Extractive Activities (extracting and screening, other than dredging of more than 100,000t but not more than 1,000,000t in a year) across the DBCT terminal site (Permit EPPR02825115). The EA authorises the undertaking of blasting as part of the extractive activities.

These Environmental Authorities have been issued by the Queensland Department of Environment & Heritage Protection ('DEHP') and cover the full extent of Zone 4 up to the terminal capacity of 89 Mtpa.

A formal referral was also made for the Zone 4 project under the *Environment Protection & Biodiversity Conservation Act, 1999 ('EPBC Act')* (Ref: 2015/7541). On 12 September 2015, the Commonwealth advised that the Zone 4 project was deemed to be a 'Non-Controlled Action' and no approval under the *EPBC Act* would be required.

On 15 December 2015, NQBP issued a conditional Port Development Approval under the Port of Hay Point Land Use Plan (approved under the *TI Act*), relating to the full extent of Zone 4 works.

5.4.2 8X Project

As previously mentioned, the expansion pathway beyond Zone 4 remains at early concept level only. The 8X and 9X project scopes outlined herein are subject to change as engineering progresses to pre-feasibility and then to feasibility level.

FEL1 studies (concept only) have also been undertaken for the other 2 incremental 8X and 9X expansions. Pre-feasibility and Feasibility work will ultimately be required to better understand these expansions, however, in accordance with the AU, this work will only be undertaken on the basis that an Access Seeker or Access Seekers are prepared to underwrite or fund the costs of the study.

The proposed 8X project is made up of a series of minor upgrades to the existing machines, systems and infrastructure, and the effective replacement of one of the existing inloading systems with a higher capacity system. Because of the building block nature of the project it can easily be implemented in phases. Two main phases have been identified as per Table 6.

8X – Phase 1								
Expansion element	Capex	Estimated Inloading capacity		Estimated Outloading capacity		Adjusted Outloading capacity for storage ratio @ 2.2%	Resultant capacity	
	M$	(tpa)	Cap increment	(tpa)	Cap increment	(tpa)	(tpa)	Cap increment
Zone 4 (baseline)	N/A	89.8	N/A	90.7	N/A	90.8	89.8	N/A
ST1 and ST2 upgrades	50.62	93.0	3.2	90.7	0	90.8	90.7	0.9
Stockpile Augmentation Project (SAP) + R2/RL3 Zone Swap - Zone 1 to OL3, Zone 3 to OL2	135.8	93.0	N/A	93.0	2.3	93.0	93.0	2.3
TOTAL Phase 1	**185.6**	**93**	**3.2**	**93**	**2.3**	**93**	**93**	**3.2**

Table 6: 8X Project Phase 1 Summary

8X - Phase 2								
Add IL4 to stackers, Upgrade IL2 and Shut down IL1	253.6	100.6	7.6	93.0	0	93.0	93.0	0
OL2 Upgrade	9.6	100.6	0	93.9	0.9	93.9	93.9	0.9
Inload buffer storage	201.3	101.4	0.8	101.3	7.4	99.9	99.9	6.0
TOTAL Phase 2	473	101.4	8.4	101.3	8.3	99.9	**99.9**	**6.9**
TOTAL 8X	650.9	101.4	11.6	101.3	10.6	99.9	99.9	10.1

Table 7: 8x – Phase 2

8X – Alternative Phase 2 (if allow storage ratio to fall to 2.15%)								
Add IL4 to stackers, Upgrade IL2 and Shut down IL1	253.6	100.6	7.6	93.0	0	93.0	93.0	0
OL2 Upgrade	9.6	100.6	0	93.9	0.9	93.9	93.9	0.9
Inload buffer storage	201.3	101.4	0.8	101.3	7.4	101.3	101.3	7.4
TOTAL Phase 2	473	101.4	8.4	101.3	8.3	101.3	**101.3**	**8.3**
TOTAL 8X	650.9	101.4	11.6	101.3	10.6	101.3	101.3	11.5

Table 8: 8X Project Phase 2 Summary

5.4.2.1 Stackers ST1 and ST2 Upgrade

Inloading system No. 3 has a rate of 8,100 tph but is limited to lower rates of 6,000 tph and 5,500 tph when used to stack via ST2 and ST1 respectively. The upgrade of these stackers and the associated yard conveyors is proposed as a potential 8X project as indicated in Figure 29.

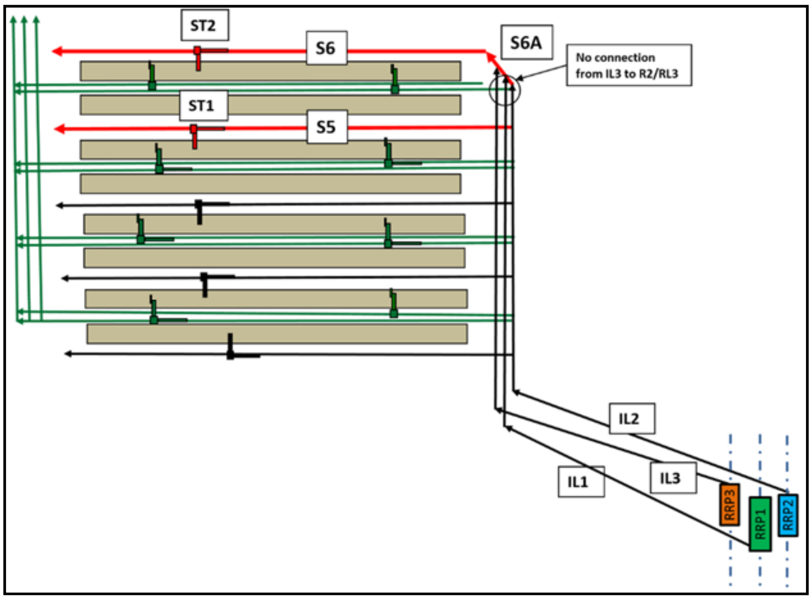

Figure 29- ST1 and ST2 Upgrade – Conveyors S6, S6A and S5 also require upgrade

In the case of ST2, a rate of 8,100 tph capacity can be achieved with only conveyor speed increases for conveyor S6A, S6 and the ST2 boom conveyor. The ST2 upgrade has been separately studied within an earlier 8X study completed by Aurecon Hatch in 2009.

In the case of ST1, a replacement of this machine with new ST1A stacker is possible prior to the commitment of 8X due to the age and condition of the existing ST1 machine. The ST1 replacement options have also been studied separately by Aurecon Hatch as reported in the document H348252-500000-100-066-0004, "Stacker ST1 Replacement Study, Feasibility Report", March 2015. If the machine is not replaced before 8X then ST1 would need to be replaced at that point because the geometry of the existing machine cannot accommodate the vertical walls. If ST1 is replaced before 8X, then the new machine geometry will be suitable, however the new machine will still require an upgrade to accommodate a rate increase as part of 8X.

The associated S5 yard conveyor can be upgraded to 8,100 tph by fitting an 1,800 mm belt to the existing stringers and operating it at 6.6 m/s. Alternatively, a slightly lower capacity of 7,500 tph could be adopted if the current maximum conveyor speed of 6.2 m/s for the site was observed. A parallel 2,000 mm wide yard conveyor could also be constructed to achieve the target 8,100 tph with slower belt speeds.

5.4.2.2 Stockpile Augmentation Project (SAP)

The Stockyard Augmentation Project (SAP) is the only component of the 8X project that will deliver an increase in stockyard storage volume. It is important to maintain a storage ratio sufficient to accommodate a larger number of stockpiles. Additional stockpiles allow cargos to be simultaneously drawn from a larger number of mines at any given time. This balances the load across the rail network, avoiding potential congestion.

The key elements of the SAP project are highlighted in Figure 30 and are summarised as:

- Addition of concrete walls to Bund 1 and Bund 3 to improve storage volume in Rows 1, 2 and 3. The constructed walls allow wider stockpiles to be stacked against the walls, similar to those developed for Bunds 4A and 5A during the 7X Expansion. Vertical walls will also improve the average reclaim rates on machines RL1, RL3, SR2 and SR3A. Volume improvements are approximately 20 to 30% compared to existing earthen bund walls, depending upon the mix of parcel sizes utilising this space. Larger parcel sizes lead to a larger percentage change.
- Upgrade of R2 conveyor to allow RL3 to be reset at its full reclaim rate potential (from 4200 tph to 5300 tph).
- A potential 'Zone swap' involving an alternative allocation of stockyard zones to outloading systems to better align the high volume, highest reclaim rate Zone 1 with the highest performing outloading system OL3.

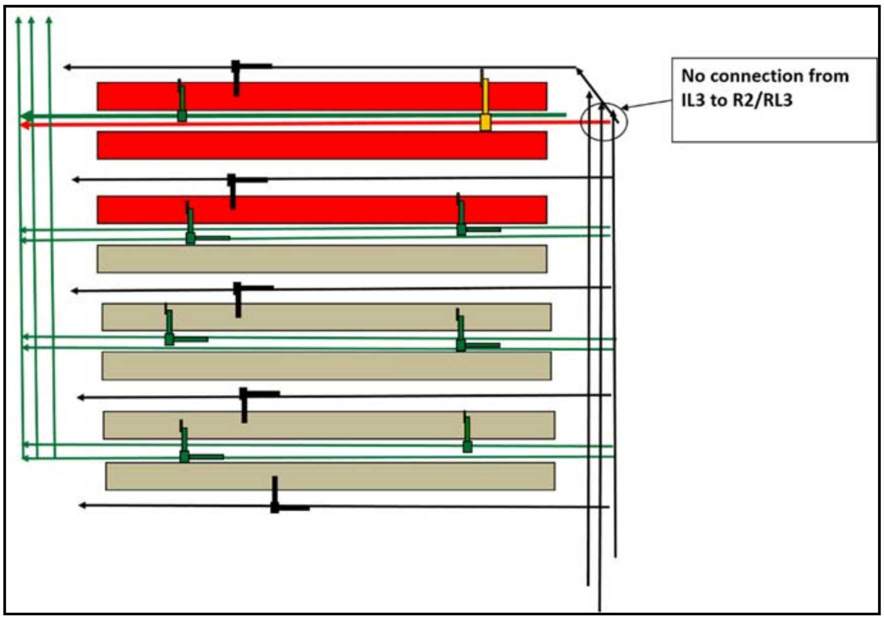

Figure 30: Schematic indicating scope of SAP project including upgrade of the RL3 yard machine and conveyor R2.

The proposed allocation of stockyard zones to outloading systems following the SAP project are shown in Figure 31.

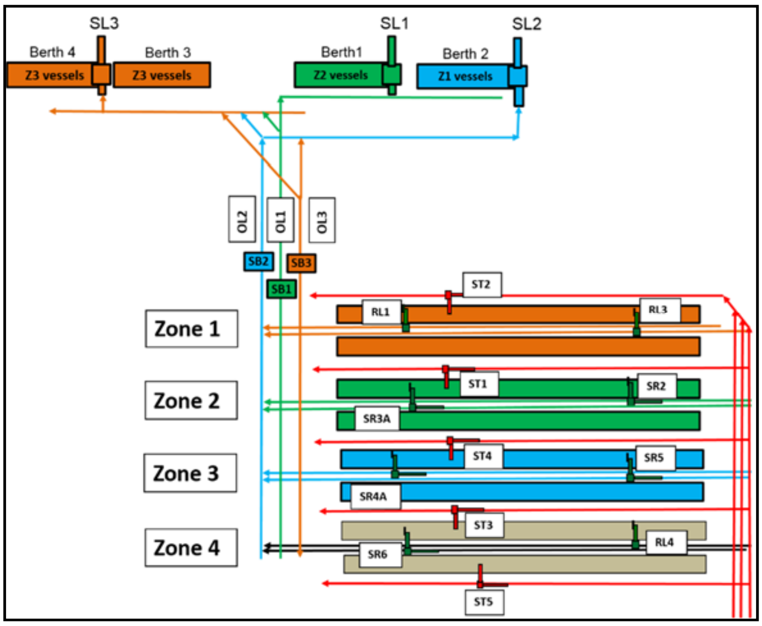

Figure 31: Proposed re-allocation of stockyard zones to OL systems following the SAP project

The SAP project will tend to draw increased capacity towards rows 2 and 3 and considering ST1 is already heavily utilised, it is likely that the ST1 upgrade would have a larger impact following completion of the SAP project.

5.4.2.3 New IL4 and IL2 upgrade

The upgrade of the existing IL1 and IL2 systems from 5,500 tph to 8,100 tph would be expected to achieve a significant boost to inloading capacity. Such an upgrade would require substantial modifications to the two rail receival pits RRP1 and RRP2 and the associated conveyors. These upgrades have been previously investigated by Aurecon Hatch. The findings are documented in the report: H79920CMP03-01, “Dalrymple Bay Coal Terminal, MP03 Concept Study, Upgrade of Inloading Systems 1 and 2”, June 2005. The upgrade of the RRP1 pit was separately investigated by DBCTM around the same time.

It is technically feasible to upgrade these systems, however the shutdown durations to complete the works is prohibitive. RRP2 would need to be shut down for approximately 6 months and RRP1 would likely need to be shut down for considerably longer. The RRP1 pit would require extensive modifications to the receival hoppers and feeder system, as well as the conveyor systems. Completing both upgrades before building a 4th system would reduce the terminal capacity to around 60 Mtpa for more than a year.

A new high capacity 4th inloading system (similar to inloading 3 developed in 7X) could be built to replace one of the existing inloading systems to provide a capacity improvement. This option would allow for the existing systems to be upgraded without capacity loss because the capacity is replaced before the losses are incurred. The upgrade of RRP2 is feasible by replacing the existing 1600 mm belts with wider 1,800 mm belts, operating at a maximum speed of approximately 6.4 m/s to minimise dust lift-off. The IL2 upgrade would only be carried out once the new IL4 was commissioned.

It is envisaged that the IL1 system would not be upgraded in 8X and would be decommissioned after IL2 is returned to service. If required, IL1 would be upgraded and returned to service as a part of the 9X project.

DBCT will only have three inloading systems in operation at the completion of the 8X project, removing the requirement to develop a 4th rail loop as part of 8X.

Considering the approaches described above, a potential sequence for upgrade of inloading systems during the 8X expansion and progressing to the potential future 9X development is described in Figure 32 and Figure 33.

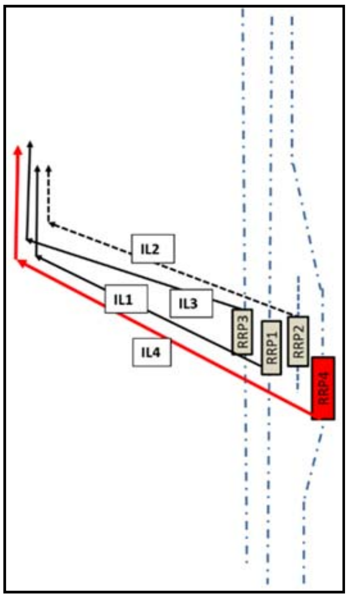

Figure 32: IL system upgrade – Step 1 - Establish new IL4 and RRP4, relocate existing RRP2 loop to service the new RRP4 and shutdown RRP2 and IL2 for refurbishment.

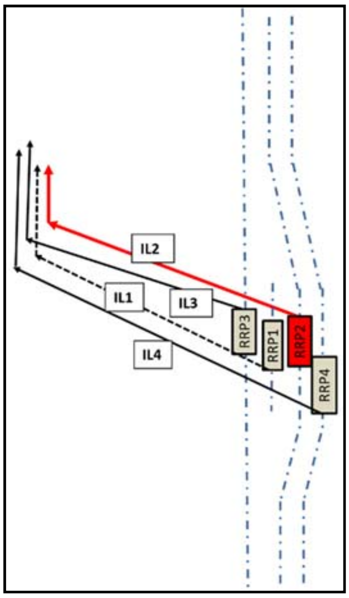

Figure 33: IL system upgrade – Step 2 - Re-commission upgraded RRP2 and IL2, relocate RRP1 loop track to service RRP2, shutdown RRP1 and IL1. IL1 would likely remain shut-down until the future 9X expansion phase.

With an objective to avoid the use of stacker reclaimers for stacking and to include upgrade options that achieve this outcome, it is proposed to connect the new IL4 system only to the stacking lines in the yard and not to the reclaim conveyors. It is acknowledged that this strategy will prevent throughloading from the IL4 system.

5.4.2.4 OL2 Upgrade

The rate limitations of the outloading conveyor systems and surge bin capacities contribute to "full bin" events during shiploading. "Full bin" events impose delays on yard machines that would normally be avoided by matching outloading rates to surge bin capacities and reclaim rates.

The potential throughput gains that might be obtained from improved conveying rates downstream of the surge bin were examined in previous studies completed by Aurecon Hatch:

- H79923CM/MP03-06 – "MP03 Concept Study, Upgrade of Outloading Systems 1 and 2" June 2005
- 319999-8043-M-RE-00001(Rev 3) – Additional Investigations into Upgrade of OL1 and OL2 – Stockyard to Surge Bin

These studies resulted in the upgrade of the conveyors between the stockyard and surge bin as a part of the 7X project completed in 2009. The studies also concluded that further capacity gains were available through upgrades to the OL1 and OL2 conveying systems downstream of the surge bins.

Approximately 1.0 Mtpa was estimated to be available from OL2 and only 0.5 Mtpa available from OL1 due to the limitations of the smaller surge bin. That conclusion was based on an outloading rate change from 7,200 tph to 8,650 tph for both systems, whereas the outloading rate for OL2 has already been increased to 7,600 tph. The further gains are expected to be approximately 0.8 Mtpa for OL2.

The cost and operational impact to upgrade OL1 is significantly greater than that of OL2. Upgrading OL1 is not considered viable based on the current level of study and is therefore not included in the 8X Scope.

5.4.2.5 Inloading Buffer Storage

This expansion element involves the addition of a short-term buffer storage facility within the inloading system. The concept allows trains to unload to the buffer store when there is no stacker machine available. The buffered coal would then be discharged to the stockyard once the required stacker becomes available. This is shown schematically in Figure 34.

The proposal requires a conveying path to be provided between the buffer storage and the stockyard that is independent of the inloading systems. Considering the proposals and sequence for upgrading the inloading systems as described above, an opportunity exists to reuse a significant portion of the existing IL1 system that would otherwise be decommissioned. This dictates the sequence for this expansion element because it can only be commissioned after IL4 is built and after IL2 is upgraded.

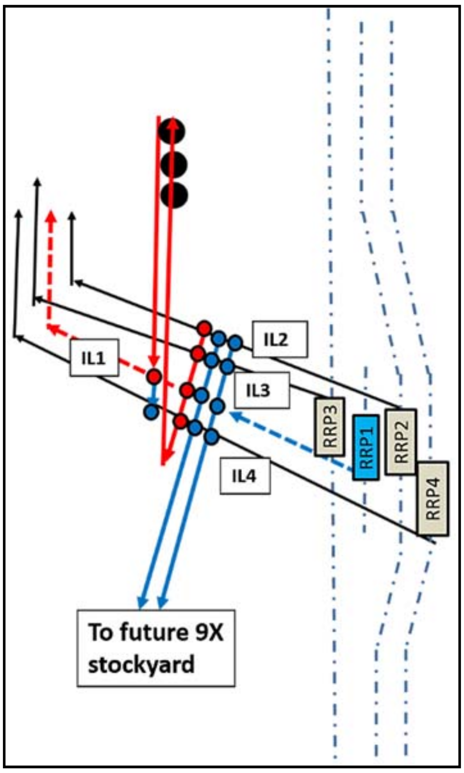

Figure 34: Schematic of inloading buffer system concept. Works required for the buffer storage are shown in red and would follow the RRP2/IL2 upgrade step for the inloading systems upgrade shown in Figure 33. Related works that would be required at the transition to the 9X upgrade when a new stockyard might be established are shown in blue.

Further details of the proposed buffer storage concept are described below:

- The schematic shown in Figure 34 suggests use of silos to provide storage. Silos would likely deliver the highest Capex/lowest Opex solution but other storage options could be employed. (e.g. stockyard in shed, bunker etc.).
- Further modelling is required to determine the ideal size and number of the storage modules. The use of 3 X 10,000 t modules to match 10,000 t train size lots has been estimated, but a larger number of 5,000 t modules may ultimately be the preferred option.
- The buffer storage should be able to be fed from IL2, IL3 and IL4 through a tripper/diverter chute arrangement.
- The IL1 system between the buffer storage and the yard is proposed to be upgraded to 7,500 tph capability when brought back into operation. It is expected that the ability to discharge a train sized lot back to the yard within the normal train unloading cycle time would be beneficial. Consideration could also be given to retaining the existing IL1 capacity of 5,500 tph.
- Coal brands of different types will be segregated in the buffer storage modules.
- A train would be diverted to the buffer storage whenever there is a conflict for access to stackers that would otherwise have resulted in the use of a Stacker Reclaimer for stacking. The Stacker Reclaimers should not be used to stack from the rail dump station or the buffer storage except as a last priority, if no other options exist or if the Stacker Reclaimers are not involved in a reclaim task.
- The buffer storage should be emptied back to the yard using stackers only,

immediately after the required stacker becomes available and is not being demanded by another train.

- Trains always take priority over the buffer storage for gaining access to stackers. This should be the case even if the buffer storage is part way through a discharge to stackers. An arriving train should interrupt and take the stacker.
- If a train is loading to buffer storage and the stacker becomes available during that time, the remainder of the train should be sent to the stacker. It is recognised that this will drive part use of a given storage cell.

The buffer storage will provide outloading capacity rather than inloading capacity. This capacity is achieved by virtually eliminating the need for the S/R's to prioritise the stacking function over the reclaim function, which at completion of Zone 4 would limit the capacity of the outloading systems.

5.4.2.6 Indicative cost of the 8X Project

An indicative capital cost estimate has been prepared for the 8X Project. In summary, the cost estimate for the 2 phases of the project are as follows.

Phase	Capacity (Mtpa)	AU$M
1. ST1 and ST2 Upgrade, SAP and R2/RL3 Upgrade	4.5	200
2. IL4, OL2 Upgrade, Inloading and Buffer Storage	8.5	500
Total AU$M	**13 Mtpa**	**700**

Table 9: 8X indicative cost

This estimate is concept level only and is based on the following:

- Target accuracy in the range -25% to + 35% at 80% confidence intervals.
- The estimate is presented in Australian Dollars with a base date of Jun 2015 with no allowance for forward escalation.

The 8X project can be undertaken in 2 separate phases which may be triggered separately depending on the quantum of demand. The 8X expansion is also wholly integrated into the existing facility and is no way separable in operation.

DBCTM is of the understanding that both the Zone 4 and 8X expansions fall into the category of Cost Sensitive Expansions as defined by the current Access Undertaking (AU) in Section 11.13 (b). These expansions are fully integrated, will have the effect of lowering Handling Charges per tonne, and potentially improve overall efficiency and risk to existing Users.

5.4.3 9X Project

The existing footprint at DBCT is limited to the 8X Capacity of 102 Mtpa. Any expansion materially beyond that capacity would require an additional stockyard for which DBCTM does not currently have access to the land. Additionally, any expansion beyond 8X will require additional berths to the north, which will necessitate capital dredging for both the berth pockets as well extensions to the departure path and aprons. Gaining the required approvals from GBRMPA for capital dredging has become materially more difficult in recent years, thereby jeopardising DBCTM's ability to deliver the 9X Project.

The 9X development will incorporate the following key elements:

- Reactivation and upgrade of RRP1 dump station that would have been placed into "care and maintenance" mode during the earlier 8X expansions works. The tail section of S1 conveyor will need to be upgraded to operate at 8100 tph capacity in order to deliver the additional required train unloading capacity.
- A new fourth (4th) rail loop that would service RRP4 with the existing RRP4 loop re-aligned to RRP2, and RRP2 loop re-aligned to RRP1, as discussed in the 8X development report.
- Provision of link conveyors from the 4 X Rail Receival Pits to feed the new 9X stockyard.
- A stockyard with sufficient storage capacity to match the proposed 34-35 Mtpa capacity expansion. Consideration needs to be given to the variety of potential operating modes, while also ensuring that the storage ratio is the same or greater than that proposed for the 8X development.
- A new fourth outloading system OL4 including; conveyors, surge bin, sample plant and shiploader SL4 with the same operating capacity as the OL3 system. Suitable link conveyors are also required for connectivity between the new stockyard and the outloading systems.
- Berths 5 and 6 to the north of the existing Berth 4, serviced by the new shiploader SL4

It is not currently possible to predict how the new stockyard might be utilised within the expanded terminal operation. There are 2 main options for stockyard strategy which require different configurations.

The stockyard could be either:

- Operated as an integrated part of the existing facility to allow an extension of existing cargo assembly operations. This would suit incremental growth in throughput of the existing coal types combined with the addition of new coal types. All products could be loaded onto vessels in any combination.
- Operated as a stand-alone terminal that would be dedicated to handling a select group of coal types. Following this approach, coal stored in the 9X stockyard would not be able to be loaded onto vessels being loaded from the existing stockyard. This application would tend to be more favourable to higher throughput coals stored in dedicated storage stockpiles.

Considering these two potential operating approaches, a number of configuration options were developed. The options that were found to be viable are summarised on the following page:

5.4.3.1 Configurations for an integrated operation

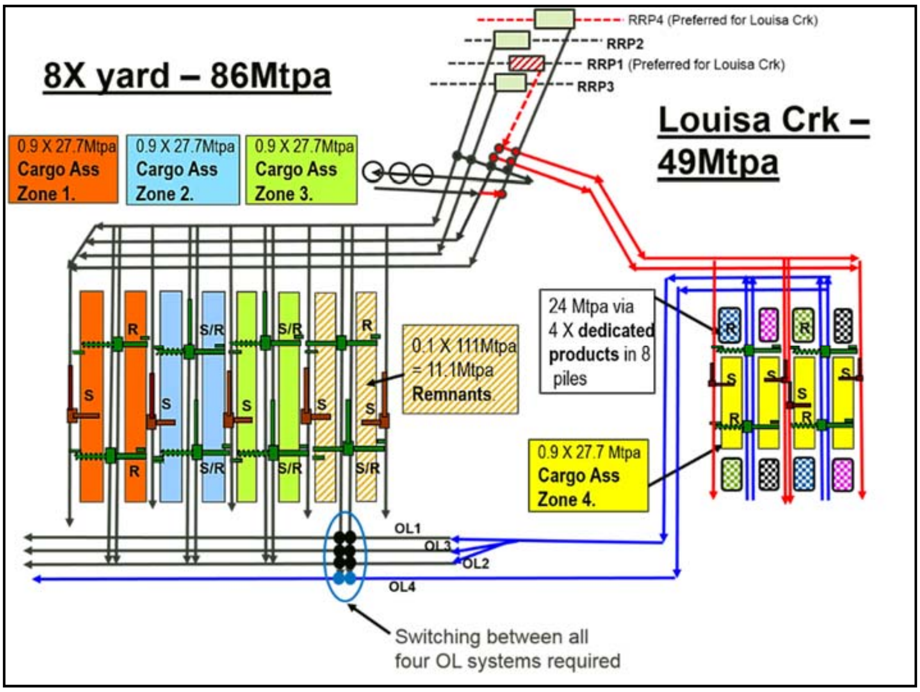

Figure 35: Option 1B – Dedicated product stockpiles moved to Louisa Creek, together with a new cargo assembly zone. Removal of dedicated piles from the existing stockyard results in a capacity loss from the existing yard. Capacity of the Louisa Creek yard is increased to compensate and exports via the OL1, OL2 and OL3 systems as well as OL4

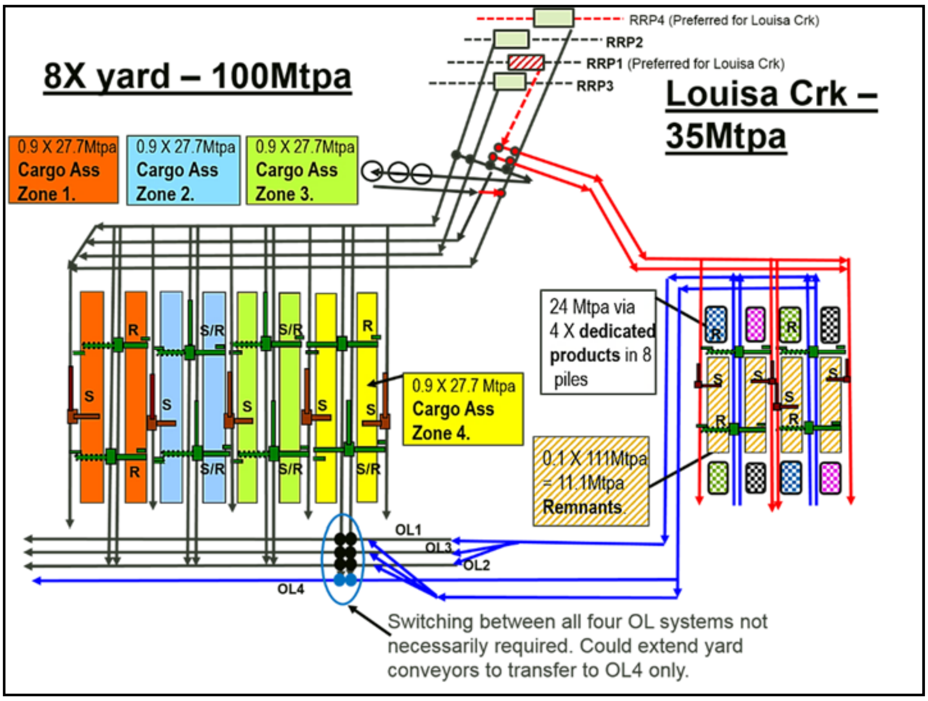

Figure 36: Option 1C – Integrated terminal with dedicated stockpiles and remnants relocated to Louisa Creek. New 4th cargo assembly zone established in Rows 7 and 8.

5.4.3.2 Configuration for stand-alone operation

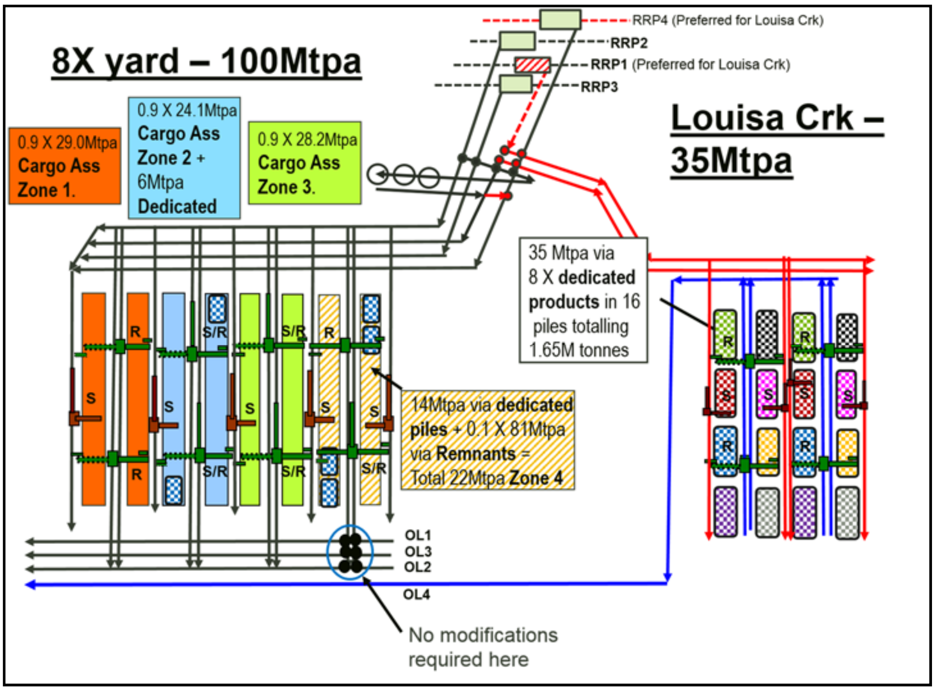

Figure 37: Option 2 – Virtual stand-alone terminal at Louisa Creek for dedicated product stockpiles. Some dedicated stockpiles must be maintained within the 8X yard to retain throughput capacity. Products at Louisa Creek cannot be loaded to vessels with products in the existing yard.

5.4.3.3 Configuration for partially integrated operation

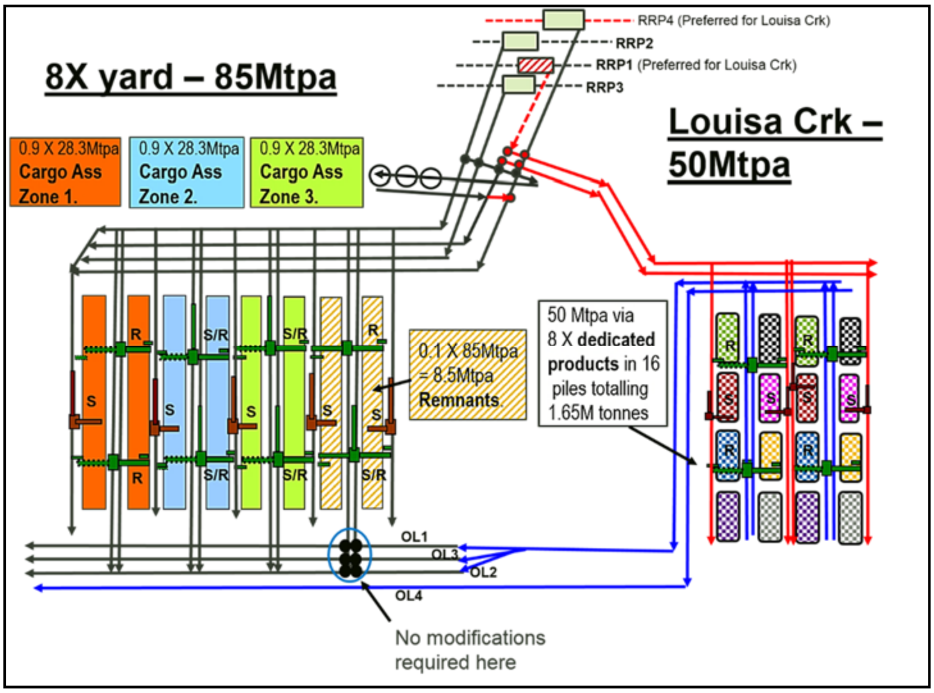

Figure 38: Option 3 – Partially integrated dedicated stockyard at Louisa Creek. This allows dedicated product stockpiles in the 8X yard to be relocated to Louisa Creek and for products stored at Louisa Creek to be loaded to vessels with cargo assembly products stored within the 8X yard (to a limited extent dictated by available capacity in OL1, OL2 & OL3).

5.4.3.4 Offshore configuration

Only one feasible option is envisaged for the 9X expansion of the offshore works. This option can be developed in two stages.

It is proposed that the new OL4 outloading string would load to vessels via a new shiploader SL4 that would operate on new Berths 5 and 6. Berths 5 and 6 are proposed to be constructed to the north of the existing berths, as shown schematically in the figure below:

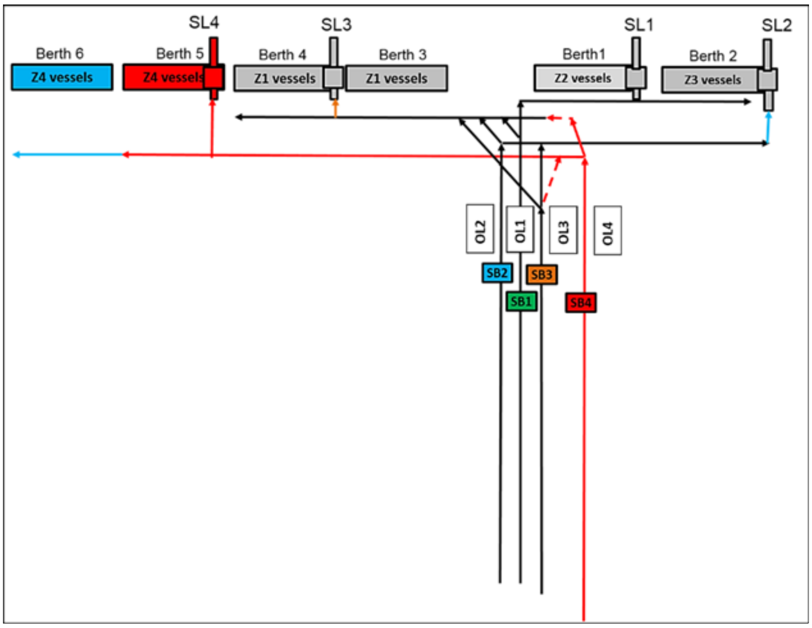

Figure 39: Proposed development of offshore facilities for the 9X project. Berths 5 and 6 and Shiploader 4 are added. The 4th shiploader and outloading system may be dedicated to the new Louisa Creek stockyard or alternatively might be associated with the added 4th cargo assembly zone depending upon the chosen operating mode and chosen stockyard configuration as discussed in the sections above.

5.4.3.5 Physical arrangements for stockyards and conveyors

Stockyard layouts have been prepared to demonstrate how the configuration options could be accommodated within the Louisa Creek site. Two potential site arrangements have been prepared including a ‘short’ and ‘long’ stockyard option, as shown in the figures below.

In general, configuration options 1B and 1C (integrated DBCT and Louisa Creek operation) would suit the ‘short’ stockyard arrangement, based on current assumptions regarding throughput associated with dedicated product stockpiles. Options 2 and 3 (standalone terminal operation at Louisa Creek) would suit the ‘long’ stockyard arrangement.

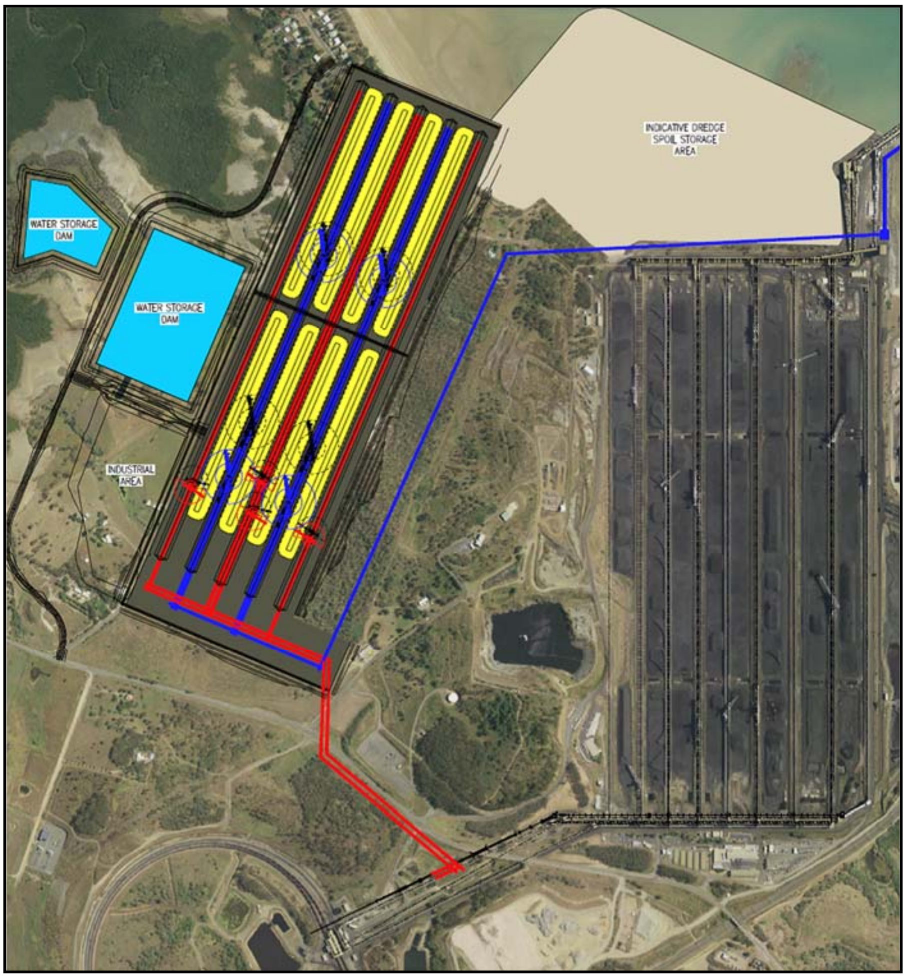

Figure 40: 'Long' stockyard arrangement suited to configuration options 2 and 3.

The arrangements are such that the short stockyard arrangement could be extended in the future to match the long stockyard arrangement if deemed necessary.

As described in the captions to the above figures, the outloading conveyor arrangements need to be varied according to the required level of integration between the Louisa Creek stockyard and the existing DBCT stockyard, and the way in which the Louisa Creek stockyard will be utilised.

The single outloading conveyor string shown for the 'long' stockyard in particular is suitable only for Option 2. This suits the case of Louisa Creek being developed as a virtual stand-alone terminal, assuming that 8X operations continue unchanged within the existing stockyard. Any other case will require the construction of some additional outloading conveyors.

The short stockyard arrangement allows the stockyard to be constructed without encroaching upon the Louisa Creek beach and with less impact upon the existing township. If a dredge spoil reclamation area is developed in the location shown above, for storage of dredged material associated with the development of Berth 5 or both Berths 5 and 6 together, then the benefits of avoiding encroachment of the beach may be limited.

5.5 Rail Infrastructure

The rail track infrastructure in the vicinity of the terminal does not form part of the asset owned and managed by DBCTM. The current rail track arrangements are understood to contribute to delays in the process of directing full trains to dump stations. Delays have also been observed in clearing empty trains from the loop after unloading to allow uninterrupted unloading of subsequent trains. Some relatively minor rail track improvements would likely address these issues and provide a throughput gain.

Potential modifications that would be expected to avoid train delays and improve utilisation of the dump stations are depicted schematically in red in Figure 41 below. It is proposed that these improvements would be carried out at the time of establishing the 4th dump station during the 8X phase i.e. when RRP4 is fed from a diverted loop 2 and prior to establishment of the 4th rail loop.

The green lines in Figure 41 indicate the proposed establishment of the fourth rail loop. It would likely not be established until much later, coincidingwith a later 9X expansion phase as described in Section 5.10.2.

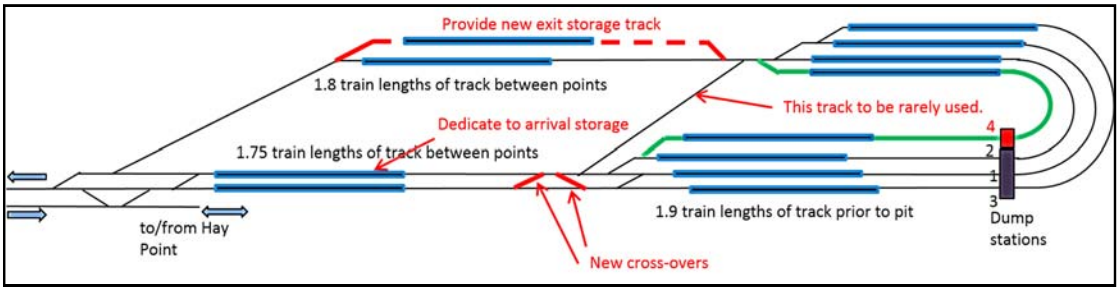

Figure 41: Proposed 8X rail loop modifications shown in red as proposed to be constructed with the IL4 dump station. The fourth rail loop in green would be constructed only at the later 9X stage.

5.6 Effect of Expansion Pricing on the Likelihood of Expansion.

The 2017 AU introduced the concept of differential pricing for future expansions. Under previous undertakings, and prior to privatisation of the terminal, all expansions of DBCT were priced on a socialised basis. An expansion that is socialised has a lower risk profile to DBCTM than a expansion that is priced differentially. This is because the existing Users of the terminal must step in to cover the access charges for an Access Seeker who defaults on their obligations. The underwriting of access charges by existing Users makes the risk profile of an expansion acceptable to both the owner of the facility and potential project financiers. All previous expansions of DBCT were financed on this basis and all current Users benefitted to some degree from this arrangement.

Differential pricing, by comparison, necessarily requires both the owner and project financiers of any expansion to underwrite their investment purely on the basis of the capacity of the Access Seeker to meet their commitment to the post-expansion access charges. In an environment where future developments are likely to be incremental in nature, there is a strong likelihood that these charges will be supported by only one, or perhaps two, Access Seekers. Where these Access Seekers are major international mining houses, the project may still be bankable. If however, the expansion capacity is to be contracted to junior mining companies with greenfield mine projects, it is highly unlikely that either the owner or potential financiers will be able to gain sufficient comfort around the risk of the project to justify proceeding to construction.

These issues will need to be considered by DBCTM before deciding whether to proceed past FEL2.

5.7 Impacts of the 2017 Access Undertaking on Expansion timing

The 2017 Access Undertaking defines the process to be followed to continue with Feasibility works and ultimately progress to an Expansion. The process steps are outlined below in Figure 42.

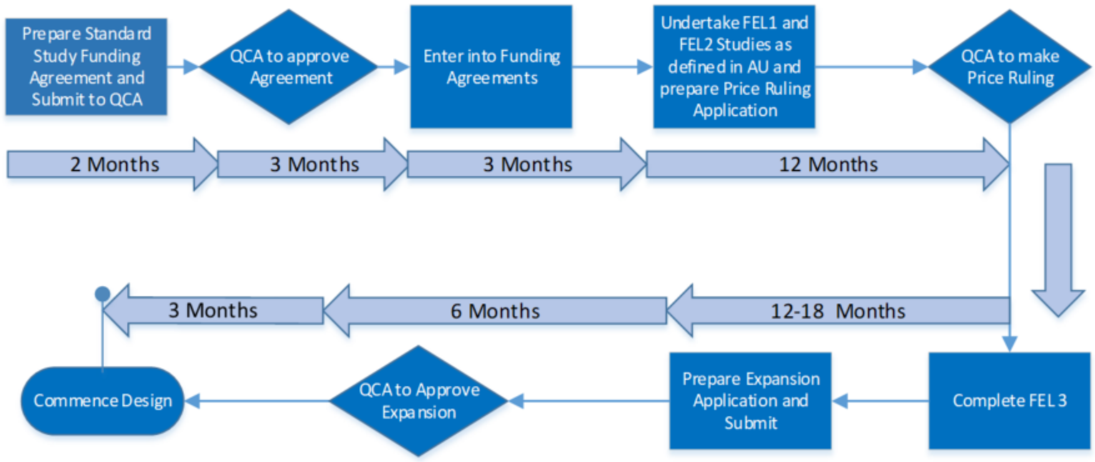

Figure 42: Expansion Approval process and indicative timeframes

In 2015 pre-feasibility (FEL2) and feasibility (FEL3) study works for Zone 4 were undertaken to a standard consistent with normal industry practice. The 2017 Access Undertaking requires greater certainty around the estimated capital cost than normally would be achieved from a FEL2 study completed to a standard consistent with normal industry practice. In 2015, sufficient work was undertaken to achieve this level of capital cost certainty in the FEL3 study. Because the level of certainty around capital costs, as defined by the AU for FEL 2 has already been achieved in DBCTM's previously completed FEL 3 studies, the time required to reach a Price Ruling for Zone 4 will be significantly quicker than for subsequent expansions, which have only been progressed to FEL 1.

The timeframes in Figure 42 are based on the assumption that no objections are received at any point on the timeline. Delays to the timeline above will certainly occur if the QCA receives objections at any of the decision points.

6 Environment

6.1 Overview/Background

The Queensland Government has responsibility for protection of the State waters and is therefore committed to a number of Reef 2050 initiatives relating to port development. The *Sustainable Ports Development Act (2015)* sets out the blueprint for port planning and management for certain ports in Queensland. The act aligns with the Commonwealth and State Government commitments under *Reef 2050*.

The increased focus on environmental management at Queensland ports, particularly those designated as 'priority ports' reinforces the need for careful and direct attention of those operating at these critical trading nodes.

DBCTM has always taken and discharged its environmental responsibilities carefully and recognises that operating in the GBRWHA requires robust environmental systems.

This attention will continue in forward years under this Master Plan.

Environmental management within the coastal environment, and particularly within the GBRWHA requires two fundamental considerations:

1. Robust consideration of existing environmental values as part of terminal and/or expansion planning – ensuring that environmental values are examined and managed using the well understood mitigation hierarchy of: avoidance, mitigation and offsets; and
2. Ensuring robust Environmental Management Frameworks are in place for the ongoing management of operations consistent with the requirements of Environmental Authorities for terminal operations and/or construction activities.

DBCTM supports the position of the Queensland Government in requiring robust Port Master Plans including greater transparency of Environmental Management Frameworks at Queensland's 'Priority Ports' and a stronger focus on port protection measures including appropriate environmental buffers.

This section of the Master Plan outlines the particular environmental issues and the corresponding management responses at play. It also addresses emissions and impacts likely from the expansion referred to as the Zone 4 expansion and that contemplated under the 8X project.

Leading up to Master Plan 2016 DBCTM did not attempt to undertake emissions modelling for the 9X expansion project because of the preliminary nature of the concept a and the lack of certainty regarding various project aspects. The 9X project is of such a scale, that more mature engineering assessments are required before any modelling of any real accuracy could be undertaken. Further, the 9X proposal would most likely trigger full Environmental Impact Statements (EIS) through State and Commonwealth processes in forward years.

6.1.1 Existing Environmental Authorities/Regulatory Processes

It should be noted that existing Environmental Authorities relevant to the terminal site and/or operations include:

- DBCTPL as the terminal operator, hold an existing Environmental Authority ('EA') (Permit EPPR00504513), granted on 19 October, 2015, which authorises the undertaking of ERA 50 (Bulk Material Handling up to 89 Mtpa which includes the proposed expansion included in the Zone 4 project) and ERA 63 (Sewage Treatment (more than 100 but less than 1500 Equivalent Persons design capacity)); and
- Additionally, DBCTM as terminal owner, holds an existing EA, granted on 27 April 2015, which authorises the undertaking of ERA 16 – Extractive Activities (extracting and screening, other than dredging of more than 100,000t but not more than 1,000,000t in a year) across the DBCT terminal site (Permit EPPR02825115). The EA authorises the undertaking of blasting as part of the extractive activities.

These Environmental Authorities have been issued by the Queensland Department of Environment & Heritage Protection ('DEHP') and cover the full extent of the Zone 4 Expansion up to the terminal capacity of 89 Mtpa.

It should also be noted that a formal referral was made for the Zone 4 project under the Environment Protection & Biodiversity Conservation Act, 1999 ('EPBC Act') (Ref: 2015/7541). On 12 September 2015, the Commonwealth advised that the Zone 4 project was deemed to be a 'Non-Controlled Action' and as such, no approval under the EPBC Act would be required.

On 15 December 2015, NQBP issued a conditional *Port Development Approval* under the Port of Hay Point Land Use Plan (approved under the TI Act), relating to the full extent of Zone 4 works.

The balance of this chapter addresses the various environmental/social values relevant to the terminal and its immediate environs and the results of predictive emission modelling relating to the proposed expansion projects Zone 4 and 8X.

6.2 Preliminary Environmental Impact Assessment

The expansion pathway outlined in this Master Plan is staged and incremental – in line with the direction under the new Commonwealth and State regulatory framework regarding coastal development within the GBRWHA.

Options have not simply been examined from an engineering and operational perspective. Because of DBCT's geographical location within the GBRWHA, it has also been important to assess ecological and social values of each of the preferred projects.

The expansion pathway has been examined against various criteria and suitability including:

- Air Quality
- Noise & Vibration
- Visual Amenity
- Cultural Heritage
- Local Maritime Operations
- Community & Social Impacts
- Coastal Processes
- Marine Ecology
- Terrestrial Ecology
- Soil & Geology
- Surface Water Quality & Hydrology
- Transport & Access
- Waste Management
- Land Tenure & Other Stakeholder Interests

Each of the above are described in the following sub-sections.

6.2.1 Air Quality

All potential air quality impacts have been examined and considered for the Zone 4 expansion project.

The increased volume of coal to be stored at an expanded terminal may increase the likelihood of dust emissions affecting neighbouring rural residential/community areas. As such, ongoing compliance with relevant Environmental Authorities will be critical in the forward management of operations as will ensuring participation in the broader 'port-wide' air quality monitoring programs managed by NQBP as the port authority.

As part of this Master Plan, predictive modelling work has been completed – see Section 6.4 for more detail.

DBCTM is continuously monitoring air emissions at and around the terminal in accordance with normal operational environmental management practices.

Work will continue and in conjunction with the port entity, NQBP, the operator will proactively adjust and adapt management practices as appropriate.

Ensuring appropriate port buffers is also a fundamental and strategic requirement for the Port of Hay Point over the longer term. This will be a critical issue for formal State Port Master Planning now underway for the port. DBCTM will work with the State and NQBP in the preparation of this planning document.

6.2.2 Noise and Vibration

All potential noise and vibration impacts have been examined and considered for the Zone 4 expansion project.

At present, DBCT P/L undertakes noise monitoring at four (4) locations around the Port of Hay Point (internally and externally to the terminal) in accordance with the existing EA under the *Environmental Protection Act, 1994* (EP Act).

Noise assessment monitoring is undertaken continuously.

A number of noise control and management measures are incorporated across the DBCT site, and for the 2014-2015 period, noise levels were compliant with the limits under the existing EA.

It is anticipated that there will not be a significant increase in noise and vibration impacts as a result of either the Zone 4 or 8X expansion works (see Section 6.5 for more detail). Intensification of existing terminal operations, largely within existing terminal footprint areas will ensure the minimisation of noise emissions from the site. Further, upgrading operational equipment over time as development continues will also assist in noise and vibration management.

It is considered that the approach to noise/acoustic assessments employed at the terminal is industry best practice – and along the whole terminal process from inloading through to shipment of cargoes.

6.2.3 Visual Amenity

All potential visual amenity impacts have been examined and considered for the Zone 4 expansion project.

DBCT is an existing, long established land use, which forms part of the Port of Hay Point. Since operations first began at the port in October 1971, the Port of Hay Point has become Queensland's largest export port with exports in the 2016/2017 financial year reaching approximately 106 Mtpa across both DBCT and the adjoining Hay Point Coal Terminal.[19] The designation of the Port of Hay Point as one of Queensland's 'Priority Ports' (thereby being a 'relevant port' under the *National Ports Strategy, 2012*) acknowledges that the visual amenity of the node is recognised and part of the landscape of this part of the Queensland coastal zone.

The Port of Hay Point is also recognised in local, regional and state-wide planning instruments as a major infrastructure node along the Queensland coast.

Expansion of the terminal as proposed under this Master Plan is consistent with the well accepted visual amenity of the local environs.

6.2.4 Cultural Heritage

A search of the Cultural Heritage Database maintained by the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) was undertaken as part of Zone 4 regulatory applications that did not identify any recorded indigenous cultural heritage sites within the area of the proposed works.

[19] NQBP website (https://nqbp.com.au/trade/throughputs)

Any future expansion would be required to proceed in line with relevant State and Commonwealth legislation regarding Cultural Heritage matters to ensure compliance with the Cultural Heritage Duty of Care under the *Aboriginal Cultural Heritage Act 2003.*

6.2.5 Local Maritime Operations

Both Zone 4 and 8X expansions do not entail any alteration to local maritime operations. Indeed, no marine development is proposed for either Zone 4 or 8X.

The 9X expansion would entail two new offshore berths and reclamation within the World Heritage Area. Development of this kind would need to be closely examined in terms of interactions with local maritime operations such as recreational and commercial fishing activities.

6.2.6 Community and Social Impacts

All potential community and social impacts have been examined and considered for the Zone 4 expansion.

Both Zone 4 and 8X expansions entail development within the existing terminal footprint. As such, it is not expected that any social or community impacts are likely as a result of terminal operations under these scenarios. Management of construction impacts will be required particularly with regard to traffic impacts and general movements around the terminal environs.

6.2.7 Coastal Processes

There are no anticipated coastal process impacts as a result of either the Zone 4 or 8X expansions, as marine works are not included in these phases.

Only the 9X proposal entails development within the coastal zone. Potential impacts associated with this expansion would be fully examined once more detailed engineering assessments have occurred in the course of normal project feasibility work.

Due to recently introduced legislation at both Commonwealth and State government levels, 'at-sea' relocation of capital dredge material is prohibited. The 9X concept therefore includes a proposal to reclaim land (as detailed in Section 5.10.2) using material from necessary berth dredging consistent with the principles of 'beneficial re-use'.

While the reclaimed area may not immediately be used for port purposes, the area will present the opportunity to help screen coastal industrial operations from the World Heritage Area, thereby reducing potential visual amenity impacts.

Given the preliminary nature of the 9X design, the extent of material for this area and size of area is unable to be confirmed. This Master Plan commits to design principles being based on a *Working with Nature* ('WwN') philosophy - as advocated by the World Association for Transport Infrastructure known as 'PIANC'.

As PIANC states:

'Working with Nature requires that a fully integrated approach be taken as soon as the project objectives are known – i.e. before the initial design is developed. It encourages consideration of how the project objectives can be achieved given the particular, site-specific characteristics of the ecosystem.

Working with Nature is about more than avoiding or mitigating the environmental impacts of a pre-defined design. Rather, it sets out to identify ways of achieving the project objectives by working with natural processes to deliver environmental protection, restoration or enhancement outcomes'.

6.2.8 Marine Ecology

There are no anticipated marine ecology impacts as a result of either the Zone 4 or 8X expansions.

Only the 9X proposal entails changes to development within the coastal zone. Potential impacts associated with this expansion will be fully examined once more detailed engineering assessments have occurred in the course of normal project feasibility work.

Increased shipping movements would also need close examination although the increased size of average export parcels per vessel is equating to lower overall vessel movements per export tonne. Using the most recent data from a full financial year (2016/2017) DBCT managed the export of 63,202,057 tonnes of coal via 630 vessels. This equates to an average payload size of 100,320 tonnes per vessel.

6.2.9 Terrestrial Ecology

All potential terrestrial impacts have been examined and considered for the Zone 4 expansion.

Potential impacts associated with the 8X and 9X expansion options will be fully examined once more detailed engineering assessments have occurred in the course of normal project feasibility work. It is clear though that existing terminal environs are highly disturbed in nature.

6.2.10 Soil and Geology

Potential impacts upon soil and geology are to be assessed in greater detail prior to development proceeding. Existing groundwater bores (subject to existing state government licence conditions) will continue to be monitored/reported as part of the terminal Environmental Management System.

It is unlikely that soil and/or geological issues will restrict the expansion pathway.

6.2.11 Surface Water Quality and Hydrology

Works undertaken in 2015 as part of the Water Quality Improvement Project (WQIP), (including the construction of the new Rail Loop Dam) have significantly improved water quality management on site through increased water storage capacity across terminal lands.

The future expansion pathway outlined in this Master Plan is likely to benefit from such water quality management improvements.

6.2.12 Transportation and Access

Transportation and access issues are unlikely to change under either Zone 4 or 8X expansions. The 9X expansion would however, trigger changes to terminal access and significant changes to rail and road infrastructure.

6.2.13 Waste Management

Waste management under all future expansions would be captured in relevant construction and operational environmental management plans as per usual operations.

6.2.14 Land Tenure and Other Stakeholder Interests

Both Zone 4 and 8X expansions use existing DBCTM held lands as they largely involve augmentation of existing terminal areas.

The 9X expansion would require further land acquisitions in the immediate port environments for both terminal area and associated infrastructure corridors (road/rail etc.).

6.3 Comparison of Expansion Projects

Table 10 outlines the qualitative risk assessment of environmental and planning issues for the proposed expansion pathway.

It should be noted that all regulatory approvals are in place for the Zone 4 expansion, hence its significantly lower risk rating.

Issue/Impact	Zone 4 Expansion (85 Mtpa-89 Mtpa)	8X Expansion (89 tpa–102 Mtpa)	9X Expansion (102 Mtpa–134 Mtpa)
Air Quality	L	M	H
Noise & Vibration	L	M	H
Visual Amenity	L	L	M
Cultural Heritage	L	M	M
Local Maritime Operations	L	L	M
Community & Social Impacts	L	L	H
Coastal Processes	L	L	H
Marine Ecology	L	L	M
Terrestrial Ecology	L	M	M
Soil & Geology	L	L	H
Surface Water Quality & Hydrology	L	L	H
Transport & Access	L	L	H
Waste Management	L	L	L
Land Tenure & Other Stakeholder Interests	L	L	M

L	Low: Limited (if any) delays are likely to be experienced during the approval process as a result of the issues identified
M	Moderate: Delays are likely to be experienced during the approvals process as a result of the issues identified, however issues are expected to be managed / addressed sufficiently to obtain approval without significant design changes.
H	High: Significant delays are likely to be experienced during the approvals process due to the issues raised. Resolution of these issues is likely to involve design changes.

Table 10: Qualitative comparison of environmental and planning risks for the proposed expansion pathway

Robust management of the construction phase will be required in accordance with the regulatory approvals already gained by both DBCTM and DBCT P/L including:

- being deemed a 'non-controlled action' under the Environment Protection and Biodiversity Conservation Act, 1999 (Commonwealth), and
- securing all necessary environmental planning approvals under State legislation including Environmental Licenses under the Environmental Protection Act, 1994 and port development approvals under the Sustainable Planning Act, 2009.

The location of the terminal within and adjacent to the GBRWHA, necessitates an absolute focus on: impact avoidance of environmental values as part of planning and design processes, and ensuring robust environmental management systems are in place for ongoing operations. This is especially true for 8X and 9X because of the larger scale of the developments.

For 8X and 9X the following is a list of key issues requiring further investigation in order to provide a more accurate assessment closer to the time of development:

- Cultural Heritage assessments of potential sites outside the existing DBCT footprint
- Likelihood of impact on marine water quality, including impact on local beaches
- Potential impacts to coastal processes as a result of reclamation works and any new marine infrastructure (9X)
- Obtaining the necessary land for 9X
- Reclamation and construction impacts upon local turtle nesting sites
- Potential impacts upon seagrasses and other marine plants
- Impacts to existing mangrove communities and the need for setbacks
- Impact to tidal flow regime of Louisa Creek during 9X expansion works
- Traffic assessment study to determine impacts upon Hay Point Road and the local road network
- Any relevant amendments to Reef 2050 including implementation policies
- Any relevant amendments to the Sustainable Port Development Act, 2015
- Quantitative noise and dust assessments based on enhanced engineering design parameters closer to the time of development
- Enhanced examination of port buffers around the Hay Point 'priority port' precinct

In order to better understand potential noise and dust emissions, DBCTM commissioned preliminary studies of dust and noise modelling to ensure critical issues are factored into preliminary design and feasibility studies. The results are detailed in the following sections.

6.4 Air Quality Environment - Post Expansion

Due to their past experience with DBCT, Katestone Environmental ("Katestone") was commissioned to undertake predictive modelling for expansion the Zone 4 project and 8X project detailed within this Master Plan.

Particulate matter is the main air pollutant associated with operation of coal terminals. Emissions of other air pollutants will be low and therefore will have a negligible potential for impact compared to particulate matter. Particulate matter was the Primary focus of the Katestone air quality assessment and other air pollutants have not been considered further.

The air quality assessment assumes that the terminal has implemented the 8X Project (i.e. terminal capacity has reached 102 Mtpa). It also assumes that the neighbouring coal terminal is operating at its approved capacity (55 Mtpa). The air quality assessment has been based on the following items:

- Development of a three-dimensional (3D) meteorological dataset representative of prevailing conditions of the surrounding area.
- Estimation of emissions of particulate matter associated with coal terminal operations based on information used in previous air quality assessments, National Pollutant Inventory (NPI) reporting, other data provided by DBCTM and standard assumptions where information is not available.
- Dispersion modelling incorporating emission characteristics and particulate matter emission rates associated with the operation of the coal terminals. The model also includes site-specific 3D meteorology, terrain, land-use and geographical location of sensitive receptors.
- Prediction of levels of particulate matter due to the operation of the coal terminals at identified sensitive receptor locations and the surrounding environment. Predicted ground-level concentrations of the key metrics including: TSP, PM10 and PM2.5 and dust deposition rates have been assessed against the relevant air quality objectives detailed in the:
    - Environmental Authority Permit Number: EPPR00504513 (Date of Issue 19 October, 2015)
    - Environmental Protection (Air) Policy 2008 (Air EPP)
    - National Environment Protection (Ambient Air Quality) Measure (Air NEPM) (Commonwealth Department of the Environment, February, 2016) Department of Environment and Heritage Protection's (EHP) Guideline, Mining: Model mining conditions (EHP, 2013)
    - Application requirements for activities with impacts to air (EHP, 2015)

The general approach to this assessment is consistent with the methodologies applied in earlier air quality assessments conducted for regulatory approvals. In the late 1990s and early 2000s, Katestone developed a dust modelling system representing the Hay Point area that included DBCT and HPCT for the Stage 6 and 7 expansions of DBCT (Hay Point DispMod v1.0). That modelling system used the USEPA's ISC3 Gaussian dispersion model.

The ISC3 model is no longer supported by the USEPA.

More recently, the modelling system was redeveloped using the CALMET/CALPUFF models and this new modelling system was used for more recent expansion projects, most recently for the EIS for the Dudgeon Point Coal Terminal (Hay Point DispMod v2.0).

The current modelling system (Hay Point DispMod v2.0) incorporates the more sophisticated CALMET meteorological model and the CALPUFF dispersion model, which are accepted for use by regulatory authorities in Australia. Hay Point DispMod v2.0 also incorporates an emissions model that is configured to represent the spatial and temporal emissions from DBCT at 85 Mtpa and HPCT at its current approved capacity of 55 Mtpa.

6.4.1 Emissions

Activities associated with the most significant emissions of particulate matter from coal terminals are conveyors, stockpiles, transfers and other activities such as bulldozing and excavators.

Dust emission rates from DBCT and HPCT were estimated in earlier studies from limited near source monitoring of TSP concentrations (GHD/Oceanics, 1975). Updated estimates were included in subsequent studies (Dames & Moore, 1996, Katestone Scientific 2000, Katestone Environmental 2005 and WBM 2004). For this air quality assessment, these estimates have been revised based on more recent emission factors reported in literature (e.g. National Pollutant Inventory Handbooks or the USEPA's AP-42 compilation of emission factors) and site-specific data obtained through the NPI reporting period 2014/2015.

For the majority of activities, the emission rate of particulate matter is dependent on the wind speed with little or no emissions occurring for some activities (e.g. stockpiles) below a wind speed threshold. For some activities (such as coal conveyors), wind speed and frequency of utilisation are important determinants of the emission rate. Other factors are also important such as coal type, coal moisture content, coal particle size distribution, rainfall and the mitigation measures that may be employed. A summary of emission rates for DBCT (8X Project) operating at 102 Mtpa is provided in Table 11:

Activity	TSP (g/s)	PM_{10} (g/s)	$PM_{2.5}$ (g/s)
Rail receival	0.17	0.08	0.01
Stacking	0.29	0.14	0.02
Reclaiming	0.57	0.27	0.04
Surge bin	0.17	0.08	0.01
Stockpiles - wind erosion	0.58	0.29	0.04
transfers - inloading	0.45	0.21	0.03
transfers - outloading	1.59	0.75	0.11
Ship loading	0.14	0.07	0.01
Conveyors	0.83	0.30	0.02
Other - bulldozing	1.53	0.50	0.03
Other - excavator	1.47	0.23	0.03
Total	**7.8**	**2.9**	**0.4**

Table 11: Summary of Emissions for DBCT (8X project) at 102 Mtpa

6.4.2 Results

Predicted concentrations are compared with limits specified in Condition B2 of DBCT's EA (Date of Issue, 19 October 2015), objectives specified in the *Air EPP* and EHP guideline documentation (EHP, 2013 and EHP, 2015). Also included is a comparison with the recently updated *Air NEPM* to assess potential impacts should the State based Air EPP objectives be revised to reflect the Air NEPM standards.

The modelling results, based on preliminary engineering, can be summarised as follows:

- Predicted maximum monthly dust deposition rates comply with Condition B2 of DBCT's EA at all receptors.
- Predicted maximum 24-hour average and annual average concentrations of PM2.5 comply with the relevant Air EPP and Air NEPM objectives and standards at all receptors.
- Predicted 6th high 24-hour average and annual concentrations of PM10 comply with the relevant Air EPP and Air NEPM standards at all receptors.
- Predicted 24-hour average concentrations of TSP comply with Condition B2 of DBCT's EA at all receptors except at Louisa Creek East (P2).
- Predicted maximum concentrations of PM10 comply with the Air NEPM standard of 50 µg/m3 (no allowable exceedances) at all receptors except at Louisa Creek East (P2).

The following tables reflect the modelling results:

Receptors	TSP 24-hour average (µg/m^3)			TSP Annual average (µg/m^3)	
	DBCT (8X Project) in isolation	DBCT (8X Project) and HPCT	DBCT (8X Project), HPCT and ambient background	DBCT (8X Project) in isolation	DBCT (8X Project), HPCT and ambient background
Louisa Creek West (P1)	19.2	40.7	101	3.3	52.6
Louisa Creek East (P2)	40.5	56.5	116	14.2	64.1
Half Tide (P3)	14.9	18.6	78.5	1.1	50.6
Salonika (P4)	11.4	12.4	72.3	0.7	49.6
Louisa Creek Central	26.4	36.4	96.3	7.8	57.4
Timberlands	6.0	8.1	68	0.3	48.9
Objective / EA Limit	**50 µg/m^3 (increase above background) (EA)**		**110 µg/m^3 (background + 50 µg/m^3)[a]**	**90 µg/m^3 (Air EPP)**	

Table note:
[a] limit of 110 µg/m^3 was calculated based on background + 50 µg/m^3 as per Condition B2 of DBCT's EA. A background of 60 µg/m^3 was determined from 75th percentile, 24-hour average for P4 from 2001 to 2011.

Table 12: Predicted ground-level concentrations of TSP

Receptors	PM_{10} Maximum 24-hour average (µg/m^3)		PM_{10} 6th high 24-hour average (µg/m^3)		PM_{10} annual average (µg/m^3)	
	DBCT (8X Project) in isolation	DBCT (8X Project), HPCT and ambient background	DBCT (8X Project) in isolation	DBCT (8X Project), HPCT and ambient background	DBCT (8X Project) in isolation	DBCT (8X Project), HPCT and ambient background
Louisa Creek West (P1)	9.7	38.5	7.4	26.0	1.7	15.3
Louisa Creek East (P2)	20.9	55.3	16.7	37.8	6.4	20.4
Half Tide (P3)	6.4	26.0	4.9	23.7	0.5	14.1
Salonika (P4)	5.2	22.5	3.2	21.5	0.3	13.6
Louisa Creek Central	12.4	41.2	10.6	31.9	3.8	17.6
Timberlands	4.6	23.1	2.9	20.3	0.2	13.3
Objective	**50 µg/m^3 (Air NEPM)**		**50 µg/m^3 (Air EPP)**		**25 µg/m^3 (Air NEPM)**	

Table 13: Predicted ground-level concentrations of PM_{10}

Receptors	$PM_{2.5}$ Maximum 24-hour average (µg/m^3)		$PM_{2.5}$ annual average (µg/m^3)	
	DBCT (8X Project) in isolation	DBCT (8X Project), HPCT and ambient background	DBCT (8X Project) in isolation	DBCT (8X Project), HPCT and ambient background
Louisa Creek West (P1)	1.3	6.5	0.25	2.79
Louisa Creek East (P2)	3.2	7.8	0.84	3.41
Half Tide (P3)	0.9	4.1	0.07	2.61
Salonika (P4)	0.7	3.9	0.05	2.57
Louisa Creek Central	2.0	6.2	0.52	3.07
Timberlands	0.7	4.1	0.04	2.55
Objective	**25 µg/m^3 / 20 µg/m^3 (Air EPP) / (Air NEPM goal for 2025)**		**8 µg/m^3 / 7 µg/m^3 (Air EPP) / (Air NEPM goal for 2025)**	

Table 14: Predicted ground-level concentrations of $PM_{2.5}$

Receptors	Dust deposition monthly average (mg/m²/day)		
	DBCT (8X Project) in isolation	DBCT (8X Project) and HPCT	DBCT (8X Project), HPCT and ambient background
Louisa Creek West (P1)	19.6	23.9	38.6
Louisa Creek East (P2)	46.5	47.4	62.0
Half Tide (P3)	5.7	10.0	24.7
Salonika (P4)	4.7	6.3	21.0
Louisa Creek Central	28.4	29.0	43.7
Timberlands	1.0	1.3	16.0
Limit / Guideline	**60 mg/m²/day (increase above background) (EA)**		**74.7 mg/m²/day (background + 60 mg/m²/day)[a] / 120 mg/m²/day (EHP model mining conditions)**
Table note: [a] A limit of 74.7 mg/m²/day was calculated based on background + 60 µg/m³ as per Condition B2 of DBCT's EA. A background of 14.7 µg/m³ was determined from monitoring data from 2001 to 2011.			

Table 15: Predicted dust deposition rates

Detailed engineering work as part of further developing the 8X concept will need to explore additional ways to mitigate emissions from the proposed development. As preliminary engineering design was used for the purpose of this current modelling, it is believed reductions in emissions may be possible at various terminal elements during advanced engineering.

Additionally, and in line with best practice long-term planning at and around this 'priority port' node, it is recommended that the form and extent of environmental buffers, particularly along the western boundary of the terminal, be examined further in conjunction with NQBP as the port authority.

It is recommended that the examination of enhanced port buffer options be highlighted as a priority issue in the formal State Port Master Planning endeavours (to be managed by the State of Queensland) scheduled to occur in 2017-2018. This is considered critical to ensure the protection of the port node and neighbouring areas into the future and consistent with the planning approach outlined in the Sustainable Port Development Act, 2015.

6.5 Noise Environment - Post Expansion

Predictive noise modelling has also been used to ensure future expansions are within reasonable limits and statutory guidelines as currently known. Due to their past experience with DBCT, Huson & Associates ("Huson") were again commissioned to model noise levels to determine the change in noise level in the environment surrounding the terminal up to and including the proposed 8X project.

The base case operations (permitted by the current environmental authority EPPR00504513 at a throughput of 89 Mtpa) considered in the noise model included Zone 4 works. This case is predicted to meet the target noise levels described in the EA.

6.5.1 License Conditions

The current noise conditions differ from earlier licenses in that D1 now refers to 'environmental nuisance' compared with earlier licenses that referred to 'unlawful environmental nuisance'.

In addition, noise sensitive places are expanded in the current license to include commercial and retail activity places.

The noise sensitive places from the *Environmental Protection (Noise) Policy 2008* are:

- dwelling (indoors and outdoors)
- library and educational institution (including a school, college and university) (for indoors)
- childcare centre or kindergarten (for indoors)
- school or playground (for outdoors)
- hospital, surgery or other medical institution (for indoors)
- commercial and retail activity (for indoors)
- protected area, or an area identified under a conservation plan under the Nature Conservation Act 1992 as a critical habitat or an area of major interest marine park under the Marine Parks Act 2004
- park or garden that is open to the public (whether or not on payment of an amount) for use other than for sport or organised entertainment

The licence changes in the latest environmental authority (EPPR00504513) now imply that the nearest sensitive place to DBCT to the south east of the terminal is the retail activity (shops) near to the new location of the P3 noise monitoring station, instead of the nearest dwelling.

Huson assumed that the commercial activities of NQBP (Ports control centre and public viewing area) and the adjoining Hay Point Coal Terminal were not considered to be Noise Sensitive Places.

6.5.2 Assessment of 8X Pathway (including Zone 4)

6.5.2.1 Noise Impact of 8X - Phase 1

The noise contribution from ST1, ST2, RL3 and the R2 conveyor are each more than 10 dB below the total DBCT site noise emissions measured at any of the nearest noise sensitive places.

No significant noise increases will be ensured through engineering associated with the stacker and reclaimer upgrades. A minor increase in noise emission from the R2 conveyor speed increase (approximately 1dB) is predicted but this will have no material effect on the noise levels observed in the surrounding community. No change in overall noise levels for any noise sensitive location surrounding DBCT are predicted at the conclusion of Phase 1 (8X). Importantly, Huson predicts that compliance with the current license conditions will be maintained.

6.5.2.2 Noise Impact of 8X - Phase 2

The opportunity exists to provide additional noise amelioration to the new RRP4 shed compared to that currently available from the existing RRP1 shed. Although a reduction in noise emissions from the new RRP4 shed can be gained, Huson (2016) conservatively assumed that no net noise reduction has been achieved and that RRP4 simply replaces RRP1 with the same noise emissions.

An upgrade of one of the outloading conveyors may produce a minor noise increase (approximately 1 dB), however, the change to the overall DBCT noise emissions observed at the nearest noise sensitive places will be insignificant.

The most significant increase in noise emissions from the Phase 2 (8X) expansion will be from the new IL4 and buffer storage which will produce a minor noise increase to the south east of the DBCT.

The net change in noise level at P3 (representative of the nearest noise sensitive place to the south east) is from 49.6 dB(A) to 50.3 dB(A), an increase of less than 1 dB and remaining below the 53 dB(A) night time noise limit in the EA.

6.5.3 Conclusions

After completion of the two phases of the 8X expansion Huson (2016) predicted no change in sound levels at noise sensitive places in the region around Louisa Creek to the west of DBCT. A minor noise increase of less than 1 dB(A) was predicted in the noise sensitive places near to the new P3 noise monitoring station in Hay Point to the east and south east of the DBCT. However, the increase in noise level would remain compliant with noise level limits in the current environmental authority.

A minor noise increase of less than 1 dB(A) was also predicted for some of the noise sensitive places around Horsburgh Road that is to the west of the DBCT rail loop.

Importantly though, increased noise level would also comply with noise level limits in the current environmental authority.

7 Stakeholder Consultation

7.1 Public Consultation Process

The Port of Hay Point Community Reference Group (CRG), which is facilitated by North Queensland Bulk Ports (NQBP) has been a critical link between DBCT and the community. Membership of the CRG currently includes representatives of DBCTM, DBCT P/L, NQBP, Mackay Regional Council and the local communities of Louisa Creek, Mirani, Sarina, Half Tide and the Droughtmaster Drive area. The general public is invited to attend meetings as observers, with questions taken from the floor. The CRG publishes minutes of meetings, as well as an official newsletter that is made available to communities. At the last meeting of the CRG in May 2017, it was agreed by all parties that the group would only reconvene when there was a compelling reason to meet. In early 2018, DBCTM initiated the reconvening of this group in the first half of 2018 on the basis of expected increases of coal throughput over coming years.

The Port of Hay Point CRG discusses a wide range of local concerns and is kept abreast of general developments at DBCT. This provides an ongoing general public forum to ensure the community is well informed about DBCT issues that affect the whole of port stakeholders. In turn, DBCTM and DBCT P/L are able to consider and gauge general community concerns as part of the ongoing DBCT planning process.

Because the more specific issues associated with the operations of DBCT were sometimes confused with the whole of port group, the DBCT P/L undertook to commence its own Community Working Group (CWG). This group is represented by community members, local government, DBCT P/L, the local State member of parliament and DBCTM. The primary goal of the group is to facilitate open two-way communications that enhance understanding of issues specifically associated with the terminal and to build trust between the members.

Environmental performance remains a source of concern for the community, and this double strategy will ensure community relations are maintained, especially as production increases and environmental risks increase. As part of ongoing efforts to further improve public consultation, DBCTM is initiatingother, more direct means of engaging with the local community (such as public information sessions and one-on-one briefings for local government).

DBCTM also recognises that expansion projects may create additional community pressures that are not related to the terminal's operations. Accordingly, DBCTM takes an active role with the community by promoting stakeholder knowledge of future expansions.

CRG meetings have been traditionally held every three months and CWG meetings are held every two months. Since mid-2014, DBCTM has regularly updated these forums on current and future projects. Current and future projects may include those undertaken as Non-Expansionary Capital Works, projects contemplated by the Master Plan, and feasibility studies. These forums are aware of the projects in the Master Plan. A detailed presentation on the updated draft Master Plan was also given to the CWG in February 2018. Considering that there is no change to the expansion pathway, and the motivation for developing Master Plan 2018 was largely to address the commercial difficulties of executing an expansion under the current 2017 Access Undertaking (see section 5.7 of this document), it was determined that no update to the community CRG was required prior to the Master Plan's release. The CWG will be informed of progress when it is reconvened later in 2018.

7.2 Community Engagement Strategy

The primary objective of a community engagement strategy is to assist in the provision of a stable social operating environment for the business and to allow DBCT to expand to meet industry demand. DBCTM's community engagement strategy is based on the following:

- Informing and educating the community regarding the terminal's operating philosophy and activities including values, history, commitment to sustainability, security, among other things.
- Working to continually improve relations with the immediate community through successful community engagement and relationship building.
- Proactively strengthening key stakeholder relationships outside the immediate community.
- Effectively and efficiently managing complaints and issues.
- Promoting greater integration/interdependence between the community and the terminal over the long term.

A multi-faceted approach to Community liaison has been adopted, as no single plan, including attendance at the Port of Hay Point Community Relations Group (CRG), can satisfy all of the expectations of various community groups and individuals.

Typical responsibilities of this liaison role include the following:

- Meet and greet activities, including working with local schools and TAFE colleges, managing site tours, visits and handouts. This forms an integral part of the community information and education campaign.
- Interaction with the CWG local advisory group.
- Production of written material on how the terminal operates, its values, history, environmental initiatives, etc.
- Development of local employment, primarily through the non-expansionary capital works program and DBCT expansion projects, as well as ongoing terminal operations.
- Speaking engagements at local clubs, council, and industry groups.
- Response to community input or issues.
- Maintaining a website to better inform interested parties of terminal related matters.

7.3 Key Stakeholder Relations Program

While the focus of this strategy is community engagement, external stakeholders also need to be included in terminal information releases. These external stakeholders include:

- approval agencies, e.g. Environmental Protection Agency and the Queensland Department of Environment and Science
- elected representatives (State, Federal and local Government)
- Ministers relevant to the operation or expansion of the terminal

- media
- environmental groups, and
- local government officers from such agencies as Department of Natural Resources & Mines and Queensland Health

As such, community engagement programs have been extended to include communication with key stakeholders in order to ensure proactive relationships with these parties.

DBCT is only one component of the Goonyella coal supply chain and relies on the performance and alignment of the upstream and downstream stakeholders to operate at maximum efficiency. As a result, DBCTM continues to place a strong emphasis on maintaining a cooperative relationship with its stakeholders.

Given the expansion pathway presented in this Master Plan is identical to the previous Master Plan (2016) the level of consultation needed in the development of this Master Plan has not been as significant as it has been in previous Master Plans. Nevertheless, this Master Plan (2018) has been prepared by DBCTM in consultation with current stakeholders, identified as follows:

- Local neighbouring communities – via CRG and CWG meetings since mid-2014 with a detailed presentation given to the CWG in February 2018.
- North Queensland Bulk Ports – February 2018.
- Queensland Department of Transport & Main Roads (TMR) including the Ports and Transport Governance Unit and the Sustainable Ports Planning Team - March 2018.
- DBCT Access Holders - February and March 2018.
- DBCT Access Seekers - February and March 2018.
- The DBCT terminal Operator (DBCT Pty Ltd) – Ongoing and specifically in February 2018.
- Aurizon Network (rail network provider) – March 2018.
- Aurizon National - March 2018.
- Pacific National – March 2018.
- Integrated Logistics Company – January 2018.

7.4 Management of Complaints and Issues

It is important for any organisation undertaking community engagement to field and manage community input and complaints in an efficient and effective manner. Dedicated channels of communication and protocols have been established to facilitate management of community suggestions and issues which include both the terminal Operator and any major works contractors.