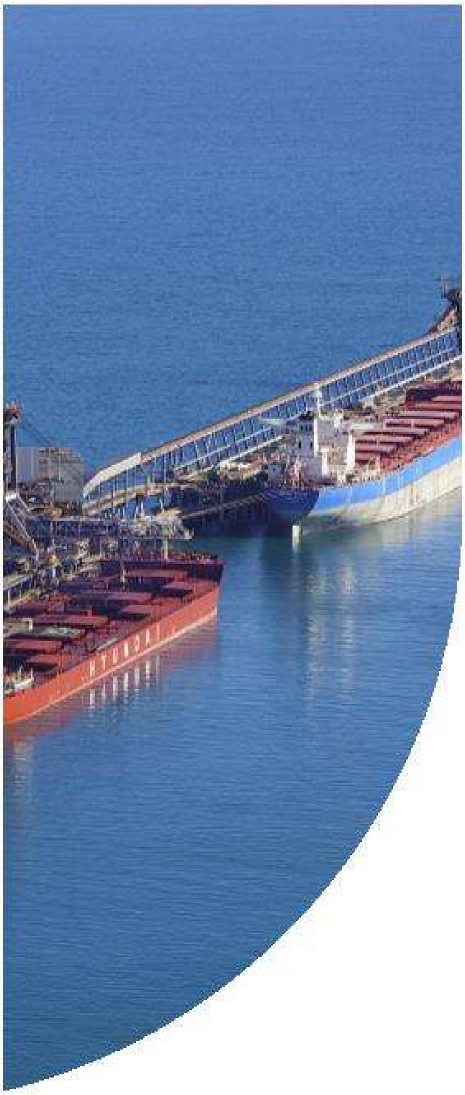

Dalrymple Bay Infrastructure Management

Master Plan 2021

Expansion Opportunities at Dalrymple Bay Terminal

Rev	Date	Revision details	Author	Verifier	Approver
1	31-Mar-21	Draft issued for approval	PW	JK	AT
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Document owner	Next revision date
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1. Executive Summary

In the decade after commissioning the last expansion of DBT to 85 Mtpa in 2009, other than short term disruptions resulting from the GFC, weather events and COVID-19 shutdowns across the world, DBT's annual throughput has generally been stable between 60 and 70 Mt annualised. As a result, since the 7X expansion significant headroom has existed between supply chain capacity and actual throughput. Since late 2016, as a result of strong global crude steel production, the price of hard coking coal (**HCC**) has generally remained above US$100/mt FOB. This improved outlook contributed to a sustained increase in demand for capacity at DBT, resulting in Access Seekers entering into approximately 15 Mtpa of new Access Agreements to service their coal projects and operations. Consequently, the headroom between capacity and throughput is expected to diminish in the short to medium term, putting pressure on the supply chain to deliver levels of throughput nearing contracted capacity.

Dalrymple Bay Infrastructure Management Pty Ltd (**DBIM**) is obliged by the Port Services Agreement (**PSA**) and the Access Undertaking (**AU**) to accommodate the actual and reasonably anticipated future demand of DBT's Users and access seekers. Accordingly, DBIM has continued to plan DBT's post-85 Mtpa expansions to meet this foreseeable demand.

While global metallurgical coal demand growth is widely anticipated to continue, the timing of demand for expansions has historically proven difficult to forecast. Mine developers appear to be undertaking their mine developments in a more measured way than during previous commodity booms. This measured approach is expected to increasingly favour incremental expansions of supply chain capacity. This Master Plan builds on previous Master Plans to outline a sustainable and incremental expansion pathway for DBT, consistent with government policy relating to development along the Queensland coastline while recognising the regulatory and other hurdles that need to be cleared prior to commencing any development works.

DBT Background (Chapter 2)

Chapter 2 reviews DBIM's involvement in the terminal and describes the asset in terms of land use and geographical location, including a brief history of the terminal and the progression to DBT's current configuration. Various elements of DBT's operations are discussed, including a description of the major plant, machinery and infrastructure that comprise the terminal to deliver contracted capacity. The region encompassing the terminal and the land leases that make up the terminal footprint are also outlined.

The chapter also deals with the Master Planning process and DBIM'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 DBT and highlights recent changes to the Access Undertaking which influence expansion activities.

Current Operations (Chapter 3)

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

Future Supply and Demand (Chapter 4)

This chapter assesses global demand and supply prospects in the context of triggering further expansions at DBT. 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.

DBIM expects increases in demand from the usual importing regions including Japan and South Korea, while India and South-East Asia drive further growth for coal handled by DBT.

Competing supply regions do pose a threat to DBT's demand, particularly Mongolian, Russian and Canadian coal production, however these regions are not expected to materially impact the long-term growth of coal production in the Central Bowen Basin. Continuing demand for coal produced in the Central Bowen Basin is expected to drive demand for expansion capacity at DBT. While there is no way to reliably predict the timing of expansions, DBIM has developed this Master Plan with the intent of having a clearly outlined development pathway that can be triggered when genuine demand exceeds available capacity.

DBT Expansion Options (Chapter 5)

This chapter outlines the proposed incremental expansion pathway for DBT. The expansion pathway has remained essentially unchanged from Master Plan 2019 with only some refinement of scope and capacity. Independent Capacity modelling undertaken by the ILC has shown that the refined 8X scope can deliver a total System Capacity of 99.1Mtpa, up from 97.5Mtpa (Master Plan 2019).

During 2020, having executed Standard Underwriting Agreements with five Access Seekers (Underwriting Parties), DBIM undertook a FEL 2 (pre-feasibility) study for 8X. The FEL 2 study further developed the scope of the 8X projects and identified a single go forward option to expand the terminal to its full potential within its current footprint. The FEL 2 studies determined that the four phases identified in Master Plan 2019 were appropriate and, with some relatively minor scope elements added to Phase 2, 8X can deliver an additional 14.9Mtpa at an expected cost of $1,276m. Significantly, several items of scope required to achieve the capacity delivered by 8X, or support the expanded terminal, would be needed in the next few years even if 8X were not developed. Some of these items have already been highlighted by the Operator as potential future Non-Expansionary Capital (**NECAP**) projects.

The 9X project remains a future expansion option beyond 8X. The earliest completion of the four phases of 8X is 2028. The 9X project will therefore not be further considered for several years while the 8X project is underway.

Alignment with Sustainability Framework (Chapter 6)

Building on programs and initiatives already in place, DBT released a 'Sustainability Strategy' in 2020, a joint commitment of DBIM as owner, and Dalrymple Bay Coal Terminal Pty Ltd (**DBCT P/L**) as operator. The Strategy was developed to be consistent with Ports Australia's 'Leading Practice Guidelines' and was based on the United Nations Sustainable Development Goal framework. This chapter outlines how the DBIM Master Plan aligns with the DBT Sustainability Strategy.

Environmental Values & Adaptive Management Approach (Chapter 7)

This chapter outlines identified critical environmental issues relevant to the expansion projects and regulatory approval requirements.

This Master Plan aligns with leading practice guidelines and policy set by the Commonwealth & State Governments by ensuring early consideration of environmental values for development along the coast adjacent to the Great Barrier Reef. Further, the intentional maintenance and enhancement of port environmental buffers through terminal planning and design will maintain 'port protection' between the terminal and neighbouring areas.

The Master Plan demonstrates that the preferred 8X expansion pathway outlined in Chapter 5 is not expected to significantly compromise the anticipated environmental outcomes for terminal operations, including existing Environmental Authorities, however advanced engineering work and further dust and noise modelling will be required to properly determine robust management responses.

Stakeholder Consultation (Chapter 8)

Chapter 8 details DBIM's interface with stakeholders in terms of current operations and future expansion of the terminal. DBIM's participation in the local community groups is detailed together with DBIM's overall engagement strategy. This chapter also includes details of the consultation process that DBIM undertook while preparing Master Plan 2021.

2. Introduction and Background

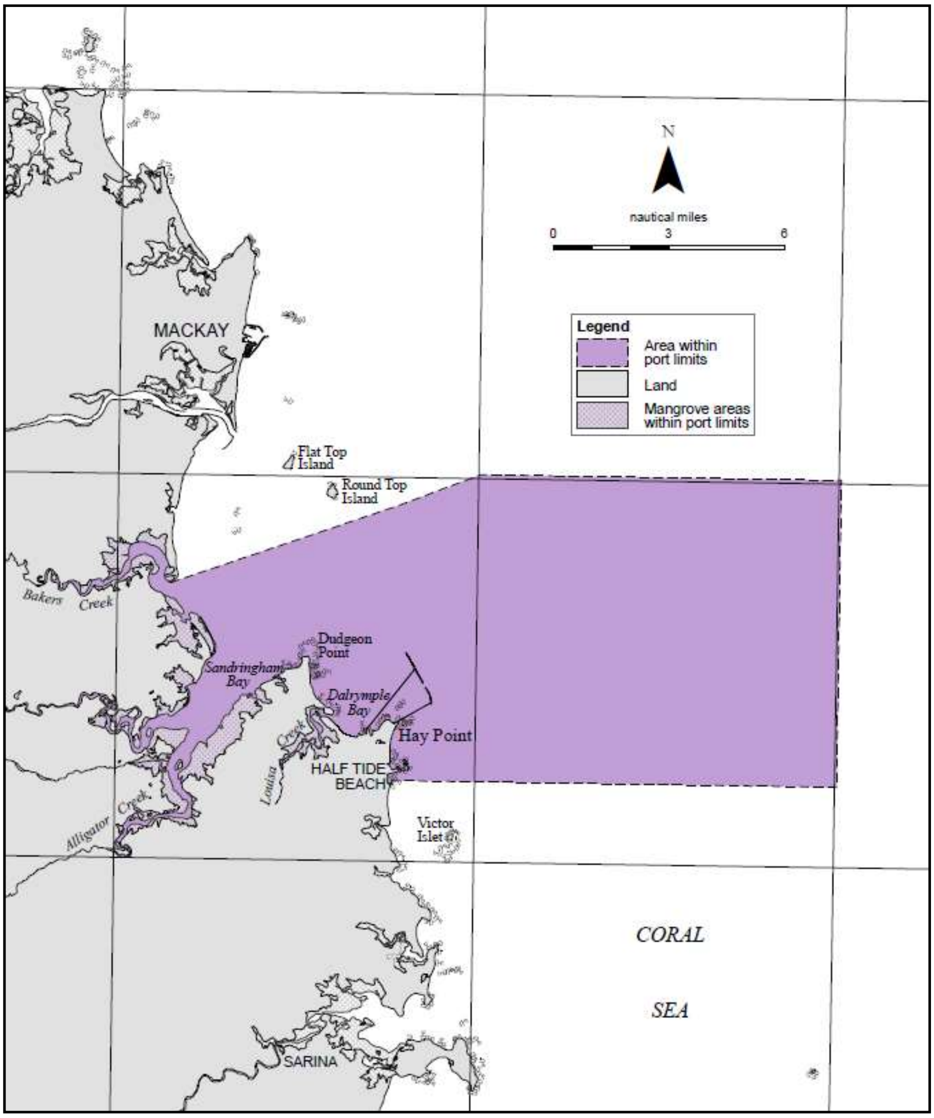
2.1 Background to DBT

DBT 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, now NQBP) and DBCT Holdings P/L, awarded a long-term lease of DBT (a 50-year term with a 49-year renewal option) to a consortium known as Coal Logistics–North Queensland (CL-NQ). Since a change of ownership in 2009 to Brookfield Infrastructure Partners (BIP), DBIM (formerly DBCTM) has held management responsibility for DBT.

DBIM's parent company DBI was listed on the ASX in December 2020 and for the purposes of this document, DBIM represents the leaseholder and related entities responsible for fulfilling the duties related to the DBT lease, the obligations contained in the PSA and any of the head leasing agreements.

The Port of Hay Point is approximately 38 km south of Mackay and includes two coal terminals - DBT and Hay Point Coal Terminal (**HPCT**) (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 Central Bowen Basin coalfields (Figure 2) by the electrified Goonyella rail system operated by Aurizon Network. Figure 3 shows DBT in the foreground.

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

Figure 3: Port of Hay Point

The daily terminal operations and maintenance activities are undertaken by DBCT P/L, a third-party service provider owned by a majority of DBT's Access Holders (by contracted capacity). Terminal operations and maintenance activities are undertaken by DBCT P/L under an evergreen Operation and Maintenance Contract (**OMC**).

Additional information is available from dbinfrastructure.com.au and dbct.com.au.

DBIM and the Operator jointly released an inaugural terminal Sustainability Strategy in 2020. This sustainability strategy was developed in line with Australian Port Industry Best Practice Guidelines. Detail of the Sustainability Strategy is available on both websites. The alignment of this Master Plan with the Sustainability Strategy is covered in more detail in Chapter 6.

The land use surrounding the port is a mix of agricultural, rural/residential and urban. The residential communities neighbouring DBT and HPCT (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 DBIM's master planning and development process.

Figure 4: Position of DBT relative to the local area

2.2 Current Asset Description

2.2.1. Basic Configuration

DBT's basic configuration can be described as 3 rail receiving stations, a stockyard and 4 offshore berths all connected by a series of conveyor systems. DBT is situated on approximately 214 hectares of strategic port land and 160 hectares of offshore 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 133 SP256544
- 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 km from the rail inloading stations to the land side end of the jetty, with the wharves a further 3.8 km offshore. The DBT system capacity is approximately 85Mtpa, and combined with the capacity of HPCT (55 Mtpa), the Port of Hay Point is one of the largest bulk export coal ports in the world.

DBT is a common-user facility, handling a wide variety of coal types from eleven coal producers. DBT handles three commercial coal categories, including coking coal, Pulverised Coal Injection (**PCI**) coal, and thermal coal. Coal types can be further blended from the terminal's stockpiles to create many different blended products. The majority of DBT's exports are shipped on a Free on Board (**FOB**) basis. The customers of DBT's Users (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.

DBT uses the following plant and equipment to deliver contracted 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 - stack rates from 4,250 - 5,500 tph and reclaim rates from 3,700–5,300 tph
- 7.5 stockpile rows, each approximately 1,100 m in length (note that row 8 is a half row). Maximum designed volumetric yard capacity is 2.3 Mt
- 3 outloading systems (OL1, OL2 & OL3) and 3 shiploaders –7,200 tph (SL1), 7,600 tph (SL2), and 8,650 tph (SL3)
- 4 berths capable of receiving cape size vessels
- SL1 serves Berths 1 & 2, SL2 serves Berths 1 & 2, and SL3 serves Berths 3 & 4
- OL1 serves SL1 & SL3, OL2 serves SL2 & SL3, and OL3 serves SL2 & SL3

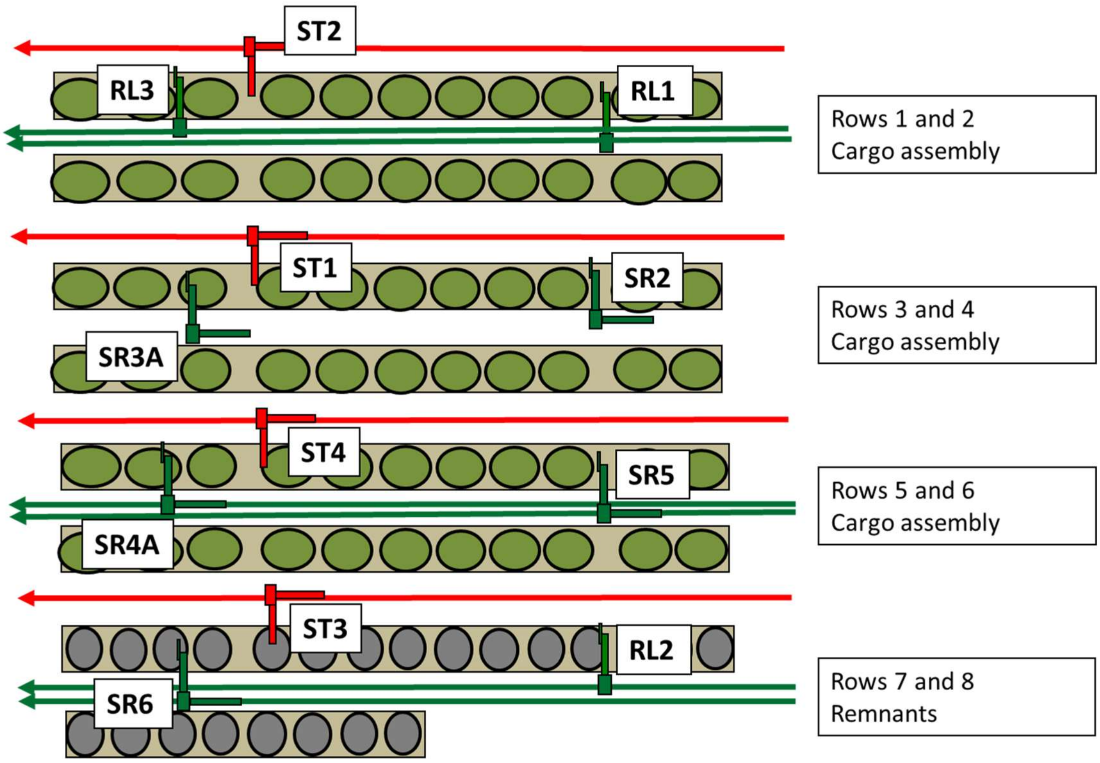
2.2.2. Inloading

DBT has 3 inloading stations, feeding 3 inloading conveyor systems which deliver coal to the DBT stockyard. The inloading stations can accept a number of different train configurations and wagon types from any one of 4 above-rail haulage operators (Pacific National, Aurizon National, BMA Rail and OneRail). The coal wagons are bottom dump type, with the coal dropping 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 DBT stockyard. This configuration gives DBT's operator ultimate flexibility when planning the location of stockpiles in the DBT stockyard.

2.2.3. Stockyard

The stockyard consists of 8 machinery bunds which support 12 yard machines and 7½ stockpile rows. These rows are each divided into three "cells" containing stockpiles (separated by drainage pits). The 12 yard machines include 4 stackers, 3 reclaimers and 5 stacker-reclaimers laid out as per Figure 5.

Figure 5: Stockyard layout of DBT 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 and size of the stockpiles in each row.

Table 1: Stockyard row volumes (m^3) – (DBCT Pty Ltd, 2019)

Row	1	2	3	4	5	6	7	8	Total
Volume	288,782	272,545	290,352	331,663	311,016	385,990	301,221	185,165	2,366,734

The stockyard has de-linked 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 2 reclaiming machines available to each outloading system. Under normal operating circumstances, 2 reclaiming machines dig from 2 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 shown in Table 2 below.

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

Yard machine	ST1	ST2	ST3	ST4	RL1	RL2	RL3	SR2	SR3A	SR4A	SR5	SR6
Stacking rate	5,500	6,000	8,100	8,100				4,250	5,500	5,500	5,500	5,500
Reclaim rate					5,300	5,300	4,250	3,700	5,300	5,300	4,500	4,300
Throughload rate						5,500	4,250	4,250	5,500	5,500	5,500	5,500

Operationally, the DBT stockyard is divided into 4 independent zones, which are usually paired with a single outloading system and generally operate under the following configuration:

Zone 1 includes the southern end of stockyard rows 3, 4, 5 and 6, and normally feeds the first outloading system. Zone 1 is shown in brown in Figure 6.

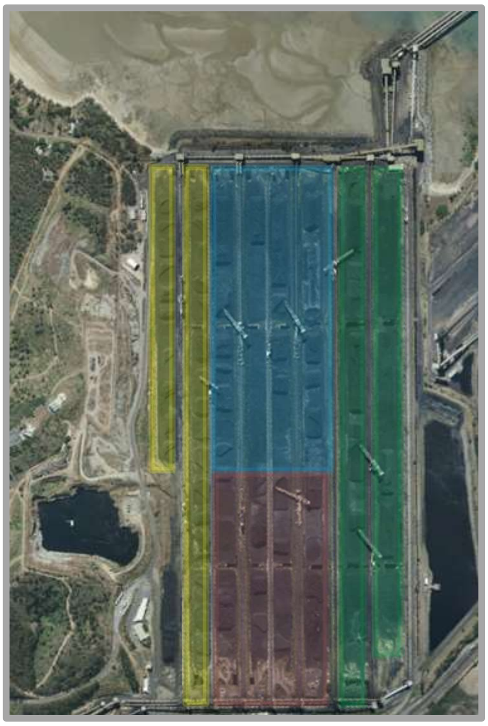
Zone 2 includes stockyard rows 1 and 2, and normally feeds the second outloading system. Zone 2 is shown in green in Figure 6 .

Zone 3 includes the northern end of stockyard rows 3, 4, 5 and 6, and normally feeds the high rate third outloading system. Zone 3 is shown in blue in Figure 6 .

Zone 4 includes row 7 and the half row 8 (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 (Section 3.1.2).

Zones 1 to 3 are referred to as the dynamic zone, while Zone 4 is referred to as the static zone.

Figure 6: DBT zonal configuration



2.2.4. Outloading

Each of the outloading conveyor systems is normally paired with a rate-matched shiploader. In this configuration, the pair of reclaiming machines, the outloading conveyor system and the shiploader have matched rates 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 OL1 feeds coal to SL1.
- Outloading system OL2 feeds coal to SL2.
- The high-rate outloading system OL3 feeds coal to the high-rate SL3.

SL1 and SL2 are normally dedicated to Berths 1 & 2 respectively with SL3 loading coal into vessels on both Berths 3 & 4.

2.2.5. Water Management Infrastructure

The water management infrastructure on the site is shown in Figure 7 and 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 via an 800 mm pipeline installed beneath the stockyard. The ID is maintained at a low level to maximise the available buffer storage, and to minimise the risk 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 when excess water is harvested from the ID during periods of sustained heavy rainfall. Transfer pumps can also return water from the RLD through the same pipeline back to the QD in the dry season to support operations.
- 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 to the ID to further improve the coal fines sedimentation and recovery process.

Figure 7: Water Management Infrastructure

2.3 Contractual Framework

2.3.1. Requirement for a Master Plan

The PSA requires DBIM 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. In 2020, DBIM wrote to DBCT Holdings advising that there had been no changes in circumstances, demand, technology or other relevant matters since the approval of Master Plan 2019 and requested that DBCT Holdings accept the approved Master Plan 2019 as if it were lodged as a draft Master Plan 2020. DBCT Holdings accepted and approved Master Plan 2019 as having met the requirements for Master Plan 2020. Therefore, no separate

Master Plan was prepared for 2020, however DBIM considers circumstances are sufficiently different to justify the issue of an updated Master Plan in 2021. This Master Plan has been drafted to:

- ensure that DBT is developed in accordance with Access Applications for terminal capacity, infrastructure planning best practice, principles of environmental sustainability, applicable laws and the balanced interests of its stakeholders;
- ensure the PSA requirement for any expansion to be both economic and reasonable is satisfied;
- ensure the responsible alignment of supply chain infrastructure;
- ensure compliance with contractual commitments and statutory obligations for master planning that meet the requirements of the PSA;
- ensure a continued 'leading practice' approach to port/terminal planning within the GBRWHA.

2.3.2. Whole of System Master Planning

The ILC maintains an integrated System Master Plan and a dynamic simulation model for the Goonyella Coal Chain, encompassing all mines in the Goonyella and Newlands Systems, in addition to:

- The below rail infrastructure and operating methods and principles.
- DBT infrastructure and operating methods.
- HPCT infrastructure and operating methods (modelled as a confidential black box)
- North Queensland Export Terminal (**NQXT**) infrastructure and operating methods
- Port Channel and vessel movement practices.

To prevent misalignment of infrastructure development, ILC capacity assessments seek to align future supply chain infrastructure expansions across all asset owners and operators through:

- the development of a common set of inputs and assumptions for the determination of system capacity
- 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 aligning and assessing alternative infrastructure expansion options in the Dalrymple Bay Coal Chain (**DBCC**)

The development and implementation of the ILC System Master Plan and dynamic system model was part of a longer-term solution to improve the performance of the Goonyella Coal Chain.

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

The ILC modelling establishes the pre-expansion system capacity as 84.2Mtpa.

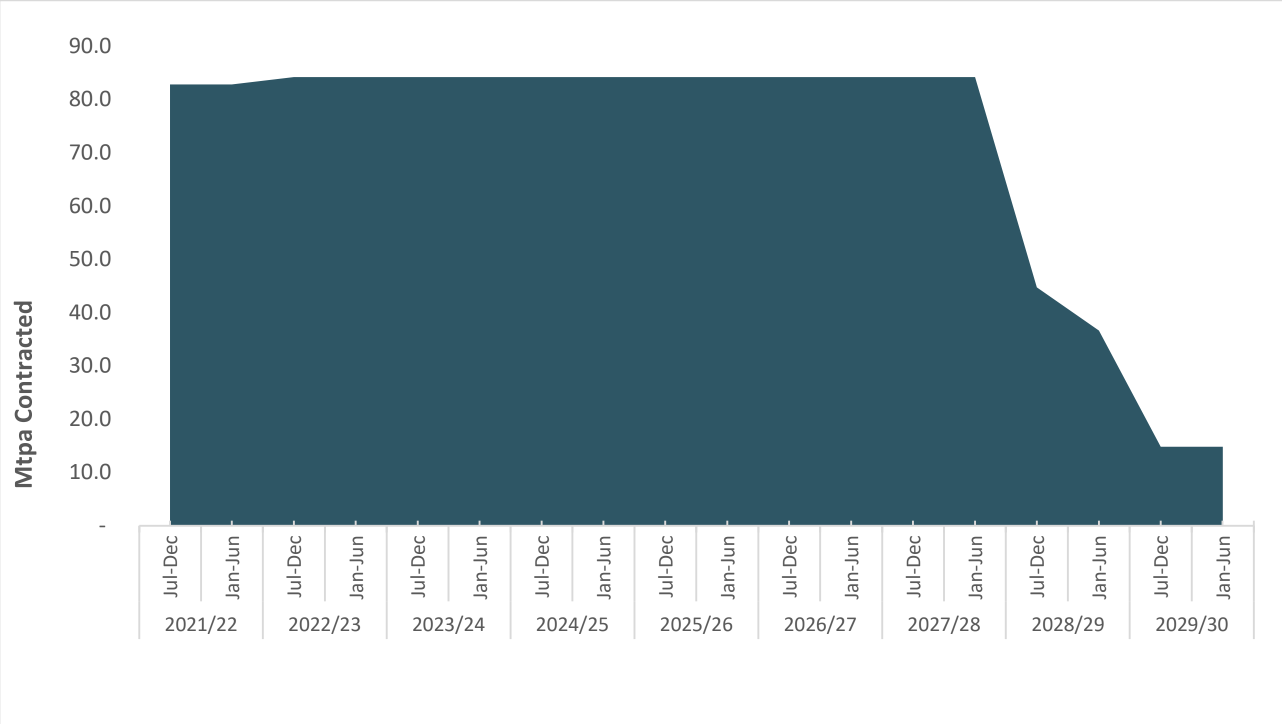
2.3.3. Contractual Position

Access to DBT is contracted generally in accordance with the Standard Access Agreement (**SAA**), which forms a part of the AU. The SAA underpins negotiations between an Access Seeker and DBIM for contracting capacity at DBT. 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. From time to time this renewal mechanism can cause the expiry profile of various contracts to appear imminent and substantial. Historically, the majority of expiring contracts have been extended prior to expiry of the extension option. In the past decade Access Holders have optimised their take-or-pay obligations, leading to some contracts not being extended and existing system capacity being made available to Access Seekers.

DBT is currently fully contracted and is unable to satisfy the demand of all Access Seekers. There are also no contract expiries due prior to 2028.

The contracted volumes, as at 1 January 2021, are shown in Figure 8.

Figure 8: DBT Contract Profile - February 2021 (assuming no extensions)



2.4 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**). Reef 2050 has been in place for several years. DBIM supports the direction of 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.

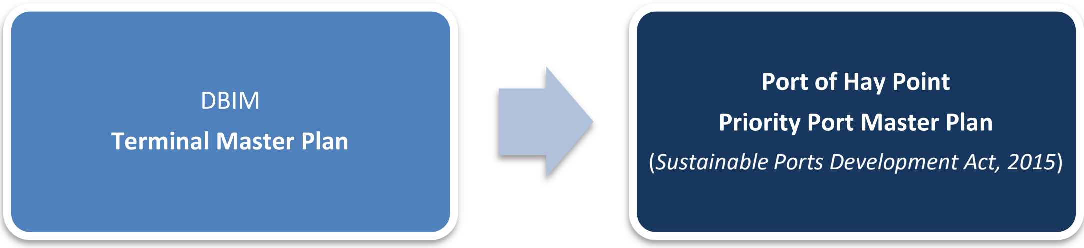
This Queensland legislation outlines a number of initiatives including:

- 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 are to be prepared by the State in consultation with port entities, relevant local governments and other state entities such as the Department of State Development and the Department of Environment & Science.

DBIM views this Terminal Master Plan as a critical input (an informing document) for the State Port Master Planning process, as shown in Figure 9.

Figure 9: Queensland Planning Process



2.4.1. Proposals for Land Use and Site Development

Regulatory approvals will be required from Commonwealth and State Governments for the proposed expansion pathway. The exact nature and extent of these approvals can only be precisely determined once; engineering design is further progressed, exact development footprints are better understood, and the timing of expansion steps (i.e. individual developments or grouped expansion packages) is confirmed.

To robustly address Commonwealth requirements, and in line with best practice governance in the Great Barrier Reef Coastal Zone, referral of the expansion pathways (up to and including the 8X project) under the Environment Protection & Biodiversity Conservation Act, 1999 (**EPBC Act**) was undertaken in December 2020.

The Commonwealth Department of Environment assessed technical information covering land use, ecology, air quality, acoustics (terrestrial and underwater/marine), infrastructure, vegetation and cultural heritage management. The Department of Environment advised on 17 February 2021 that the 8X Project was deemed to be a 'Non-Controlled Action' and as such, no approval under the EPBC Act would be required (ref: 2020/8860). The 9X expansion pathway was not part of this referral due to limited detail. The 9X expansion pathway will need to be referred to the Department of Environment in the future.

NQBP is the Assessment Manager for development on Strategic Port Land on behalf of the State of Queensland. NQBP will coordinate assessments under Queensland legislation. It is anticipated that this will involve approvals under the following tier one Acts:

- Transport Infrastructure Act 1994 (**TIA**) (i.e. Port Development Assessment)
- Coastal Protection and Management Act 1995 & Fisheries Act 1994 (ie. Coastal Zone, Tidal Works & Marine Plant matters – via the State Development Assessment Provisions and relevant State Codes)
- Environmental Protection Act 1994 (i.e. Environmental Authority matters)

Preliminary discussions have indicated consistency with the Port of Hay Point Land Use Plan (**LUP**) for all expansion options. It is anticipated that the existing LUP will be amended following (or concurrently with) the preparation of an NQBP Long term Development Plan (**LTDP**) and the formal State Port Master Plan under the Sustainable Ports Development Act (2015). DBIM has been consulted regarding these plans by both NQBP and the relevant State Department.

Figure 10 shows the current offshore and onshore areas defined as Strategic Port Land at the Port of Hay Point. Figure 11 shows DBT more specifically.

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

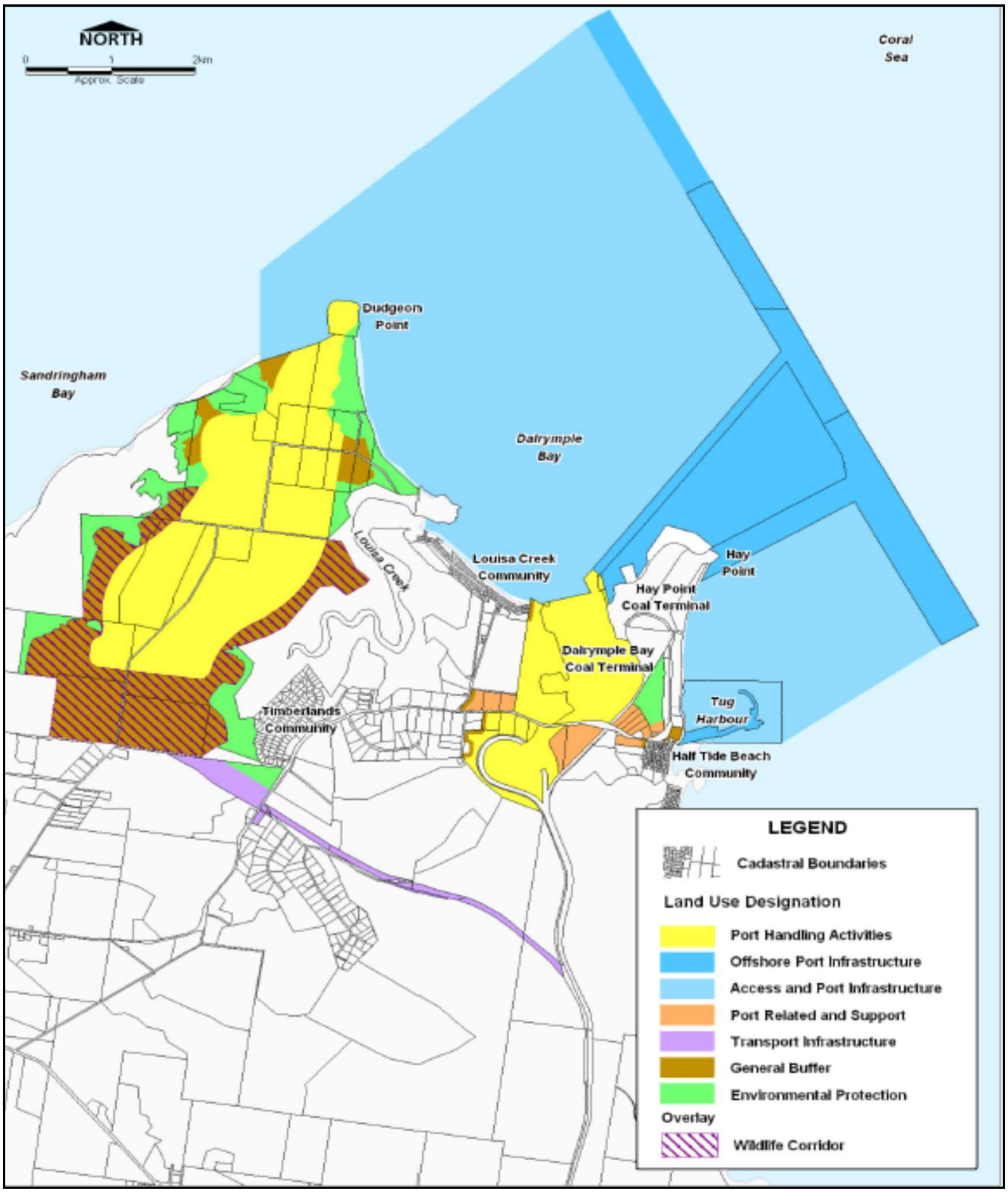
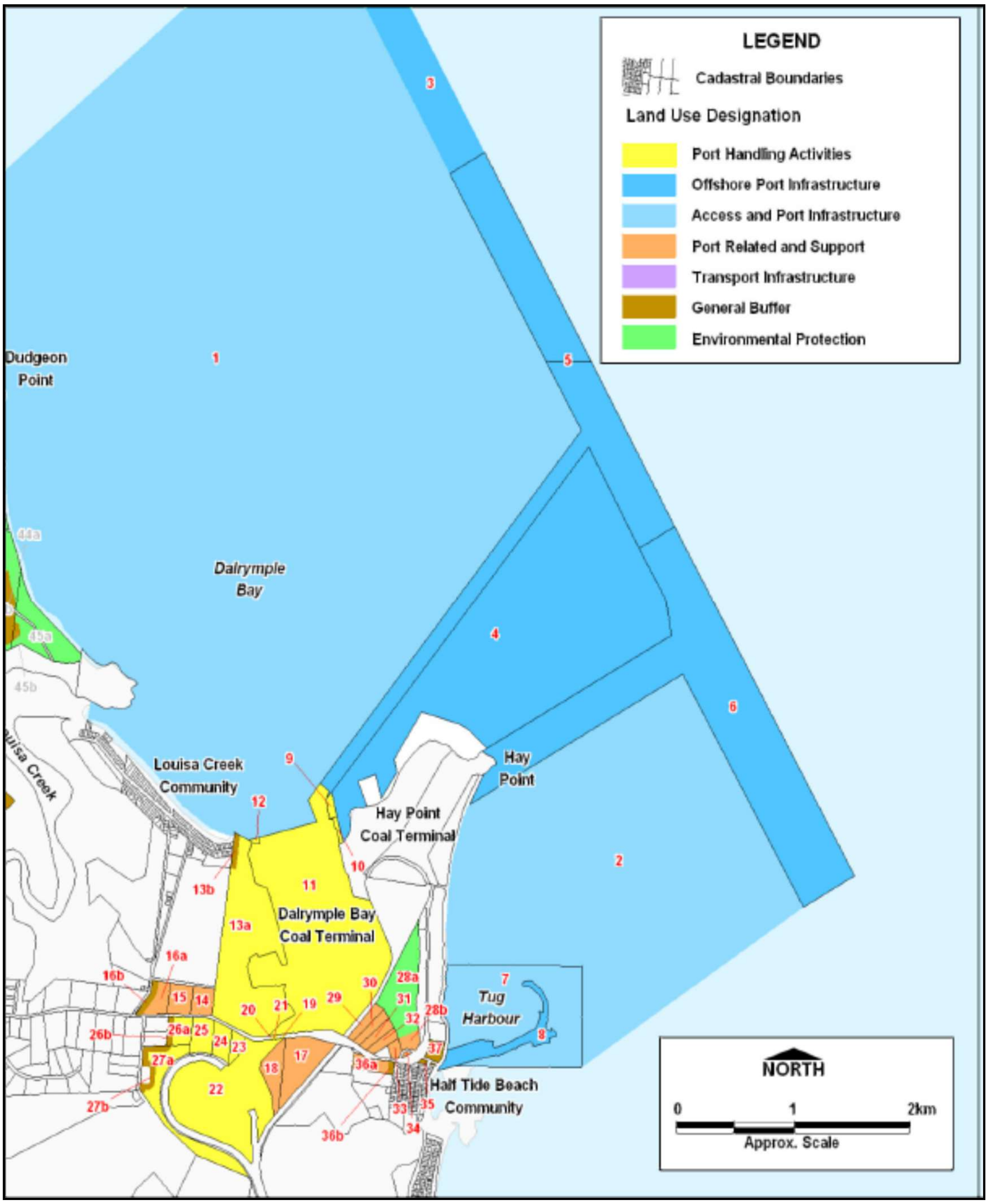


Figure 11: DBT development on Strategic Port Land



2.5 Access Regime

The coal handling service at DBT is declared for third party access under the Queensland Competition Authority Act (1997) (**QCA Act**). An Access Undertaking (**AU**) details the terms and conditions under which third parties can access DBT's services.

Commencing with the 2010 AU, DBIM has only been able to contract available system capacity[1] rather than standalone terminal capacity. 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 efficient manner, determined collaboratively by all system participants.

2.5.1. Access Applications

Access Applications are the instrument that the Access Seeker uses to inform DBIM of its current or future requirements for terminal capacity. When capacity is made available, either due to expansion, a contract expiry , or a terminated contract, DBIM must offer the capacity to the DBT 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. Available Capacity is offered to and contracted in accordance with Section 5.4 of the AU.

If an access seeker intends to contract available capacity, it is required to enter into an Access Agreement (AA) with DBIM. If an access seeker executes an AA to contract for access to DBT, 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 contractual capacity requested in the access application has not been satisfied in full and that there is not sufficient available system capacity to service this remaining tonnage.

2.5.2. Expansion pricing under the 2017 Access Undertaking

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 DBIM 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] 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 DBT
[2] QCA Capacity Expansion and Access Pricing for Rail and Ports April 2013 p. iv
[3] Section 11.13 of the AU – Expansion Pricing Principles

- *the materiality of the increase in the Existing Terminal's Reference Tariff that would be affected by socialising the Cost Sensitive Expansion*
- *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*
- *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)*
- *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*
- *any other factor that the QCA considers relevant."*

It is DBIM's view that the 8X Expansion outlined in this Master Plan is a Cost Sensitive expansion that satisfies the exceptions listed above, such that Access to the expanded terminal should be priced on a Socialised basis. This is discussed further in Section 5.4.9.

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 philosophies:

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

The selection of operating mode depends on the number of discrete coal products to be accommodated and the available space for stockpiling those coal products.

A dedicated stockpile approach allows terminal users to stockpile large amounts of coal at the terminal, independent of:

- a vessel waiting within the port limits to load that product
- a vessel being in transit to the loading terminal

In a dedicated stockpiling terminal, the User will typically rail coal to the terminal when the coal is ready for railing from the mine site and a train is available to haul the coal to the terminal. 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 dedicated stockpile by railing product evenly from the mine to the export terminal.

Because of the irregular demand pattern for an individual product and DBT's available storage space in the stockyard, dedicated stockpiles cannot be maintained for all of DBT's customers. DBT utilises a cargo assembly/hybrid approach to coal stockpiling . Unlike a dedicated stockpiling operation, a cargo assembly operation requires railing of products in accordance with the requirements of arriving vessels. In the DBT cargo assembly operation, a vessel typically provides its Notice of Readiness (NoR) to indicate it is ready in all respects to commence loading. Once all parcels to be loaded on the vessel are produced by the mine and made available for railing, the above-rail operators deliver the coal to an allocated space in the terminal stockyard. Railings to complete the vessel are subject to the availability and capability of the mine load-out, terminal capability to unload and stockpile the coal, and the ability of the rail system to deliver the coal to the terminal.

Under cargo assembly, the stockpile for each individual vessel and each parcel on that vessel is separated from all other cargoes in the stockyard. This separation maintains the quality of all coal products delivered to the terminal. Due to the requirements for separation, the space between individual products cannot be utilised. To reduce stockpile separation and the resulting unutilised space in the stockyard, particularly when the same product is required for multiple vessels, the Operator is able to plan for limited dedicated (hybrid) stockpiling for high volume products.

3.1.1. Hybrid Stockpiling

Under the hybrid approach to stockpiling, the supply chain planners look at upcoming demand and identify opportunities where the same product is required for multiple near-spaced vessels. The planners would plan for similar coal for two or more vessels to be stacked into a single stockpile. Under cargo assembly, the planners would ordinarily plan to stack the cargoes for each vessel into distinct, separated stockpiles. Hybrid stockpiling minimises:

- 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 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 lifespan of the hybrid stockpile is then only limited by the continuing, near-spaced shipping demand for that particular coal type.

3.1.2. Remnant Management

To assist in vessel loading requirements without compromising the efficiency of DBT, the stockyard has been segregated into two distinct zones. Row 7 and the half Row 8 are used for the exclusive purpose of managing remnant coal (the static zone). Each Access Holder is allocated a portion of the total volume of the remnant area, calculated 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 (the **dynamic zone**).

This vessel assembly strategy sees two cargo assembly or hybrid stockpiles allocated to each parcel in the dynamic zone (shown in Figure 6). 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 that is not required to complete a 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 can then be topped up from the Access Holder's remnant stockpile.

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

System Capacity is calculated considering service provision requirements and the shipping mix. If future service requirements change from current demands, the rated terminal capacity could also change.

DBT is required to meet varying service requirements in line with coal producer and coal end-user requests. Different coal types present different handling characteristics, requiring a variety of handling strategies designed to maintain coal quality. Reduction of normal equipment rates to cater for these individual products could degrade the capability of the supply chain.

3.2.2. Vessel Trends

DBT can load coal onto vessels ranging from 40,000 to 220,000 Dwt in size. DBT is primarily exposed to five classes of vessels: Large Capesize, Capesize, Panamax, Japmax and Handimax. 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 of the 583 vessels loaded at DBT in the 2020 calendar year. The load rates clearly show faster loading performance into the larger vessels.

Table 3: DBT ship arrivals 1 Jan 2020 – 31 December 2020

Vessel Type	Size (Dwt)	Average load rate (tph)	Average load time (hours)	% of total vessels
Large Capesize	140,000-220,000	5,279	28.57	26%
Capesize	100,000-140,000	5,161	16.93	4%
Panamax	65,000-100,000	4,897	16.47	62%
Handymax	40,000-65,000	3,751	14.25	9%

DBT's outloading capability has been enhanced by an 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.

DBT's average vessel size surpassed 100,000 Dwt in 2010 and has remained stable in subsequent years. Despite this recent trend towards larger vessels, the arriving vessel mix can change from month to month in response to freight rate volatility and the global availability of various vessel classes.

3.3 Contracted Capacity vs Throughput

The 7X Expansion was completed in 2009. That expansion produced a significant step up in the capacity of the terminal from 60Mtpa to 85Mtpa. Since then the terminal has had latent capacity, as various factors have combined to limit throughput to a peak of 71.5 Mt in any one year (FY2014-15). System Capacity constraints, fluctuating demand and the impact of significant weather events have all played a part in limiting throughput to below the rated system capacity.

During an extended period of low coal prices (2012-2016), several existing Users relinquished excess capacity rather than maintain take-or-pay obligations. DBIM recontracted this capacity during 2017 and 2018 to Access Seekers who planned to increase coal production, either through greenfield or brownfield developments. Because this capacity was contracted to parties wishing to increase coal production, it is anticipated that almost all of this re-contracted capacity will be utilised by the Access Holders that have contracted it. Accordingly, DBIM expects a closing of the gap between contracted capacity and throughput as the various developments ramp up production.

3.4 Terminal vs System Capacity

DBIM contracts available terminal capacity with Access Seekers and Access Holders. Despite having a theoretical standalone terminal capacity of approximately 94 Mtpa (ILC, 2018), DBIM only contracts terminal capacity up to the practically achievable system capacity limit. Operating in its role as DBIM's independent Expert, the ILC's capacity assessment (undertaken in October 2018) determined that the DBT supply chain has a long term, achievable system capacity of 84.2 Mtpa.

Standalone terminal capacity assessments will generally yield higher indicated throughput results than a system capacity assessment. A system capacity assessment necessarily introduces the constraining effects and the interface inefficiencies that result when the upstream assets are connected to the terminal. Standalone terminal capacity assessments instead look at the terminal in isolation and do not impose any of the upstream inefficiencies required by a system capacity assessment. Terminal capacity assessments are based on theoretical levels of demand and an arrival sequence and frequency of trains that is impractical in real world operations.

Standalone terminal capacity may be increased following a terminal capacity expansion, however any terminal capacity that exists in excess of system capacity is not accessible to Access Holders and is unable to be contracted. Accordingly, the assessed system capacity is far more relevant than the assessed terminal capacity for the purposes of developing a terminal Master Plan and contracting available capacity.

4. Supply and Demand Expectations

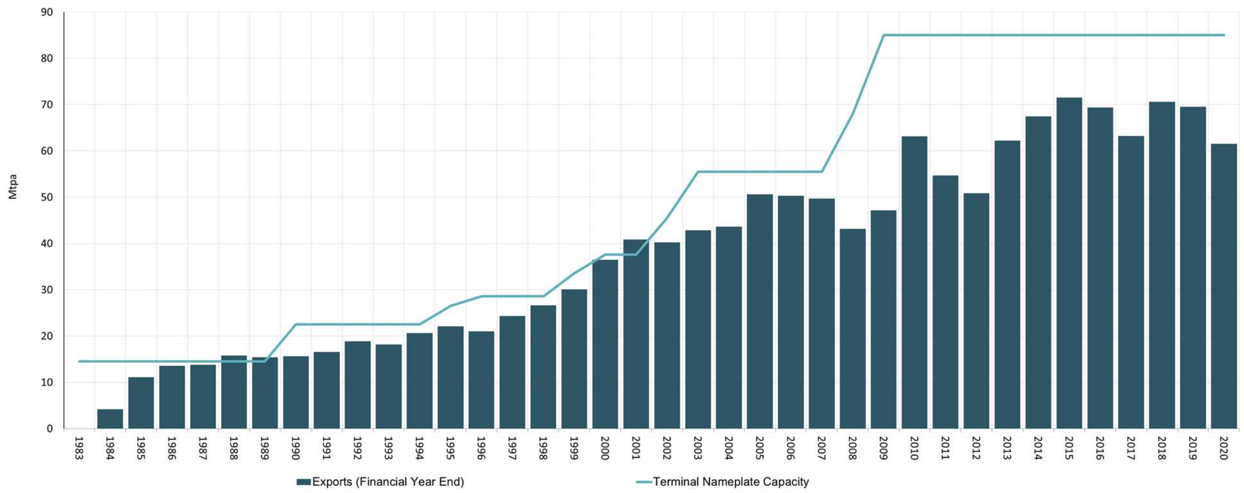
The PSA requires DBIM to:

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

4.1 Throughput Growth

DBT's highest recorded throughput in a financial year was 71.5 Mt in FY2014/15. While a gap still exists between DBT's highest throughput and system capacity (84.2 Mtpa), this has generally resulted from levels of demand and mine production which were below contracted capacity (refer Figure 12). While it is difficult to assess current mine capability, it is assumed that take-or-pay access agreements for rail and terminal capacity represent DBT Users' real expectations for future throughput.

Figure 12: DBT throughput and capacity growth history (DBIM, 2020)



In the depressed coal markets prior to late 2016, and with costs clearly under focus, miners are understood to have reduced their exposure to any excess rail and port take-or-pay obligations. The relinquished terminal capacity has subsequently been recontracted to service brownfield and greenfield mine developments. Since 2017, DBIM has been able to recontract approximately 15 Mtpa of previously relinquished long-term capacity.

It is DBIM's view that the current wave of coal mine development has occurred in a much more measured and controlled manner than during the previous commodity booms. Mine developments appear to be passing through many levels of internal and external scrutiny in order to proceed to the final investment decision. [4] It also appears that mining companies and explorers are exercising discipline when it comes to assessing the economics of a prospective development. There are a number of promising coal prospects within the DBT catchment at various levels of approval and development maturity.

4.2 Metallurgical Coal History

DBT's predominant export product is metallurgical coal (PCI and coking), accounting for approximately 82% of total throughput (2020). DBIM's master planning is primarily focused on metallurgical coal demand and development, as this is the dominant resource within DBT'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. After a decade of price growth in the 2000's, the

[4] Office of the Chief Economist Resources and Energy Quarterly – December 2020 pp.49

hard coking coal (HCC) price began to fall from 2012 onwards, culminating in a contract price of US$81/mt FOB in the January 2016 quarter. Following a sustained rationalisation of coal production globally, the prime HCC spot price has generally stayed above US$100/t since September 2016. At times, the HCC spot price has exceeded $US200/t for extended periods, indicating that the years of production rationalisation has returned the market to something resembling a balance of supply and demand.[5]

Changes to approach to contract pricing

A key change occurred in seaborne hard coking coal (HCC) contract pricing immediately following the interruptions caused by Cyclone Debbie in 2017. This change was reportedly brought about by the price volatility that ensued following a sustained interruption to Queensland's metallurgical coal supply. A new mechanism was agreed between buyer and seller which retrospectively pegs the HCC quarterly contract price 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). It is unclear what impact this change might have on long term volatility in pricing and demand patterns. The HCC price history to 2007 is shown in Figure 13 below.

Figure 13: Spot FOB QLD met coal price history (Platts CTI & IHS, 2007-2020)

4.3 Supply

The supply of metallurgical coal into the seaborne market is currently dominated by five countries. In 2019, Australia supplied 55% of global exports, US based producers supplied 15%, Canada supplied 10%, Mongolia supplied 9% and Russia supplied 7%. Queensland metallurgical coal producers have a natural geographical advantage over other metallurgical coal supplying regions. During the mid to late 2000s, in response to an expectation of continuing Chinese demand growth, global metallurgical coal production reached historically high levels through the introduction of new coal mines and expansions of existing coal mines. Australian producers exported approximately 184 Mt of coal in 2019[6].

In response to subsequent falling coal prices between 2012 and 2016, many coal producers appeared to reduce 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. Many miners achieved significant cost savings at their operations to improve profitability. Cost savings were achieved in a number of ways, but the main focus areas were capital discipline, reducing the cost of labour, and reducing their exploration spend. DBIM expects Australian producers to continue to benefit from the cost reductions achieved in the downturn between 2012 and 2016. At current coal prices, DBIM expects that most of the coal

[5] Platts CTI and IHS Inside Coal
[6] Office of the Chief Economist Resources and Energy Quarterly – December 2020

production in the Central Bowen Basin is profitable and that sustained healthy pricing will ultimately incentivise mine development.

During the 2012-2016 downturn, many coal producers in North America were forced to idle coal mines or seek bankruptcy protection under Chapter 11 provisions. In response to a healthier coal market, a number of these operations have since resumed production and re-joined the export market. It is expected that US coal suppliers will continue to provide swing capacity to the global seaborne markets.

Mozambican coal production has also faced delays and extra costs to repair, upgrade and build coal transport infrastructure. The country's most advanced and significant coal mine (Moatize) and accompanying infrastructure project (Nacala) in Mozambique is majority owned by Vale. Approximately 5 Mt of metallurgical coal was exported from Mozambique in 2019[7]. The Moatize mine project will export up to 18 Mtpa from Nacala Port at full capacity, utilising the Nacala Rail corridor for coal transportation. Given its proximity to India and Europe, Mozambique's coal production has the potential to displace some demand for Australian metallurgical coals to these regions. It is uncertain if these capacity upgrades will proceed as planned with Vale announcing that it intends to offload its Mozambican coal assets in order to become carbon neutral by 2050.[8]

In Mongolia, miners have faced issues with cash flow, profitability and more recently, border interruptions resulting from COVID-19. Mongolian coal developments have the potential to displace Chinese demand for Australian coal. Mongolian coal miners exported approximately 30 Mt of coal in 2019, most of this is understood to have been exported across the border to China. Geography, Infrastructure and border bottlenecks have typically provided a natural barrier to increased coal exports, particularly to the seaborne market. Because miners currently appear to be limited to selling into the Chinese market, it is understood that the sale price of this coal is typically well below the seaborne price.

After falling to US$81/t FOB in Q1 2016, HCC prices were generally sustained above US$100/mt FOB since August-September 2016 and have remained above US$200/t for months at a time. These improved market conditions appear to be the result of closely aligned supply and demand.[9]

Coinciding with sustained healthy market conditions, DBIM has observed an increase in demand for terminal capacity from developers of new and existing coal mines. This increased demand indicates that miners may be willing to bring new greenfield and brownfield metallurgical coal mine developments online in the Central Bowen Basin. Following years of cost cutting initiatives, combined with the advantages of well-developed infrastructure and proximity to Asian import destinations, Queensland miners are expected to maintain a substantial advantage over their global competitors. Recent demand trends from DBT'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 are generally a significant distance from end users. Indian metallurgical coal also tends to be of lower quality and with more impurities than Australian coals.

Indian steelmakers imported 58 Mt of metallurgical coal in 2019. India's future seaborne metallurgical coal demand will be largely dependent on its ability to increase its domestic steel production capacity from 99 Mtpa (2020) to 300 Mtpa by 2030.[10] With limited domestic reserves of metallurgical coal, Indian domestic suppliers are not expected to keep pace with India's ambitious steel production growth plans. Accordingly, DBIM expects that India is likely to need to supplement its domestic metallurgical coal production with greater seaborne metallurgical coal or raw steel imports.

[7] Office of the Chief Economist Resources and Energy Quarterly – December 2020 pp. 50
[8] S&P Global Vale to exit coal business, buys Mitsui's Moatize stake in restructuring
[9] IHS Inside Coal – Australian prime hard coking coal (2015-2020)
[10] Office of the Chief Economist Resources and Energy Quarterly – December 2020 pp. 31

4.3.2. Chinese domestic production

Chinese domestic producers accounted for 537 Mt of metallurgical coal supply in 2018.[11] 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 the perceived over-production of coal and steel, the Chinese government imposed policies designed to protect Chinese coal producers from competition from imported coals, while also removing unprofitable Chinese domestic production from the market.

The first of the key policies involved quality checks for trace elements on imported coals. The second was a blanket tariff applied to imported coals which was subsequently removed. More recently, the Chinese government implemented a ban on all coal imports from Australia. In effect, this resulted in no vessels Chinese-chartered vessels being nominated to load at DBT after November 2020. From 1 January 2020, up until the ban in mid-November 2020, Chinese buyers took approximately 15 Mt of coal from DBT (Figure 18).

Despite the import ban imposed on Australian coals by the Chinese government, due to the high quality of metallurgical coals exported through DBT, DBIM expects Chinese demand for coals exported from DBT to return at some time in the future.

4.3.3. ESG risks to supply

It is DBIM's expectation that mine expansions and new developments will also continue to face headwinds relating to anti-coal sentiment, net zero and carbon neutral targets which will impact the ability of miners to obtain approvals, financing and insurance on reasonable terms. DBIM does however expect that with no current commercially viable substitutes for producing steel, the world will continue to need increasing quantities of metallurgical coal.

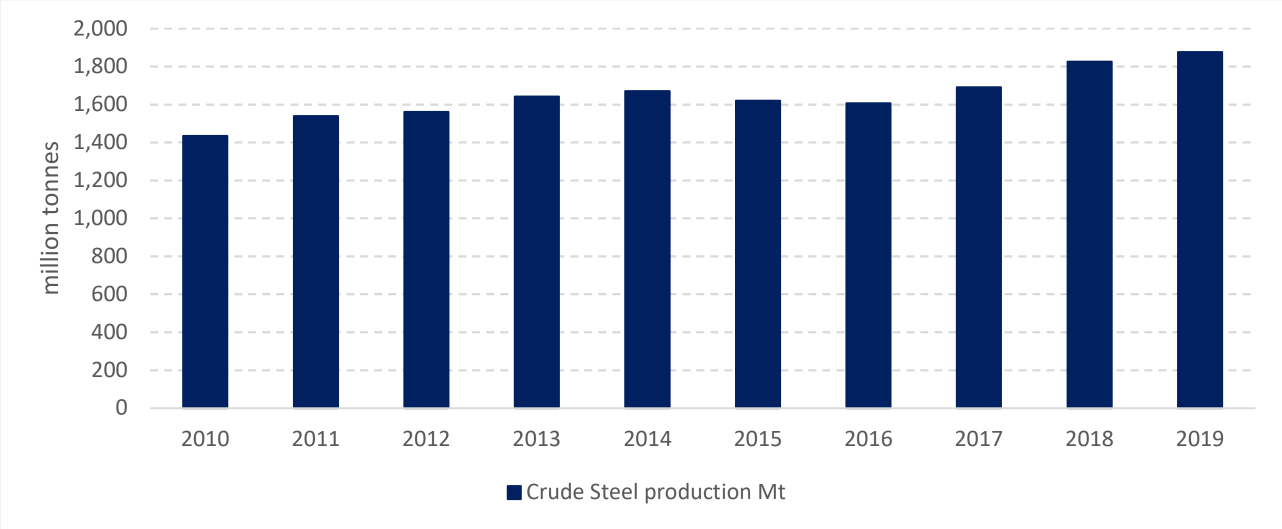
4.4 Demand

Global crude steel production grew from 1,343 Mt in 2008 to 1,870 Mt in 2019.[12] DBIM expects that India's infrastructure build program will continue to drive strong demand for DBT's coal, particularly after the infrastructure-friendly Modi government was elected for a second term in a landslide victory in May 2019.

Notwithstanding changes in regulations to increase domestic coal consumption, China's dependence on seaborne coal is expected to continue to drive healthy demand for global seaborne coal exports. If Chinese demand doesn't return to Australian exporters in the near future, DBIM expects that demand for Queensland metallurgical coal from other major importing regions (including Japan, Taiwan, South Korea, India and Europe) may increase as they are displaced by Chinese buyers from their usual supply regions. Steel production in DBT's well developed export regions is expected to remain stable, however these regions are expected to require additional Australian coal as long as the Chinese import ban on Australian coal persists.

[11] Mining Weekly 23 May 2019 India to surpass China as largest importer of coking coal by 2025
[12] World Steel Association 27 January 2020 Global crude steel output increases by 3.4% in 2019

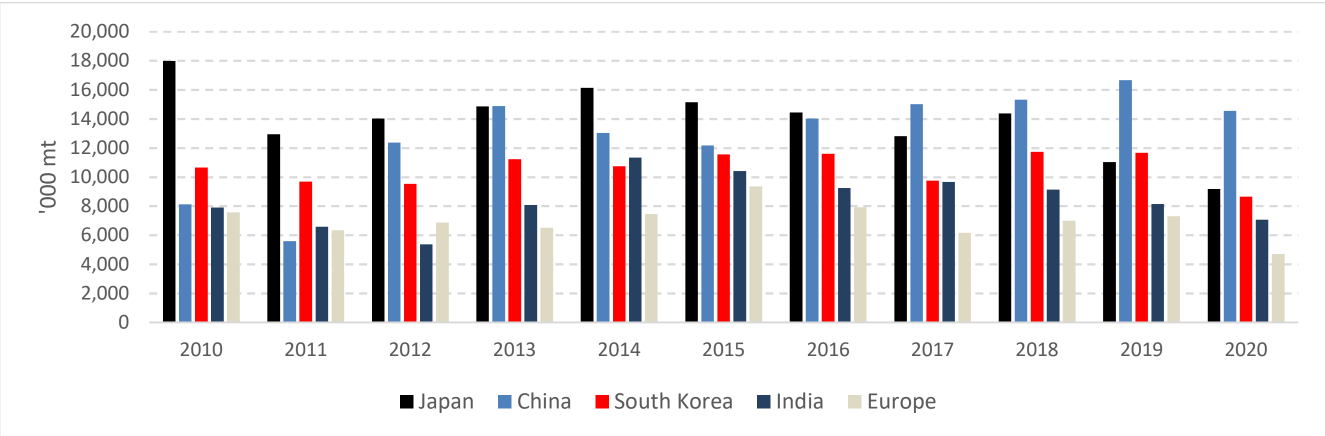
Figure 14: World crude steel production – World Steel Association, 2020



The comparatively mature economies of Japan, South Korea and Europe have well-developed steelmaking capacity, but do not have substantial domestic metallurgical coal reserves. These economies experienced growth in their steelmaking industries well before the recent rise of China and India as steelmaking leaders. 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 have grown rapidly but are 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, it is encouraging that Indian steel producers have ambitious growth plans and are seeking to expand steel production in accelerated timeframes.[13]

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, or hydrogen-based green steel initiatives may pose a risk to long term metallurgical coal demand. These technologies are relatively immature and are expected to take significant time to reach a scale that is commercial and capable of displacing significant levels of demand for seaborne metallurgical coal[14].

Figure 15: DBT historical exports to key importing regions (DBIM, 2020)



[13] World Steel Association 25 January 2019 Global crude steel output increases by 4.6% in 2018
[14] The Weekend Australian Magazine 4 May 2019 Turning trash into treasure

4.4.1. India

India's ambitions to increase domestic crude steel production from 100 Mtpa in 2017 to 300 Mtpa in 2030 is the most likely driver of Indian seaborne metallurgical coal demand growth in the coming decade. India increased steel production by 6% in 2017, and for the first time surpassed 100 Mtpa of crude steel production. Since 2015, Indian steelmakers have been able to increase crude steel production by 6 Mtpa, year on year, culminating in 111 Mt of Indian crude steel production in 2019.[15] A number of Indian steelmakers are currently undertaking steel production expansion projects, however, to reach the stated 300 Mtpa of crude steel production target by 2030, the pace of new capacity development will need to increase.

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

Figure 16: Exports to India from DBT (DBIM, 2020)

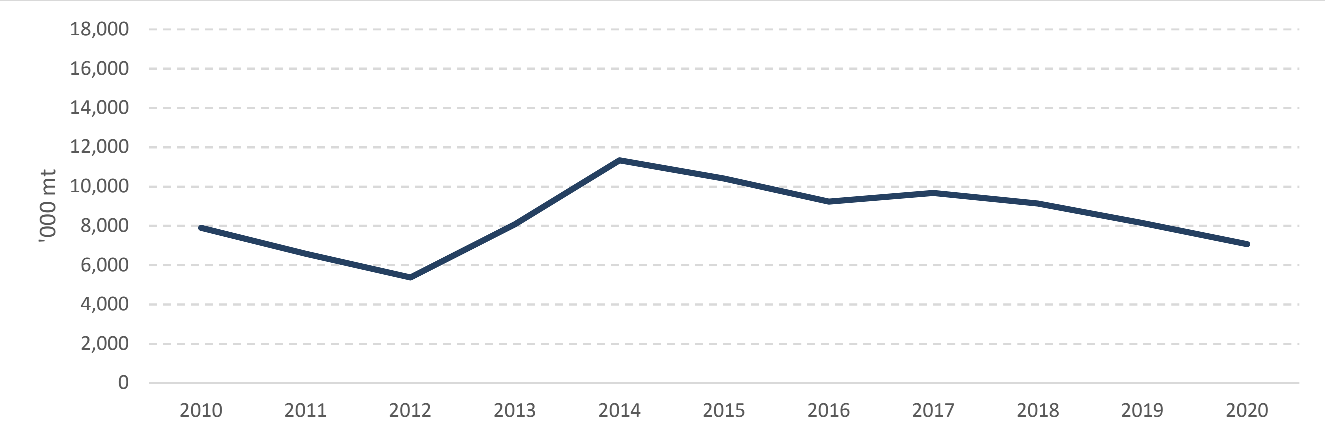
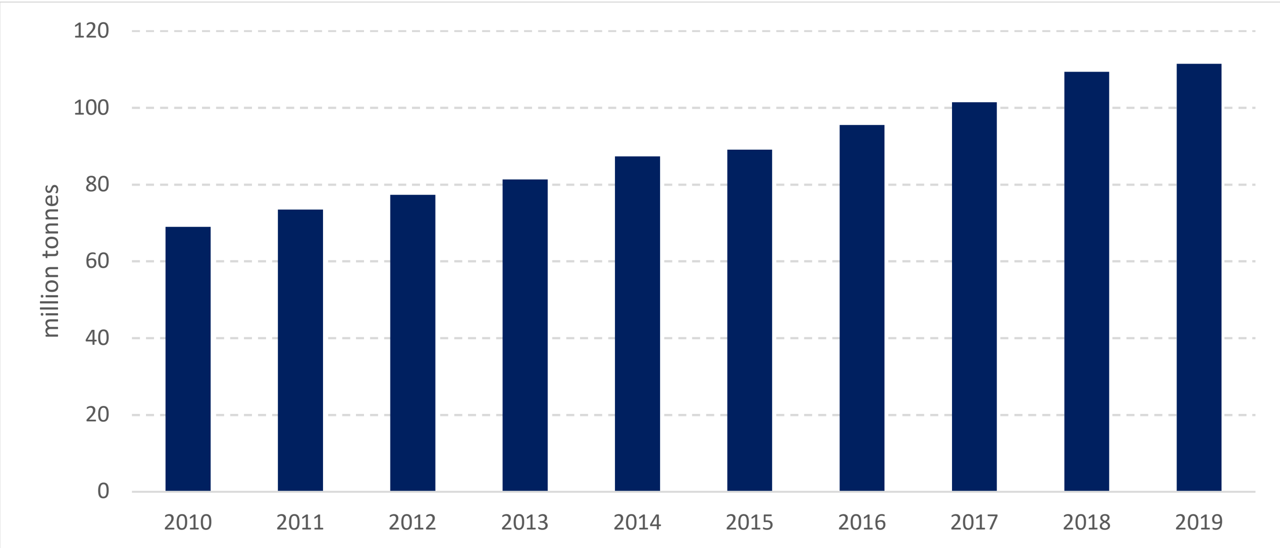


Figure 17: Indian crude steel production (World Steel Association, 2020)



4.4.2. China

After entering the seaborne market as an importer in 2009, China's demand for seaborne metallurgical coal has varied in line with the performance of its economy, steel markets, domestic metallurgical coal production and Chinese government policy. China's steelmakers are estimated to have imported 75 Mt of metallurgical

[15] World Steel Association 25 January 2020 Global crude steel output increases by 4.6% in 2018

coal in 2019.[16] 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 reported capacity rationalisation in 2016 and 2017, Chinese crude steel production was the highest on record in 2019 (996 Mt).

In addition to the reported removal of approximately 120 Mtpa of steel production capacity in 2016 and 2017, the Chinese government was targeting the reduction of another 30 Mtpa of steel production in 2018, bringing the three year target to approximately 150 Mtpa.

As shown in Figure 18, DBT'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. It is difficult to forecast how long Chinese government ban on Australian coals may last. It is however DBIM's expectation that other importing regions will need to secure additional Australian coals to make up any shortfall as a result of Chinese demand moving away from Australian suppliers.

Figure 18: Chinese imports from DBT (DBIM, 2020)

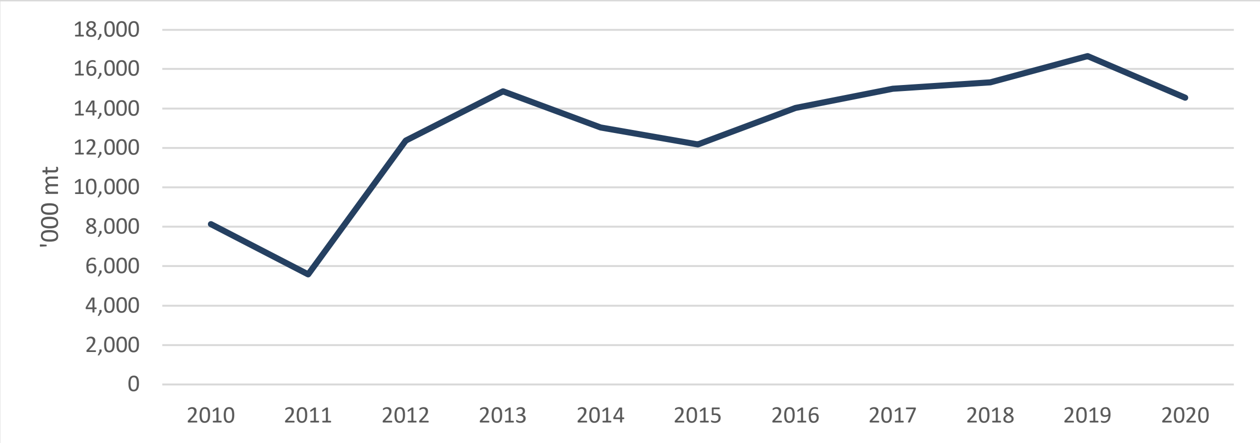
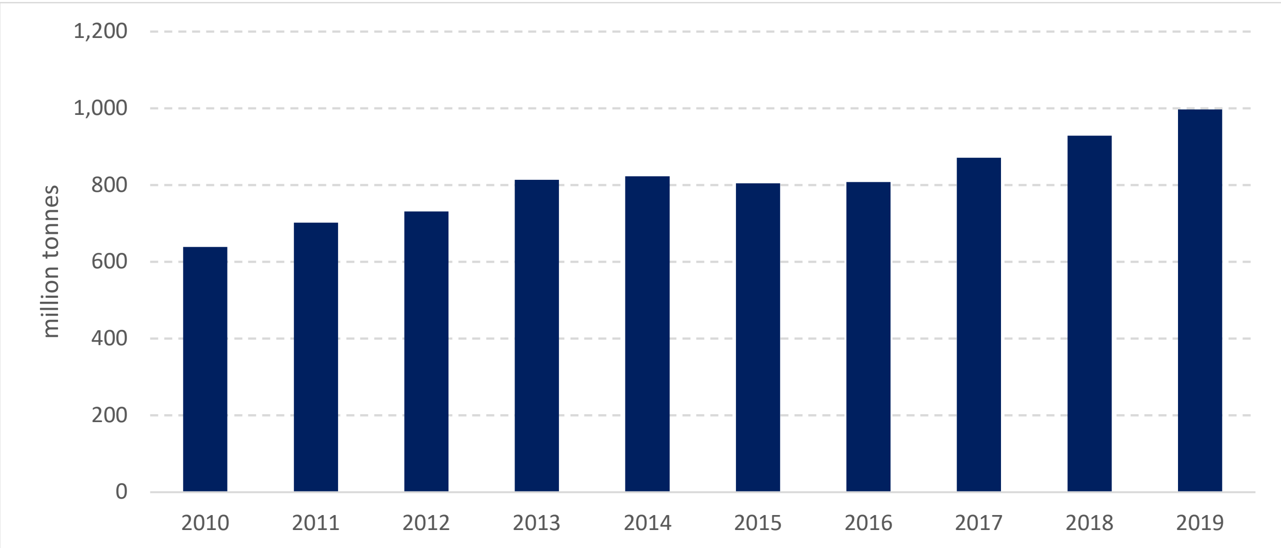


Figure 19: Chinese crude steel production (World Steel Association, 2020)



4.4.3. South Korea and Japan

DBIM views South Korea and Japan as stable destinations for DBT's metallurgical coal exports. While these nations are not expected to provide material growth in crude steel production, they are expected to take a

[16] Office of the Chief Economist Resources and Energy Quarterly December 2020 – Metallurgical Coal

substantial proportion of DBT's coal for as long as the Chinese ban on Australian coals persists. Many of the mines that export through DBT 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 20: Japanese imports from DBT (DBIM, 2020)

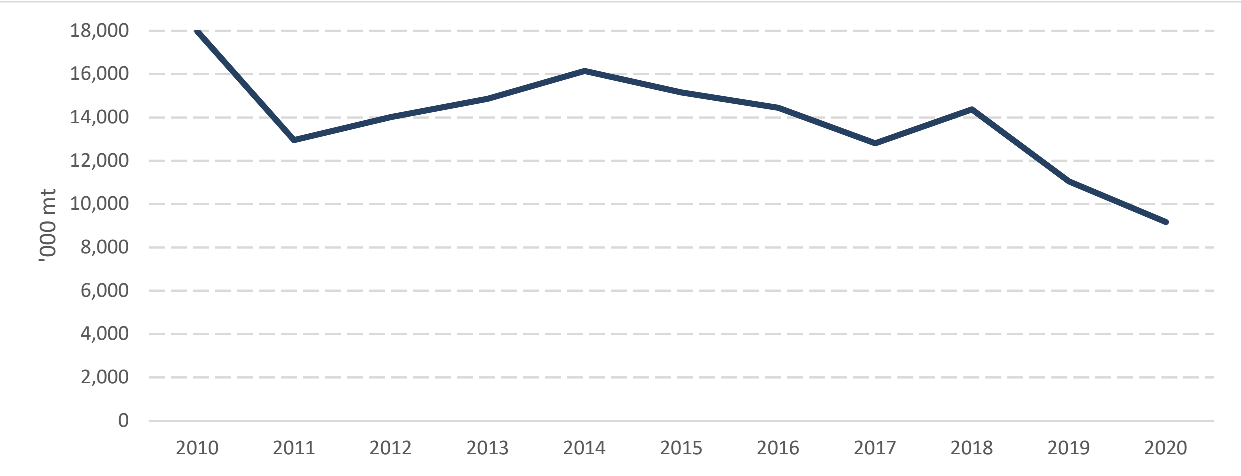


Figure 21: South Korean imports from DBT (DBIM, 2020)

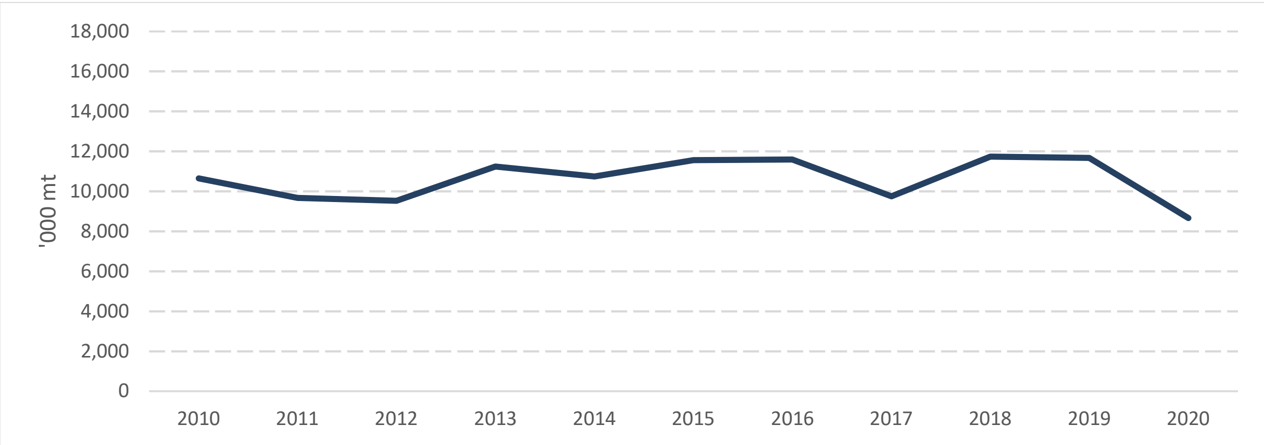


Figure 22: Japanese crude steel production (World Steel Association, 2020)

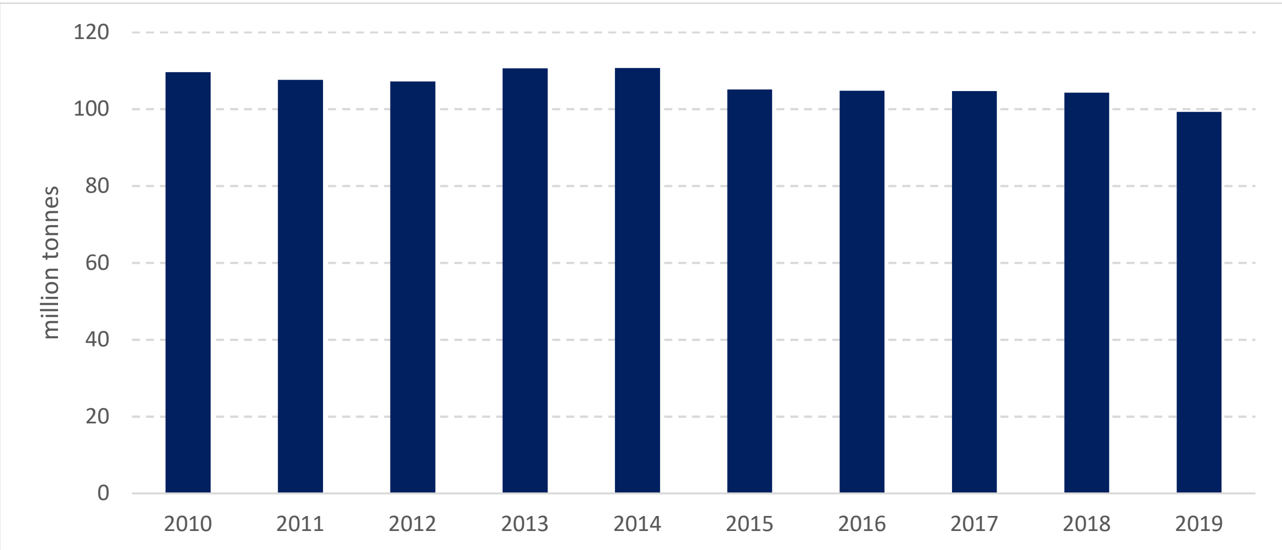
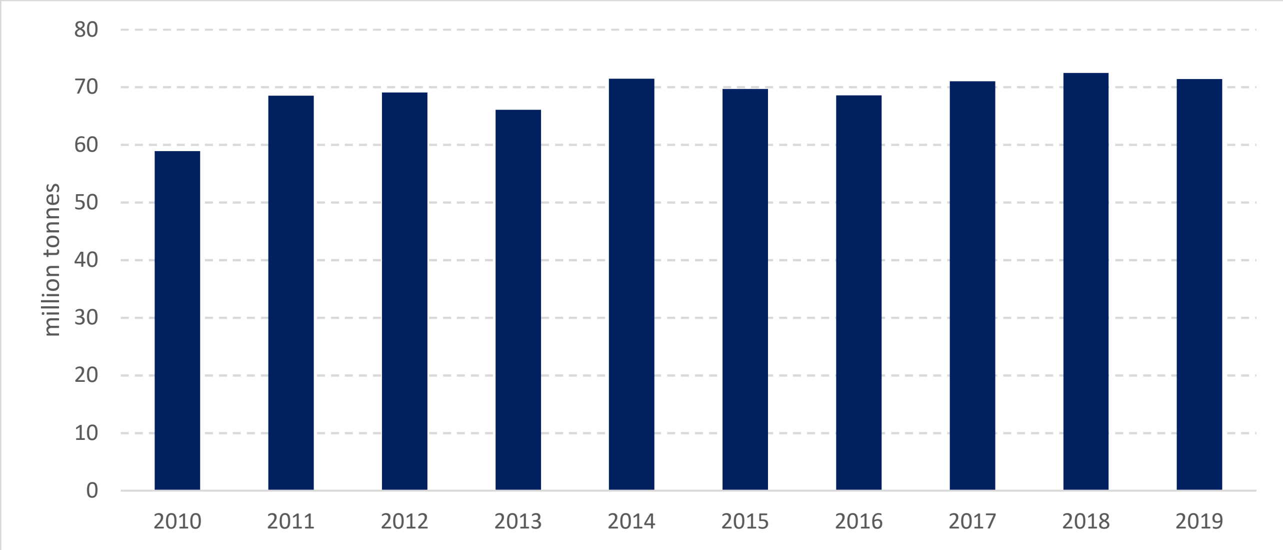


Figure 23: South Korean crude steel production (World Steel Association, 2020)

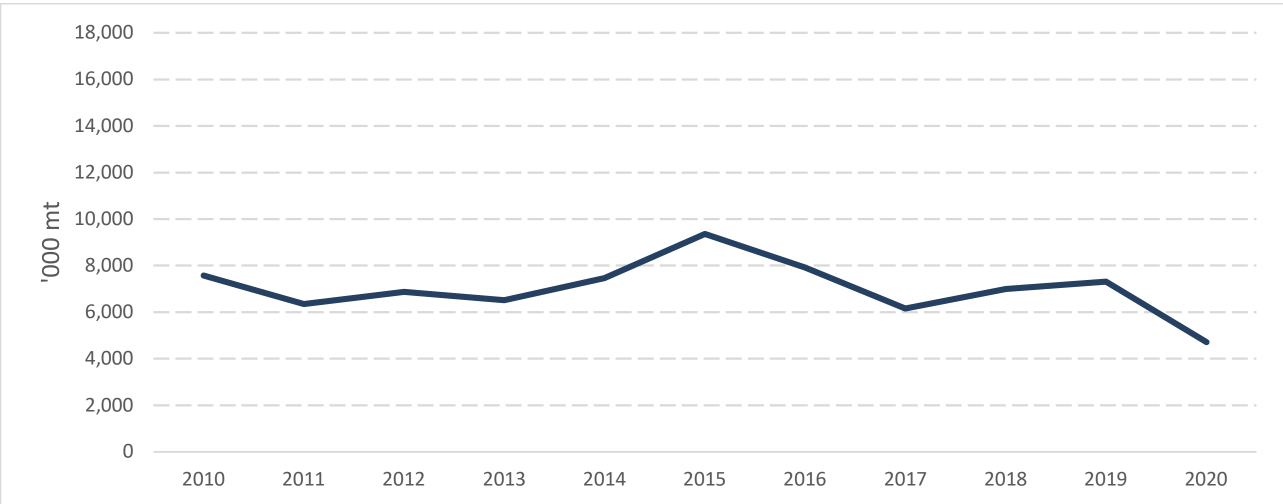


4.4.4. Europe

A number of steelmaking facilities have closed in the past 3 to 5 years in some of DBT's usual European export destinations, however these closures represent a small percentage of Europe's overall steelmaking capacity. Following a reduction in crude steel output between 2012 to 2016, crude steel production from the EU fell to 148 Mt in 2019 (Figure 25).[17]

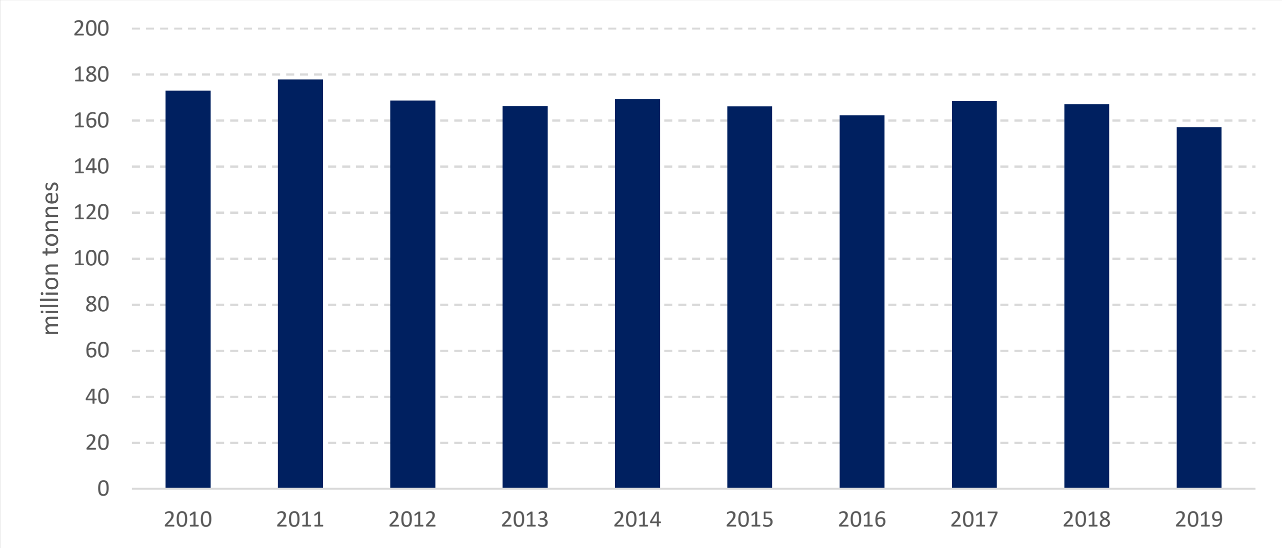
Historically low freight rates have likely been a factor in the increasing volumes of exports from DBT to Europe over the past decade. DBIM expects that Europe's appetite for DBT coal will continue to be responsive to freight rate volatility and the exchange rates of various currencies against the US dollar. Both factors have the potential to impact the ability of DBT 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, however the recovery in US coal production is likely to have displaced Australian coal exports to Europe more recently.

Figure 24: European imports from DBT (DBIM, 2020)



[17] World Steel Association 25 January 2019 Global crude steel output increases by 4.6% in 2018

Figure 25: Eu-28 crude steel production (World Steel Association, 2020)



4.4.5. Thermal coal

DBT's thermal coal exports comprise approximately 18% of total throughput (2020). DBIM expects demand for thermal coal exports out of Queensland to grow in the medium to long term. Accordingly, demand for DBT's thermal coal exports is expected to continue from the traditional customers of the DBT-exporting thermal mines. The growth in thermal coal demand from Queensland is expected to increase with continuing economic development in India and the South East Asian regions. In both regions, imports of thermal coal are expected to supplement domestic production.

4.5 Mine Development Triggers

In the first quarter of 2016, coking coal prices were well below US$100/mt. At that time there was limited demand for expansion capacity at DBT, while existing capacity was being relinquished for the first time in DBT's history. By late 2016, metallurgical coal prices had surpassed US$100/mt and have generally remained above these levels since. While the incentive price for new mine developments varies, real demand for terminal capacity has increased, such that existing system capacity is not sufficient to satisfy all genuine demand from Access Seekers, in addition to already contracted capacity.

DBIM was unable to satisfy all demand received in the form of Access Agreements in late 2018. Considering there are no further DBT contract expiries due until 2028, DBIM's only option for satisfying the real demand from the Access Queue is by expansion of the terminal.

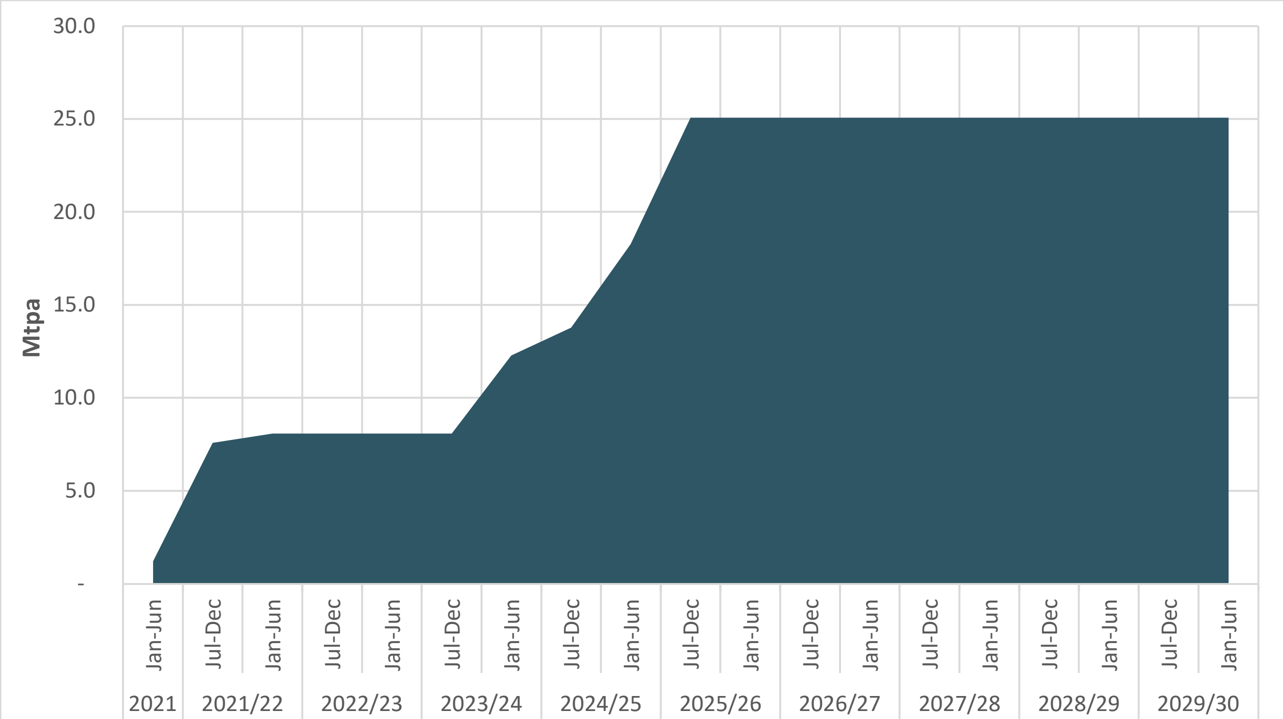
4.6 Expansion Demand

In December 2019, with an Access Queue of 56.6 Mtpa, DBIM commenced the initial processes of the 8X Expansion in accordance with existing Access Agreements and the AU. These initial processes were essential to identify:

- the true demand for new capacity;
- the extent to which that demand could be satisfied by existing capacity; and
- that the 8X Feasibility Studies would be underwritten by Access Seekers.

In March 2020, DBIM received Conditional Access Agreements (**CAAs**) for 27 Mtpa, which significantly oversubscribed the capacity that would be made available by the 8X expansion. By April 2020, DBIM had received confirmation from Access Holders that existing Access Agreements would be extended to at least 2028. These contract extensions meant that no existing capacity was available to satisfy the requirements of Access Seekers.

Figure 26: DBT Access Queue Feb-21



During May 2020, DBIM received signed Standard Underwriting Agreement (**SUAs**) for the FEL 2 (pre-feasibility) Studies totalling 14.87 Mtpa from five Access Seekers. The aggregate capacity required by the five Underwriting Parties exceeded the capacity available from the 8X expansion as determined by the FEL 1 (concept) studies and as depicted in Master Plan 2019 DBIM subsequently removed all Access Applications from the queue that were not supported by both a CAA and SUA. This reduced the Access Queue at the time to 14.87 Mtpa. Since that time, new Access Applications have been received from Access Seekers and, at the time of publication of this Master Plan, the peak capacity requested by the Access Queue is 25.1 Mtpa. Given the process, it is evident that the genuine demand for expansion capacity in the second half of 2020 ranged from 14.87 Mtpa to 25.1 Mtpa, justifying DBIM's decision to undertake the 8X FEL 2 studies.

In early June 2020, DBIM executed SUAs and CAAs with the Underwriting Parties for 13.3Mtpa of expansion capacity. These SUAs and CAAs represented all of the capacity to be released by the 8X Expansion, thereby supporting the commencement of FEL 2 studies. The engineering component of the FEL 2 Study was completed in December 2020, with the entire FEL 2 Study being completed in late Feb 2021. DBIM has since received signed SUAs from the same five Underwriting Parties indicating their continued support for the 8X expansion. DBIM plans to commence the 8X FEL 3 studies in April 2021.

5. DBT Expansion Options

5.1 Development objectives for DBT

DBIM's development objectives for DBT are as follows:

- Develop Master Plans that define strategies to ensure efficient, sustainable and secure long-term operation of the DBT 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 2015 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 relationships 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.
- Ensure that DBT continues to be managed, operated and maintained at a standard consistent with the obligations set out in the PSA.
- Realise 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 Queensland coastal zone, particularly within the GBRWHA.

DBIM uses the following key drivers to guide the ongoing planning for expansions at DBT:

- 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.

Consistent with previous master plans, any terminal expansion is integrally linked to other supply chain infrastructure. DBIM 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.

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

5.2 Recap of Master Plan 2019

Master Plan 2019 was the last version of the Master Plan produced. During 2020, DBIM undertook further investigations and feasibility studies based on Master Plan 2019. Master Plan 2019 outlined an incremental expansion pathway that could take the terminal to a nominal ultimate capacity of 131 Mtpa. Detailed capacity modelling undertaken by the ILC during the development of Master Plan 2019 determined that the

8X expansion would take the System Capacity from the current 84.2 Mtpa to 97.5 Mtpa. Beyond that, Master Plan 2019 outlined options at a high-level for a 9X expansion at Louisa Creek that potentially could take the terminal to 131 Mtpa.

The expansion pathway that was proposed is summarised in Table 5 below.

Table 4: Proposed expansion pathway (Master Plan 2019)

<table>
<tr><th colspan="4">Scope</th><th rowspan="2">Incremental Capacity</th><th rowspan="2">Capacity (Mtpa)</th><th rowspan="2">Cost ($m)</th></tr>
<tr><th colspan="3">Stage</th><th>Description</th></tr>
<tr><td rowspan="4">Within Footprint</td><td rowspan="4">8X</td><td>Phase 1</td><td>New Shiploader 4 on Berth 3 plus outloading debottlenecking</td><td>4.3</td><td>88.5</td><td>240 (indicative)</td></tr>
<tr><td>Phase 2</td><td>Stockyard Augmentation Project (SAP) plus upgrade of Stacker ST2 and conveyors S5, S6A, S6, R1 and R2</td><td>2.7</td><td>91.2</td><td>175 (indicative)</td></tr>
<tr><td>Phase 3</td><td>Rail Receival Pit 4 & Inloading System 4 plus upgrade to Inloading 2 and Outloading 2</td><td>3.3</td><td>94.5</td><td>350 (indicative)</td></tr>
<tr><td>Phase 4</td><td>Completion of Row 8, vertical western wall, replacement of Reclaimer RL2 with a new Stacker Reclaimer to suit the new row 8 configuration, a new stacking conveyor and a new Stacker to the west of Row 8.</td><td>3</td><td>97.5</td><td>395</td></tr>
<tr><td>New Stockyard at Louisa Creek</td><td colspan="2">9X</td><td>New Stockyard at Louisa Creek, upgrades to Inloading 1, new Outloading System 4 and up to 2 berths to the north including significant land reclamation to accommodate dredge spoil</td><td>≈34</td><td>131 (approx)</td><td>3,000 (indicative)</td></tr>
</table>

In 2020, with the support of Underwriting Parties, DBIM undertook a FEL2 (Pre-Feasibility) study for 8X. The starting point for this study was the scope as outlined in Master Plan 2019 and detailed by Aurecon in a consolidated Concept Study (FEL1) report that Aurecon prepared for DBIM in late 2019. During the FEL2 Study, each phase of 8X was reviewed in detail to fine tune the scope and investigate optionality around individual scope elements in order to get the maximum practicable capacity from the existing terminal footprint.

The 9X expansion remained unchanged in Master Plan 2019 from what appeared in previous iterations of the Master Plan. During 2019, further thought was given to how 9X could be implemented following a more incremental approach. This changed approach resulted in a slight change to the likely phasing of 9X and a slightly higher ultimate capacity.

5.3 System Capacity Modelling

In October 2018 the ILC issued a System Capacity Assessment that determined the System Capacity of the existing supply chain infrastructure and terminal to be 84.2Mtpa. The modelling that underpinned the October 2018 assessment was used by DBIM in the development of Master Plan 2019. During 2020, DBIM appointed the ILC as Independent Expert for determination of System Capacity for both the 8X FEL2 and FEL3 studies in accordance with Section 12 of the Access Undertaking.

The ILC's Dynamic Simulation Model of the DBCC is a Discrete Event Simulation (**DES**) model developed in the AnyLogic modelling platform. It uses stochastic methods to generate the randomness of operational events that occur over time. The model is then capable of capturing the dynamic interactions within the system. The model was developed by ILC staff who have extensive experience with DBCC and simulation modelling. It was developed through a rigorous approach, including stakeholder consultation to understand current operating methodologies and planning practices, in order to determine and apply operating logic definition. Input data was been sourced from various stakeholders, as well as the actual performance of the system as recorded in the Supply Chain Analytics (**SCA**) system.

The model logic and input data are continually checked and verified to confirm their validity and currency. DBT Users and Service Providers regularly provide updated information to the ILC for simulation modelling purposes. ILC model results are published monthly and discussed at industry forums.

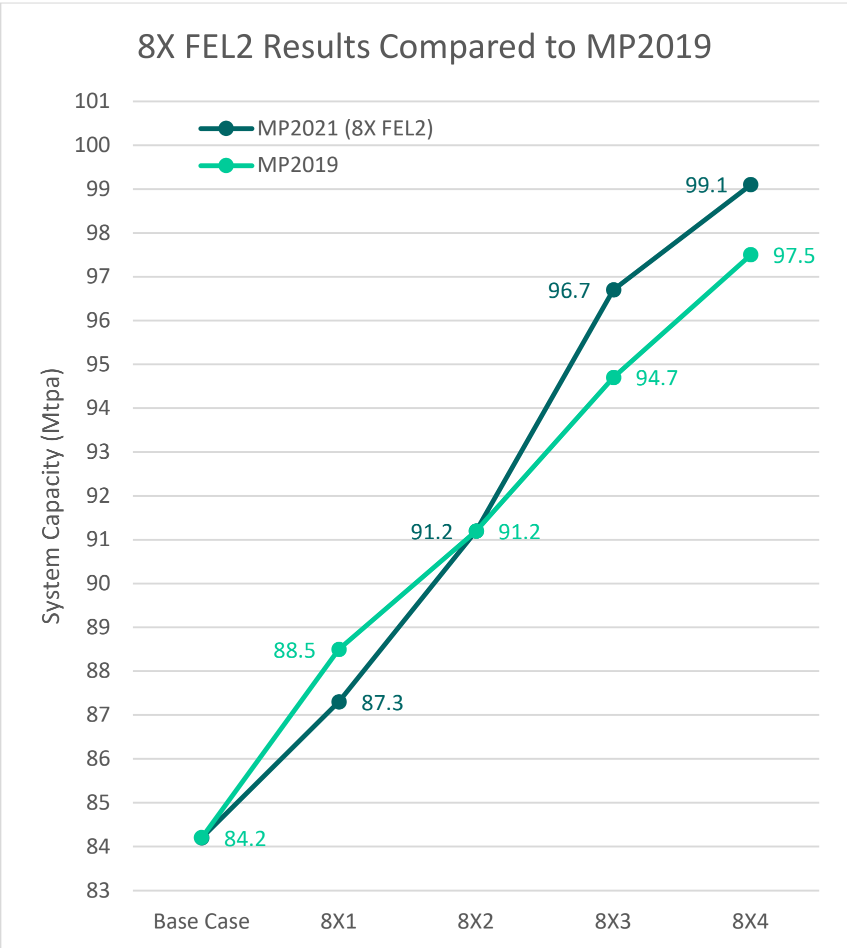
The scope of the ILC's Dynamic Simulation Model is as follows:

- From the train loadouts at the mines for all mines exporting through DBT, HPCT and NQXT; and
- Rail transport for coal and non-coal trains arriving at, departing from and travelling within the network with no additional rail infrastructure per Figure 2;
- All associated infrastructure and processes from the inloading circuit through to the vessel hatch at DBT and NQXT;
- Higher level representation of the terminal operations at HPCT; and
- The infrastructure and processes required to facilitate the movement of ships between the ship queue and the berths at DBT, HPCT and NQXT, and vice versa.

The maintenance schedule used in the modelling for 8X was provided to the ILC by DBIM following detailed consultation with the DBT's Operator. Expected equipment rates for parts of the terminal that are proposed to be upgraded in 8X were provided by Aurecon as part of the results of the FEL 2 Studies. The contracted demand levels and profiles were provided by DBIM, including existing Access Holder and Access Seeker tonnages. For Capacity Estimates, demand was assumed to be spread reasonably uniformly over each year.

The modelling results showed that 8X could deliver a higher capacity once some additional scope elements were added to 8X. In particular, the addition of an Outloading 1 (**OL1**) upgrade, a change to the ultimate capacity of IL2 and ST1A from 7,600 tph to 8,100 tph and an upgraded R3 Conveyor drove the majority of the increase in the capacity from 97.5 Mtpa to 99.1 Mtpa. Those scope elements have all been added to 8X Phases 2 and 3. The modelling results for System Capacity are shown in Figure 27.

Figure 27: Comparison of Modelling results (ILC 2021)



5.4 8X Expansion

The four phased 8X Expansion, as depicted in Table 5, represents the maximum practicable System Capacity that can be achieved with the existing footprint of DBT. In Master Plan 2019, the maximum capacity that 8X could deliver was estimated at 97.1 Mtpa at a total cost of $1.16b. During FEL2, DBIM identified some additional minor scope elements that the ILC confirmed add additional capacity taking 8X up to 99.1Mtpa. This additional capacity is realised in Phase 3. The ILCs modelling confirmed that the System Capacity of 99.1 Mtpa is achievable without rail network upgrades except for the rail loop modifications at the port as described in this Master Plan.

Table 5: Master Plan 2021 8X Expansion

Scope			Gain (Mtpa)	Capacity (Mtpa)	Cost ($m) @ P50
Stage		Description			
8X	Phase 1	• Installation of new Shiploader 4 - including construction of new L18 Conveyor and support structure behind Berth 3 • Replace Jetty Head end building • Improve outloading optimisation through augmented yard machinery controls to increase reclaim rate • Stockyard to surge bin string control improvements • L3 & L4 Conveyor drive upgrades	3.1	87.3	246
	Phase 2	• Vertical Bund walls and backfill, Bund 1 (west) and Bund 3 • Stockyard surface re-grading • Upgrades of existing yard equipment and conveyors upgrades in eastern stockyard (Stackers ST2, ST1A, reclaimer RL3 and conveyors S6, S6A, S5 and R2) • Zone reconfiguration of stockyard	3.9	91.2	229
	Phase 3	• Rail Receival Pit 4 (RRP4) and inloading system IL4 (8,100tpa) and decommissioning of RRP1 • IL2 upgrade (5,500tph to 8,100tph) by splitting flow onto original IL1 conveyors • Upgrade to existing outloading conveyors OL1 & OL2 to 8,650tph • Upgrade R3 conveyor to accommodate higher rate SR2A	5.5	96.7	461
	Phase 4	• Zone 4 project – completion of Row 8 with western walls, new stacker (ST5) for row 8 and new reclaimer RL2A (replace RL2) • New western road and access gate • Relocated Office Complex (likely to be moved to Phase 1)	2.4	99.1	340

During FEL 2, DBIM asked the Operator to undertake two significant studies. The first study undertaken by the Operator was a review of the incremental Operating and Maintenance Costs per phase as a result of 8X. In January 2021, the Operator delivered a summary of the additional 8X Operational Costs by phase which detailed the additional costs by Business Unit required during the implementation of the project and also the additional ongoing Operation and Maintenance costs as a result of the expansion. This information was presented by Phase for the entire 8X Expansion and has been used by DBIM to model the cost impacts for Users. The second significant study was a Strategic Workforce Facilities Planning Study. This work was undertaken to determine DBTs long term needs with respect to office facilities, amenities, workshop areas, car parks and other facilities with and without 8X. The need for rationalisation of isolated and temporary facilities was also identified in the study. While some allowances for additional facilities were already included in 8X in Master Plan 2019 the requirement for these facilities has been now been quantified. Where facilities are directly impacted by 8X, or are required to support 8X, they have been included in the 8X scope. Where additional facilities have been identified in the assessment, but they are not required as a direct result of 8X they have not been included in the scope. As a result, some additional infrastructure facilities are likely to be added to the NECAP program as required.

The project scope is shown schematically in Figure 28 and Figure 29, and summarised in the following sections.

Figure 28: DBT 8X Expansion – Phases Schematic – Offshore

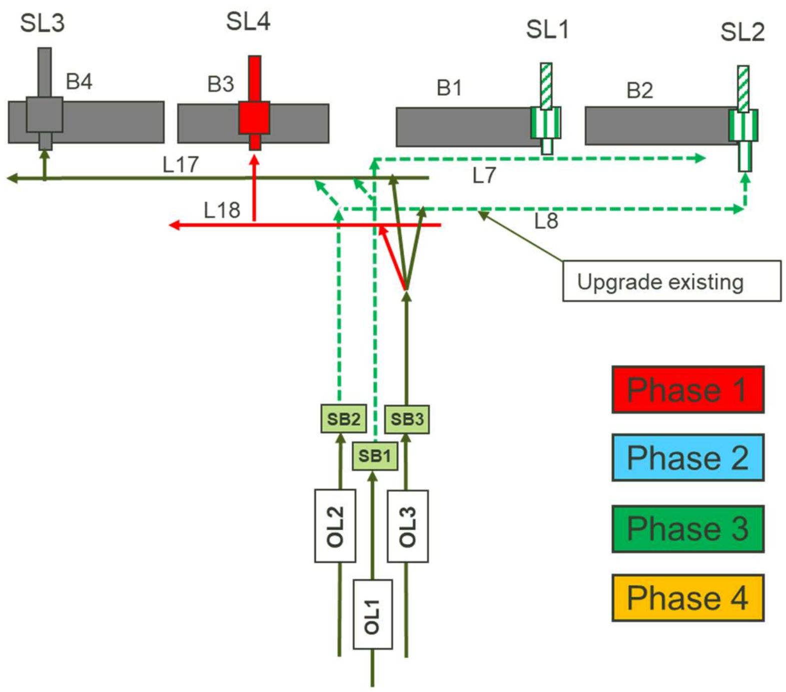
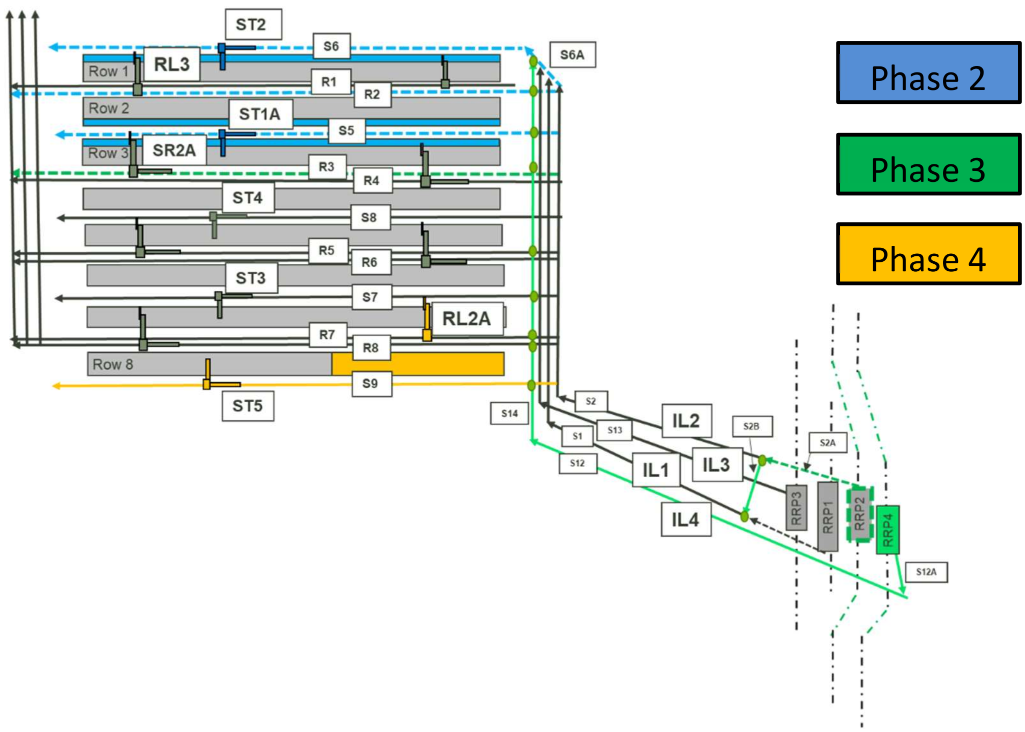


Figure 29: DBT 8X Expansion – Phases Schematic – Onshore



5.4.1. Phase 1: Shiploader SL4 and Outloading Optimisation

The key elements of Phase 1 are summarised as:

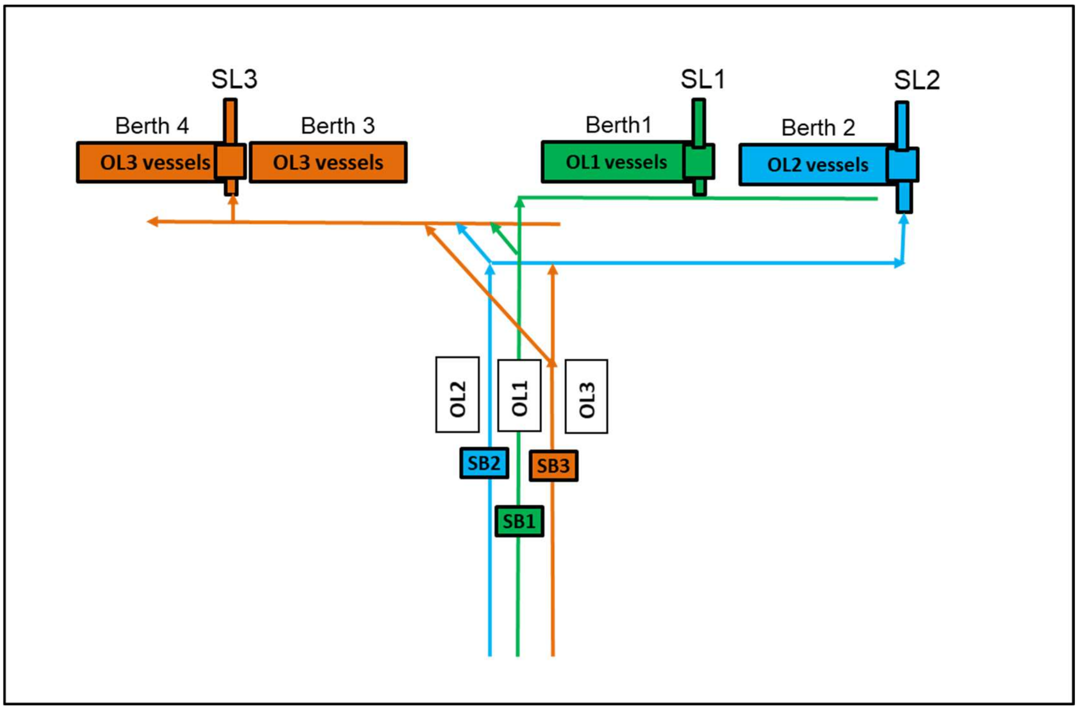
- Installation of new Shiploader 4 - including construction of new L18 Conveyor and support structure behind Berth 3
- Improved outloading optimisation through augmented yard machinery controls to increase reclaim rates
- Stockyard to surge bin string control improvements
- L3 & L4 Conveyor drive upgrades

Shiploader SL4

Machine availability is the measure of time a machine is available to operate. That is, the percentage of time that it is not planned to be shut down for maintenance. Reliability is separate to availability. Reliability is a measure of the percentage of time the machine operates correctly when it is required to do so. Availability and reliability are related. To achieve the high reliabilities expected of equipment at DBT, the equipment must be routinely shut down and maintained. The more difficult a machine is to maintain, the more difficult it is to achieve high reliability and high availability. It follows that the simpler the machine, the easier it is to meet availability requirements.

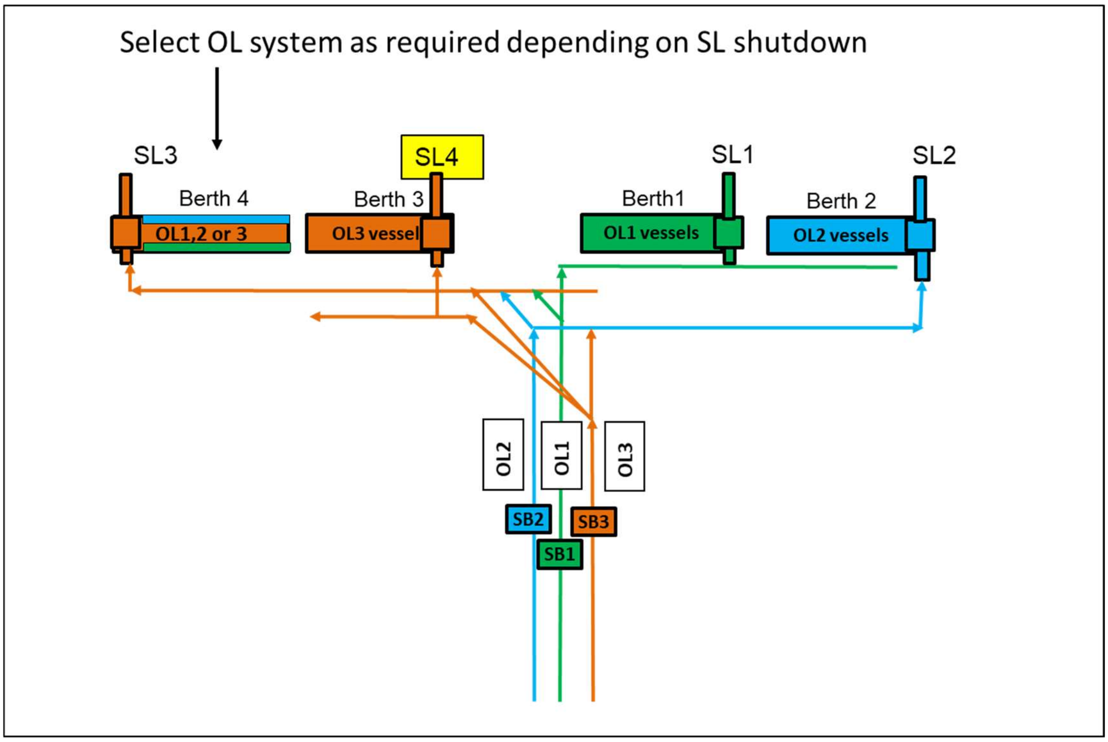
Shiploader complexity, coupled with access constraints, mean that it is more difficult to achieve high levels of availability for the shiploaders than it is for outloading conveyor strings. An average availability of 95% is achievable over the long term for the three outloading strings, whereas achieving 91% average availability for the shiploaders can be challenging. The current outloading configuration is based on 3 shiploaders being fed by 3 outloading conveyor strings as depicted in Figure 30. Currently, when a shiploader is being maintained, a maximum of two outloading systems are available thereby limiting the terminal outloading system availability to no more than the number of available shiploaders.

Figure 30: Existing Outloading to Shiploader connectivity



A fourth shiploader on Berth 3 allows for the existing outloading strings to operate independently of shiploader maintenance, thereby providing an overall 4% increase in outloading availability and a subsequent capacity increase. The proposed connectivity is shown in Figure 31.

Figure 31: Proposed Outloading to Shiploader connectivity with SL4



Outloading Optimisation, including L3/L4 Drives and Reclaim/Surge Bin Control

Current outloading availability is masked or hidden to some extent by shiploader availability. Once shiploader availability is no longer the constraint on availability, all impacts on outloading availability will have an impact to capacity. During the FEL 2 Study DBIM worked closely with the Operator and Aurecon to identify areas for optimisation in outloading and eliminate unnecessary delays to outloading availability. Areas where infrastructure modifications or control system upgrades are required have been incorporated into the scope of 8X. Most significantly, there is a requirement to upgrade the drives on conveyors L3 & L4 that feed Surge Bins 1 & 2 respectively. While the drives were originally designed to the normal drive sizing requirements adopted at DBT, they are not suitable to allow robust operation in a situation where the Operator is trying to always maximise reclaim capacity. When the surge bins are being filled as quickly as practicable then the existing drives have the potential to reach thermal overload and cause significant delays after surge bin full events or metal detection stops. Replacing the drives allows for a change to the way the surge bin levels are controlled, allowing for a maximisation of reclaim capacity and a resulting uplift to outloading capacity.

The ILC modelling highlighted that at the completion on 8X Phase 1, the terminal stockyard was the next capacity constraint. This constraint is addressed by the stockyard augmentation project as part of Phase 2. Therefore, Phase 1 alone does not produce as much capacity as was described in Master Plan 2019. The additional capacity released by 8X Phase 1 is 3.1 Mtpa as shown in Table 6.

Table 6: Phase 1 Scope and Capacity Increment for Phase 1

Phase	Description	Capacity (Mtpa)
Baseline	ILC System Capacity Assessment October 2018	84.2
8X Phase 1	Shiploader SL4 on Berth 3 • Shiploader 4 (SL4) located on Berth 3, a new long travelling luffing A-Frame shiploader (8,650tph) • L18 wharf conveyor located behind Berth 3 and L17, including tripper to feed SL4 (8,650tph) • Replacement of Jetty head end building Outloading Optimisations • Reclaim bucketwheel upgrades • Stockyard to surge bin string control upgrades • Drive upgrades to L3 & L4 conveyors • Hatch change Automation	87.3

Operational impacts during implementation of Phase 1

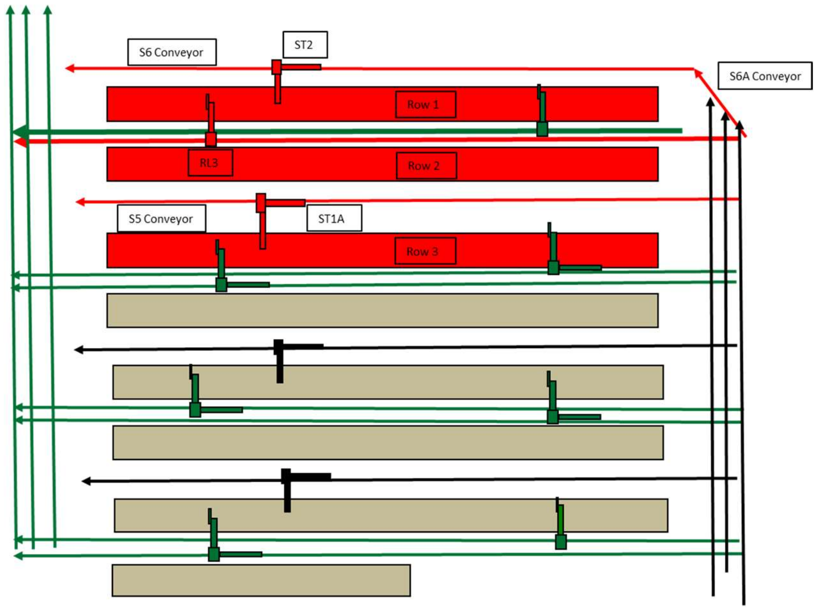
No material throughput losses are expected during the implementation of Phase 1. The cut-in to allow feed from outloading system OL3 was considered in the development of 7X, is relatively simple and can be completed during a routine maintenance outage. In fact, the SL4 project reduces long term capacity outages, particularly in relation to shiploader replacements or major refurbishments. Outages associated with L3 and L4 Conveyor drive replacements are also not material, as they can be masked by usual maintenance outages for SL1 and SL2.

5.4.2. Phase 2: Stockpile Augmentation and Conveyor Upgrades

The key elements of Phase 2 are highlighted in Figure 32 and are summarised as:

- Stockpile Augmentation Project - Addition of walls to Bund 1 and Bund 3 to improve storage volume in Rows 1, 2 and 3 by allowing wider piles to be stacked against the walls.
- Upgrade of R2 conveyor to allow RL3 to operate at its full reclaim rate potential (from 4200 tph to 5300 tph) from Rows 1 & 2.
- Upgrade of S5 Conveyor to allow the new Stacker ST1A to stack at its full rate potential of 8100tph into Rows 2 & 3
- Upgrade of Conveyors S6A/S6 and Stacker ST2 to allow stacking at a higher rate into Row 1
- A Zone swap to optimise the pairing of yard zones to outloading systems

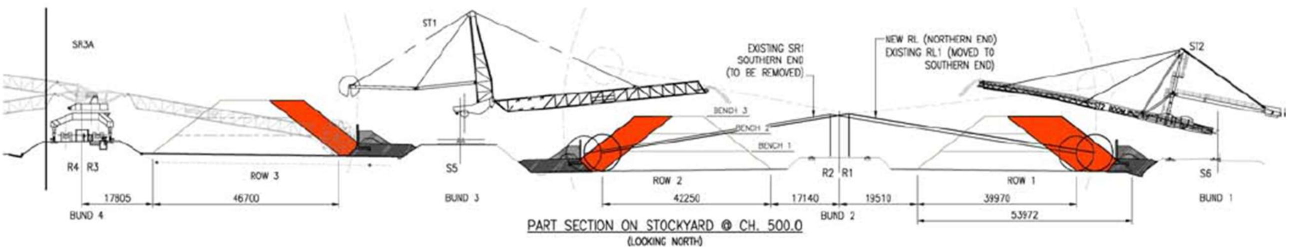
Figure 32: Areas of Stockyard affected by Phase 2



Stockyard Augmentation Project (SAP)

The SAP is the first component of the 8X project that increases the stockyard storage volume. This additional volume delivers an efficiency gain in the existing coal chain by allowing more parcels to be built simultaneously in the stockyard which, in turn, allows trains to be sent to more mine load-outs on any given day. This improved efficiency provides additional system capacity by reducing the peaking congestion at points in the network. The infrastructure provided by SAP 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.

Figure 33: Cross-Section of Rows 1 to 3 showing proposed walls and additional stockpile volume



Volume improvements are approximately 20 to 35% based on typical 25,000 t individual pile sizes associated with typical 60 kt average parcel sizes. The gains could be greater depending upon the mix of stockpile sizes involved. Larger parcels lead to a larger relative change in volume.

The vertical walls also have the effect of improving average reclaim rates able to be achieved by reclaim machines RL1, RL3, SR2 and SR3A.

R2/RL3 Upgrade

When RL3 was designed and built between 2012 and 2014, as a NECAP Series D Project, it had the same capacity bucketwheel, boom conveyor and reclaim chute as all new reclaimer machines since 2006, namely RL1, SR3A, SR4A and RL2. The machine is capable of operating at a nominal 5,300 tph without requiring any major upgrades. The receiving conveyor, R2, which operates at 4,200 tph, was not upgraded at the time because the additional capacity was not required. Phase 2 includes the upgrade of R2 Conveyor to 5,300 tph to capitalise on RL3's capability. This will be achieved by a speed increase from 4.9 m/s to 6.2 m/s and a carry idler upgrade from 35° to 45°. A drive and brake upgrade and a transfer chute replacement will also be required as is the inclusion of a tail mounted brake to prevent chute overfilling.

R2 will also receive a conveyor safety system upgrade to comply with AS4024 for devices associated with emergency stops. This upgrade will be required for R2 Conveyor as a NECAP project if 8X does not proceed.

There is minimal work required to allow RL3 to reclaim at the new rate. These tasks include;

- Adjustment of the skirts on RL3 transfer conveyor/R2 transfer chute
- Commissioning RL3's reclaim parameters to suit 5,300 tph (including adjusting chutes, deflectors, skirts, blocked chute switches and other field devices to suit the new operating conditions)
- Revising control parameters for reclaiming against the new SAP walls on Bunds 1 and 3

Stackers ST1 and ST2 Upgrade

Inloading system 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. Figure 34 shows the relative locations of these machines in the stockyard

In the case of ST2, a rate of 8,100 tph can be achieved with a conveyor speed increase for conveyor S6A, S6 and the ST2 boom conveyor. To accommodate this speed increase, the drives of each conveyor will need upgrading together with braking arrangements and pulley arrangements. Transfer chutes from S6A to S6 and from ST2 tripper to boom will also need modifications.

In the case of ST1, a replacement of this machine with new ST1A stacker is currently underway and that project is due for completion in the first half of 2022. The new ST1A machine geometry is suitable to accommodate the vertical bund walls and is designed to accommodate the higher stacking rate with only minor modifications.

During the FEL 2 Study it was determined that S5 conveyor should be replaced with a new 2000 mm wide conveyor to achieve the target 8100 tph consistent with all other yard belts feeding stackers on site. It was determined not to be practicable to achieve 8100 tph using an 1800 mm belt as proposed in FEL 1 Study. The higher rate of 8100 tph allows higher rate inloading systems to stack at full rate whenever a dedicated stacker is being used.

Replacing the conveyor with a new conveyor on the same footings has the additional benefit of reducing brownfield shutdown risk.

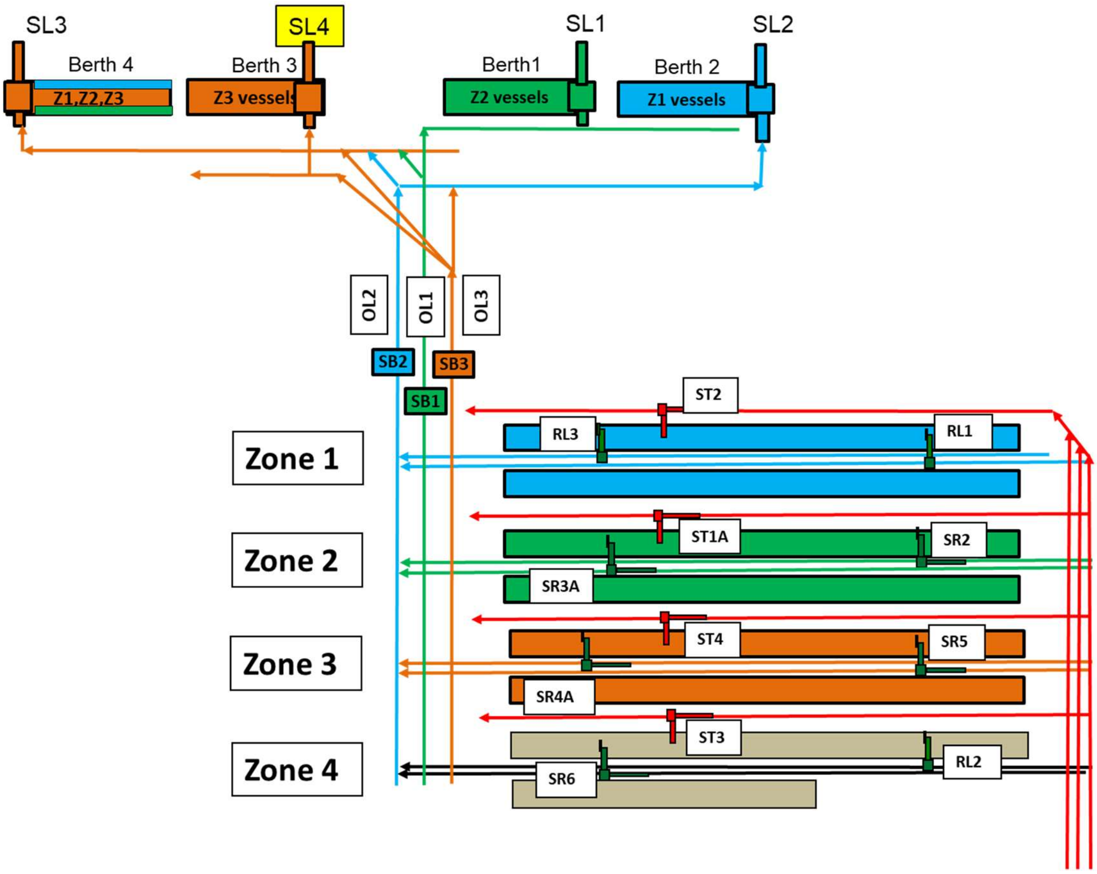
Zone Swap

Once Phase 2 is complete, the Zone to OL system pairing is proposed to be changed to reflect the new balance of reclaim rates and storage volumes across the Zones.

The new optimal pairing for normal operation can be identified by inspection as follows:

- Zone 1 to OL3, SL3/SL4 on a dual Berths 3 and 4
- Zone 2 to OL1, SL1 on a single Berth 1

Figure 34: Proposed re-allocation of stockyard zones to OL systems following the SAP project



The ILC model shows that completion of Phase 2 yields a System Capacity of 91.2 Mtpa (Table 7).

Table 7: Scope and Capacity Increment for Phase 2

Phase	Description	Capacity (Mtpa)
Baseline	Phase 1	87.3
8X Phase 2	• Vertical Bund walls and backfill, Bund 1 (west) and Bund 3 • Stockyard surface re-grading • Upgrades of existing yard equipment and conveyors upgrades in eastern stockyard (Stackers ST2, ST1A, reclaimer RL3 and conveyors S6, S6A, S5 and R2) • Zone reconfiguration of stockyard	91.2

Operational impacts during implementation Phase 2

DBIM engaged the ILC during FEL 2 to model the potential throughput losses that would occur during the construction of SAP and the conveyor upgrades included in Phase 2. Various implementation scenarios were modelled. The modelling led to an optimisation of the implementation schedule to minimise the impact of the works. The modelling shows that the total loss of throughput over an 84 week schedule is between 2.6 Mt and 3.5 Mt if the terminal is trying to ship 100% of its contracted demand over that period. The 3.5 Mt is based on quite conservative stockyard row width assumptions for affected rows whereas the 2.6 Mt is based on more realistic restrictions. There is scope to further reduce this loss by applying similar measures to those used during 7X where temporary coal bunds were used to locally increase storage volume in these areas. The merits of this will be further examined during FEL 3. The modelling showed that the operational impact would be 0 Mt if the terminal was trying to ship at a level equivalent to the producer sales forecast provided to the Operator for the period in question.

5.4.3. Phase 3: IL4 and Inloading and Outloading Upgrades

The key elements of Phase 3 are summarised as:

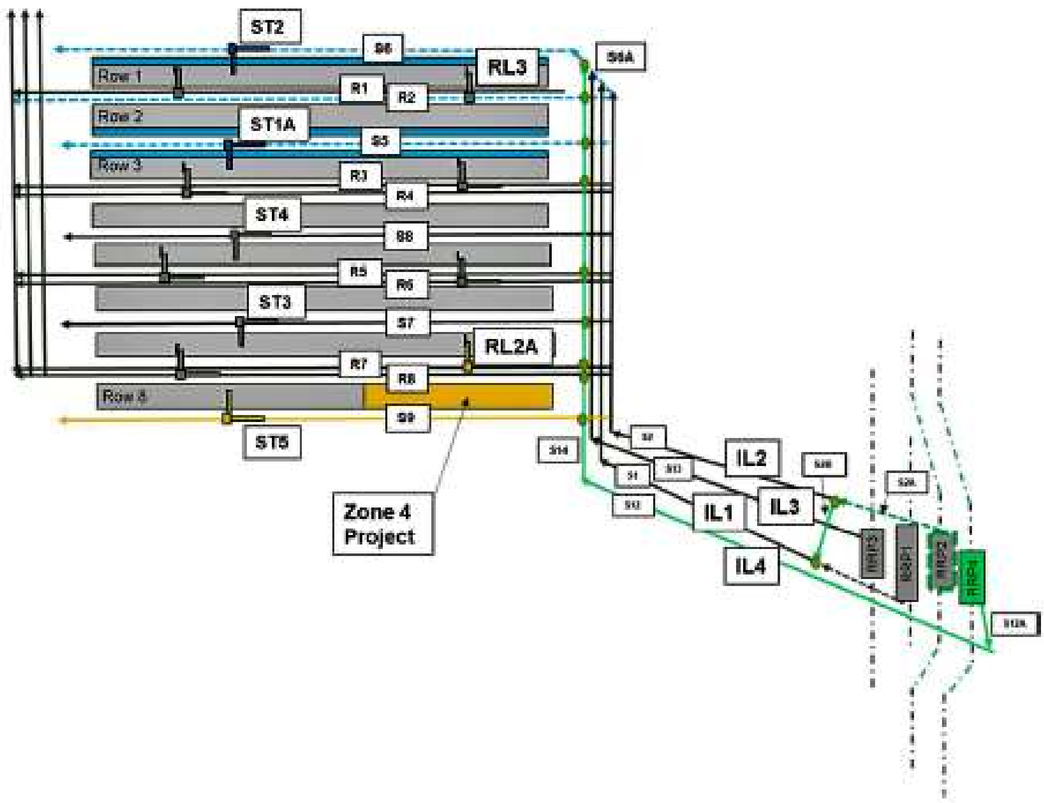
- Rail Receival Pit 4 (RRP4) and inloading system IL4 (8,100 tph)
- IL2 upgrade (5,500 tph to 8,100 tph) by splitting flow onto original IL1 conveyors
- Decommissioning of RRP1
- Upgrade to existing outloading conveyors OL1 & OL2 to 8,650 tph
- Upgrade R3 conveyor to accommodate higher rate SR2A

New Inloading System IL4

Currently DBT has one high rate inloading string (IL3 operating at 8100 tph) and 2 lower rate systems (IL1 and IL2 operating at 5500 tph). It is technically feasible to upgrade IL1 and IL2 to 7600 tph, however the shutdown durations to complete the works are prohibitive. The shutdown duration to upgrade RRP2 and IL2 is estimated to be 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 fourth system would reduce the terminal capacity to around 60 Mtpa for more than a year.

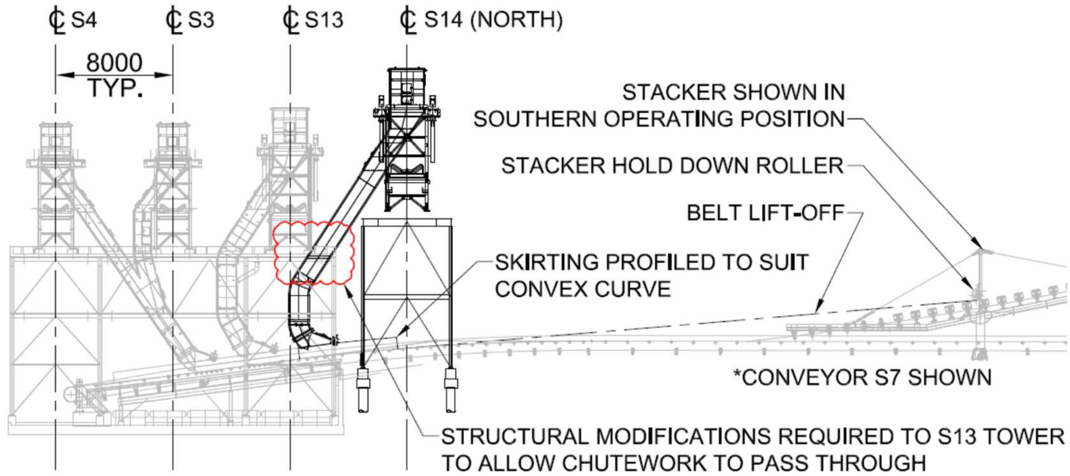
A new high capacity fourth inloading system (based on the IL3 design) is proposed as the first step to increase inloading capacity as a part of 8X Phase 3. During the FEL 2 Study investigations, several options for IL4 were considered. The preferred solution involves construction of RRP4 on the inside of the existing rail loops and the providing of a conveyor system over the rail lines, with the conveyors then running along the northern side of S13 Conveyor to feed the yard (Figure 35).

Figure 35: Onshore expansion works showing IL4 and IL2 upgrade



IL4 will run across the southern end of the stockyard on an alignment which is north of the existing system.

Figure 36: Proposed alignment of IL4 conveyor S14 at the southern end of the yard

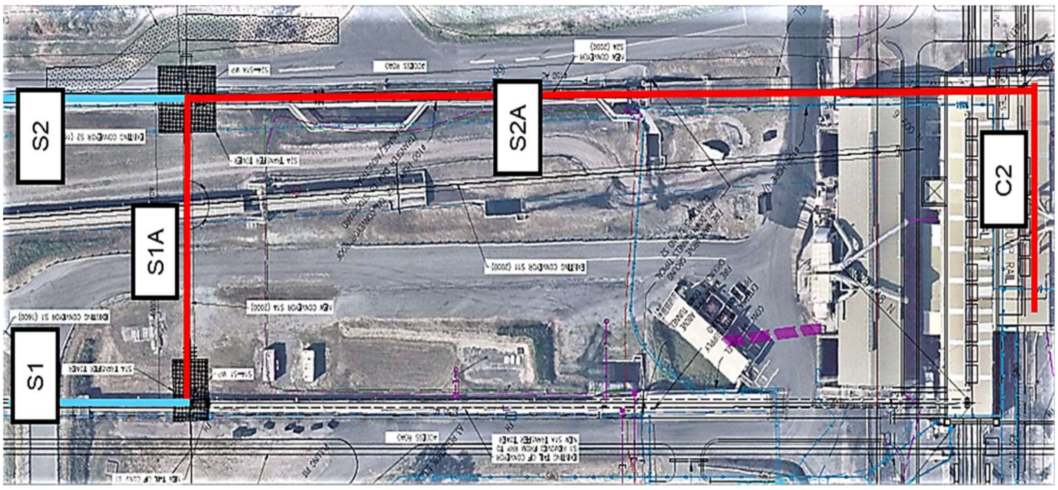


Rail access to RRP4 is achieved by a temporary closure of RRP2 and slewing of existing rail line 2 to provide access to RRP4. This provides an opportunity to upgrade RRP2 without throughput loss.

Inloading System IL2

During FEL 2, a simpler, lower capital cost and lower whole of life cost solution to upgrading IL2 was identified. This involves the upgrade of RRP2 to 8,100 tph and splitting of the 8,100 tph flow between the existing IL1 and IL2 conveyor systems as shown in Figure 37. The flow is then combined again on the yard conveyors as it is delivered from S3 and S4 conveyors simultaneously. The existing IL1 and IL2 Systems are rated at 5,500 tph and therefore do not require any upgrade. One significant benefit of this approach is that it eliminates several shutdowns on the transfers from IL2 to the various yard conveyors.

Figure 37: IL2 Upgrade Conveying Systems - New/Replaced conveyors in red. Existing Conveyors in blue.



The key elements of the upgrade include:

- Upgrade of RRP2 to 8100 tph by operation of the existing vibrating feeders at higher amplitudes and modifications to the pit concrete and trigger locations;
- Replacement of the C2 conveyor within the RRP2 receival station with a new 2500 mm conveyor to handle 8100 tph;
- Replacement of the tail section of S2 within the RRP2 inclined exit tunnel with a new 8100 tph, 2000 mm wide belt conveyor. This conveyor would be designated S2A;

- Construction of S2A drive tower over the relocated S2 tail end. Flow from RRP2 would be split at this point to discharge on to S2 and/or a new transfer conveyor designated S1A;
- Construction of the 5500 tph transfer conveyor S1A to allow diversion of flow from S2A to a new S1A drive tower located over S1 to effect transfer on to S1; and
- Relocation of the tail end of S1 to S1A drive tower and removal of the redundant section of S1 as part of the decommissioning of RRP1.

A key feature of the proposed upgrade is that train unloading would normally proceed at 8100 tph but would automatically reduce to no less than 5500 tph, and continue operation without delay, should one of the two inloading conveyor systems (IL1 or IL2) halt unexpectedly during train unloading.

To enable this transition to occur without stopping rail unloading operations, the S2A conveyor is proposed to utilise a VVVF drive controller for variable speed operation. Some surge capacity is also proposed to be incorporated into the S2A to S1A/S2 transfer chutes to store coal for the short period while the rate arriving at the head of the S2A conveyor is being adjusted from 8100 tph to 5500 tph to match the revised outgoing rate of 5500 tph from this transfer.

The 'Split Flow' concept also allows the flow to be either re-joined at transfer to a common 8100 tph stacking conveyor in the yard, or alternatively to instead be directed to two different stacking conveyors at the same time, subject to the availability of the two stackers. This type of operation could potentially deliver time savings when required to split train loads to two separate stockpile destinations to ensure coal is not over-stacked in the dynamic zone.

Alternatively, the system can be set to operate at a reduced rate of 5500 tph via either IL1 or IL2 alone in cases where lack of availability of a high rate stacking path forces stacking via a stacker-reclaimer that may be capable of stacking at only 5500 tph.

Decommissioning of Inloading System IL1

The IL1 system will not be upgraded in 8X and will be decommissioned after IL2 is returned to service by slewing the rail line from IL1 to IL2. If required, IL1 will be upgraded and returned to service as a part of the 9X project.

The scope of RRP1 decommissioning includes the removal of all mechanical and electrical equipment except the following:

- Enclosing building
- Access pit covers
- All existing access stairs
- Existing monorail beams
- Rail beams and existing grizzlies and hopper covers
- Pit and tunnel ventilation system including ductwork, registers, flashings, mechanical ventilation unit, filters and weatherproof acoustic enclosure
- Sump pump and associated piping

Steel plate covers to protect existing openings between rails will be added to make the area safe.

OL1 and OL2 Upgrade

The rate limitations of the outloading conveyor systems and surge bin capacities contribute to "full bin" events during ship loading. "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 upgrade of OL2 was identified in FEL 1 and included in Master Plan 2019. OL2 is to be upgraded from the current rate of 7,600 tph to 8,650 tph by speeding up the conveyor string from the Surge Bin to the shiploaders. Shiploader SL2 will also need upgrades to the L10 Conveyor and the telechute to accommodate the higher rate. FEL 2 also identified some significant upgrade works that will be required on SL2, resulting from a recent SL2 Structural Integrity Assessment project initiated by the Operator. While this work would typically be undertaken as a NECAP project, it is considered appropriate that this work is undertaken during the same maintenance outage as the upgrade, so has been added to the scope of 8X.

The potential upgrade of OL1 was not recommended in Master Plan 2019. This is because the limited capacity of the SR2 (reclaiming machine feeding OL1) meant any gains of upgrading of the outloading system beyond Surge Bin 1 would be somewhat diminished. This was reconsidered during FEL 2. After Phase 1, reclaim rates from machines in Rows 1, 2 & 3 will be increased, giving SR3A, SR2's partner machine, a boost. Additionally, the Operator has advised that SR2 is reaching end of life and has initiated a design project for a replacement machine. That machine would be replaced with a higher rate machine with a capacity equal to all bucketwheel reclaimers built at DBT in the last 15 years (RL1, SR3A, SR4A, RL2 and RL3). These two factors make increasing the OL1 rate from 7,200 tph to 8,650 tph to match OL3 viable. The addition of OL1 upgrades to 8X has added an additional 0.6 Mtpa to the 8X Capacity, provided R3 Conveyor is also upgraded.

The OL1 rate increase will be achieved by speeding up Belt Feeders BF5 & 7, L5 and L7 Conveyors. Several transfer chutes will also require upgrade or replacement.

During structural analysis of the L5/L6 Drive tower during FEL 2, Aurecon identified a structural deficiency that must be addressed. The L5/L6 Drive Tower is a complex structure that has been subject to many modifications over the various stages of development at DBT. Since the tower was originally built, the assessment of drag loads from wind has progressed. Modelling during FEL 2 has identified several structural members are non-compliant for all design wind cases. This work has been added to 8X because many of these same members need upgrading as part of 8X, based on the increased operating loads imposed by the upgraded equipment. The extent of the overload is greatest during extreme wind events, meaning that if 8X does not go ahead in a timely fashion, this work will need to be carried out as a NECAP project.

R3 Conveyor

SR2 is currently 37 years old and is due for replacement. The inclusion of an upgrade of Conveyor R3 in 8X allows the additional reclaim capacity from a replacement machine to be utilised while also providing a capacity increment to the OL1 upgrade. R3 conveyor will receive a speed increase, brake upgrade and chute replacement to increase the operating rate from 4,200tph to 5,850tph.

ILC modelling shows that completion of Phase 3 yields a System Capacity of 96.7 Mtpa (Table 8)

Table 8 : Scope and Capacity Increment Phase 3

Phase	Description	Capacity (Mtpa)
Baseline	Phase 2	91.2
8X Phase 3	• Rail Receival Pit 4 (RRP4) and inloading system IL4 (8,100tpa) • IL2 upgrade (5,500 tph to 8,100 tph) by splitting flow to original IL1 conveyors • Upgrade to existing outloading conveyors OL1 & OL2 to 8,650 tph • Upgrade R3 conveyor to 5,850 tph	96.7

Operational impacts during implementation Phase 3

The Phase 3 works have been developed to ensure that there are no material operational impacts during the Phase 3 implementation. Shutdowns required for inloading upgrades are all expected to take days rather than weeks to complete. It is anticipated that the duration and can be planned to shadow normal maintenance outages.

The R3 Conveyor upgrade is likely to have the largest single impact. The R3 shutdown is anticipated to take approximately 6 weeks and is estimated to cause a total throughput impact of less than 200,000 tonnes, if the terminal is shipping the full contract tonnage of 84.2 Mtpa at the time.

The works required on SL2 and L5/L6 may have an impact on throughput, but would both need to be completed as NECAP projects if they were not included in the 8X scope, meaning the net effect of these shutdowns is negligible.

Shutdown durations and impacts will be further refined in the FEL 3 Study, due to commence in April 2021.

5.4.4. Phase 4: Zone 4

Phase 4 involves completion of the existing stockyard Row 8 to enable both Rows 7 and 8 to operate together as a fourth operating zone (**Zone 4**). Zone 4 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 existing Western Site Access Gate and the Western Access Road.

The above aspects of the Zone 4 Project are illustrated in Figure 38 below.

Figure 38: 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.

Like SAP, 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 more simultaneous cargo builds in the stockyard at any one time. Building more simultaneous parcels allows for more mine loadouts to be accessed on any day, reducing the peaking congestion on various parts of the rail network. The infrastructure provided by the Zone 4 expansion 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 proposed increase in the DBT 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 hybrid stockpiling. 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 4th 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.

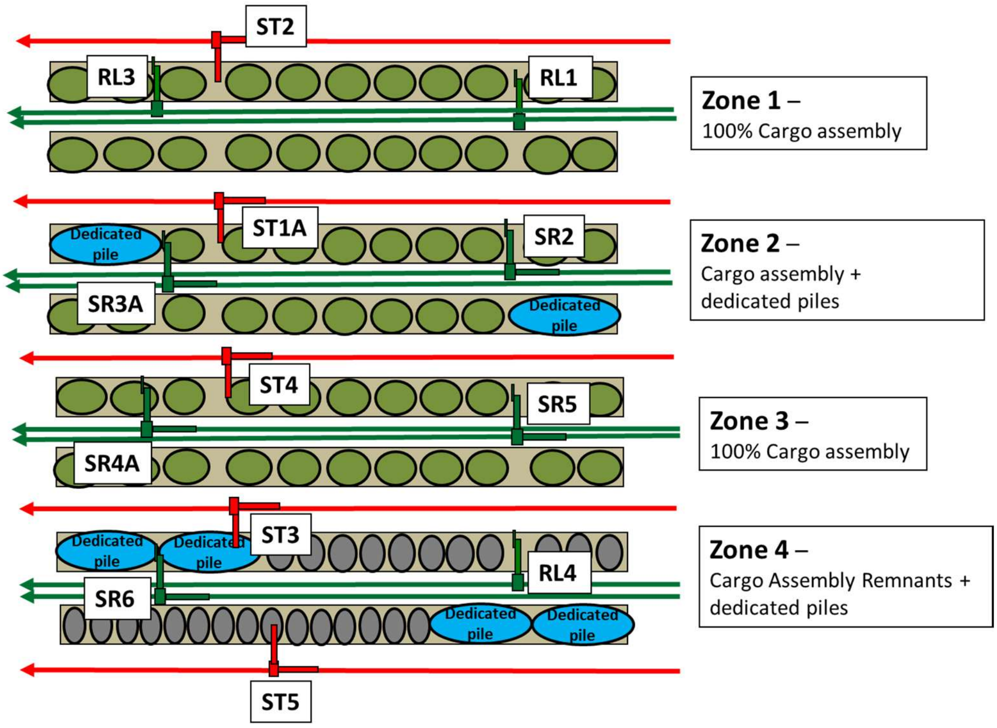
Minor improvements in overall stacking and reclaiming performance are also achieved in the Zone 4 Project via:

- replacement of the existing RL2 reclaimer with reclaimer RL4 which will feature a longer boom. 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 from the Zone 4 project.

The stockpile areas are proposed to be utilised as shown below (Figure 39)

Figure 39: DBT 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 kt capacity for a high throughput coking coal (shown in blue). This is expected to handle most 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.

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 DBT. 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.

The ILC modelling shows that Phase 4 adds 2.4 Mtpa, taking the System Capacity at completion of the full 8X project to 99.1 Mtpa (Table 9).

Table 9: Scope and Capacity Increment Phase 4

Phase	Description	Capacity (Mtpa)
Baseline	Phase 3	96.7
8X Phase 4	Zone 4 including: • Row 8 stockyard development • ST5/Conveyor S9 on Bund 7 to the west of Row 8 • Replacement of RL2 with RL2A with a longer boom & different slew centre • Construction of new office buildings that are impacted by Zone 4	99.1

Operational impacts during implementation Phase 4

The operational impact from Phase 4 is not expected to be significant. The existing operational areas in Row 8 are currently used for remnant management. There will need to be a width reduction in the operational stockpile width while Bund 7 is constructed. This will impact on the reclaim rate from the remnant stockpiles which forms only a small part of each cargo. Currently, the reach of SR6 is approximately 9m longer than RL2 in Row 8. Limiting the western toe of the Row 8 stockpiles to RL2's reach is likely to be sufficient space to allow safe construction of Bund 7. This will be further investigated in the FEL 3 Study.

5.4.5. Secondary Infrastructure and Facilities

The proposed 8X Expansion directly impacts on several buildings across the site. The Operator currently makes use of an office and ablutions facility at the Jetty Head end which is made up of temporary construction buildings. This facility was originally built by the Offshore contractor for the 7X Project around 2007. The facility is rapidly approaching its end of life. The L18 conveyor alignment is close to this facility and the area adjacent to the building, which is where the area's car parking is currently located, will no longer be available post-expansion. During Phase 1, a new facility will be built on the new marine structure just north of the existing facility, leaving room for car parking where the existing facility currently sits.

Other buildings directly impacted by 8X relate mostly to Phase 4 development. The Hilltop building complex, the Corporate Centre, the Onshore Maintenance Offices and the Control Tower will be in the shadow of the new Stacker ST5 and need to be relocated to be a safe distance from the machine's operating envelope. These buildings are shown in Figure 40.

During FEL 3, DBIM will investigate whether it is better to move this element of scope from Phase 4 to Phase 1. This is driven by the fact that the existing Hilltop Building Compound, which was also a "temporary" construction facility built for 7X in 2005, is approaching end of life and will need to be replaced irrespective of whether Phase 4 proceeds. Combining this replacement with the relocation of the other facilities may allow for the most efficient rationalisation of space to meet the future business needs of the Operator. Also, providing the new buildings in Phase 1, allows the existing buildings to be used as temporary construction facilities during Phases 2, 3 & 4 which will ultimately save on construction costs.

Figure 40: Buildings impacted by Phase 4

Other building works required to support 8X include the western entry security gatehouse relocation and a warehouse extension to cater for the additional spares as a result of 8X.

5.4.6. Capital Cost of 8X

The Capital Cost estimate for 8X was revised during FEL 2. A summary is shown in Table 10. The estimate is in AUD with a base date of October 2020.

The is defined as a Pre-Feasibility Study (Class 3) estimate under the AACE classification. The estimate has been prepared in a manner consistent with an expected estimate accuracy range of ±20% within an 80% confidence interval.

Based on the probabilistic contingency analysis, the actual P10 to P90 estimate range is -12.32% to +14.40% from the P50.

The estimate has been prepared on the basis that all four phases progress past the FEL 3 Study and into execution. Should there be some rationalisation of demand and less than four phases are committed then the capital cost estimate will require adjustment.

Table 10: 8X Capital Cost Estimate

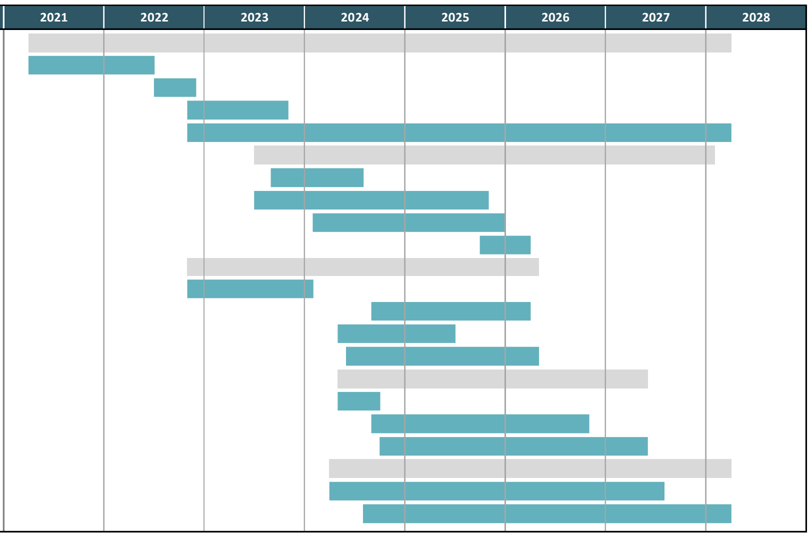
Description			Incremental Capacity	Capacity (Mtpa)	Cost ($m) @ P50
Phase		Scope			
8X	Phase 1	SL4 plus outloading optimisation	3.1	87.3	246
	Phase 2	SAP and yard upgrades	3.9	91.2	229
	Phase 3	New IL4 and IL2 Upgrade plus OL1 and OL2 Upgrade	5.5	96.7	461
	Phase 4	Zone 4 project	2.4	99.1	340
Total			14.9	99.1	1,276

5.4.7. 8X Schedule

The 8X expansion is an incremental 4 phase approach to the development of DBIM. This phasing becomes less relevant if demand exists for all 14.9 Mtpa that 8X can deliver. Developed together, the order of completion changes slightly and capacity increments that become available are no longer neatly defined as 4 incremental capacity steps. During FEL 3 the schedule will be further refined, and the capacity steps will be identified. A high-level summary schedule as at completion of FEL 2 is shown in Figure 41.

Figure 41: 8X Summary Schedule

ID	Activity	Start	Finish
1	**Major milestones**	**Apr-21**	**Mar-28**
2	FEL 3 study	Apr-21	Jun-22
3	TCMP, 60/60, CEA & Approvals	Jul-22	Nov-22
4	FEL 4 engineering	Nov-22	Oct-23
5	EPCM	Nov-22	Mar-28
6	**Phase 1 - SL4 and outloading optimisation**	**Jul-23**	**Jan-28**
7	Outloading optimisation	Sep-23	Jul-24
8	SL4 fabrication & installation	Jul-23	Oct-25
9	L18 fabrication & installation	Feb-24	Dec-25
10	SL2 & L8 installation (Phase 3)	Oct-25	Mar-26
12	**Phase 2 - SAP**	**Nov-22**	**Apr-26**
13	SAP panel fabrication	Nov-22	Jan-24
14	SAP Row 1 (Bund 1) and ST2/S6 installation	Sep-24	Mar-26
15	SAP Row 2 (Bund 3) and ST1/S5 installation	May-24	Jun-25
16	SAP Row 3 (Bund 2) and RL3/R2 installation	Jun-24	Apr-26
17	**Phase 3 - New IL4 and IL2/OL2 upgrade**	**May-24**	**May-27**
18	OL2 upgrade	May-24	Sep-24
19	New IL4 fabrication and installation	Sep-24	Oct-26
20	IL2 upgrade	Oct-24	May-27
21	**Phase 4 - Zone 4**	**Apr-24**	**Mar-28**
22	Row 8 on Bund 7 fabrication & development	Apr-24	Jul-27
23	RL2 & ST5 fabrication and installation	Aug-24	Mar-28



5.4.8. Effect of 8X on O&M Costs

During FEL 2, the Operator conducted an assessment of incremental additional Operation and Maintenance (**O&M**) costs that would be applicable for each of the phases of 8X. The study identified the one-off project costs that the Operator will incur during the development of 8X as well as the long term effect on O&M costs of the terminal. Where appropriate, as defined by the Operations and Maintenance Contract (**OMC**) the one-off project costs are included in the 8X capital estimate. The incremental O&M costs provided by the Operator during FEL 2 are shown in Table 11. The Operator estimates that the additional O&M cost for the full four phases of 8X will be $9.254m per annum which, when spread over the full 99.1 Mtpa available at completion of 8X will significantly lower the Handling Charge per tonne for all Users of DBT.

Table 11: Incremental O&M Costs associated with 8X ($m)

Phase	1	2	3	4	Total
Incremental O&M Costs	5.28	0.259	3.11	0.604	9.254

5.4.9. 8X Price Ruling

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 DBT were priced on a socialised basis. An expansion that is socialised has a lower risk profile than an expansion that is priced differentially. This is because Access Holders have agreed that in the unlikely event of default of any Access Holder, the remaining Access Holders would incur a proportionate increase in their terminal access charges to cover the shortfall. This makes the risk profile of an expansion acceptable to both the lessee of the facility and potential project financiers. All previous expansions of DBT were financed on this basis and all current Users benefitted to some degree from this arrangement.

Differential pricing, by comparison, necessarily requires both lessee 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 have high creditworthiness, the project may still be bankable, provided longer term take-or-pay contracts were negotiated to effectively return DBIM's capital during the term of the contract. However, if the Access Seekers have lower creditworthiness and are unable to provide sufficient security to support longer term payment obligations, it is highly unlikely that either the lessee or potential financiers would accept the related risk and the project would not proceed.

In March 2021, DBIM submitted an application for a Ruling on the Price Method applicable to the 8X Expansion to the QCA. While the QCA considers the application, DBIM plans to continue with the FEL 3 Study to ensure that the expansion planning continues in a timely and efficient manner. The Underwriting Agreements for FEL 3 are capped to a total Underwriting of $8m. This cap will only be lifted if or when the QCA decides that 8X should fully socialised.

8X is a Cost Sensitive Expansion as defined in s.11.13(b) of the AU and therefore the default position is that 8X should therefore be treated as a Differential Expansion Component. However, there are compelling reasons to justify the Socialisation of 8X under s.11.13(c) of the AU. 8X is expected to be socialised because it:

- will operate in a wholly integrated way with the existing terminal
- will significantly reduce O&M costs on a per tonne basis
- reduces ongoing NECAP costs
- reduces risks to existing Users
- reduces future throughput losses through increased availability, reliability and flexibility.

5.5 9X Project

The 9X Expansion comprises four phases which could increase terminal capacity to 135.7 Mtpa. The 9X Expansion includes the addition of a new stockyard and two new berths. These components cannot be delivered within the existing terminal footprint. As a result, DBT would require additional land, in addition to capital dredging. The requirement for capital dredging introduces further challenges and is anticipated to require complex environmental approvals.

Capacity on the Goonyella rail system will need to be expanded to accommodate the 9X Expansion. In a previous review, Aurizon Network identified that capacity on the trunk route between Hatfield and Yukan was limited, and that additional capacity would require triplication and other upgrades.

The proposed 9X Expansion is outlined in Table 12.

Table 12: 9X Expansion - Scope by Phase

Scope			Gain (Mtpa)	Capacity (Mtpa)	Cost ($m) @ P50
Phase		Description			
9X	1A	• 4th Rail loop to connect IL4 + Other rail loop siding mods • IL1 recommissioned to the 8X footprint (Upgrade of RRP1 and first conveyor segment to Louisa Creek transfer point is optional) • 1 X New inloading stream to connect to IL1 and IL4. • New stockyard – 2 Rows, 2 Reclaimers, 2 Stackers – with overall length dependent on operating mode • New OL4 on existing jetty structure to feed L18 only	8.5	107.6	1500
	1B	• 1 X New inloading stream to connect to IL1 and IL4 • Additional 2 rows of stockyard with 1 X additional reclaimer and 1 X additional stacker	13.6	121.2	460
	2	• Additional OL onshore conveyor link from Louisa Creek to existing OL1, OL2, OL3 • 1 x new stacker and 1 x new reclaimer • New Berth 5, extend L17 to allow SL3 to work Berth 4 and Berth 5	5.9	127.1	670

Scope		Gain (Mtpa)	Capacity (Mtpa)	Cost ($m) @ P50
Phase	Description			
3	• New SL5 & wharf conveyor L27, provide transfer from OL4. • Extend L18 to allow SL4 to work Berth 4 and return to task of backing up SL1, SL2, SL3 for the 8X yard. SL4 also backs up SL5 when available.	6.0	133.1	210
4	• New Berth 6 & extend L17 to allow SL3 to move to Berth 6 • Extend L18 to allow SL4 to move to Berth 5 • Extend L27 to allow SL5 to move to Berth 4 providing dual berth capacity to Louisa Creek	4.2	137.3	530
Total		38.2	137.3	3,370

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 already loading 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 are possible. These were documented in more detail in Master Plan 2018. They are highly dependent on the commercial arrangements that underpin such an expansion and would be further developed in any future feasibility studies that include 9X.

Offshore configuration

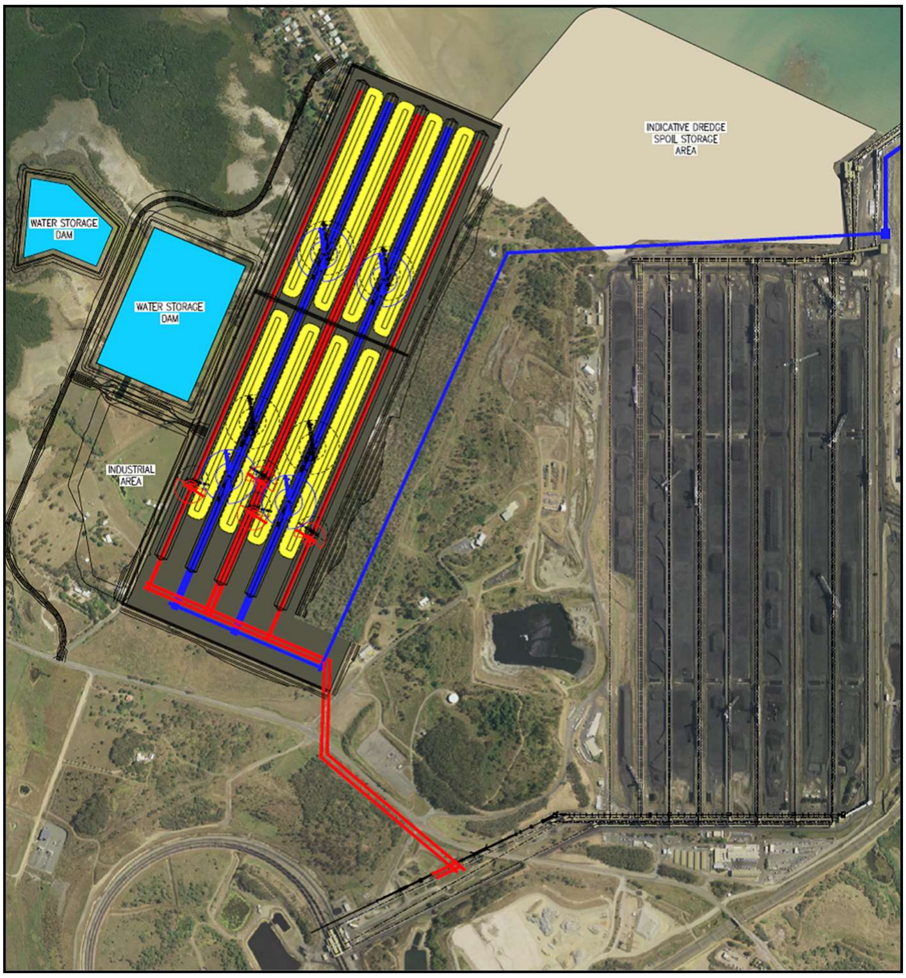
It is proposed that the new OL4 outloading string would load to vessels via shiploader SL3, which would operate on new Berths 5 and 6. The travel range for shiploader SL4 would be increased to include Berth 4 at that stage.

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.

The standalone terminal operation at Louisa Creek would best suit the long stockyard arrangement.

Figure 42: Long stockyard arrangement



The outloading conveyor arrangements need to be varied according to the required level of integration between the Louisa Creek stockyard and the existing DBT 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 in the case of Louisa Creek being developed as a virtual standalone terminal, assuming that 8X operations continue unchanged within the existing stockyard. Any other case will require the construction of some additional outloading conveyors.

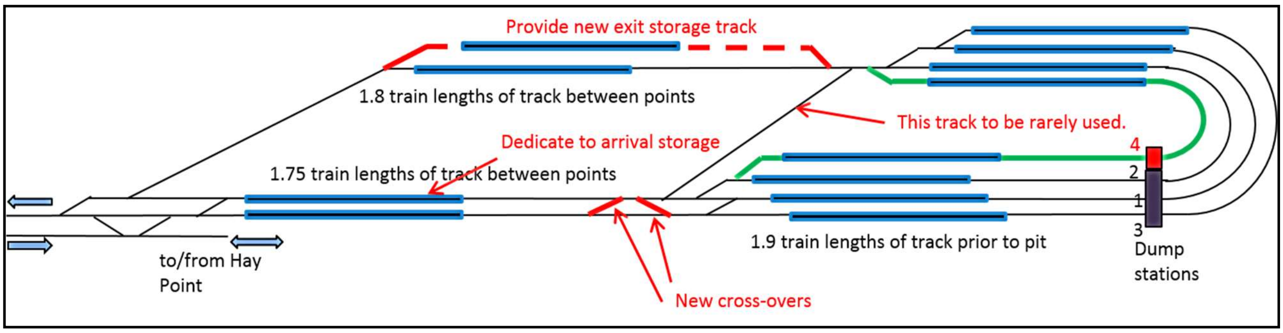
5.6 Rail Infrastructure

The rail track infrastructure in the vicinity of the terminal does not form part of the asset managed by DBIM. 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 indicated in red in Figure 43 below. It is proposed that these improvements would be carried out at the time of establishing RRP4 during the 8X expansion i.e. when RRP4 is fed from a diverted loop 2 and prior to establishment of the fourth rail loop.

The green lines in Figure 43 indicate the proposed establishment of the fourth rail loop. It would likely not be established until much later, coinciding with a later 9X expansion phase as described in Section 5.5.

Figure 43: 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.



6. Alignment with Sustainability Framework

Overview

DBT has developed a Sustainability Strategy – 'Handling with Care' – a joint commitment of DBIM as owner, and DBCT P/L as the Operator.

DBT's sustainability principles have been defined to underpin decision-making and future planning, to balance core business goals with corporate responsibilities. Key themes of the Strategy include a focus on People, Environment, Business Performance and Community & Partnerships as seen in Figure 44.

Figure 44: DBT Sustainability Strategy - Key Themes

Alignment with United Nations Sustainable Development Goal (**SDG**) Framework

In line with the Sustainability Strategy, the new Terminal Master Plan has included sustainability considerations. Key principles upon which the plan has been built are included in Table 13.

Table 13: Alignment of Master Plan 2021 with DBT Sustainability Strategy

Principles	Key Themes	Master Plan 2021	Aligned with UN SDGs
Drives Land Use Efficiency / Efficient Use of Resources	**Business Performance**	• The 8X Project has been specifically designed to be within the existing terminal footprint and strategic port lands already allocated to DBIM. • The 8X project has increased infrastructure capabilities throughout the terminal process - increasing the overall efficiency of the terminal footprint.	
Facilitates Economic Growth	**Business Performance**	• The 8X Project will facilitate export of an additional14.9 Mtpa - increasing economic prosperity in the region through increased employment opportunities for local supliers and labour hire groups through construction and operations.	

Principles	Key Themes	Master Plan 2021	Aligned with UN SDGs
Ensures Resilient & Adaptive Infrastructure	**Business Performance**	• The design of project infrastructure has considered existing operational and coastal marine environment learnings from historical operations. • Climate change considerations (ie. adaptation and resilience) have been examined in terms of appropriate and additional infrastructure within the marine environment. • Whole of Life costs have been used to help shape and instruct infrastructure design.	
Manages the 'Port-Township' Interface	**Partnerships**	• Robust consideration of adjoining rural residential and neighbouring residential areas and protection of port buffers have been focus points of the design of the 8X project - in particular with regards to potential air quality and noise impacts. • Significant consultation with community representative groups, elected representatives (State and Commonwealth) and the Mackay Regional Council has been undertaken to ensure the expansion pathway is well understood. See Chapter 8 for more detail.	
Includes Early Consideration (& subsequent protection) of Environmental Values	**Environment**	• Early consideration of National and State Matters of Environmental Significance in the 8X pathway including detailed assessment of ecological values and coastal processes / marine values (ie. terrestrial and marine based values assessment). • Project has avoided any dredging and/or significant disturbance to marine areas.	
Identifies & Protects Critical Supply Chains	**Business Performance Partnerships**	• Master Planning process has considered efficiency gains across surface transport supply chains - rail / sea channels etc	
Promotes Stakeholder Engagement, Inclusiveness & Transparency	**People** **Partnerships**	• Extensive Consultation undertaken as part of the Master Planning and 8X Project Process (see Chapter 8 for more detail)	
Ensures Port Safety & Security	**People**	• Engineering Design has been developed in accordance with relevant standards & regulations • Safety remains the key focus for terminal operations.	

Climate Change

DBIM has acknowledged the findings of the Intergovernmental Panel on Climate Change. DBIM is committed to limiting the impact from their own operations and will seek to partner with those within the value chain to further reduce emissions where possible.

DBIM has also committed to achieving net zero Scope 1 and Scope 2 greenhouse gas emissions from DBT operations by 2050, and is actively working on a strategy to shorten that timeframe.

DBIM has also committed to the following strategic actions:

- Develop a net zero road map for Scope 1 and 2 greenhouse gas emissions;
- Review Scope 3 emissions and assist partners to reduce these where feasible;
- Embed climate change strategy and risk management within governance structures; and
- Report on progress in line with recommendations of the Task Force on Climate-related Financial Disclosures (**TCFD**).

Water Management

One of the principal aims of Reef 2050 is a continued focus on improving water quality throughout the Great Barrier Reef World Heritage Area (**GBRWHA**) and control of inflows into the Great Barrier Reef marine environment. As part of robust terminal master planning, DBIM has over the past several years, actively invested in water management infrastructure across the terminal environs to improve both water security and water efficiency. Equally, the investment in significant water management infrastructure such as the series of terminal dams – including the most recently completed Rail Loop Dam increases the ability of the terminal to significantly reduce outflows into the surrounding marine environment. For a full description of water management infrastructure refer to Section 2.2.5.

Monitoring of water quality also forms part of the Environmental Licence conditions in place for the terminal from the Department of Environment and Science (**DES**).

Geopolitical & Social Influences

Increasing stakeholder expectations regarding robust governance systems and whole-of-business sustainability considerations have continued in recent years.

Within the sphere of control of the DBT is the need to ensure all operations are appropriately focussed on relevant people, environment, business & prosperity, and community & partnership issues. The recently completed DBT Sustainability Strategy appropriately addresses these themes, and as appropriate for this Master Plan.

In terms of social influences, existing consultation undertakings provided by DBIM, DBCT Pty Ltd and NQBP ensure that the community is adequately aware of terminal issues, trends and planned activities including expansion options. Refer to Chapter 8 for more information regarding the consultation activities undertaken in the preparation of this Master Plan.

7. Environmental Values & Adaptive Management Approach

7.1 Overview

Over the past several years, stakeholder expectations have significantly increased as the global community looks at Australia's response to increase environmental protection and management of the Great Barrier Reef World Heritage Area (GBRWHA) in which the DBT is located.

DBIM has long adopted a robust governance approach to environmental management at the DBT. This includes ensuring all relevant Commonwealth, State and relevant local Government laws and regulations are complied with at all times.

The Commonwealth Government has ultimate responsibility for the GBRWHA. The *Reef 2050 Long-Term Sustainability Plan* is the Australian and Queensland Government's overarching framework for protecting and managing the Great Barrier Reef to 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. 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.

DBIM will continue to discharge its environmental responsibilities carefully and recognises that operating in the GBRWHA requires robust environmental systems and proactive management.

Best practice environmental management within the coastal environment, and particularly within the GBRWHA requires two fundamental considerations:

- 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
- Ensuring robust Environmental Management Frameworks are in place for the ongoing management of operations consistent with the requirements of existing and renewed Environmental Authorities for terminal operations and/or construction activities.

DBIM 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.

Under the Sustainable Ports Development Act (2015), Master Planning for the priority Port of Hay Point/Mackay formally commenced with a notice of proposal issued on 27 October 2017.

Despite delays in advancing this work, including those caused by COVID-19 throughout 2020, preliminary master planning processes are now currently underway with NQBP regularly engaging with DBIM.

This section of the Master Plan outlines the particular environmental issues associated with the preferred growth pathways and the corresponding management responses.

7.1.1. Existing Environmental Authorities/Regulatory Processes

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

- DBCT P/L as the terminal operator holds an existing Environmental Authority (EA) (Permit EPPR00504513) which authorises the undertaking of ERA 50 Bulk Material Handling (up to 89 Mtpa) and ERA 63 (Sewage Treatment (more than 100 but less than 1500 Equivalent Persons design capacity)); and
- Additionally, DBIM 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 DBT terminal site (Permit EPPR02825115). The EA authorises the undertaking of blasting as part of the extractive activities.

7.2 Preliminary Environmental Impact Assessment

Commonwealth Matters

In line with DBIM's best practice approach to environmental planning regulatory approval requirements, the 8X project was referred to the Commonwealth Department of the Environment under the provisions of the *Environment Protection and Biodiversity Conservation Act, 1999* (**EPBC Act**) in late December 2020.

On 17 February 2021, the Commonwealth advised that the 8X Project was deemed to be a Non-Controlled Action and as such, no approval under the EPBC Act would be required (ref: 2020/8860).

State Matters

The expansion pathway outlined in this 2021 Master Plan is staged and incremental – consistent with the policy direction prescribed under Commonwealth and State regulatory frameworks regarding a sensible approach to coastal development within the GBRWHA.

Existing EAs issued by the Queensland Department of Environment & Science (**DES**) cover a terminal capacity of 89 Mtpa, as State and Port Development Approvals were previously sought and secured for the former Zone 4 expansion stage. However, as discussed in Chapter 5, a re-ordering of the preferred expansion pathway has occurred.

While expansion options outlined in this chapter must be further examined from detailed engineering and operational perspectives, the important environmental and social aspects have also been addressed.

Because of the DBT's geographical location within the GBRWHA, a preliminary assessment of ecological and social aspects of each of the preferred projects has been undertaken.

Subject to more detailed engineering design work being undertaken, each expansion step will need to be examined against various criteria and suitability including:

- Air Quality
- Noise & Vibration
- Underwater / Marine Noise
- 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.

7.2.1. Air Quality

All potential air quality impacts will need to be examined and considered for the expansion steps. Increased volumes 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.

DBCT P/L 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 Authority (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 under formal State Port Master Planning now underway for the port. DBIM will work with the State and NQBP in the preparation of this strategic planning document.

Initial Impact Assessment (Air Quality)

While the overall capacity of DBT is expected to increase by around 10% from the terminal's existing environmental licensed capacity of 89 Mtpa, the project will not result in a commensurate increase in emissions of dust due to upgrades to existing equipment and process improvements. It is anticipated that there will not be a significant increase in air quality impacts as a result of either the new Shiploader 4 (8X Phase 1) or SAP (8X Phase 2) Expansion Works. The 8X Phase 3 works, involving a new rail receival pit and inloading system, and Phase 4 works will be reviewed in the context of air and noise quality at the time of advanced engineering design. In terms of potential dust impacts on the marine environment, at most, the 8X Project may result in a marginal increase in dust and metals deposition into the marine environment and protection areas. The cumulative effect of the 8X Project and existing activities is however, unlikely to adversely affect water quality.

All stages of expansion must ensure any emissions and/or impacts are minimised, with regulatory compliance always remaining critical.

7.2.2. Noise and Vibration

All potential noise and vibration impacts will need to be examined when detailed engineering data is available and considered for all expansion steps. At present, DBCT P/L undertakes continuous noise monitoring at 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**). A number of noise control and management measures are incorporated across the DBT site.

Intensification of existing terminal operations, largely within existing terminal footprint areas will ensure the minimisation of noise emissions from the site as compared to a new greenfield development site. Further, upgrading/renewing operational equipment over time as development continues will also assist in noise and vibration management.

Initial Impact Assessment (Noise & Vibration)

It is anticipated that there will not be a significant increase in noise and vibration impacts as a result of any of the 4 phases of 8X. Advanced acoustic modelling work will be undertaken to verify anticipated changes.

All stages of expansion must ensure any emissions and/or impacts are minimised, with regulatory compliance being critical at all times.

7.2.3. Underwater / Marine Noise

The primary source of underwater noise generated by the marine piling for piling works associated with the installation of the new Shiploader 4 is the use of impact hammers to drive piles into the seabed. The resultant sound field in the water column at a measurable distance from the pile depends on operational and environmental factors, including:

- Pile size (diameter, wall thickness), shape and material;

- Hammer type and energy;
- Sediment depth and the depth to seabed at the pile toe;
- Bathymetry and its variations, and
- Sound speed profiles across the water column.

Initial Impact Assessment (Underwater / Marine Noise)

Preliminary assessment indicates underwater noise impacts on marine fauna species may be divided into two categories, 'behavioural' impacts and 'physiological' impacts. The extent and significance of these impacts can vary based on the level and character of the noise generated and the various marine species within the environment.

The proposed duration of up to 2 hours per pile, and 1-2 piles driven per month would see total piling around 4 hours per month. Acoustic consultants have advised that while this does not change the instantaneous (single strike) underwater noise level emissions from piling (and associated zones of impact), this limits the cumulative noise level emissions which in-turn limits the potential impact buffer zone from a more intensive piling program operating over a longer duration.

As such, the physical duration of the piling is in part expected to ensure such underwater noise impacts can remain a low likelihood, with the potential mitigation principles (ie. safety zones, management/mitigation procedures etc) to be incorporated when conducting piling works to further ensure an acceptably low impact outcome can be achieved.

This matter was assessed by the Commonwealth as part of the EPBC Referral. In line with best practice, a project-specific underwater noise assessment will occur as part of the State assessment process to accurately inform a Marine Construction Environmental Management Plan (**MCEMP**) to manage marine works.

7.2.4. Visual Amenity

DBT is an existing, long-established land use which forms part of the known landscape of the Port of Hay Point. 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 within this region. Additionally, the Port of Hay Point is recognised in local, regional and state-wide planning instruments as a major infrastructure node along the Queensland coast.

Initial Impact Assessment (Visual Amenity)

Expansion of the terminal as proposed under this Master Plan up to the 9X project (ie. all works within existing terminal and/or operational footprint) is consistent with the well accepted visual amenity of the local environs.

7.2.5. Cultural Heritage

A search of the Cultural Heritage Database maintained by the Department of Aboriginal and Torres Strait Islander Partnerships (**DATSIP**) was undertaken. The search did not identify any recorded indigenous cultural heritage sites within the area of the proposed 8X project. An indigenous Fish Trap / Weir is located adjacent to Lot 131 SP 136318, however will not be impacted by the proposed 8X project. It is not expected that the 8X project will encounter any relevant issued issues due to works occurring within existing terminal footprints and previously disturbed operational areas.

As always acknowledged, all expansion works will 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*.

In line with the recently completed DBT Sustainability Strategy, Cultural Heritage matters and potential indigenous partnerships have been identified as a key governance issue. DBIM is currently investigating entering into a Voluntary Cultural Heritage Management Plan with the Yuwi Aboriginal Corporation who were recognised as the Registered Native Title Claimants in February 2020.

Initial Impact Assessment (Cultural Heritage)

Expansion of the terminal as proposed under this Masterplan up to the 9X project (ie. all works within existing terminal and/or operational footprint) is not expected to trigger any material cultural heritage requirements. Regulatory compliance will be required at all times with the Cultural Heritage Duty of Care provisions prescribed under the *Aboriginal Cultural Heritage Act 2003*.

7.2.6. Local Maritime Operations

All expansion options up to and including 9X would not entail any material alteration to local maritime operations. The Shiploader 4 (8X Phase 1) works are localised and within operational tenured areas and no additional marine development is proposed for any of the 8X Phases 2, 3 and 4. Maritime Safety Queensland (**MSQ**) will be involved in the assessment of the State application for these works.

The 9X expansion may entail up to two new offshore berths and reclamation within the Great Barrier Reef 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 and is likely to trigger the need for extensive environmental impact studies.

Initial Impact Assessment

Expansion of the terminal as proposed under this Master Plan up to the 9X project (ie. all works within existing terminal and/or operational footprint) is not expected to trigger any material local maritime issues.

7.2.7. Community and Social Impacts

All potential community and social impacts will need to be examined for all expansion steps as part of State assessment processes. Initial discussions with the relevant local government (Mackay Regional Council) have indicated very strong support for the proposed 8X expansion pathway given the social and economic opportunities likely to be provided to the regional community.

Acoustic and air quality considerations have been integral to the design of the 8X expansion pathway. Further examination of amelioration of these potential impacts will be addressed as part of the State assessment processes.

Initial Impact Assessment (Community & Social Impacts)

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 construction noise, traffic impacts, dust and general movements around the terminal environs. Ongoing management of operational impacts will be managed via relevant regulations, port development conditions and updated environmental licences.

7.2.8. Coastal Processes

Potential impacts on coastal processes are limited to 8X Phase 1 as the only phase involving marine works (viz. the installation of vertical piles to support the development of conveyors for Shiploader 4).

Approximately 20 vertical piles will be driven alongside the existing Berth 3 structure, however these potential impacts are to be managed via the Queensland State regulatory approval processes to be coordinated by NQBP and the State Assessment and Referral Agency (**SARA**).

Additionally, 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.

Legislation at both Commonwealth and State government levels prohibits the at-sea relocation of capital dredge material. The 9X concept therefore includes a proposal to reclaim land using material from necessary berth dredging consistent with the principles of beneficial re-use. Given the preliminary nature of the 9X design, the extent of material for this area and size of area is unable to be accurately confirmed at this time. 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'.

7.2.9. Marine Ecology

Potential marine impacts associated with the 8X expansion pathway are limited to the installation of vertical piles adjacent to Berth 3. The 9X expansion pathway would entail a significant amount of marine works and as such, marine impacts would need to be examined in great detail when engineering parameters and detail is better known.

Initial Impact Assessment (Marine Ecology)

Potential marine ecology impacts associated with the new Shiploader 4 have been examined via a Marine Macrophyte Survey by James Cook University's Centre for Tropical Water and Aquatic Ecosystem Research (**TropWATER**). The investigation of marine plants, in particular seagrass and macro-algae, was performed in October 2020, using live digital camera footage and Van Veen sediment grab techniques. Examination of the area around Berth 3 found an "open substrate of muddy sediments with no marine plants present". In essence, no marine vegetation or algae was determined to be within the installation or construction zone. The construction site is therefore not species attracting.

The findings of this examination were detailed with the Commonwealth as part of EPBC Referral.

7.2.10. Terrestrial Ecology

Potential impacts associated with the expansion options up to and including 8X have been examined in preparing for the formal EPBC Referral to the Commonwealth. Desktop and detailed field-based investigations were undertaken by qualified ecologists and environmental management personnel.

Initial Impact Assessment (Terrestrial Ecology)

No material issues anticipated up to the 9X expansion, as development is largely within highly disturbed footprint. No Matters of National Environmental Significance (including *Threatened Ecological Communities*, *Threatened Flora* or *Threatened Terrestrial Fauna* etc) were evident across the proposed 8X development sites. More detailed investigation would need to occur across the proposed 9X sites when footprints and engineering parameters are better understood.

7.2.11. 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 and reported as part of the terminal Environmental Management System.

Initial Impact Assessment

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

7.2.12. 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 8X expansion pathway outlined in this Master Plan is likely to benefit from such water quality management improvements.

Initial Impact Assessment

Potential construction impacts associated with the 8X expansion pathway are to be managed via Construction Environmental Management Plans (**CEMPs**). Ongoing operational impacts are to be regulated in accordance with relevant Environmental Licences. More detailed investigation would need to occur across the proposed 9X sites when footprints and engineering parameters are better understood.

7.2.13. Transportation and Access

Transportation and access issues are unlikely to significantly change under expansions outlined within this Master Plan. Changes to inloading rail receival pits would occur within already highly disturbed environments. Relevant modifications to entry gates and gatehouses would all be facilitated on strategic port lands and within known future transport infrastructure (viz. roadways) areas.

The 9X expansion would however, trigger changes to terminal access and significant changes to rail and road infrastructure.

7.2.14. Waste Management

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

7.2.15. Land Tenure and Other Stakeholder Interests

All expansion options up to 9X utilise existing DBIM held lands as they largely involve augmentation of existing terminal areas. Additional short-term tenure may be required to facilitate project related lay down areas and/or management of traffic associated with project personnel. The 9X expansion would require further land acquisitions in the immediate port environments for both terminal area and associated infrastructure corridors (road, rail etc.).

7.3 Comparison of Expansion Projects

Table 14 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 lower risk rating.

Table 14: Qualitative comparison of environmental and planning risk for the proposed expansion pathway

Issue or Impact	8X Phase 1	8X Phase 2	8X Phase 3	8X Phase 4	9X
Air Quality	L	L	L	L	H
Noise & Vibration	L	L	L-M	L	H
Underwater Noise	M	L	L	L	H
Visual Amenity	L	L	L	L	L-M
Cultural Heritage	L	L	L	L	M-H
Local Maritime Operations	L	L	L	L	M
Community & Social Impacts	L	L	L-M	L	H
Coastal Processes	L	L	L	L	M-H
Marine Ecology	L-M	L	L	L	M-H
Terrestrial Ecology	L	L	L	L	M-H

Issue or Impact	8X Phase 1	8X Phase 2	8X Phase 3	8X Phase 4	9X
Soil & Geology	L	L	L	L	M-H
Surface Water Quality & Hydrology	L	L	L	L	M-H
Transport & Access	L	L	L	L	M
Waste Management	L	L	L	L	L-M
Land Tenure & Other Stakeholder Interests	L	L	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.				

Robust management of the construction phase will be required for all expansion steps. Close regulatory liaison is recommended ensuring a 'no surprises' culture and partnership approach. The location of the terminal within and adjacent to the GBRWHA, necessitates a robust focus on impact avoidance of management of environmental values as part of planning and design processes, and ensuring robust environmental management systems are in place for ongoing operations.

For 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 DBT 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 9X marine infrastructure
- Securing the necessary land and appropriate form of tenure
- Reclamation and potential construction impacts upon local marine species
- 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

7.4 Post Expansion Assessments (Preliminary)

In order to better understand potential noise and dust emissions, DBIM previously commissioned preliminary studies of dust and noise modelling to ensure critical issues are factored into preliminary design and feasibility studies.

Air Quality Assessment

Due to their past experience with DBT, Katestone Environmental (**Katestone**) were previously commissioned to undertake predictive modelling for terminal expansions. The air quality assessment assumed that the terminal capacity had reached 102 Mtpa – albeit under a differing expansion pathway. Katestone have been re-engaged to conduct detailed assessments of the proposed 8X pathway for State Assessment purposes.

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.

It is assumed that the neighbouring coal terminal is operating at its approved capacity (55 Mtpa). The air quality assessment was 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 DBIM 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: Total Suspended Particulate matter (**TSP**), PM 10 and PM 2.5. PM 10 and PM 2.5 are defined as Fraction of Particulate Matter with diameter smaller than 10 and 2.5 micrometres respectively.
- 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 the assessment was 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 DBT and HPCT for the Stage 6 and 7 expansions of DBT (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 DBT at 85 Mtpa and HPCT at its current approved capacity of 55 Mtpa.

As a result of the changed expansion pathway proposed under this Master Plan, detailed engineering work as part of further developing expansion pathways will need to explore additional ways to mitigate air quality impacts from future development.

7.4.1. 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.

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.

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 in its capacity as 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 activities (to be managed by the State of Queensland). 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.

Acoustic Environment

Noise modelling in relation to advanced engineering works will also be required to ensure future expansions are within reasonable limits and statutory guidelines, including the relevant criteria under Environmental Authorities held by the DBCT P/L. These noise modelling studies will need to include both marine (underwater) and terrestrial based noise assessments.

8. Stakeholder Consultation

8.1 Public Consultation Process

Community Reference Group

The Port of Hay Point Community Reference Group (**CRG**) is facilitated by NQBP and has been a critical link between DBT and the community. Membership of the CRG currently includes representatives from the following groups:

- NQBP (including the CEO as chair)
- Mackay Regional Council
- Local Business
- Yuwi Aboriginal Corporation
- Aurizon
- BMA
- DBCT P/L
- DBIM
- and the local communities of Louisa Creek, Timberlands, Half Tide, Salonika Beach, McEwans Beach, and Fenechvale/Droughtmaster Drive.

The CRG discusses a wide range of local concerns and is kept abreast of general developments at DBT and Hay Point. This forum provides an ongoing opportunity to ensure the community is well informed about DBT issues that affect port stakeholders. In turn, DBIM and DBCT P/L are able to consider and gauge general community concerns as part of the ongoing DBT planning process. The CRG Terms of Reference is available on NQBP's website together with minutes of meetings and copies of presentations given during the meetings.

Community Working Group

In addition to the CRG, DBCT P/L facilitates the Community Working Group (**CWG**). This group is represented by community members, local government, DBCT P/L, the local State member of parliament and DBIM. 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 DBIMs involvement in the CRG and CWG ensures community relations are maintained and that community concerns are heard and acted upon.

DBIM recognises that potential expansion projects may create additional community pressures that are not related to the terminal's operations. Accordingly, DBIM takes an active role with the community by promoting stakeholder knowledge of future potential expansions by giving progress updates in these two forums.

CRG meetings are typically held every three months and CWG meetings are held every two months. Since mid-2014, DBIM has regularly updated these forums on current and future projects. Current and future projects may include projects undertaken as NECAP works, expansion projects contemplated by the Master Plan, and feasibility studies. Both the CWG and the CRG have been kept abreast of the full suite of projects contained in this Master Plan.

An Expansion Planning Update presentation showing the results of the 8X FEL 2 Study and the draft Master Plan 2021 was given to the CRG on 11 November 2020, and a similar presentation was given to the CRG on 10 December 2020. The feedback from the community has been consistent. The local communities are most concerned about any further development outside the existing terminal footprint (9X). In contrast, the overwhelming feedback to DBIM has centred around one key message - development within the footprint

(8X) is less likely to upset the local community, provided the environmental impacts and construction impacts are effectively managed.

8.2 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 DBT to expand to meet industry demand. DBIM'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 open and 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 CRG or CWG meetings, 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 CRG and 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 DBT expansion projects, as well as ongoing terminal operations.
- Speaking engagements at local clubs, council, and industry groups where appropriate
- Support for local charities and community groups
- Response to community input or issues.
- Maintaining a website to better inform interested parties of terminal related matters.

8.3 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,
- 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.

DBT 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, DBIM continues to place a strong emphasis on maintaining a cooperative relationship with its stakeholders through its membership of the ILC and through regular informal contact.

Master Plan 2021 has been prepared by DBIM 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 CRG in November 2020 and the CWG in December 2020.
- North Queensland Bulk Ports – Principal Planner – March 2021.
- Queensland Department of Transport & Main Roads (**TMR**) including Director of Ports and the Project Manager (Sustainable Ports Planning) – March 2021.
- State Member for Mackay, Hon Julieanne Gilbert - letter and meeting November 2020
- State Member for Mirani, Hon Stephan Andrew - letter November 2020
- Federal Member for Dawson, Hon George Christensen – letter and meeting November 2020
- Federal Member for Capricornia (Assistant Minister for Northern Australia), Hon Michelle Landry – letter and meeting November 2020
- Federal Minister for the Environment, Hon Susan Ley - letter November 2020
- Federal Minister for Resources, Water and Northern Australia, Hon Keith Pitt – letter November 2020
- Deputy Prime Minister and Minister for Infrastructure, Transport and Regional Development, Hon Michael McCormack – letter November 2020
- Mayor and Chief Executive, Mackay Regional Council, Mayor Greg Williamson and Mr Michael Thomson – letter and meeting November 2020
- All DBT Access Holders – Throughput and Capacity Forum, March 2021.
- All current DBT Access Seekers – Throughput and Capacity Forum, March 2021.
- The DBT terminal Operator (DBCT P/L) – Master Plan 2021 presentation to Executive Leadership Team (**ELT**) and Key Managers – February 2021, regular monthly TMT meetings with ELT plus regular monthly Master Plan meetings since November 2018 with Manager Projects
- Aurizon Network (rail network owner and manager) – Supply Chain Development Manager – Network - March 2021.
- Aurizon National – Throughput and Capacity Forum, March 2021.
- Pacific National – Throughput and Capacity Forum, March 2021.
- OneRail – Throughput and Capacity Forum, March 2021
- BMA Rail – Throughput and Capacity Forum, March 2021
- Integrated Logistics Company – General Manager and Master Planning and Simulation Manager - ongoing and frequently throughout the development of Master Plan 2021

8.4 Management of Complaints and Issues

DBIM values its trusted relationship with the local community in which it operates. To maintain this relationship, DBIM fosters 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.