Dalrymple Bay Infrastructure Management Pty Ltd

Application for NECAP Prudency Ruling for Projects NS01 and NS06

Supporting Material

06 February 2025

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1 Executive Summary

1.1 Purpose

This document provides supporting material for the QCA's consideration of DBIM's application for a Prudency Ruling for the actual expenditure of $6.115m on completed works forming part of two projects in NECAP Series S (**the two projects**) that were not approved by one Access Holder.

The status of the two projects is summarised below.

ID	Project	Budget[1]	Actual[2]	To Go[3]	Forecast[4]	Underrun[5]
NS01	Arc Flash Mitigation – Phase 2	4,791,000	3,772,496	888,504	4,661,000	130,000
NS06	Site Roads Upgrade Program	3,850,000	2,343,051	115,949	2,459,000	1,391,000
Total		**8,641,000**	**6,115,547**	**1,004,453**	**7,120,000**	**1,521,000**

DBIM considers that the expenditure on the two projects was prudently incurred.

This section summarises DBIM's view of the factors in s.12.10(c) that the QCA may have regard to (among other things) in making a Prudency Ruling in respect of the two projects.

1.2 DBIM's obligations

The AU requires DBIM to incur NECAP under certain circumstances, as discussed in Section 2.1 of this application. The OMC requires annual and 5-year capital expenditure plans to be prepared by the Operator in consultation with DBIM. These plans are the foundation of the NECAP Program.

1.3 Approvals

In April 2022, the Board of the Operator (owned by a majority of Access Holders by contracted capacity) approved the 5 year capital plan which included the proposed NECAP Series S group of projects (including the two projects) as shown in Section 7.2.1.

In May 2022, in accordance with s.12.10(b)(3) of the AU, NECAP Series S (including the two projects) was recommended for implementation by the Operator in its NECAP Compliance Statement, which is summarised in Section 3 and attached in Section 7.2.2.

In June 2022, pursuant to s.12.10(b)(2)(A) of the AU, DBIM issued the NECAP Series S projects to Access Holders for approval. In August 2022, after extensive stakeholder consultation, all Access Holders approved six of the eight projects in NECAP Series S, which DBIM also approved to proceed.

All but one Access Holder approved the two projects, as evidenced in Section 7.2.3. In February 2023, after further consultation with the Access Holder that did not approve the two projects, and for the reasons outlined in this submission, DBIM approved the two projects to proceed without unanimous approval by Access Holders.

By November 2024, substantial components of the two projects were completed and handed over into operation.[6]

[1] Budget is the project value recommended by the Operator for implementation, including project management costs and appropriate contingency essential for completion of the works.
[2] Actual is the actual expenditure incurred up to the end of November 2024 on the proportion of the scope that is completed and handed over into operation.
[3] To Go is the expected remaining costs that do not affect the operation of the completed facilities.
[4] Forecast is DBIM's estimated total cost of the project
[5] Underrun is the expected underrun compared to the Budget (Budget minus Forecast)
[6] Some expenditure remains to be incurred that does not affect the operation of the completed facilities, including finalisation of construction and supply contracts, the production of as-built documentation, and specifically for NS01, the cost of 3.3kv switchgear for SL2 for installation in Phase 3, and the acquisition of spares.

However, as the requirement in section 12.10(b)(2) was not satisfied in respect of the two projects, DBIM has applied for a NECAP Prudency Ruling pursuant to s.12.10(c) in respect of the two projects.

1.4 Factors relating to prudency

1.4.1 The works are necessary – s.12.10(c)(1) of the AU

The two projects were implemented on the basis of the recommendation of the Operator and the approval of all but one Access Holder. The necessity of the works is summarised in the Justification section of the related Project Brief provided in Section 7.3.1.2 for NS01 and Section 7.3.2.1 for NS06.

In summary:

- NS01 is part of an essential multi-phase safety program to upgrade electrical switchgear and motor control centres to reduce the exposure of personnel to dangerous arc flash incidents. Other relevant factors supporting the necessity of the works are listed in Sections 4.1 and 4.2.1.
- NS06 is part of a program to upgrade critical heavily-used roads at the terminal which is necessary to ensure they provided safe and efficient service at the lowest whole of life cost. Other relevant factors supporting the necessity of the works are listed in Section 5.1 and 5.2.1.

Based on these factors, DBIM considers that the works are necessary and prudently implemented for the purposes of s.12.10(c)(1).

1.4.2 The scope of work is appropriate – s.12.10(c)(2) of the AU

The scope of works for the two projects is summarised in the relevant Project Briefs, and further detail is provided in Sections 4.2.2 for NS01 and 5.2.2 for NS06. The scope provided a fit for purpose outcome, supports the objectives of the relevant multi-phase programs, and is consistent with the definition of Capital Expenditure in the AU.

DBIM notes that the two projects are similar to other recent NECAP works which were approved by all Access Holders:

- NS01 is similar to NR01 Arc Flash Mitigation Phase 1, which was completed in 2021-22
- NS06 is similar to NQ01 L2 Roadway Upgrade, which was completed in 2022-23

In respect of NR01 and NQ01, pursuant to s.12.10(b)(1), the QCA confirmed that it was reasonably satisfied that the expenditure incurred fell within the definition of Capital Expenditure contained in the AU.[7]

DBIM notes that the scope of the two projects did not include any unnecessary works, and no material changes in scope occurred following approval, and no costs for any DBT Operations and Maintenance activities were included in the expenditure.

Based on these factors, DBIM considers the scope is appropriate for the purposes of s.12.10(c)(2).

1.4.3 The standard of works is reasonable – s.12.10(c)(3) of the AU

The two projects were managed and implemented by the Operator, which was best placed to undertake these works in consideration of the high level of interaction with operating facilities and the requirement for access to perform the works on an opportune basis. The projects were executed in accordance with the Operator's standard procedures, specifications and procurement practices, and in accordance with the relevant Australian Standards and industry practices as appropriate.

The standard of works did not exceed the General Construction Standards in clause 12.1 of the PSA, which promote fit for purpose construction.

Based on these factors, DBIM considers the standard of works on the two projects was reasonable for the purposes of s.12.10(c)(3).

[7] Refer QCA website Non-expansion capital expenditure for the QCA's decision on NECAP 2021-22 and NECAP 2022-23

1.4.4 The costs are prudent considering the prevailing market – s.12.10(c)(4) of the AU

The budgets for the two projects were based on direct costs and quantities factored from previous similar works undertaken by the Operator, as well as budget quotes from qualified suppliers and contractors as appropriate, and estimates provided by Operator personnel with the relevant skills and experience. These direct costs and the risks associated with the costs and execution of the works were then combined in a quantitative risk assessment, which calculated the appropriate levels of contingency to apply to the direct costs. Project management and other ancillary or incidental costs essential for the completion of the works were also included. DBIM considers this approach is prudent, as further detailed in Section 2.3.

The Operator's approach to markets for engineering, equipment supply and construction is reflected in the contracting strategies included in the Project Execution Plans for the two projects, which are detailed further in Sections 4.2.4 and 7.3.1.3 for NS01 and 5.2.4 and 7.3.2.2 for NS06.

The cost of $6.1m incurred to date in relation to the two projects is associated with works that are completed and handed over into operation, as indicated by the Handover Certificates in Sections 7.3.1.4 for NS01 and 7.3.2.3 for NS06.

A further $1m (mostly for NS01) is estimated to be incurred by the end of 2025 on post-completion works that do not affect the operation of the relevant facilities, including finalisation of construction and supply contracts, the production of as-built documentation, and specifically for NS01, the cost of 3.3kv switchgear for SL2 for installation in Phase 3, and the acquisition of spares.

DBIM forecasts that the two projects will underrun their combined budget by $1.5m, mostly due to reduced pricing of construction contracts on NS06.

These factors support that the costs are prudent for the purposes of s.12.10(c)(4) in consideration of the circumstances prevailing in the markets for engineering, equipment supply and construction.

1.4.5 Safety during construction and operation – s.12.10(c)(5) of the AU

The two projects were implemented by the Operator's skilled and experienced Project Team which was best placed to undertake the works in consideration of the high level of interaction with operating facilities and the requirement for access on an opportune basis. These processes require robust access controls and work procedures to ensure the safety of the Operator's personnel and contractors during completion of the works, and the safety of the operations and maintenance personnel when the facilities are returned to service.

The two projects were both related to implementing safety improvements at the terminal. The design of the new facilities incorporated safety features and operability improvements to support ongoing safe operation and maintenance, as outlined in Sections 4.1 and 4.2.5 for NS01 and 5.1 and 5.2.5 for NS06.

DBIM notes that no injuries or damage to the facilities occurred in the course of the works or as a result of operating the upgraded facilities.

Based on these factors, DBIM considers the works were prudently managed for the purposes of s.12.10(c)(5).

1.4.6 Environmental compliance – s.12.10(c)(6) of the AU

In consideration of compliance with environmental requirements during construction, all contractors engaged by the Operator were required to implement environmental management plans as part of their contracts. This covered noise and air pollution, waste management, and appropriate levels of training and certification for the relevant activities.

All new facilities were required to comply with the Operator’s Environmental Management System, for which the Operator has ISO 14001 accreditation.

DBIM notes that no community complaints or reportable environmental non-compliances occurred relating to the construction or operation of the new facilities, and that the cost of measures taken to minimise potential environmental incidents was prudent given the potential risk and costs of environmental harm. DBIM considers the works were prudently managed for the purposes of s.12.10(c)(6).

1.4.7 Whole of asset life costs are minimised – s.12.10(c)(7) of the AU

As part of the development of the two projects, a number of alternatives and options were assessed in order to provide the best balance between capital cost, service life, functionality, and expected operations and maintenance cost, without compromising the project objectives in regard to safety and other key factors.

The selected solutions were appropriate and similar to other facilities at the terminal, and DBIM considers the whole of asset life costs were minimised effectively for the purposes of s.12.10(c)(7).

1.4.8 Independent assessment – s.12.10(c)(8) of the AU

The two projects were managed and executed by the Operator in accordance with the OMC using the Operator's own procedures and processes. In addition to the documentation supplied as part of this Prudency Ruling application, the Operator's Project Team will be available to assist with any independent advisors' queries, should the QCA decide to appoint advisors.

2 The NECAP Program

2.1 DBIM's obligations

DBIM has obligations in respect of NECAP under the AU, OMC, and the PSA. These obligations are detailed in the following sections.

2.1.1 The Access Undertaking

In accordance with section 12.10(a) of the AU, DBIM will incur NECAP as is necessary to ensure:

(1) that the Terminal complies with Good Operating and Maintenance Practice; and

(2) that DBIM complies with its obligations under the Port Services Agreement (**PSA**).

The NECAP will be Presumed Prudent under section 12.10(b) of the AU if:

(1) the expenditure falls within the definition of Capital Expenditure;

(2) the NECAP is unanimously approved (or not objected to) by all Access Holders; and

(3) the Operator has recommended the NECAP.

Where NECAP does not comply with all the conditions in s.12.10(b), DBIM may apply to the QCA under s.12.10(c) for a ruling that the NECAP is nonetheless prudent (**NECAP Prudency Ruling**) having regard to (among other things):

(1) the need for the work to be undertaken for the efficient operation and use of the Terminal having regard to demand, cost benefit and other relevant factors;

(2) the scope of the work undertaken;

(3) the standard of the work undertaken;

(4) the circumstances prevailing in the markets for engineering, equipment supply and construction;

(5) safety during construction and operation;

(6) compliance with environmental requirements during construction and operation;

(7) minimising whole of asset life costs; and

(8) the advice of independent advisors using appropriate benchmarks and experience and which advisors are appointed (and paid for) by the QCA or paid for by DBIM.

For the purposes of s.12.10(b)(1), the definition of **Capital Expenditure** in the AU is expenditure (incurred by DBIM) which:

(a) relates to replacement or expansion of any part of the Terminal;

(b) relates to refurbishment or upgrade of any part of the Terminal which can reasonably be expected to extend the life of the relevant part beyond its original useful life or is undertaken for environmental or safety reasons;

(c) otherwise relates to the refurbishment or upgrade of Terminal plant and/or infrastructure which is reasonably expected to improve whole of life cost, or is incurred with the agreement of the Operator; or

(d) is ancillary or incidental to paragraphs (a), (b) or (c),

but not expenditure recovered through HCF or HCV (as those terms are defined in the Standard Access Agreement).

2.1.2 The Operation and Maintenance Contract

[redacted]

[redacted]

[redacted]

2.2 The NECAP Process

In summary, the process for NECAP project selection and implementation is as follows:

(a) A number of projects are identified and proposed by the Operator or DBIM, typically as part of the Operator's annual budgeting and planning process. If the criteria for NECAP are satisfied, the projects may be added to a new NECAP Series.

(b) The Series is included in the Operator's annual and 5 year capital plans, which is reviewed and approved by the Board of the Operator.

(c) The Series is recommended for implementation by the Operator in accordance with s.12.10(b)(3).

(d) DBIM submits the Series for review and approval by Access Holders in accordance with s.12.10(b)(2).

(e) The Series is reviewed and approved to proceed by DBIM. DBIM then provides funding for the works and (as NECAP Manager) oversees the construction and completion of the works in conjunction with the Operator and in accordance with the NECAP procedures. DBIM reviews and reports on progress and expenditure on a regular basis.

(f) Following completion of the works, in accordance with the User Agreements and after satisfying the requirements of s.12.10, DBIM will adjust the Access Charges to the extent appropriate due to the prudent NECAP expenditure in the relevant period.

This is a robust process ensuring all stakeholders have a role in assessing the projects before the work is commenced, during execution, and after completion.

Flow charts of the overall NECAP process are included in Section 7.1.

2.3 Assessment of NECAP

The estimated cost for an individual project does not constitute a fixed price or guarantee that the project will be completed at that cost. Rather, DBIM commits to delivery of the scope included in the project description, and the cost is estimated based on best practices in the industry, inclusive of contingency. After the base cost estimate is determined, a quantitative risk analysis is conducted to identify potential events that could impact the cost, and the likelihood of those events occurring. The analysis then calculates a range of total project costs and the probability that cost will be achieved. A project cost is selected such that there is a 95% probability that the total cost of the Series will not be exceeded (**P95**). Contingency is the amount added to the base cost estimate of a project to cover uncertainty and risk exposure in the areas of cost, schedule, and execution of the works.

This approach is conservative but prudent in consideration that costs can change for a number of different reasons, for example:

- The original estimates of project cost may have little engineering and design work to support them. In particular, in many cases no firm pricing has been sought prior to being approved by the Access Holders. This can result in unexpected cost increases. However, cost reductions for supply items and construction contracts are just as likely, as a consequence of market-related factors or higher levels of competition.
- The NECAP projects are completed in an operating facility, which is a 24/7 operation with tight controls on plant shutdowns. Many NECAP projects are scheduled for implementation on an opportunistic basis, where the related plant is shut down for other reasons such as operational delays or maintenance requirements, in which case the NECAP works may also be completed. However, if the NECAP works are urgent, then it may be appropriate to shut down the relevant plant for the NECAP works, during which time the Operator may also schedule any required maintenance and other works. This approach is prudent in that the impact on throughput due to NECAP is minimised. However, these timing issues may have an impact on contractor mobilisations, delivery of supplies and equipment, standby costs, etc.
- The terminal is subject to severe weather impacts which can delay project implementation. Similarly, if expected severe weather events do not occur, then the related cost provisions may be declared as savings and returned to the contingency pool.
- Conditions associated with the works at the terminal may be better or worse than estimated, which may have a significant impact on costs. For example, while excavating for a dam, hard rock may be encountered instead of the softer material provided for in the estimate, resulting in a major impact to excavating time and equipment requirements. Also, services such as water pipework or electrical cabling may be buried but not shown on the historical drawings, requiring additional cost and delay for relocation of services. Conversely, expected poor conditions may not eventuate, and provisions made for these are not required and may be released to the contingency pool.

The project managers use best endeavours to deliver the scope within the estimated time and cost. Any material changes of scope are subject to additional approvals.

In its role as NECAP Manager, DBIM allocates contingency to ensure the project managers deliver the scope. If additional prudent costs are required to be incurred, DBIM will allocate the funds from the contingency pool. Likewise, if savings are achieved, they are allocated back to the contingency pool. As a result, the size of the Series contingency pool fluctuates as the project implementation progresses, and this is monitored closely by DBIM.

In most Series, the original value estimated for contingency may be relatively small. However, this is no indication of the critical role played by contingency in ensuring that the Series does not overrun the overall cost as recommended by the Operator and approved by Access Holders.

Therefore, rather than assessing individual projects, the overall Series may be assessed on the basis of the remaining contingency. If an underrun for the Series has been achieved (or is forecast) then the costs incurred may be considered prudent.

DBIM notes that the P95 contingency included in the project estimate is based on an industry standard approach, and is prudent in consideration of the nature of the work. In all cases, only the prudent actual costs

are included in any asset base that informs the related Access Charges, and any underrun is to the benefit of Access Holders by way of a reduction to Access Charges.

This approach was included in submissions relating to NECAP under the 2017 AU, following which the QCA accepted the relevant capital expenditure.[9] DBIM notes that every Series currently in progress is forecast to be completed at or below the original value recommended by the Operator, demonstrating the effectiveness of the contingency allocation process.

[9] Refer QCA website Non-expansion capital expenditure under the DBCT 2017 AU

3 NECAP Series S

The projects in NECAP Series S were approved to commence in Financial Year 2022-23. The related projects are listed in the table below. The two projects which are the subject of this submission are highlighted.

ID	Project	Project Manager	Justification	Budget
NS01	Arc flash mitigation - phase 2	Operator	Safety: upgrade switchboards to comply with current safety standards	4,791,000
NS02	SL2 luff winch underpans	Operator	Environment & safety: install underpans to reduce risks due to grease spillage and working at height	374,000
NS03	Offshore pile wrapping - Phase 9	DBIM	Maintenance cost reduction: continuation of OPW program, wrapping 127 piles in this phase	9,071,000
NS04	Sample Plant 1 lift upgrade	DBIM	End-of-life: replace Sample Plant 1 lift due to end of life	2,958,000
NS05	MCC replacement project - phase 3	Operator	End-of-life & safety: replace MCC04 in Substation 3 due to deterioration of components	2,329,000
NS06	Site roads upgrade program	Operator	Safety & end-of-life: upgrade deteriorated roads at L1 conveyor, Bund 4, and S4 conveyor	3,850,000
NS07	Site wide gravity take-up safe isolation access	Operator	Safety: provides an isolation point for lock out once GTU is suspended.	2,647,000
NS08	Offshore conveyor access study	DBIM	Maintenance cost reduction & safety: study of options for access solutions to offshore structures	465,000
Total				**26,485,000**

4 Project NS01 Arc Flash Mitigation – Phase 2

4.1 Description of the project

4.1.1 Objectives of the Arc Flash Mitigation program

The Arc Flash Mitigation program reduces the risk to personnel from exposure to arc flashes while working around electrical switchgear, in particular with older high voltage (**HV**) switchgear, new HV switchgear, and low voltage (**LV**) motor control centres (**MCC**s). These are located in substations, yard machines, and shiploaders. Each area requires individual solutions and planning to complete the works in available shutdowns, consequently this program will be completed in a number of phases.

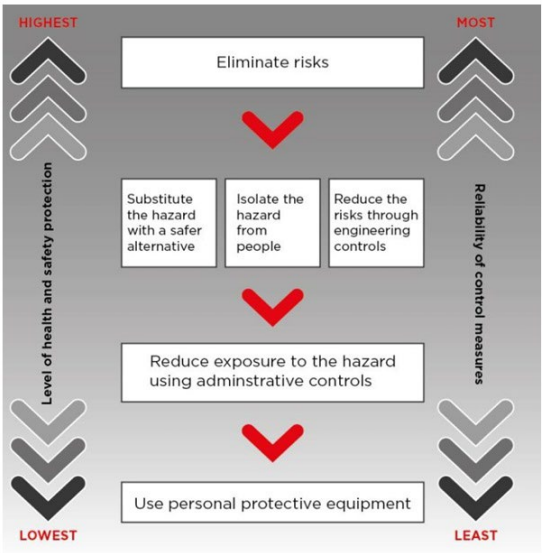
An electrical arc fault or **arc flash** is an unexpected explosive electrical short circuit in the air that produces intense light and heat. Any fault occurring while working around electrical switchgear could result in an arc flash which could cause significant damage to plant and equipment, ignite flammable materials (including clothing), and in the worst case cause serious burns or injuries to personnel and potentially permanent injury or death.[10,11]

The energy density of an arc flash is measured in cal/cm^2, with 1.2 cal/cm^2 causing second degree burns to bare skin, and 8 cal/cm^2 causing third degree burns. This program will implement engineering solutions to reduce exposure to below 8 cal/cm^2 wherever possible.

To support this aim, the program objectives are to:

1. Remove personnel from the line of fire
2. Standardise high voltage (**HV**) equipment to include arc fault containment measures.
3. Replace electrical equipment that has reached its end of service life.
4. Provide effective hazard management with consideration of operational practices.
5. Eliminate the need for highly constrictive Personal Protective Equipment (**PPE**) required for works around electrical switchgear ("bomb suits"). PPE is the lowest order of priority in the hierarchy of control.

Figure 1 – Hierarchy of control[12]



[10] WorkSafe Queensland has further information regarding arc flash incidents and its common causes and general risk management (note that the video Arc flash safety – Mark's story has confronting content).
[11] Resources Safety & Health Queensland has issued numerous safety bulletins which illustrate the many circumstances that trigger an arc flash: 26 | 45 | 68 | 73 | 75 | 136 | 156 | 220 | 231 | 303 | 308 | 329
[12] WorkSafe Queensland How to manage work health and safety risks Code of Practice 2021 refer Section 4.1

An overview of the Arc Flash Mitigation Program is included in Section 7.3.1.1, showing the expected scope for each phase at the time NS01 was approved. This lists the alternatives assessed for Phase 2, and additional detail on the remote racking trial and its justification.

4.1.2 Project summary

NS01 is the second phase of the Arc Flash Mitigation program. The project is outlined in the NS01 Project Brief in Section 7.3.1.2.

These major scope items and related budgets are summarised below, including allocation of design work, project management costs and contingency essential for completion of the works.

Scope item	Budget
Replacement of HV switchgear in Substation SS9 with modern ABB Unigear ZS1 arc fault contained switchgear. This implements Objective 2.	1,173,000
Replacement of older 11kV Hawker Siddeley metal-enclosed Ring Main Unit (**RMU**) 6 in Substation SS9 with modern ABB metal-clad arc fault contained switchgear, including fast acting protection relays. Complete design for the installation of RMU 1, 2, 3 and 4. This implements Objective 2 and 3.	571,000
Installation of arc duct partitioning for 3.3kV switchgear in substations SS3, SS4 & SS5B, and for 11kV switchgear in substation SS2B. This supports Objective 2 and efficient operation by replacing common ducting with individual ducting allowing safe partial shutdown instead of full shutdown.	271,000
Remote operation and **racking**[13] trial of 3.3kV contactors on L6, L4 and L2 conveyor drives. This trial will support costing and execution methodology for future works, and supports Objective 1 and 4.	451,000
Remote PanelView installation in 6 substations and 12 yard machines to provide (1) arc flash detector status indication, (2) remote close facilities on all LV ACBs and (3) future remote racking for all LV ACBs. This supports Objective 1 and 4.	935,000
Replacement of older LV air circuit breakers (**ACB**s) with modern ACBs and upgraded protection relays. The faster operating times of the new ACBs will reduce arc flash energy density, and improved protection relays will support detection of fault currents. The new ACBs are the current terminal standard with remote close & open facilities. This is aligned with Objective 3 to replace end of life equipment and Objective 5 by reducing arc flash energy.	864,000
Procurement of 3.3kV ABB Unigear ZS1 switchgear for Shiploader SL2 (for installation in Phase 3). This supports Objective 3.	526,000
Total Budget for NS01	**4,791,000**

4.1.3 Remote racking trial for 3.3kV contactors

An important component of this project was the trial of remote racking and operation of the 3.3kV contactors for L6, L4 and L2 conveyor drives. The works included design, testing and installation which will also provide input to costing, execution methodology and planning for future phases, as well as improved access procedures and hazard management.

Manual racking of contactors is one of the most frequent activities that exposes personnel to risk of arc flash, as personnel must be in close proximity in order to physically rack the contactor. The ability to remotely rack the equipment greatly reduces the risk of injury to personnel during these routine tasks, as they are located out of range of the arc flash.

The photos below show the works associated with the remote racking trial.

[13] A contactor (or circuit breaker) is racked in or out to connect or disconnect from the power supply in the switchboard.

Figure 2 – Original 3.3kv switchboard cubicles for L6, L4 & L2 conveyor drives (manual racking system)

Figure 3 – Factory testing of new remote racking. New motorised contactor "trucks" are at centre left

Figure 4 – Installation of the new switchgear

Figure 5 – New remote racking system complete and in operation

4.2 Compliance with s.12.10(c)

This section addresses the factors the QCA may have regard to in its Prudency Ruling in respect of the capital expenditure associated with NS01 Arc Flash Mitigation Phase 2.

4.2.1 The works are necessary

Section 12.10(c)(1) of the AU considers the need for the work to be undertaken for the efficient operation and use of the Terminal having regard to demand, cost benefit and other relevant factors.

The necessity of the works is summarised in the Justification section of the related Project Brief in Section 7.3.1.2. NS01 was implemented on the basis of the recommendation of the Operator and the approval of all but one Access Holder.

Safety of personnel is a core value of DBIM and the Operator, and is essential for the efficient operation of the terminal. NS01 is part of a multi-phase safety program to upgrade electrical switchgear and motor control centres to reduce the exposure of personnel to potentially catastrophic arc flash incidents.

The implementation of NS01 further supports operational efficiency by:

- Replacement of end-of-life electrical switchgear, which (apart from reducing the risk of arc flash) reduces the potential for breakdown and delays to return-to-service as the old switchgear components are no longer in production.
- Partitioning of existing common arc ducting, which (apart from improved arc flash performance) requires only the affected switchgear to be taken out of service, rather than all the switchgear connected to the common ducting.
- Remote racking of 3.3kV contactors, which (apart from minimising the risk of arc flash to personnel) allows related works to be performed more quickly.
- The installation was completed during existing shutdowns, rather than on an emergency or standalone shutdown basis.

DBIM considers that the works are necessary and prudently implemented for the purposes of s.12.10(c)(1).

4.2.2 The scope of work is appropriate

Section 12.10(c)(2) of the AU considers the scope of the work undertaken.

The scope of NS01 is summarised in the relevant Project Brief, and further detail is provided in Section 4.1. The scope provides an outcome that is fit for purpose, and supports the objectives of the Arc Flash Mitigation program.

As this project is part of a multi-phase program, the scope intentionally includes procurement of a long lead item (3.3kV switchgear for Shiploader SL2) which facilitates scheduling of the overall program, however the installation will be completed in a later phase. The cost of supply of this item has not been incurred at this time, but may be included in a future application when it is installed and handed over into operation.

The scope is consistent with section (b) of the definition of Capital Expenditure in the AU, as it "relates to refurbishment or upgrade of any part of the Terminal which can reasonably be expected to extend the life of the relevant part beyond its original useful life or is undertaken for environmental or safety reasons".

DBIM notes NS01 is similar to NR01 Arc Flash Mitigation Phase 1 which was handed over into operation progressively as separable components were completed, and included in the NECAP Asset Base in 2021-22. Pursuant to s.12.10(b)(1), the QCA confirmed that it was reasonably satisfied that the expenditure incurred for NR01 fell within the definition of Capital Expenditure contained in the AU, on the basis of the nature of the works undertaken.[14]

[14] Refer QCA website Non-expansion capital expenditure for the QCA's decision on NECAP 2021-22

DBIM notes also that the scope of NS01 did not include any unnecessary works, and no material changes in scope occurred following approval, and no costs for any operations and maintenance activities were included in the expenditure.

Based on these factors, DBIM considers the scope is appropriate for the purposes of s.12.10(c)(2).

4.2.3 The standard of the works is reasonable

Section 12.10(c)(3) of the AU considers the standard of the work undertaken .

NS01 was managed and implemented by the Operator, which was best placed to manage the risks and undertake the works in consideration of the high level of interaction with operating facilities and the requirement for access to perform the works on an opportune basis. NS01 was implemented in accordance with the Operator's standard procedures, specifications and procurement practices, and in accordance with the relevant Australian Standards and industry practices as appropriate.

The standard of works did not exceed the General Construction Standards in clause 12.1 of the PSA which promote fit for purpose construction.

Based on these factors, DBIM considers the standard of works on NS01 was appropriate for the purposes of s.12.10(c)(3).

4.2.4 Costs are prudent considering the prevailing market

Section 12.10(c)(4) of the AU considers the circumstances prevailing in the markets for engineering, equipment supply and construction.

The budget for NS01 was based on direct costs and quantities factored from previous similar works undertaken by the Operator (including NR01 Arc Flash Mitigation Phase 1), as well as budget quotes from qualified suppliers and contractors, and estimates provided by Operator personnel with the relevant skills and experience. These direct costs and the risks associated with the costs and execution of the works were then combined in a quantitative risk assessment, which calculated the appropriate levels of contingency to apply to the direct costs. An allowance for project management and other ancillary or incidental costs essential for the completion of the works were also included. DBIM considers this approach it is prudent, as further detailed in Section 2.3.

The Operator's approach to markets for engineering, equipment supply and construction is reflected in the contracting strategies included in the Project Execution Plan for NS01 in Section 7.3.1.3. The Operator also has considerable resources located at the terminal primarily to support operations and maintenance works, including directly employed permanent staff and contractors, long-term service agreements for consultants and construction contractors, and extensive spares and warehousing facilities. The Operator has a high level of skills and flexibility in applying these resources, as well as comprehensive enterprise systems to ensure costs are managed and charged appropriately between OMC and NECAP works.

The design of the works was performed by consultants (Worley, Cell, ATSYS) with high levels of expertise in the relevant areas and strong performance previously at the terminal. These contracts are sole sourced on a schedule of rates basis.

Supply of proprietary equipment and materials was sole sourced to the relevant manufacturers (ABB, Terasaki) in accordance with existing terminal specification. The complete design, supply and installation of the new ABB proprietary remote racking system was contracted to ABB on a sole source lump sum basis.

Installation of the works was tendered to local contractors on a competitive lump sum basis, or to existing contractors at the terminal on schedule of rates basis in accordance with the service agreements, depending on the scale and complexity of the works. This provided a good balance between a large dedicated workforce during fixed outages and flexibility for works during opportune access.

Construction services and project management costs essential to the completion of the works are also included, for example the costs of Operator personnel to manage and supervise the design, procurement and installation, and ancillary costs such as site cleaning, waste disposal, temporary facilities, etc. An allocation of DBIM costs associated with NECAP program management, insurance, QLeave, etc is also included.

The cost of $3,772,496 incurred to date for NS01 is associated with works that are completed and handed over into operation, as indicated by the related Handover Certificates in Section 7.3.1.4.

A further $888,504 is estimated to be incurred by the end of 2025, associated with the procurement of 3.3kV switchgear for Shiploader SL2 (for installation in the next phase), the finalisation of construction and supply contracts, the production of as-built documentation, the acquisition of spares as appropriate, and other post-completion works that do not affect the operation of the relevant facilities.

DBIM forecasts that NS01 will underrun its budget by $130,000.

Based on these factors, DBIM considers that the costs are prudent for the purposes of s.12.10(c)(4) in consideration of the circumstances prevailing in the markets for engineering, equipment supply and construction.

4.2.5 Safety during construction and operation

Section 12.10(c)(5) of the AU considers safety during construction and operation.

NS01 is the second phase of the Arch Flash Mitigation program which has implemented significant improvements to electrical safety at the terminal.. These safety features are detailed in Section 4.1 and in the Project Brief in Section 7.3.1.2.

NS01 was implemented by the Operator's skilled and experienced Project Team which was best placed to manage the risks and undertake the works in consideration of the high level of interaction with operating facilities and the requirement for access on an opportune basis. These processes require robust access controls and work procedures to ensure the safety of the Operator's personnel and contractors during completion of the works, as well as the safety of the operations and maintenance personnel when the facilities are returned to service.

The wiring and assembly of the new switchgear was conducted in an offsite workshop to reduce the installation time, and installation works were conducted when the switchgear was fully isolated.

DBIM notes that no injuries or damage to the facilities occurred during the course of the works or as a result of operating the upgraded facilities.

Based on these factors, DBIM considers the works were prudently managed in regard to safety during construction and operation for the purposes of s.12.10(c)(5).

4.2.6 Environmental compliance during construction and operation

Section 12.10(c)(6) of the AU considers compliance with environmental requirements during construction and operation.

All construction contractors were required to implement environmental management plans as part of their contract. This covered noise and air pollution, waste management, and appropriate levels of training and certification for the relevant activities.

All new facilities were required to comply with the Operator’s Environmental Management System, for which the Operator has ISO14001 accreditation.

DBIM notes that no community complaints or reportable environmental non-compliances occurred relating to the construction or operation of the new facilities, and that the cost of measures taken to minimise potential environmental incidents was prudent given the potential risk and costs of environmental harm.

DBIM considers the works were prudently managed in regard to environmental compliance during construction and operation for the purposes of s.12.10(c)(6).

4.2.7 Whole of asset life costs are minimised

Section 12.10(c)(7) of the AU considers minimising whole of asset life costs.

As part of the development of NS01, a number of alternatives and options were assessed in order to provide the best balance between capital cost, service life, functionality, and expected operations and maintenance cost, consistent with the project objectives and without compromising safety and other key factors.

The selected solutions were appropriate, for example:

- End-of-life non-standard components and switchgear were replaced with new equipment matching the site standard specification. This reduces the potential for breakdown or extended maintenance to impact terminal throughput.
- The trial remote racking solution will reduce the time taken for safe racking of the 3.3kV contactors. This will support improved productivity for ongoing operations and maintenance associated with this task when the solution is implemented across 75 separate 3.3kV conveyor drives, considering that in 2022, the Operator recorded an average of 205 drive isolations per month.

Based on these factors, DBIM considers the whole of asset life costs were minimised effectively for the purposes of s.12.10(c)(7).

4.2.8 Independent assessment

Section 12.10(c)(8) of the AU considers the advice of independent advisors using appropriate benchmarks and experience and which advisors are appointed (and paid for) by the QCA or paid for by DBIM.

NS01 was managed and executed by the Operator in accordance with the OMC using the Operator's own procedures and processes. In addition to the documentation supplied as part of this Prudency Ruling application, the Operator's Project Team will be available to assist with any independent advisors' queries, should the QCA decide to appoint advisors.

5 Project NS06 Site Roads Upgrade Program

5.1 Description of the project

5.1.1 Objectives of the Site Roads Upgrade program

A number of the site roads were not originally designed to safely handle the current levels of heavy traffic, and consequently have deteriorated to a point where maintenance work is not effective and capital works are required. Achieving the objectives below ensures safe and efficient roads at the lowest whole of life cost:

1. extending road service life, with drainage and surface materials suitable for the traffic
2. improving road safety, with road alignment, guardrails, delineation and sign works as appropriate.
3. reducing whole of life cost, by completing works in time to prevent failure of the underlying road base

5.1.2 Project summary

The project is summarised in the NS06 Project Brief in section 7.3.2.1. NS06 focused on upgrading the three highest priority roads. Each road required a different solution and a number of options were addressed, supported by whole-of-life cost analysis as required. The related budgets include design, project management and contingency essential for completion of the works.

Scope item	Budget
S4 Conveyor road repair	975,000
Bund 4 centre road reconstruction	1,421,000
L1 Conveyor road southern lane repair	1,454,000
Total Budget for NS06	**3,850,000**

The location of the roads is shown in the terminal aerial photo at left. Further details or the roadworks are provided in the sections below, along with before-and-after photos.

5.1.2.1 S4 Conveyor road

The S4 road is a two-lane asphalt sealed major roadway running the length of the southern end of the stockyard. It is a critical terminal roadway with significant daily traffic loads, and is the only road that provides vehicle access to the elevated inloading conveyors S3, S4 & S13 and into the southern end of every stockyard row. It is also subject to significant loading from heavy vehicles, and forms part of the site road network for all traffic arriving at the terminal entrance destined for every other part of the terminal including offshore.

The pavement underneath S4 road is in relatively good condition, however the asphalt seal running surface was more than 20 years old and was rapidly approaching end of life, with extensive crocodile cracking over the majority of the surface area with both transverse and longitudinal cracking. Such cracking allows water to penetrate the surface and over time, the underlying pavement is damaged to the extent that the pavement needs to be replaced. This is a major undertaking, requiring the roadway to be closed for a lengthy period for excavation to a depth in the order of 1 metre and related works to replace the pavement material.

Asphalt resealing of the surface ensured that the underlying pavement does not deteriorate any further and can be retained in a serviceable condition for many years, avoiding a more significant and expensive road pavement rebuild in the future.

Figure 6 – S4 Conveyor road.

S4 road (before). Typical surface condition

S4 road (after). Resurfaced

5.1.2.2 Bund 4 centre road reconstruction

The original Bund 4 centre roadway was built in 1983, with a single lane bitumen seal down the centre of the 5.7m wide and 1300m long bund running surface. The unsealed edges either side of the old bitumen seal were in very poor condition. Large portions of the unsealed road shoulders needed to be fully rebuilt to correct the ruts, potholes and depressions in the surface, in order to facilitate effective long term drainage and correct the surface deficiencies.

The road surface conditions also created an additional risk of injury to maintenance personnel through the possibility of ankle injuries when boarding and dismounting the yard machines for routine servicing and maintenance activities, much of which occurs outside of daylight hours.

Significant historical repairs were complicated by the inability of standard size road construction equipment such as graders, rollers, trucks and watercarts to access the narrow bund roadway during normal daily operations due to the limited height clearance constraints under the yard machines.

A focused and coordinated project approach facilitate the necessary capital works, which were scheduled to coincide with machine shutdown periods and agreed daily operational restrictions.

This allowed the original Bund 4 pavement to be fully reworked, compacted and trimmed, with a two-coat bitumen seal over the full extent of the road width between R3 & R4 conveyors. The road was rebuilt in sections when the opportunity was available (due to yard machine height constraints).

The finished road surface was raised to the original design heights and profiled with a centre crown to ensure effective cross drainage for stormwater to pass under the yard conveyors and off the bund surface.

This solution provided significant benefit to all Bund 4 traffic users, reduced the potential for ankle injuries to site personnel, provided an effective long term drainage solution, and provided a cost-effective pavement seal to maximise and significantly extend the service life of the roadway.

Figure 7 – Bund 4 centre road, before and after.

Bund 4 road (before). Typical surface condition

Bund 4 road, after reconstruction and resurfacing

5.1.2.3 L1 Conveyor road – southern lane

The L1 Conveyor road runs the length of the northern end of the stockyard. It is a critical terminal roadway with significant daily traffic loads, and is the only road that provides vehicle access into the northern end of every stockyard row.

The northern lane (eastern traffic flow) is asphalt sealed but the southern lane (western traffic flow) had never been sealed because of the occasional need for the DBCT dozer to move between stockyard rows.

In two-way traffic, west-bound vehicles needed to drive on the unsealed portion of the southern lane, which was prone to ruts, deep potholes and localised pavement failures. This contributed to swerving of the vehicles to avoid the hazards, and if the vehicles hit the hazards then this tyre and suspension damage to the vehicles and jarring of the vehicle occupants could result. These circumstances were unacceptable from a safety perspective.

Despite frequent maintenance repairs, the pavement failures recurred due to the lack of a competent sealed running surface, and were exacerbated during wet weather. Localised pavement maintenance repairs were reactive, provided only a short-term benefit, and were relatively expensive.

The Operator assessed a number of options to develop a long-term solution to address these issues in a cost effective manner. The selected solution included:

- replacement of the soil forming the southern lane with competent pavement material
- installation of an asphalt seal of the same standard of the northern lane.
- delineation of the lanes
- the pavement depth and asphalt type is suitable for the occasional movement of the DBCT dozer between rows, and was matched in level with the existing road surface and concrete dozer slabs.

Figure 8 – L1 Conveyor southern lane, before and after.

L1 southern lane (before). Typical surface condition

L1 southern lane (after). Resurfaced

5.2 Compliance with s.12.10(c)

This section addresses the factors the QCA may have regard to in its Prudency Ruling in respect of the capital expenditure associated with NS06 Site Roads Upgrade Program.

5.2.1 The works are necessary

Section 12.10(c)(1) of the AU considers the need for the work to be undertaken for the efficient operation and use of the Terminal having regard to demand, cost benefit and other relevant factors.

The necessity of the works is summarised in the Justification section of the related Project Brief, attached for reference in Section 7.3.2.1. NS06 was implemented on the basis of the recommendation of the Operator and the approval of all but one Access Holder

Safe and timely transport is essential for the efficient operation of the terminal. NS06 upgraded three roads on site that are critical to the transport of personnel, equipment and materials to locations where they are required to support operations and maintenance in the onshore area of the terminal.

The Operator developed a number of options for each road to determine the most effective solution to achieve the objectives of the Site Roads Upgrade program, and these are supported by whole of life cost benefit analysis.

The implementation of NS06 supported operational efficiency by:

- Avoiding an expected significant increase in maintenance costs by repairing the surface of the roads before the underlying pavement was destroyed by the ingress of water, particularly for S4 and L1 roads
- Removing road hazards to reduce the potential for injury to personnel and damage to site vehicles.
- Upgrading road design to match the increase in usage by heavy vehicles, or increased traffic.
- Improving traffic flow as a result of better road alignment and delineation.
- Completing the roadworks during existing planned shutdowns, rather than on an emergency basis or as a standalone shutdown.

Based on these factors, DBIM considers that the works are necessary and prudently implemented for the purposes of s.12.10(c)(1).

5.2.2 The scope of work is appropriate

Section 12.10(c)(2) of the AU considers the scope of the work undertaken.

The scope of NS06 is summarised in the relevant Project Brief, and further detail is provided in Section 5.1. The scope provides an outcome that is fit for purpose, and supports the objectives of the Site Roads Upgrade program.

Each road required a different solution and a number of options were addressed, supported by whole-of-life cost analysis as required.

The scope is consistent with section (b) of the definition of Capital Expenditure in the AU, as it "relates to refurbishment or upgrade of any part of the Terminal which can reasonably be expected to extend the life of the relevant part beyond its original useful life or is undertaken for environmental or safety reasons".

DBIM notes NS06 is similar to NQ01 L2 Roadway Upgrade, which was completed in 2022-23. Pursuant to s.12.10(b)(1), the QCA confirmed that it was reasonably satisfied that the expenditure incurred for NQ01 fell within the definition of Capital Expenditure contained in the AU.[15]

DBIM further notes that the scope of NS06 did not include any unnecessary works, that no material changes in scope occurred following approval, and no costs for any operations and maintenance activities were included in the expenditure.

Based on these factors, DBIM considers the scope is appropriate for the purposes of s.12.10(c)(2).

[15] Refer QCA website Non-expansion capital expenditure for the QCA's decision on NECAP 2022-23

5.2.3 The standard of the works is reasonable

Section 12.10(c)(3) of the AU considers the standard of the work undertaken.

NS06 was managed and implemented by the Operator of the terminal, which was best placed to manage the risks and undertake the works in consideration of the high level of interaction with operating facilities and the requirement for access to perform the works on an opportune basis. NS06 was implemented in accordance with the Operator's standard procedures, specifications and procurement practices, and in accordance with the relevant Australian Standards and industry practices as appropriate.

The standard of the works did not exceed the General Construction Standards in clause 12.1 of the PSA, which promote fit for purpose construction.

Based on these factors, DBIM considers the standard of the works for NS06 was reasonable for the purposes of s.12.10(c)(3).

5.2.4 Costs are prudent considering the prevailing market

Section 12.10(c)(4) of the AU considers the circumstances prevailing in the markets for engineering, equipment supply and construction.

The budget for NS06 was based on direct costs and quantities factored from previous similar works undertaken by the Operator (including NQ01 L2 Roadway Upgrade), and estimates provided by Operator personnel with the relevant skills and experience. These direct costs and the risks associated with the costs and execution of the works were then combined in a quantitative risk assessment, which calculated the appropriate levels of contingency to apply to the direct costs. An allowance for project management and other ancillary or incidental costs essential for the completion of the works were also included. DBIM considers this approach is prudent, as further detailed in Section 2.3.

The Operator's approach to markets for engineering, equipment supply and construction is reflected in the contracting strategies included in the Project Execution Plan for NS06 in Section 7.3.2.2. The Operator also has considerable resources located at the terminal primarily to support operations and maintenance works, including directly employed permanent staff and contractors, long-term service agreements for consultants and construction contractors, and extensive spares and warehousing facilities. The Operator has a high level of skills and flexibility in applying these resources, as well as comprehensive enterprise systems to ensure costs are managed and charged appropriately between OMC and NECAP works.

The design of the works was performed by local consultants (Field Engineers) with high levels of expertise in the relevant areas and strong performance previously at the terminal. This contract was competitively tendered on a schedule of rates basis.

Installation of the works was tendered to the Operator's regular local contractors on a competitive unit rate basis for the majority of the works, which is typical for roadworks. This provided the necessary flexibility for works during opportune access. Mackay-based construction contractors Vassallo and RPQ were selected.

Construction services and project management costs essential to the completion of the works are also included, for example the costs of Operator personnel to manage and supervise the design, procurement and installation, and ancillary costs such as site cleaning, waste disposal, temporary facilities, etc. An allocation of DBIM costs associated with NECAP program management, insurance, QLeave, etc is also included.

The cost of $2,343,051 incurred to date for NS06 is associated with works that are completed and handed over into operation, as indicated by the related Handover Certificate in Section 7.3.2.3.

A further $115,949 is estimated to be incurred by the end of 2025, associated with the finalisation of construction contracts, the production of as-built documentation, and minor post-completion works that do not affect the operation of the relevant facilities.

DBIM forecasts that NS06 will underrun its budget by $1,391,000. This is due to significantly reduced pricing in the competitively-tendered construction contracts, despite some delays and inefficiencies associated with wet weather.

Based on these factors, DBIM considers the costs are prudent for the purposes of s.12.10(c)(4) in consideration of the circumstances prevailing in the markets for engineering, equipment supply and construction.

5.2.5 Safety during construction and operation

Section 12.10(c)(5) of the AU considers safety during construction and operation.

NS06 is part of the ongoing Site Road Upgrade program which has implemented significant improvements to road safety and traffic flow at the terminal. The safety features are detailed in Section 5.1 and in the Project Brief in Section 7.3.2.1

NS06 was implemented by the Operator's skilled and experienced Project Team which was best placed to manage the risks and undertake the works in consideration of the high level of interaction with operating facilities and the requirement for access on an opportune basis. These factors require robust access controls and work procedures to ensure the safety of the Operator's staff and contractors during completion of the works, and the safety of the operations and maintenance personnel when the facilities are returned to service.

The Operator planned safe detours for traffic as required during the construction works.

DBIM notes that no injuries or damage to the facilities occurred during the course of the works or as a result of use of the upgraded facilities.

Based on these factors, DBIM considers the works were prudently managed in regard to safety during construction and operation for the purposes of s.12.10(c)(5).

5.2.6 Environmental compliance during construction and operation

Section 12.10(c)(6) of the AU considers compliance with environmental requirements during construction and operation.

All construction contractors were required to implement environmental management plans as part of their contract. This covered noise and air pollution, waste management, and appropriate levels of training and certification for the relevant activities.

All new facilities were required to comply with the Operator’s Environmental Management System, for which the Operator has ISO14001 accreditation.

DBIM notes that no community complaints or reportable environmental non-compliances occurred relating to the construction or operation of the new facilities, and that the cost of measures taken to minimise potential environmental incidents was prudent given the potential risk and costs of environmental harm.

DBIM considers the works were prudently managed in regard to environmental compliance during construction and operation for the purposes of s.12.10(c)(6).

5.2.7 Whole of asset life costs are minimised

Section 12.10(c)(7) of the AU considers minimising whole of asset life costs.

As part of the development of NS06, a number of alternatives and options were assessed in order to provide the best balance between capital cost, service life, functionality, and expected operations and maintenance cost, consistent with the project objectives and without compromising safety and other key factors.

The selected solutions were appropriate, for example:

- Damaged road surfaces and structures were removed and suitable quality materials were used in resurfacing or reconstruction of the roads. This reduces the potential for passenger injury or vehicle damage and associated reactive maintenance to impact terminal operations.
- The underlying pavement was retained where its remaining service life was consistent with the new construction, providing a fit for purpose solution at reasonable cost, without the potential for significant costs associated with major pavement upgrades for these critical roads.

DBIM considers the whole of asset life costs were minimised effectively for the purposes of s.12.10(c)(7).

5.2.8 Independent assessment

Section 12.10(c)(8) of the AU considers the advice of independent advisors using appropriate benchmarks and experience and which advisors are appointed (and paid for) by the QCA or paid for by DBIM.

NS05 was managed and executed by the Operator in accordance with the OMC using the Operator's own procedures and processes. In addition to the documentation supplied as part of this Prudency Ruling application, the Operator's Project Team will be available to assist with any independent advisors' queries, should the QCA decide to appoint advisors.

6 Definitions

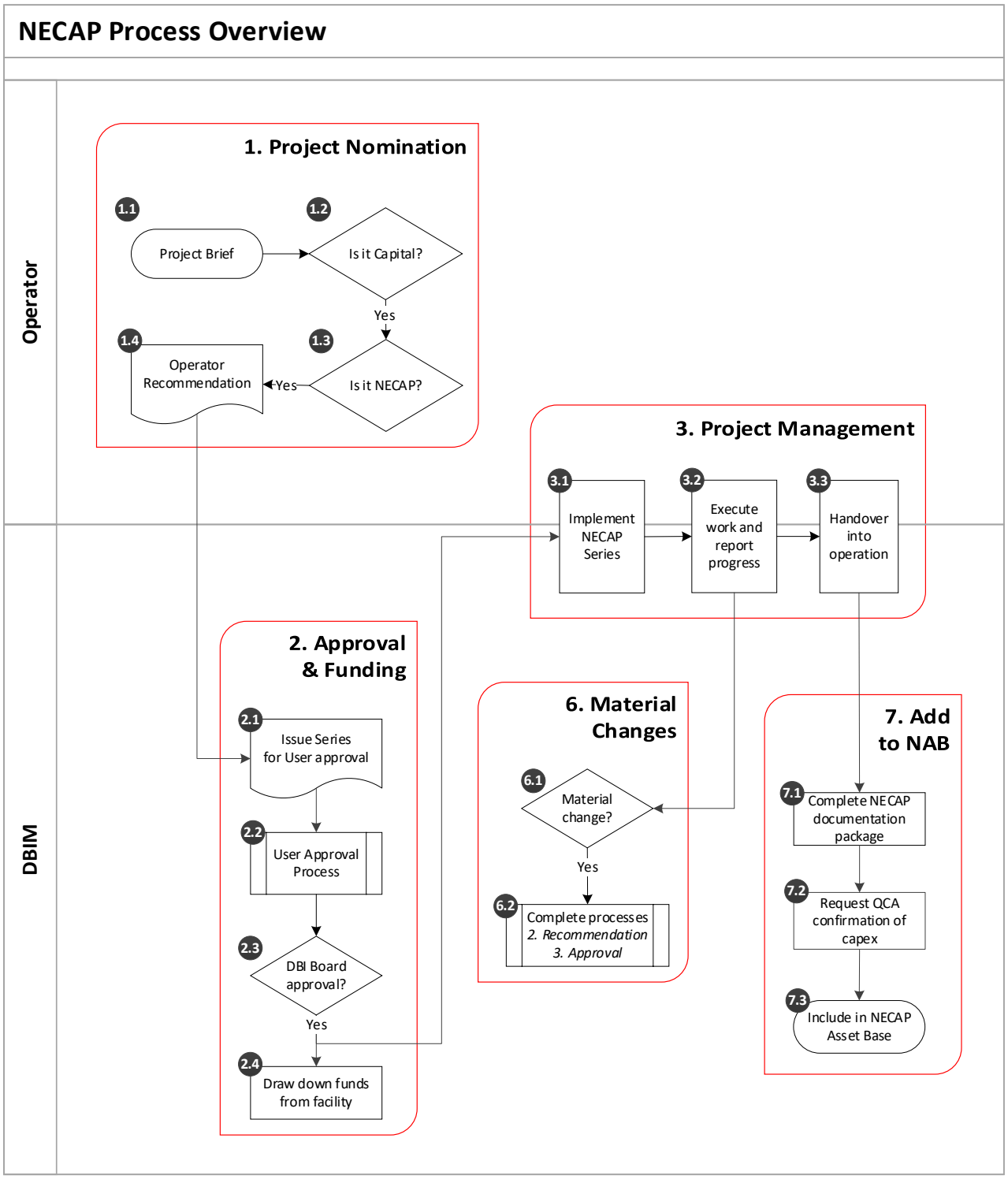
Term	Definition
ACB	Air circuit breaker
Access Holder	(User) A party with entitlement to capacity at DBT under a User Agreement.
AU	Access Undertaking
Australian Standard	Australian Standards are voluntary documents administered by Standards Australia that set out specifications, procedures and guidelines that aim to ensure products, services, and systems are safe, consistent, and reliable. Australian Standards are amended from time to time and also include international standards.
DBCT	Dalrymple Bay Coal Terminal (now DBT)
DBI	Dalrymple Bay Infrastructure Limited
DBIM	Dalrymple Bay Infrastructure Management Pty Ltd
DBT	Dalrymple Bay Terminal
Good Operating and Maintenance Practice	(in accordance with the AU) Adherence to a standard of practice which includes the exercise of that degree of skill, diligence, prudence and foresight which would reasonably be expected from a competent, experienced and qualified operator of a facility comparable with the Terminal.
GTU	Gravity take-up
HCF	Handling Charges – Fixed
HCV	Handling Charges – Variable
HV	High voltage
LV	Low voltage
MCC	Motor control centre
OMC	Operation and Maintenance Contract
Operator	The terminal operator Dalrymple Bay Coal Terminal Pty Ltd
P50	The cost at which there is 50% probability the project estimate will not be exceeded. This forms the basis for the project contingency, allocated by the Project Manager.
P95	The cost at which there is 95% probability the Series estimate will not be exceeded. This forms the basis for the Series Reserve, allocated by the Group Projects Director.
PPE	Personal Protective Equipment
PanelView	Display terminal for system monitoring and control
Project Brief	A Project Brief summarises the key aspects of a project including the problem, recommended solution, justification, scope, cost estimate, schedule, asset life, NECAP compliance criteria and the project team.
Project Execution Plan	The Project Execution Plan summarises the intended delivery method and contracting strategy of a project.
PSA	Port Services Agreement
QCA	Queensland Competition Authority
QLeave	QLeave administers portable long service leave for workers in Queensland's building and construction industry, in accordance with the *Building and Construction Industry (Portable Long Service Leave) Act 1991,* funded by collection of a levy on the value of construction works.
RMU	A Ring Main Unit is a factory assembled, metal enclosed set of electrical switchgear used at the load connection points of a ring-type distribution network
Site	The Dalrymple Bay Terminal operating facility
User	Access Holder at DBT
User Agreement	An Access Agreement with existing Users

7 Appendices

7.1 NECAP process overview

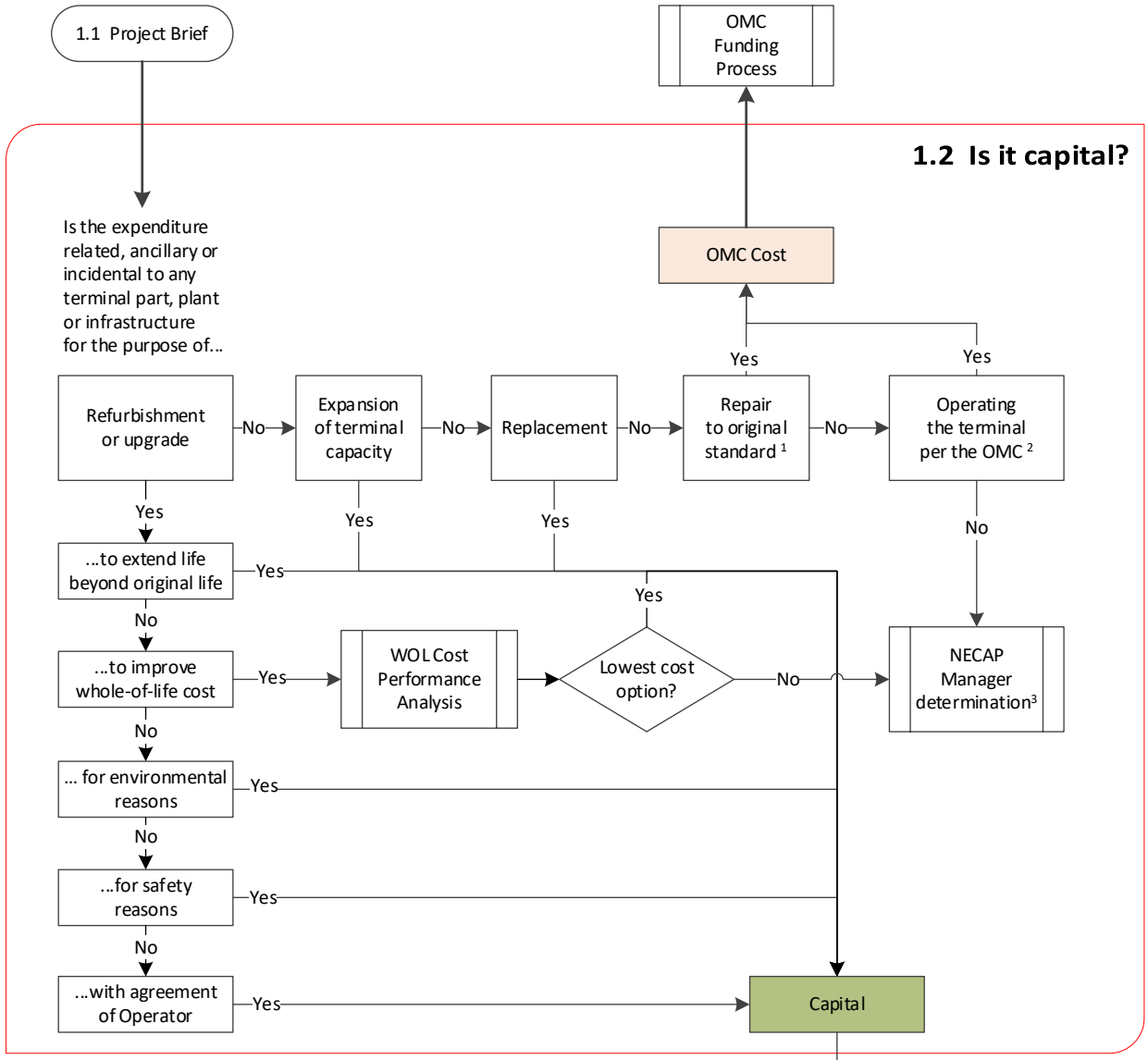
7.1.1 NECAP process map

This section summarises the key steps from Project Brief to inclusion in the NECAP Asset Base



7.1.2 Capital expenditure determination

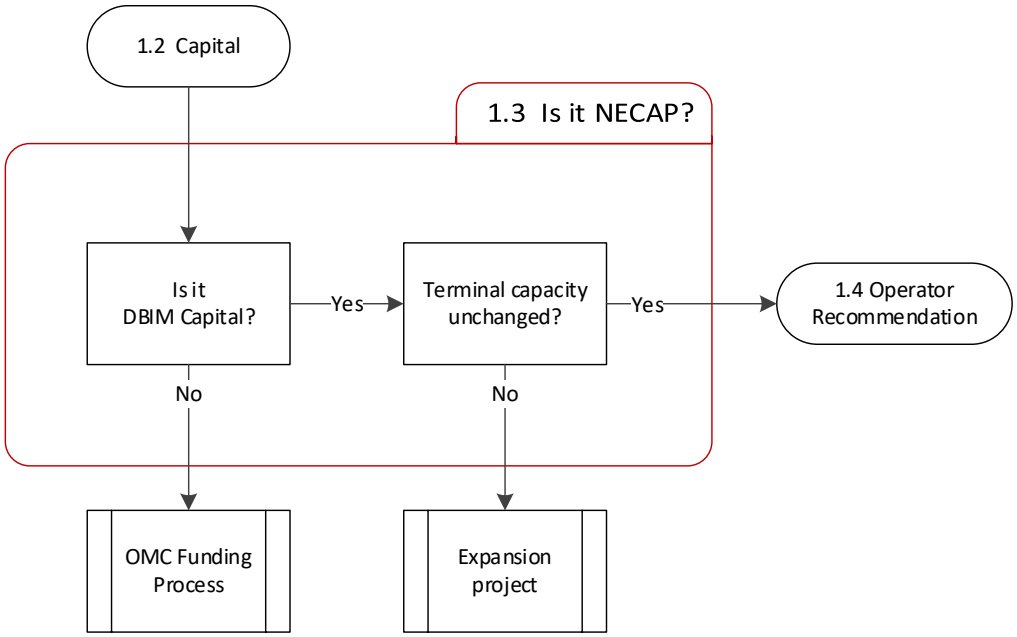
This section summarises the decision-making process for identification of capital costs, based on the definition of capital expenditure from the AU.



1. To original standard, its equivalent, or the current terminal standard.
2. Operational Costs are defined in Schedule 5 of the OMC.
3. If this process does not provide a logical outcome, the NECAP Manager will finalise the assessment.

7.1.3 Responsibility for capex

This section identifies the key decisions for determining if the capital is NECAP Expenditure to be incurred by DBIM or costs incurred by the Operator in accordance with the OMC..



7.2 NECAP Series S approval documentation

This section provides documentation related to the approvals for NECAP Series S projects.

7.2.1 Operator's 5-year capital plan for NECAP

This section provides the NECAP plan for 2022-23

7.2.2 NECAP Compliance Statement

This section provides the recommendation of the Operator in its NECAP Compliance Statement for NECAP Series S, which also includes all the related Project Briefs.

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11th May 2022

Mr Tim Ffrost
Site Manager
DBI Management Mackay
C/- Site Office
HAY POINT QLD 4740

Via Email: *Tim.Ffrost@dbinfrastructure.com.au*

Dear Tim

DALRYMPLE BAY COAL TERMINAL -

Projects Proposed for NECAP Series S Statement of Compliance & Recommendation

The proposed projects for NECAP Series S are listed within the table below, and in detail in the attached Project Briefs. For your information:

1. *These projects have been reviewed against the DBIM NECAP selection criteria and comply with the requirements for addition to NECAP.*
2. *It has been determined, together with DBIM, that none of the listed projects require an Independent Engineer to undertake a verification at project completion.*
3. *These projects are hereby recommended for implementation.*

ID	Project Title	DBCT P/L Annual Plan	Independent Verification Required
NECAP S PROJECTS			
NS01	Arc Flash Mitigation - Phase 2	$4,791,000	N
NS02	SL2 Luff Winch Underpan	$374,000	N
NS03	Offshore Pile Wrapping - Phase 9	$9,071,000	N
NS04	Sample Plant 1 Goods and Personal Lift Upgrade	$2,958,000	N
NS05	MCC Replacement Project – Phase 3: Sub3 – MCC04	$2,329,000	N
NS06	Site Roads Upgrade Program	$3,850,000	N
NS07	Site Wide GTU Pinning Frame Upgrade	$2,647,000	N
NS08	Offshore Conveyor Structural Maintenance Access Study	$465,000	N
TOTAL NECAP Series S		**$26,485,000**	

Please contact me if any further information is required.

Regards

.....
BRETT JURD
Executive Manager Asset Management

cc: A.Timbrell (DBI), P.Wotherspoon (DBI), & S.Rae (DBCT P/L)

Att. *Proposed Project Briefs - Necap Series S*

Project Brief
NS01 – Arc Flash Mitigation – Phase 2

1 Recommendation

Following on from the approved NR01 Arc Flash Mitigation – Phase 1 works, it is recommended to proceed with the Phase 2 component, under the provisions of the NECAP program. These projects aim to reduce the risk caused by arc flash energy levels that personnel are exposed to when performing works around electrical switchgear. The implementation of Arc Flash Mitigation Phase 2 works has an estimated cost of $4,791,000.

The concepts developed for the site arc flash mitigation strategy commenced with risk assessment #7719 "Arc Flash Hazards Around Electrical Installations". The risk assessment nominates how to operate and maintain all electrical switchgear on site safely, with the identified arc flash energy levels. External consultants were engaged to provide recommendations on mitigation and energy reduction [1].

2 Problem

Presently, site electrical workers are exposed to high levels of incident energy during operation and maintenance of electrical switchgear at DBCT. In the event a fault was to occur during the operation of this switchgear the potential outcome could be catastrophic for the personnel involved in the activity. Engineering solutions are required to reduce this incident energy. Phase 2 of this project is focussed on limiting or eliminating risk exposure in multiple key plant areas, each area requiring individual solutions. There are three main installation types where Arc Flash exposure is more prominent, namely older style HV switchgear, new HV switchgear and LV MCCs. These installation types are found in substations, yard machines, and shiploaders.

For background, an electrical arc fault is often referred to as an Arc Flash. Arc faults arise when current flows through the air between phase conductors or between phase conductors and neutral or ground. Put simply, an arc fault could be described as an unexpected, violent, electrical short circuit in the air that produces an arc and associated by-products. When arc faults occur, the resulting energy released may be enough to seriously burn or otherwise injure nearby persons, ignite flammable materials (including clothing), and cause significant damage to plant and equipment.

The potential energy release at the switchgear is called incident energy. Incident energy is a calculated value of the potential release of energy due to an arcing fault between phase conductors, phase/neutral conductors, or phase/earth conductors. The energy density of this incident energy is measured in cal/cm^2. A value of 1.2cal/cm^2 results in second degree burns to bare skin, and 8cal/cm^2 in third degree burns. DBCT P/L aims to reduce all incident energy exposure to below 8cal/cm^2 wherever possible

2.1 LV MCCs

There are three problem statements:

1. LV MCCs are based on the modular style motor control centres, with no arc fault containment certification. The associated LV switchgear is protected by electro-mechanical style protection relays with limited settings.
2. Most substation main incomers have high incident energies excessive of 12cal/cm^2.
3. Testing and fault-finding electrical equipment while powered is deemed by the Qld Electrical Safety Regulations as performing live work. There are occasions when it is necessary to perform live work while fault finding on the MCCs. To ensure that this is practically possible without exposing workers to hazardous situations, suitable arc flash protection techniques are required to be adopted within the bus sections of the MCC.

[1] refer WELCON report GJ2672-RP-01B, LV MCC Arc Flash Energy Reduction & Mitigation, dated 16 March 2020

In summary from above, the substation MCCs are not arc fault contained; switching operator personnel are exposed to high levels of incident energy, with a potential catastrophic outcome if a fault was to occur during a switching operation.

2.2 Shiploaders

There are two problem statements:

1. SL1 has onboard 3.3kV short circuit protection provided by modern ABB switchgear and an ABB REF610 protection relay supplying a 3.3kV/415V transformer. Fault clearance times are significantly reduced on SL1 compared to SL2 and SL3. Protection on SL2 and SL3 provided for the NSMS is via the original 3.3kV switchgear. This includes 150A fuse and HV contactor arrangements, supplying the 3.3kV/415V transformer.

   Table 1 – SL1, SL2, SL3 Incident Energy Levels (cal/cm^2)

Standard	SL1	SL2	SL3
NSMC	13.7	70.6	59.9

2. Additionally, there is a site wide strategy to replace all non-arc fault contained HV switchgear with appropriately rated switchgear. To perform isolations on boom conveyors for SL2 and SL3, isolators must wear the appropriate PPE to safely undertake the task. A larger floor space is required for both switchrooms on SL2 and SL3 to replace the existing switchgear with rated equipment identical to the equipment installed on SL1.

2.3 HV Switchgear (Old)

The 11kV reticulation system on site uses metal enclosed switchgear sets called Ring Main Units (RMUs) that are used at the load connection points of the ring type distribution network. These existing RMUs have no arc flash containment ratings, notwithstanding the issue of the units being discontinued (parts no longer available).

The 11kV HV switchgear in SS9 is metal enclosed switchgear with an exposed spout for the connection between the bus bar and the circuit breaker. There is no arc flash containment on this switchgear. The spouts are facing down which offers the operator protection while operating (arc blast is directed down instead of directly into the operator). Arc gases generated from an arcing event on the older style switchgear are not currently vented externally to the switchroom.

2.4 HV Switchgear (modern)

The modern ABB metal clad HV switchgear installed on site are arc fault contained. A common arc duct plenum is installed across the top of each suite of ABB panels, which is intended to expel explosive gases and vapours externally to the switchroom.

The common duct presents problems when completing internal inspections on HV switchgear. As an example, the entire HV board requires isolation even though the left-hand side bus may be electrically isolated from the right-hand side bus due to the common arc duct shared between both sections.

2.5 HV Switchgear (contactor & CB racking)

Presently the method of isolating 3.3kV conveyor drives is achieved by manually racking their associated 3.3kV contactors out of service. This practice is also undertaken by non-electrical personnel who have been provided the appropriate training. Returning a failed contactor back into service could have serious consequences for both personnel and equipment. Being able to remotely rack the equipment would greatly reduce the risk of injury to personnel during these routine tasks.

3 Solution

Phase 2 – This project

- Replacement of SS9 HV switchgear for modern ABB ZS1 arc fault contained gear.
- Replacement of RMU6 and complete design for the installation of RMU1, 2, 3, and 4.

- Installation of Arc Duct partitioning on SS3, SS4, and SS5B 3.3kV switchgear and SS2B 11kV switchgear.
- Remote operation and racking of 3.3kV contactors associated with L6, L4 and L2 conveyors to be completed as a trial prior to future works.
- Procurement of SL2 3.3kV ABB Unigear ZS1 switchgear. Installation of equipment in Phase 3.
- Replacement of older style LV ACBs with modern quicker operating ACBs including protection relay upgrade.
- Panel view installation in 6 substations and 12 yard machines to provide:
    - Arc flash detector status indication
    - Remote close facilities on all LV ACBs
    - Future remote racking for all LV ACBs

Phase 3 – Future

- Installation of RMU 1, 2, 3, 4.
- Installation of Arc Duct partitioning on remaining 3.3kV and 11kV switchboards in SS1.
- Procurement of SL3 3.3kV ABB Unigear ZS1 switchgear and installation of the switchgear on Shiploaders 2 and 3.
- Arc Flash Detection in 3.3kV switchgear for protection of persons while replacing contactors.
- Remote racking of various 3.3kV motor contactors and 3.3kV & 11kV circuit breakers.

Phase 4 – Future

- Remote operation and racking of the remainder of 3.3kV contactors & circuit breakers and 11kV circuit breakers across site.

3.1 LV MCCs

There are two targeted approaches of the same arc flash mitigation technique applied to LV MCCs.

Phase 2 – This Project

- Replacement of older style ACB's, reducing incident energy with faster operating times and improved protection relays for detecting fault currents. The new breakers will be in-line with current site standard with remote close/open facilities.
- Removing the operator from in front of the ACB with the installation of remote HMI.

3.2 Shiploaders

Replacement of SL2 and SL3 3.3kV switchgear with the modern ABB metal clad arc fault contained switchgear, including fast acting protection relays.

Phase 2 – This Project

- Procurement of the SL2 3.3kV ABB ZS1 Unigear and associated structural components ready for installation.

Phase 3 – Future

- Installation of SL2 3.3kV switchgear
- Procurement and installation of SL3 3.3kV switchgear.

3.3 HV Switchgear (Old)

11kV RMU

Complete project - Replacement of the 5 x RMU's on site with arc fault contained, metal clad enclosures.

Phase 2 – This Project

- Replacement of RMU6
- Engineering completed for the replacement of RMU1, 2, 3 and 4.

Phase 3 - Future

- Replacement of the remaining 4 RMU units.

11kV Switchgear

Phase 2 – This Project

- Replacement of SS9 11kV Hawker Siddley metal enclosed switchgear with the modern ABB *metal clad* arc fault contained switchgear, including fast acting protection relays.

3.4 HV Switchgear (Modern)

Complete Project - Installation of arc duct partitions between LHS and RHS arc ducts, inclusive of separate external-to-substation venting. Equipment outage requirements for this modification mandates arc duct works to be broken up over different stages to minimise operational delays.

Phase 2 – This Project

- Procurement and installation of arc duct partitions in SS3 3.3kV, SS4 3.3kV, SS5B 3.3kV and SS2B 11kV switchboards.

Phase 3 – Future

- Procurement and installation of arc duct partitions in SS1 3.3kV and SS1 11kV switchboards.

3.5 HV Switchgear (contactor & CB racking)

Complete Project - Engineering and installation to allow remote racking of 3.3kV conveyor motor contactors currently installed in ABB Unigear ZVC switchboards. This includes replacing the existing 3.3kV contactor trucks with units equipped with motor operators, modification of the control wiring to incorporate additional positional switches, and control system interface with the local switchroom HMI panel. Prior to this work it will be necessary to complete the arc duct partition installation works (other works in this phase), thus allowing partial shutdown of the section concerned without affecting operations.

Phase 2 – This Project

- Engineering and installation for remote racking of L6, L4 and L2 3.3kV conveyor contactors
- Identification and engineering for remaining site locations and planning for future phases

Phase 3 – Future

- To be determined from exploratory engineering works in Phase 2

Phase 4 – Future

- To be determined from exploratory engineering works in Phase 2

4 Justification

The objective of the Arc Flash mitigation strategy is to:

- Provide effective hazard management with consideration of operational practices on site.
- Remove electrical persons from donning arduous PPE (Bomb Suits). Arc flash hazard risks are managed by applying the hierarchy of risk control. PPE is the lowest order of priority.
- Standardise HV equipment operated on site, where all HV equipment is arc fault contained.
- Allow for the replacement of electrical equipment that has reached its end of service life.
- Remove personnel from the line of fire.

4.1 LV MCCs

This project provides engineering tools for maintenance teams to conduct isolations and perform maintenance activities on switchboards. The current PPE requirement contributes to restricted mobility and frustration when carrying out work, notwithstanding the time taken to don the PPE equipment.

4.2 Shiploaders

The target outcome is to achieve a significant reduction in risk to personnel and equipment by providing effective arc fault contained 3.3kV switchgear, inclusive of incident energy level reduction across the LV switchboard.

4.3 HV Switchgear (Old)

Ensure all HV equipment operated on site is arc fault contained with fast operating times of modern protection relays.

4.4 HV Switchgear (Modern)

Arc duct partitioning provides opportunities for HV maintenance and inspection activities that are otherwise difficult to complete due to the availability of terminal assets.

As the HV equipment ages, internal bus inspections become more important regarding early detection of possible disruptive failure modes of the electrical equipment.

4.5 HV Switchgear (contactor & CB racking)

Remote racking of HV contactors and circuit breakers will remove personnel from the direct line of fire should a fault develop in the switchgear at the same time they are completing racking operations.

5 Scope

Element of scope	How this scope supports the resolution of the problem
Scope of works	Fully develop the Scope of Works supported by design drawings for each of the projects
OEM Engagement	Engagement of OEMs for respective equipment using industry best practice to derive the method/equipment most appropriate for site implementation
Procurement	Procurement of 11kV switchgear for SS9, RMU6, 3.3kV switchgear for SL2 and contactors for L6, L4 and L2. Lead times for the some of the ABB equipment requires early planning and coordinating.
Contractors	Engagement of various contractors for the selected work- engagement of electrical, plumbing, fabrication, and civil trades to complete works.
Installation works	Work being conducted from on-shore to off-shore. Methodology will be different for each of the listed works. As work progresses, familiarisation packages will be released, and gradual awareness and support of the workforce is paramount.
Power Study	Updated power study performed on electrical plant to confirm reduction of incident energies across electrical apparatus
Redundant stock inventory	Identify stock obsolescence and review of critical spares for new equipment
Out of scope	Arc Flash mitigation phase three works: a. Procurement and installation of RMU1, RMU2, RMU3 and RMU4 switchgear b. Installation of Arc Duct partitioning on remaining 3.3kV and 11kV switchboards in SS1 c. Procurement of SL3 3.3kV ABB Unigear ZS1 switchgear and the installation of the switchgear on Shiploaders 2 and 3 d. Arc Flash Detection in 3.3kV switchgear for protection of persons while replacing contactors e. Execution works of switchgear for SL2 Arc Flash mitigation phase four works: a. Remote operation and racking of the remainder of 3.3kV contactors and circuit breakers across site

6 Cost Estimate

Item	Description	Estimate
1	Design work	$215,000
2	Material supply & fabrication	$1,425,000
3	Site installation	$1,647,000
4	Engineering Assistance	$493,000
5	Contingency	$304,000
Project Manager's Budget		**$4,084,000**
6	Project Management	$452,000
7	Contingency P95	$255,000
Total Project Estimate		**$4,791,000**

7 Schedule

Key activities for the project are listed below:

Activity	Start	Finish
User approval	Jan 2022	Jul 2022
Tender process and contract award	Jul 2022	Sep 2022
Material supply	Sep 2022	Jul 2023
Onsite installation	Jan 2023	Dec 2023
Handover into operation	Aug 2023	Dec 2023

8 Asset life assessment

The recommended asset life is 20 years, consistent with asset life typically assigned to electrical equipment. ABB switchgear has a recommended life expectancy of 20-30 years.

Equipment and methodologies adopted for this arc flash mitigation strategy are of latest industry standard.

9 NECAP Compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure, relating primarily to the upgrade to plant for safety reasons, but also to improve the whole of life cost of the asset
- It is capital expenditure that relates to improvements in support of good operations and maintenance practice.
- It is owner capital, being outside the OMC obligations and Operator's capex cap
- It does not change terminal capacity

10 Project Team

Role	Name
Project Manager	Bill Mackay / Selwyn Finn
Project Sponsor	Brett Jurd
DBCT Support	Dean Anderson
DBI Support	Wayne Russell

11 Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Bill Mackay/Selwyn Finn	Brett Jurd	Tim Ffrost
Position	Project Managers	DBCT P/L EM AM	DBIM NECAP Manager
Date	04 May 2022 | 9:33 AM AEST	04 May 2022 | 7:26 PM AEST	05 May 2022 | 11:36 AM AEST
Signature	DocuSigned by: DCD117F66388420...	DocuSigned by: Brett Jurd 51EC2B739C8546C...	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with good operations and maintenance practice, or complies with DBIM's obligations under the PSA.

Project Brief

NS02 – SL2 Luff Winch Underpan

1. Recommendation

It is recommended to proceed with the Luff Winch Underpan Project, for an estimated cost of $374,000 under the provisions of the NECAP series S program.

The project delivers improvement opportunities which will:

- Eliminate work at height hazards when winch guarding is removed, and
- Capture excess lubricant applied to the boom luff ropes and drum.

2. Problem

Underpans are installed under the luff winch bull gear and pinion but not the winch drum. Lubricant is regularly sprayed onto the wire rope while spooling onto the winch drums. The excess lubricant builds up on the drum and falls onto the shiploader 'Luff Deck' access and walkways below, or into the ocean. This increases the risk of slips, trips, and falls when accessing the Luff Deck. Additionally, there is potential for contamination of the marine ecosystem. As the maintainer's are aware of the potential for the lubricant to enter the marine environment, the wire rope lubricant used (Lanotec-Lanolin) has been selected to minimise environmental impact.

During regular maintenance of the rope, winch drum and brake disc/callipers, guarding must be removed for access. The open floor beneath the drum exposes personnel to a fall from heights risk. In this location there are no certified anchor points for fall arrest or restraint.

3. Solution

Install new stainless underpans (x4) with minimal floor slope and fibre reinforced plastic (FRP) mesh inserts to capture excess rope lubricant spillage, whilst providing a safe maintenance access floor beneath the winch drums while the guarding is removed.

Each of the pans will fall toward a corner tundish that diverts rainwater, or large volumes of lubricant, into a single drainpipe that deposits the material onto the L7 conveyor.

4. Justification

This project will enhance safety to staff, decrease maintenance time and decrease the risk to the environment by:

- Eliminating the work at height hazard when winch drum guarding is removed.
- Capturing excess lubricant applied to the luff rope and drum to prevent this from entering the marine environment and reduce risks of slips, trips and falls on accessways to the luff deck
- Quicker, easier, and safer to maintenance of the luff drum and brake calipers with guards removed, as the work at height risk has been eliminated.

5. Scope

Element of scope	How this scope supports the resolution of the problem
In Scope	Design stainless underpans (4 of) complete with mesh floor and drainpipe to L7 for the floor openings beneath the luff winch drums. Fabricate and install stainless underpans c/w mesh floor and drainpipe. Paint any existing structure coatings that are damaged during installation.
Out of Scope	Remediation of any existing floor structure/beams and coatings. Installation of anchor points for fall arrest or fall restraint. Modification to the existing winch drum guarding. Ongoing maintenance or cleaning of the new underpans.

6. Cost Estimate

Item	Description	Estimate
1	Design work	$30,000
2	Material supply & fabrication	$38,000
3	Site installation	$161,000
4	Engineering assistance	$34,000
5	Contingency	$42,000
Project Manager's Budget		**$305,000**
6	Project Management	$35,000
7	Contingency P95	$34,000
Total Project Estimate		**$374,000**

7. Schedule

Key activities for the project are listed below:

Activity	Start	Finish
User approval	Feb 2022	Jun 2022
Tender process and contract award	Jul 2022	Aug 2022
Offsite fabrication	Aug 2022	Oct 2022
Onsite installation	Oct 2022	Nov 2022
Handover into operation	Nov 2022	Dec 2022
Completion of all scope	Dec 2022	Jan 2023

8. Asset life assessment

These works will not directly impact the asset life of SL2.

9. NECAP Compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure, relating primarily to the upgrade to plant for safety and environmental reasons
- It is owner capital, being outside the OMC obligations and Operator's capex cap
- It does not change terminal capacity

10. Project Team

Role	Name
Project Manager	Garreth Ludke
Project Sponsor	Brett Jurd
DBCT Support	Jack Drefke

11. Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Garreth Ludke	Brett Jurd	Tim Ffrost
Position	Project Manager	DBCT P/L EM AM	DBIM NECAP Manager
Date	03 May 2022 | 6:08 PM AEST	04 May 2022 | 7:27 PM AEST	05 May 2022 | 11:39 AM AEST
Signature	DocuSigned by: Garreth Ludke 84D9E2682FCD4F4...	DocuSigned by: Brett Jurd 51FC2B739C8546C...	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with good operations and maintenance practice, or complies with DBIM's obligations under the PSA.

Project Brief
NS03 – Offshore Pile Wrapping (OPW) – Phase 9

1. Recommendation

It is recommended to proceed with Phase 9 of the OPW project under the provisions of the NECAP program. This phase of the project will target wrapping a further 122 piles using the recommended access methods, materials and contracting strategies refined in previous phases. The estimated cost of this phase is $9,071,000.

2. Problem

The original protective treatment on a large number of piles is past the end of its effective life and requires increasing maintenance efforts to maintain structural integrity. The Operator's condition assessment of many of the existing piles has identified protective coating failures particularly within the tidal and splash zone. Left exposed, the localised failures of the protective coating will progressively compromise the structural integrity of the pile wall and then requires expensive structural remediation repairs followed by blasting and reinstatement of the original paint system.

3. Solution

The OPW program is a multi-year project to wrap the terminal's 1,705 piles supporting the jetty and berth structures. This program will use various access methodologies to implement an approved petrolatum tape wrapping material system on all piles.

4. Justification

The implementation of the OPW project significantly reduces pile protective treatment maintenance costs and maintains the long-term structural integrity of piles by providing a competent long-term protective treatment system. The Denso SeaShield system has a 30-year plus proven service life which reduces the need for ongoing maintenance both in the splash zone and at higher pile levels right up to underside of headstock level.

The Denso SeaShield system adopted is essentially maintenance free, which significantly reduces the associated cost and safety risk to personnel normally required to scaffold down to the water line to perform traditional protective treatment repairs. The Denso SeaShield system represents the lowest whole of life cost for maintaining the piles out of all the identified systems and methodologies available.

The cost of the temporary scaffold access system required to access each dolphin and/or wharf pile location is a significant component of the overall project cost. For reasons of cost efficiency, it has been agreed with the Operator that DBCTM principal contractors performing pile wrapping installation works will, where such access allows, also perform any required structural and protective treatment repairs to headstocks, piles caps of other ancillary steelwork above the pile jackets while the access is available. The direct repair costs of such work is reimbursed by the Operator, and so does not form part of the approved NECAP budget, and is included only as scope.

5. Scope

The following 122 piles have been selected for the OPW Phase 9 works program to fit in with operational factors and seasonal weather constraints:

DBCTM scope

Location	Piles
Berth 2 piles	18
Jetty 1 & Jetty 2 headend piles	32
Mooring Dolphin MD1	20
Jetty 1 headend/B3 roadway piles	10
Total	**80 piles**

DBCT P/L scope

Location	Piles
Berth 1 rear piles – S1 to S7	25
Berth 1 longitudinal anchor piles	8
Berth 1 BD6 – BD7 walkway piles	3
Berth 1 front piles	4
Berth 4 BD31/BD32 rear fender frame piles	2
Total	**42 piles**

OPW Project status

Series	Phase	Status	Piles
G	1	Complete	50
L	2	Complete	26
M	3	Complete	201
N	4	Complete	197
O	5	Complete	168
P	6	Complete	151
Q	7	In Progress	170
R	8	In Progress	130
Total to date			**963 piles**

6. Cost Estimate

Item	Description	Estimate
1	Company supply materials	500,000
2	Installation works	6,717,000
3	General engineering assistance & technical support	50,000
4	Contingency	351,000
Project Manager's Budget		**7,618,000**
5	Project Management	856,000
6	Contingency P95	597,000
Total Project Estimate		**9,071,000**

7. Schedule

Key activities for the project are listed below:

Activity	Date
NECAP Series S User approval	June 2022
Award of installation works contract	July 2022
Progressive Company supply of Denso materials	From September 2022
Completion of Phase 9 installation works	September 2023

8. Asset life assessment

The Denso SeaShield pile wrapping system has a 30-year plus proven service life, and may well exceed the effective life of other critical elements of the offshore terminal infrastructure.

9. NECAP compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure, relating to installation of pile wrapping systems to improve personnel safety and reduce maintenance costs.

- It is owner capital, being outside the OMC obligations and Operator's capex cap
- It does not change terminal capacity

10. Project Team

Role	Name
Project Manager	Andrew Mecoles
Project Sponsor	Peter Wotherspoon
DBCT Support	Grahame Turner

11. Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Andrew Mecoles	Brett Jurd	Tim Ffrost
Position	Project Manager	DBCT P/L EM AM	DBIM NECAP Manager
Signature	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...	DocuSigned by: Brett Jurd 51FC2B739C8546C...	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...
Date	03 May 2022 | 3:57 PM AEST	04 May 2022 | 7:27 PM AEST	05 May 2022 | 11:39 AM AEST

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with good operations and maintenance practice, or complies with DBCTM's obligations under the PSA.

Project Brief
NS04 – SP1 Goods and Personnel Lift Upgrade

1. Recommendation

It is recommended to proceed with the Sample Plant 1 (SP1) Goods and Personnel Lift upgrade project, for an estimated cost of $2,958,000, under the provision of the NECAP series S program.

The project shall replace the original lift which has exceeded the recommended service life and has critical part obsolescence effecting maintainability.

2. Problem

Sample Plant 1 (SP1) personnel/goods lift (Alimak) commenced service in early 1999 following Stage 3 expansion and has been in service for over 20 years. It has now passed the supplier's recommended service life. The lift operates in a very aggressive environment that exacerbates condition degradation which is not conducive to continuing to maintain and operate the asset reliably.

The manufacturer of the variable speed drive that controls the lift winch ceased full support of the drive in late 2012, since then the scheduled maintenance has been achieved by utilising the limited available spare parts. Nine years on, these parts are almost exhausted and DBCT P/L now experiences difficulty in sourcing speciality parts, which can have lead times in excess of six months. The OEM advises that operating a drive which has reached the end of its lifecycle may result in unpredictable process downtime due to wear or failure.

Lifts are classified as High-Risk Plant under the QLD WHS Act/Regulations. This classification requires that they be registered and adds additional inspection and maintenance requirements. Ongoing maintenance when OEM spares become unavailable will create a scenario where modifications may be required to the plant to ensure ongoing operability. This is not a desired outcome as DBCT P/L will take on the obligations of the designer according to WHS laws. Any change to registered plant also requires that the plant be re-registered.

DBCT is obligated to undertake sampling of the coal processed through the outloading system. If the lift is out-of-service for extended periods of time, it may result in operational delays and increase the risk of fatigue related injuries from sampling activities. The lift is critical in ensuring this sampling is done efficiently and safely.

3. Solution

The proposal to replace the life on SP1 includes:

- Improved access around sampling equipment,
- Provision of a lift access to the belt feeder level,
- Provision of a lift size of 1170 x 1040 (same as SP2)
    - A car capable of being pinned for maintenance, eliminating the risk of working under a suspended load,
    - Supported VSD,
    - Improved PLC functionality,
    - Design improvements to the door actuators,
    - Allowance for remote monitoring
- Enabling a maintenance overhead crane to be installed,

Access from the new lift to the sample plant will be via the existing lift well with minor bracing modifications to the existing surge bin structure. The advantage of this option will be to enable the new lift to be installed and commissioned prior to decommissioning of the existing lift, mitigating any time samplers are without a lift.

4. Justification

Undertaking this project will replace the existing lift which has exceeded its recommended service life and is fitted with obsolete parts. Additional benefits include:

- Mitigate the possibility of DBCT P/L taking on risks and onerous legislative requirements associated with modifying High Risk Plant.
- Mitigate the possibility that a breakdown developing that cannot be repaired or, at best, repaired outside a reasonable timeframe.
- Mitigate the reliance on obsolete components to continue operation of the lift
- The reduction of scheduled maintenance (which is currently double that of SP3). This will provide a small reduction in maintenance cost and reduce the likelihood of manual handling incidents of sample personnel (who are required to use ~70 flights of stairs while the lift is inoperable multiple times a shift).

5. Scope

In Scope	• Procurement and Purchase of personnel/goods lift, • Removal of existing SP1 personnel/goods lift, • Extension to the existing lift well, • Installation of personnel/goods lift, • Update relevant BOM's and PM's, • Update existing drawings as required.
Out of Scope	• Structural remediation and coating repair of existing SP1 floor levels

6. Cost Estimate

Item	Description	Estimate
1	Design work	$76,000
2	Material supply & fabrication	$904,000
3	Site works	$1,136,000
4	Contingency	$292,000
Project Manager's Budget		**$2,408,000**
5	Project Management	$279,000
6	Contingency P95	$271,000
Total Project Estimate		**$2,958,000**

7. Schedule

Key activities for the project are listed below:

User approval	Jan 2022	Jun 2022
Tender process and contract award	Apr 2022	Aug 2022
Material supply	Aug 2022	Mar 2023
Onsite installation	March 2023	July 2023
Handover into operation	July 2023	Aug 2023
Completion of all scope	July 2023	Aug 2023

8. Asset life assessment

The minimum operational life of the components installed by this project is 20 years as per site specification - SP0004 Mechanical Equipment Supply and Installation.

9. NECAP Compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure that relates to improvements in support of good operations and maintenance practice.
- It is owner capital, being outside the OMC obligations and Operator's capex cap
- It does not change terminal capacity

10. Project Team

Project Manager	Mathew Nield
Project Sponsor	Tim Ffrost
DBCT Support	Peter Rimmington

11. Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Mathew Nield	Brett Jurd	Tim Ffrost
Position	Project Manager	DBCT P/L EM AM	DBIM NECAP Manager
Date	05 May 2022	1:26 PM AEST	05 May 2022 | 3:07 PM AEST	05 May 2022 | 3:23 PM AEST
Signature	DocuSigned by: Mathew Nield 4A9B0CAA76D1421...	DocuSigned by: Brett Jurd 51EC2B739C8546C...	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with good operations and maintenance practice, or complies with DBIM's obligations under the PSA.

Project Brief
NS05 – MCC Replacement Project – Phase 3: Sub 3 - MCC04

1. Recommendation

It is recommended to proceed with the MCC Replacement Project – Phase 3, for an estimated cost of $2,329,000 under the provisions of the NECAP series S program. The estimated replacement cost for each of the five proposed MCC's is similar and therefore this Phase 3 is expected to represent nominally 20% of the total multiphase project cost.

This project will address the compliance and end of life issues observed on several existing MCCs by replacing the nominated MCCs over several phases.

- Phase 1: Sub 2 - MCC03 & Sub 5 - MCC08
- Phase 2: Sub 2A - MCC11
- Phase 3: Sub 3 - MCC04
- Phase 4: Sub 4 - MCC06

MCC Replacement Project – Phases 1 and 2 are underway and are scheduled to be completed by Nov 2022.

Technical issues associated with AS/NZS 61439.1:2016 compliance initially delayed Phase 1 design completion. This issue has been resolved and will not impact future phases. Additionally, procurement delays due to component shortages throughout the COVID pandemic have delayed delivery of the MCC hardware. The intention of progressing with this phase 3 now is to allow early procurement commencement in order to scheduled outage dates in mid 2023.

It is recommended to proceed with Phase 3 in NECAP series S, based on longer than normal lead times, resulting in the MCC build time estimated to be 6-8 months. This will allow the MCC to be installed in the nominated mid 2023 outage.

2. Problem

Compliance issues have been identified on several 415V MCCs, along with the equipment becoming unserviceable and discontinued, therefore reaching end of life.

Specifically, breakdown of the original insulation material shrouding busbars, busways and live conductors has been observed during condition inspections. It has been noted that the red coloured insulation is breaking down, posing potential risk to electrical workers, with the possibility that 240V control circuits are not protected by earth leakage.

Additionally, the identified MCCs are not 'typed tested' with arc fault containment to AS/NZS 3439.1:2002 (superseded, now AS/NZS 61439.1:2016) as per other MCCs on site and therefore present an increased risk of personnel injury in the event of a catastrophic failure. Administrative controls are in place to mitigate this risk in the short term.

The following 415V MCCs have been in service for 25+ years have been prioritised due to age, condition, arc flash & arc fault containment issues, etc.

Substation	MCC	Commissioned Date	Years in Service	Priority
Sub 2	MCC03	1983	36	1
Sub 5	MCC08	1983	36	2
Sub 2A	MCC11	1994	25	3
Sub 3	MCC04	1983	36	4
Sub 4	MCC06	1983 (original) 1994 (extension)	36 25	5

3. Solution

There are several options to consider when engineering the optimal solution; upgrade MCCs through replacement of incoming circuit breakers and protection relays, change out or overhaul individual cells in situ, rewire the control circuits and/or install new components. There is also the need to consider 24VDC control circuits to replace the existing 240VAC circuits, which requires existing 240VAC field equipment to be replaced with 24VDC components.

Options identified for possible solutions to these issues are,

3.1 Progressive Replacement of Cells

The older MCCs use bolted connections which mean the entire MCC needs to be isolated to disconnect, remove, and replace an individual cell, or isolator.

The older MCCs do not have withdrawable cells meaning that direct replacements are not easily completed without full MCC isolations and access through major outages.

3.2 Progressive Replacement of Panel Wiring & Components

Whilst economically presenting perhaps the lowest cost, this approach presents issues with the number of required outages to complete the works and the state of the installation in between outages due to alterations required to the control wiring looms. Potentially it could take years to complete with increased risk of failure during that period.

In some cases, this would not address the arc fault containment deficiencies identified in some MCCs.

3.3 Replacement of MCCs

Complete replacement of an MCC is the ideal solution, although presenting logistical issues with available space and opportunities to complete the change outs. The latest Australian Standards specify clearances which don't currently exist in some instances.

After considering the 3 possible solutions, the optimal solution is to replace the MCCs. This project brief recommends the following replacement strategies:

Where sufficient substation floor space exists:

- Installation of new cable trenches or cable ladder
- Installation of a new 415V MCC, adjacent to the existing MCC
- Supplying 415V to the new MCC from an existing transformer supply
- Progressive changeover of circuits during scheduled outages or opportunities
- Replacement of 240VAC field equipment with 24VDC components
- Removal of the existing MCC
- Reinstatement of substation floor protective coatings

Where sufficient substation floor space does not exist:

- Removal of the existing MCC
- Installation and commissioning of a new 415V MCC, in or close to the existing MCC footprint
- Changeover of circuits within a nominated scheduled outage
- Replacement of 240VAC field equipment with 24VDC components
- Reinstatement of substation floor protective coatings as required

4. Justification

The MCCs listed in the project are approaching end of life on a condition basis and non-compliance issues to current standards also exist. By implementing the preferred solution of MCC replacement, there are many benefits as follows:

- Compliance to current standards and reduced risk of personnel injury
- Minimised plant downtime and risk of catastrophic failure
- Reduced maintenance costs
- Reduced unscheduled maintenance
- Reduced inventory
- Optimised performance

5. Scope

Element of scope	How this scope supports the resolution of the problem
In Scope	• Fully develop the Scope of Works and Cable Schedules for the nominated MCC • Procurement of the MCC • Engage contractors to complete the installation works • Schedule work to align with shutdown opportunities where required • Progressively complete and close out work fronts • Revise or provide new As Built Schematic, Single Line and Termination drawings • Replacement of 240VAC field equipment with 24VDC components • Identify any superseded/redundant drawings • Identify any superseded/redundant warehouse stock
Out of Scope	• Additional circuits other than those required by the existing MCC functions • Installation of MCCs/switchboards in locations other than those nominated • Upgrading the terminals 415V distribution system as a whole • Upgrading of equipment solely due to capacity restrictions

6. Cost Estimate

Item	Description	Estimate
1	Design work	$121,000
2	Material supply & fabrication	$803,000
3	Site installation	$676,000
4	Engineering assistance	$240,000
5	Contingency	$110,000
Project Manager's Budget		**$1,950,000**
6	Project Management	$220,000
7	Contingency P95	$159,000
Total Project Estimate		**$2,329,000**

7. Schedule

Key activities for the project are listed below:

Activity	Start	Finish
User approval	Jan 2022	Jun 2022
Tender process and contract award	Jul 2022	Sep 2022
Material supply / Offsite Fabrication	Sep 2022	Jul 2023
Onsite installation	Jul 2023	Aug 2023
Handover into operation	Aug 2023	Sep 2023
Completion of all scope	Sep 2023	Oct 2023

8. Asset life assessment

The recommended asset life is 20 years, consistent with asset life typically assigned to electrical equipment.

9. NECAP Compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination, which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure, relating primarily to the upgrade to plant for safety reasons, but also to improve the whole of life cost of the asset.
- It is capital expenditure that relates to improvements in support of good operations and maintenance practice.
- It is owner capital, being outside the OMC obligations and Operator's capex cap.
- It does not change terminal capacity

10. Project Team

Role	Name
Project Manager	Steve Conescu
Project Sponsor	Brett Jurd
DBCT Support	Dean Anderson

11. Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Selwyn Finn	Brett Jurd	Tim Ffrost
Position	Project Manager	DBCT P/L EM AM	DBIM NECAP Manager
Date	05 May 2022	4:08 PM AEST 06 May 2022 | 5:35 AM AEST	06 May 2022 | 6:16 AM AEST
Signature	DocuSigned by: 8EC06F4ED4A44E8...	DocuSigned by: Brett Jurd 51FC2B739C8546C...	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with good operations and maintenance practice, or complies with DBIM's obligations under the PSA.

Project Brief
NS06 – Site Roads Upgrade Program

1. Recommendation

It is recommended to proceed with the Site Roads Upgrade project, for an estimated cost of $3,850,000 under the provisions of the NECAP Series S program.

The project delivers important capital improvements to three major site roadways to extend their service life and reduce the potential for premature pavement failure and subsequent replacement of the underlying road pavement.

2. Problem

The following three major site roadways are in extremely poor condition and have been assessed as the highest priority for urgent capital improvement.

- L1 road - southern lane
- Bund 4 centre road
- S4 road

The current condition of each roadway, and the problems associated, are discussed below in more detail.

2.1 L1 road – southern lane

The existing L1 roadway is a major roadway running the length of the northern end of the stockyard. It is a critical terminal roadway with significant daily traffic loads, and is the only road that provides vehicle access into the northern end of every stockyard row.

The northern lane (eastern traffic flow) is asphalt sealed but the southern lane (western traffic flow) has never been sealed because of the occasional need for the DBCT dozer to move between stockyard rows.

When two vehicles are required to pass each other, the western bound vehicle is forced off the single lane sealed running surface and onto the unsealed portion of the road which is prone to ruts, deep potholes and localised pavement failures. Drivers of site vehicles are often unaware of the potential pavement failure hazards, which can cause tyre and suspension damage to site vehicles and sudden and significant jarring to the occupants. Even when the hazards are detectable, the vehicles must be driven erratically to avoid the localised failures. Both circumstances are unacceptable from a safety perspective.

Despite frequent minor repairs, the pavement failures are continuous in nature due to the lack of a competent sealed running surface and are further exacerbated during wet weather. Localised pavement repairs only provide a short-term benefit, are quite expensive and are very reactive in nature, and so do not effectively fix the existing continuous cycle of temporarily correcting potentially unsafe conditions with no long-term solution.

2.2 Bund 4 centre road

The existing Bund 4 centre roadway is an original terminal roadway built in Stage 1 and is now approaching 40 years old. It only has a single lane bitumen seal down the centre of the 5.7m wide and 1300m long bund running surface. The existing unsealed edges either side of the old bitumen seal are in very poor condition. There are large portions of the unsealed road shoulders which need to be fully rebuilt to correct the existing ruts, potholes and depressions in the surface to facilitate effective long term drainage and correct the surface deficiencies.

The current road surface conditions also create an additional injury risk to maintenance personnel through the possibility of ankle injuries when boarding and dismounting the yard machines for routine servicing and maintenance activities, much of which occurs outside of daylight hours.

Significant historical repairs have been further complicated by the fact that standard size road construction equipment such as graders, rollers, trucks and watercarts are unable to access the narrow bund roadway during normal daily operations due to the limited height clearance constraints under the yard machines.

A focussed and coordinated project approach is needed to facilitate the necessary capital improvements, which must coincide with machine shutdown periods and agreed daily operational restrictions.

2.3 S4 Road

The existing S4 road is a two-lane asphalt sealed major roadway running the length of the southern end of the stockyard. It is a critical terminal roadway with significant daily traffic loads, and is the only road that provides vehicle access to the elevated inloading conveyors S3, S4 & S13 and into the southern end of every stockyard row. It is also subject to significant heavy vehicle loading, and forms part of the site road network for all traffic arriving at the terminal entrance destined for every other part of the terminal including offshore.

The S4 roadway pavement underneath overall is in relatively good condition, however the existing asphalt seal running surface is now more than 20 years old and is rapidly approaching end of life. The existing surface exhibits extensive crocodile cracking over the majority of the surface area with both transverse and longitudinal cracking prevalent and now requires significant maintenance patching.

If the running surface is not replaced soon, the existing sealed surface will deteriorate rapidly through ongoing use and will require an escalating level of maintenance and operational disruption to remove and repair patches and provide periodical sealing of cracked areas.

Such maintenance activities are highly reactive and expensive, and do not materially extend the service life of the roadway overall because if the underlying pavement started to fail, then a more significant and expensive road pavement rebuild would inevitably be required in the near future.

3. Solution

To ensure that major terminal roadways provide safe and efficient service at the lowest whole of life cost, the following targeted solutions for each roadway are proposed.

3.1 L1 Road

The soil forming the unsealed southern lane of the L1 roadway will be fully removed to the appropriate depth and replaced with competent pavement material and an asphalt seal to be consistent with the standard of the northern lane. The asphalt type and pavement depth will be selected to cope with the occasional movement of the DBCT dozer between rows and will be matched in level with the existing road surface and existing concrete dozer slabs.

This solution will create significant benefit to all terminal traffic users, will reduce the potential for tyre and suspension damage to site vehicles and reduce the likelihood of significant jarring to the occupants. It will also allow proper two-way lane delineation to be created for the finished running surface, and eliminate the risks associated with the sharing of a single sealed laneway for bi-directional traffic in a busy operating terminal.

3.2 Bund 4 Road

Suitable operational opportunities will be created to allow the existing Bund 4 pavement to be fully reworked, compacted and trimmed, and provide a two-coat bitumen seal over the full extent of the road width between R3 & R4 conveyors. The road will need to be rebuilt in sections when the opportunity is available (due to yard machine height constraints).

The finished road surface will be slightly raised back to the original design heights and profiled with a centre crown to ensure effective cross drainage is created for stormwater to pass under the yard conveyors and off the bund surface.

This solution will create significant benefit to all Bund 4 traffic users, will reduce the potential for ankle injuries to site personnel, provide an effective long term drainage solution, and provide a cost-effective pavement seal to maximise and significantly extend the service life of the existing roadway.

3.1 S4 Road

A technical assessment will be undertaken to confirm if the existing asphalt seal forming the running surface of the S4 roadway should be retained or removed, prior to the placement of a new asphalt seal running surface over the existing pavement.

Asphalt resealing the surface of the S4 roadway ensures that the underlying pavement does not deteriorate any further and can be retained for many years to come in a serviceable condition, thus avoiding a more significant and expensive road pavement rebuild in the future.

4. Justification

The nominated roadways require the specified capital improvements to extend their service life and reduce the potential for premature pavement failure and subsequent replacement of the underlying road pavement. Undertaking this scope in a timely manner ensures that these important terminal roadways provide safe and efficient service at the lowest whole of life cost.

5. Scope

In Scope	• Design, Project Management and Supervision • Survey for matching new road surfaces to existing structures. • Pavement and sealing works for the roadways nominated • Line marking, signage and any other minor miscellaneous road furniture needed to support the above scope.
Out of Scope	• Removal of coal or drainage maintenance • Service relocations • Replacement of existing guardrail

6. Cost Estimate

Item	Description	Estimate
1	Design work	$210,000
2	Site installation	$2,403,000
3	Engineering assistance	$392,000
4	Project Manager's Contingency	$265,000
Project Manager's Budget		**$3,270,000**
5	Project Management	$364,000
6	Series Contingency	$216,000
Total Project Estimate		**$3,850,000**

7. Schedule

Key activities for the project are listed below:

User approval	Jun 22	Jun 22
Survey, design & tender preparation	Mar 22	Aug 22
Tender process and contract award	Sep 22	Jan 23
Onsite installation	Feb 23	Dec 23
Handover into operation	Jan 24	Jan 24
Completion of all scope	Feb 24	Mar 24

8. NECAP Compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure, relating to improvements in support of Good Operations and Maintenance Practice
- It is owner capital, being outside the OMC obligations and Operator's capex cap
- It does not change terminal capacity

9. Project Team

Project Manager	Jake Thompson
Project Sponsor	Brett Jurd
DBCT Support	Yuvaraj Devarajan
DBIM Support	Andrew Mecoles

10. Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Jake Thompson	Brett Jurd	Tim Ffrost
Position	Project Manager	DBCT P/L EM AM	DBIM NECAP Manager
Date	03 May 2022 | 3:43 PM AEST	04 May 2022 | 7:28 PM AEST	05 May 2022 | 11:40 AM AEST
Signature	DocuSigned by: Jake Thompson 5B6A39E66BF74E4...	DocuSigned by: Brett Jurd 51FC2B739C8546C...	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with Good Operations and Maintenance Practice, or complies with DBIM's obligations under the PSA.

Project Brief
NS07 – Site Wide GTU Pinning Frame Upgrade

1. Recommendation

It is recommended to proceed with the installation of the conveyor gravity take up (GTU) pinning frame upgrades across site (14 off), under the provisions of the NECAP program. This project will eliminate the need for personnel to install fixed chains onto a suspended load, by modifying the GTU frame so the maintainers can access the GTU restraint from the walkway above. The estimated cost is $2,647,000.

2. Problem

Personnel are at risk of being injured when isolating GTUs when either:

- Climbing onto the GTU to connect / disconnect the fixed chains
- Installing fixed chains via an EWP

The GTU is raised clear of the conveyor belt using a slew crane and then suspended via the structure using 25 tonne rated chains and shackles. The above tasks are conducted at heights and on a suspended load. This problem exists on the GTU for conveyors L6A, S13, S6A, S11, S4, S5, R5, S3, S1, L9, L19, L10, R4, and R8.

3. Solution

It is proposed to design and install an alternate take up isolation system which eliminates the need for personnel to install fixed chains onto a suspended load. The new GTU pinning frame system has been installed and successfully proven on multiple other locations to date. This project will see the pinning frames being installed to all remaining land-based conveyor GTUs.

4. Justification

Undertaking this project will result in a reduction of safety risk to personnel lifting and lowering the GTU. The GTU frames provide an isolation point for lock out once suspended which was not the case with suspension chains.

This project will eliminate:

- The need for personnel to climb onto a suspended load or use an EWP to access GTU isolation chain connecting points.
- The need for personnel to man handle 25 tonne rated fixed chains and shackles whilst performing this task.
- PM inspections of GTU chain hanging lugs i.e. mag particle testing of lugs.

5. Scope

Modification of the remaining conveyor gravity take up units across site with an engineered pinning frame.

In Scope	• Design, manufacture and install GTU isolation frame • Corrosion protection repairs to guide rail and areas damaged by modifications • The below conveyor GTU's will be scheduled over three years as per the EOS once developed (L6A, S13, S6A, S11, S4, S5, R5, S3, S1, L9, L19, L10, R4, and R8).
Out of Scope	• Conveyor belt / pulley repairs • Corrosion protection repairs not related to the GTU frame works.

6. Cost Estimate

The current cost estimate has been generated off the findings of the initial manufacture and installation costs for previously installed pinning frames.

Item	Description	Estimate
1	Design work	$150,000
2	Material supply & fabrication	$600,000
3	Site installation	$950,000
4	Engineering assistance	$255,000
5	Contingency	$206,000
Project Manager's Budget		**$2,161,000**
6	Project Management	$250,000
7	Contingency P95	$236,000
Total Project Estimate		**$2,647,000**

7. Schedule

The execution will consist of a staged handover spanning three years as per the EOS.

Assumption: It is estimated that the total project will take three years to complete dependant on shutdown access.

Key activities for the project are listed below:

User approval	Feb 2022	Jun 2022
Engineering and drafting	Jul 2022	Sep 2022
Tender process and contract award	May 2022	Jul 2022
Offsite fabrication – phased approach	Jul 2022	Feb 2023
Onsite installation – phased approach	Aug 2022	Dec 2024

8. Asset life assessment

The minimum operational life of the components installed by this project is 20 years as per site specifications [SP0004 Mechanical Equipment Supply and Installation].

9. NECAP Compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure, relating primarily to the upgrade of plant for safety reasons.
- It is capital expenditure in support of good operations and maintenance practice.
- It is owner capital, being outside the OMC obligations and Operator's capex cap
- It does not change terminal capacity

10. Project Team

Project Manager	Rod Tattersall
Project Sponsor	Brett Jurd
DBIM Support	Tim Frost

11. Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Rod Tattersall	Brett Jurd	Tim Frost
Position	Project Manager	DBCT P/L EM AM	DBIM NECAP Manager
Date	03 May 2022 | 3:34 PM AEST	04 May 2022 | 7:28 PM AEST	05 May 2022 | 11:41 AM AEST
Signature	DocuSigned by: Rod Tattersall 0D032D6E346F4F0...	DocuSigned by: Brett Jurd 54FG2B739C8646C...	DocuSigned by: Tim Frost 9ED9CFC9F00F43E...

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with good operations and maintenance practice, or complies with DBIM's obligations under the PSA.

Project Brief
NS08 – Offshore Conveyor Structural Maintenance Access Study

1. Recommendation

It is recommended to proceed with the *Offshore Conveyor Structural Maintenance Access Study* project, under the provisions of the NECAP program. This project will provide a feasibility engineering assessment of the re-purposing of the existing pile wrapping access gantry and develop other options for efficient, safe access to the galleries of jetty conveyors L5, L6 and L15 for protective treatment and structural maintenance works. The estimated cost is $465,000.

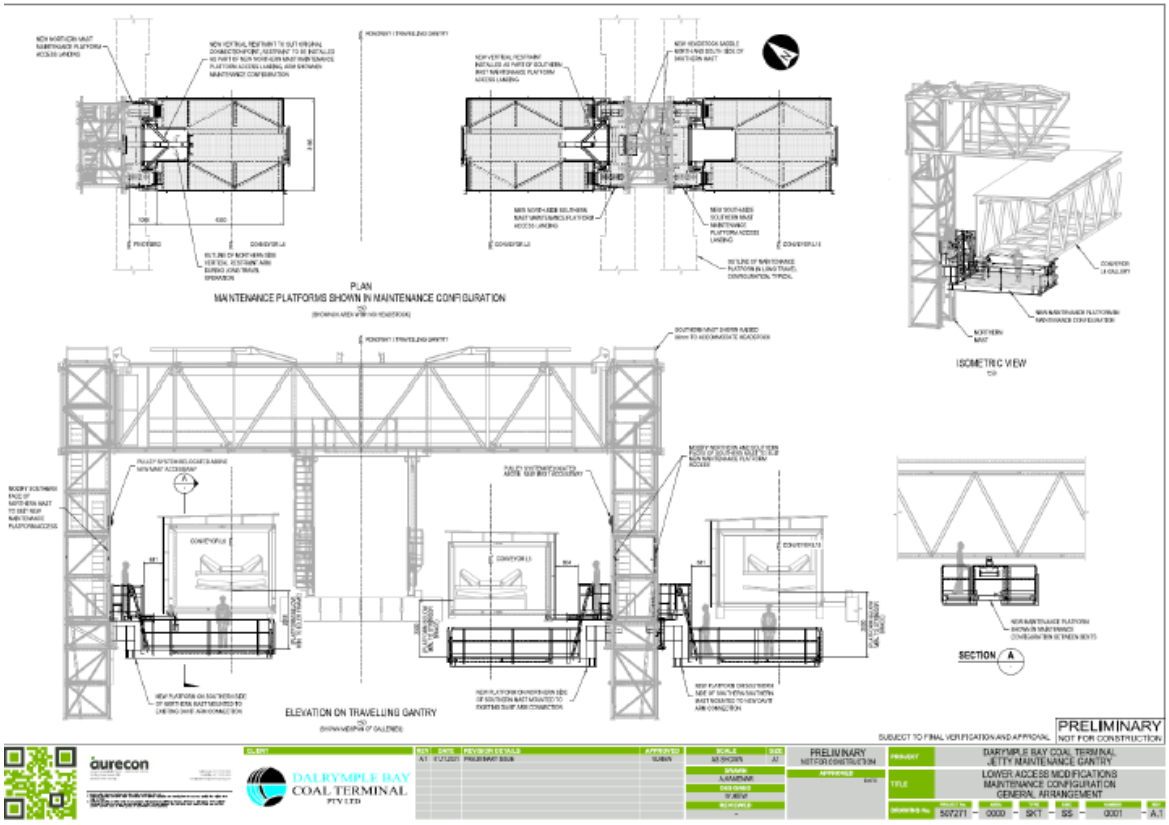
2. Problem

Providing access to the three jetty conveyor galleries (along the 3.8km length) currently requires the installation of temporary access, via scaffolding or utilising rope access systems. Access is required for ongoing maintenance activities such as condition inspection, structural repairs and protective treatment application. Traditional scaffold access is a time consuming and costly exercise, and is also high risk work due to working at heights, working over water and manual handling. Additionally, isolation of the conveyor strings is required during part of the erection and dismantling of the scaffold access platforms.

3. Solution

The offshore pile wrapping project developed a purpose-built access gantry for Jetty 1 which resolved all of the problem statement issues listed above. The pile wrapping gantry still exists onsite and has been considered for augmentation to suit gallery maintenance work at a conceptual level. This concept engineering will be developed further to a feasibility level during this study. Initial stakeholder feedback suggests that more than one gantry will be required to facilitate the planned maintenance tasks on the three conveyors. Additional gantries will allow greater flexibility for access to the three conveyors and also provide opportunity for multiple work fronts. The study will deliver feasibility designs for any additional gantries and detailed estimated costs for all proposed access gantries works (including augmentation of the existing and new).

Figure 1: Concept Design General Arrangement



4. Justification

Identifying a suitable solution for accessing the jetty conveyor galleries has the potential to offset an estimated $16M of scaffolding access cost, per jetty conveyor, for the identified upcoming spot repairs and protective treatment application projects.

Additionally, the project will provide a readily relocatable access solution that will increase the productivity of remedial works on the galleries. The purpose built access solution will also mitigate the safety impacts related to the significant hours of scaffolding execution required with the traditional access method.

5. Scope

The scope covers the augmentation of the existing pile wrapping gantry and identification of other gantry access options. Options analysis, feasibility designs of preferred purpose-built gantries and execution cost estimates will also be studied.

In Scope	• Review of proposed works and access schedule • Identification of access options • Development of feasibility designs of access gantries and costing estimates • Feasibility review • Design risk assessments • Options analysis • Development of scope of work, budget and schedule for preferred options • Development of project brief for future NECAP submission
Out of Scope	• Completion of any repair or wrapping works associated with the justification of this project • Funding or development of any other identified access solutions for areas outside of the jetty conveyors • Execution of any modification or construction

6. Cost Estimate

Cost estimates are based on concept design vendor estimates for material supply, fabrication, installation, recommissioning and handover.

Item	Description	Estimate
1	Study	$300,000
2	Engineering Assistance	$45,000
3	Contingency	$12,000
Project Manager's Budget		**$357,000**
7	Project Management	$44,000
8	Contingency P95	$64,000
Total Project Estimate		**$465,000**

7. Schedule

Key activities for the project are listed below:

User Approval	Feb 2022	Jun 2022
Assess stakeholder's requirement in accordance with 5-year maintenance plan	Mar 2022	Jun 2022
Feasibility, conceptual and design study	Jun 2022	Oct 2022
Implementing stakeholders' feedback	Oct 2022	Oct 2022
Updating Project Brief	Nov 2022	Dec 2022
Completion of all scope	Jan 2023	Jan 2023

8. Asset life assessment

N/A. Study only.

9. NECAP Compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure, relating to improvements in support of good operations and maintenance practice
- It is owner capital, being outside the OMC obligations and Operator's capex cap
- It does not change terminal capacity

10. Project Team

Project Manager	Sam Mazaheri
Project Sponsor	Brett Jurd
DBCT Support	Grahame Turner
DBIM Support	Tim Ffrost

11. Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Sam Mazaheri	Brett Jurd	Tim Ffrost
Position	Project Manager	DBCT P/L EM AM	DBIM NECAP Manager
Date	03 May 2022 | 2:58 PM AEST	04 May 2022 | 7:25 PM AEST	05 May 2022 | 11:35 AM AEST
Signature	DocuSigned by: Sam Mazaheri 4DD8A3F15C44423...	DocuSigned by: Brett Jurd 51FC2B739C8546C...	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with good operations and maintenance practice, or complies with DBIM's obligations under the PSA.

7.2.3 Access Holder approvals

This section provides a summary of Access Holder approvals for NECAP Series S

Access Holder	Mine	All projects approved
[redacted]	[redacted]	30-Jun-22
		30-Jun-22
		30-Jun-22
		23-Jun-22
		21-Jun-22
		21-Jun-22
		20-Jul-22
		08-Jun-22
		08-Jun-22
		03-Jun-22
		07-Jun-22
		16-Jun-22
		20-Jun-22
		08-Jun-22

7.3 Project documentation

7.3.1 Documentation for NS01 Arc Flash Mitigation – Phase 2

7.3.1.1 Overview of Arc Flash Mitigation Program

Arc Flash Mitigation Program Overview
Supplement to NS01 Arc Flash Mitigation Phase 2

1 Summary of Works

The Arc Flash Mitigation project is broken up over phases to limit resource and operational constraints. Phase 1 and phase 2 have been risk profiled and contingency modelled, however Phase 3 is listed below as an estimate after modelling, as crystal ball analysis has yet to be completed. Phase 4 is yet to be completely cost estimated.

PHASE 1 (NR01)

Component	Work Function
SS2A 11SB01 Switchboard Replacement	Procurement & execution
11RMU5 Replacement	Procurement & execution
11RMU6 Replacement	Engineering
Arc Duct Partitioning SS1A (11kV), SS3C (11kV), SS4 (11kV), SS4A (11kV), SS5B (11kV)	Procurement & execution
Substation Arc Detection	Design, procurement & installation
Yard Machine Arc Detection	Design, procurement & installation
Shiploader Arc Detection	Design, procurement & installation
Shiploader 1 & 2 3.3kV Switchgear Replacement	Engineering
PHASE 1 TOTAL	$3,400,000

PHASE 2 (NS01)

Component	Work Function	Alternative
SS9 11SB01 Switchboard Replacement	Procurement & execution	Replacement only suitable option.
11RMU6 Replacement	Procurement & execution	Replacement only suitable option, end of life.
Arc Duct Partitioning SS2B (11kV), SS3 (3.3kV), SS4 (3.3kV), SS5B (3.3kV)	Procurement & execution	Required to be able to perform the below auto racking works. Arc detection was considered for this component however partitioning provides 'isolation' of incident energy as opposed to an 'engineering' control.
HV CB & Contactor Auto Racking L2, L4 & L6 Drive Contactors (3.3kV MCC 07)	Engineering design and costing verification project	Switchboard replacement unviable due to equipment availability requirements and overall cost.
Remote Switching – Yard Machines	Design, procurement & installation	Applied in conjunction with arc fault detection to achieve ALARP risk reduction.
Remote Switching- Substations	Design, procurement & installation	Applied in conjunction with arc fault detection to achieve ALARP risk reduction.
LV MCC Incomer replacement	Design, procurement & installation	Required to allow necessary adjustment of time current curves to reduce incident energy. MCC replacement unviable due to equipment availability requirements and overall cost.
Shiploader 2 & 3.3kV Switchgear Replacement	Procurement	Replacement only suitable option.
PHASE 2 TOTAL	$4,800,000	

PHASE 3 (NT01)

Component	Work Function	Alternative
11RMU1 Replacement	Procurement & execution	Replacement only suitable option, end of life.
11RMU2 Replacement	Procurement & execution	Replacement only suitable option, end of life.
11RMU3 Replacement	Procurement & execution	Replacement only suitable option, end of life.
11RMU4 Replacement	Procurement & execution	Replacement only suitable option, end of life.
Arc Duct Partitioning SS1 (11kV), SS1 (3.3kV)	Procurement & execution	Required to allow maintenance task to be performed given extremely limited outage availability in the forward plan.
Shiploader 2 3.3kV Switchgear Replacement	Execution	Replacement only suitable option.
Shiploader 3 3.3kV Switchgear Replacement	Procurement & installation	Replacement only suitable option.
3.3kV Arc Flash Detection	Trial- not costed to NECAP project	Applied in conjunction with remote racking to achieve ALARP risk reduction and to increase number of failure modes and outcomes being protected.
PHASE 3 TOTAL	$3,700,000- estimate	

PHASE 4

Component	Work Function
SS1 11kV Remote racking	Design, procurement, and installation
SS1 3.3kV Remote racking	Design, procurement, and installation
SS1 3.3kV Arc Flash detection	Design, procurement, and installation
SS1A 11KV Remote racking	Design, procurement, and installation
SS2B 11kV Remote racking	Design, procurement, and installation
SS3 3.3kV Remote racking	Design, procurement, and installation
SS3 3.3kV Arc Flash Detection	Design, procurement, and installation
SS3C 11kV Remote racking	Design, procurement, and installation
SS4 3.3kV Remote racking	Design, procurement, and installation
SS4 3.3kV Arc Flash Detection	Design, procurement, and installation
SS4 11kV Remote racking	Design, procurement, and installation
SS4A 11kV Remote racking	Design, procurement, and installation
SS5B 3.3kV Remote racking	Design, procurement, and installation
SS5B 3.3kV Arc Flash Detection	Design, procurement, and installation
SS5B 11kV Remote racking	Design, procurement, and installation
SL1 3.3kV Remote racking	Design, procurement, and installation
SL1 3.3kV Arc Flash Detection Note: SL2 and SL3 3.3kV switchgear is replaced under Phase 2 and Phase 3 projects. Design includes remote racking and AFD protection	Design, procurement, and installation
PHASE 4 TOTAL	No costing collated at this time

2 Trial Programs

There are two trial programs listed over the arc flash series of work:

- HV CB and Contactor Remote Racking (Phase 2 NS01)
- Arc Fault detection for 3.3kV drive contactors (Phase 3 NT01)

The HV CB and contactor remote racking is considered a trial; whilst the technology and concept is commonly understood and implemented in wider industry, it is not currently deployed in the DBCT terminal. There are no off-the-shelf retrofit kits available for the older style switchgear so this is being developed in coordination with the manufacturer, ABB. Initially, new remote racking contactors will be purchased to replace the existing units. These units will then be returned to ABB to be retrofitted to contain racking motors.

The 3.3kV arc fault detection is considered a trial and as it is an assessment of concept. This work is an extension of the arc fault detection completed in phase 1, however a different make and model of relay is required to be deployed in these specific areas. This integration needs to be fully understood before a further deployment is made across all applicable assets on site.

Both trials will

- Validate engineering detail
- Assess the robustness of design
- Optimise any human machine interface
- Determine execution costs of the future deployments
- Assess the validity of the future justification and/or its comparison to alternatives

The trail program will run over a 3–4-year period and if the latter projects are justified at the completion of the trial, the work will be funded under its own justification, listed thus far as phase 4 but could also be presented as a totally separate package. We have chosen to list it as phase 4 to give clarity to the users about the potential works required.

3 Justification

HV CB and Contactor Remote Racking

Arc fault contained enclosures reduce the risk that a person standing in front of switchgear, with closed and latched doors, will be injured in the event of an arcing current event inside the apparatus. Even with arc fault contained switchgear, should a fault develop, it is possible a person standing nearby could incur injuries such as hearing loss and smoke/gas inhalation.

The process of racking a circuit breaker or contactor in its in-service position requires moving the apparatus to contact live HV busbar. As far as isolating HV contactors (to access conveyors and the like for maintenance), this can be a frequent exercise that exposes an operator to unnecessary risk. Racking in-out requires moving the breaker/contactor, operating shutter mechanisms and interfacing mechanical links which are vulnerable to mechanical failure. This is considered one of the highest likelihood tasks performed that correlates with arc fault events.

The Electrical Arc Flash Hazard Management Guideline [1] lists the effectiveness of risk control for various arc flash techniques and nominates Remote Operation (isolation) as a more effective control than Arc Resistant panels (engineering control).

Remote racking removes human behaviour from playing a significant role in the racking procedure and moves the human to a safer distance from the apparatus during the time when the likelihood of an arc event is increased.

Alternatives considered include either replacing the switchgear with new, connecting 3rd party portable racking motors externally to the switchgear each time an isolation is required, or implementing arc flash detection systems into the switchgear. Replacing the existing switchboards with new would require aligning

[1] refer diagram 13. Electrical Arc Flash Hazard Management Guideline (endorsed by Australia Energy Council AEC).

outages to fit within the availability requirements of the terminal. This is not practical due to all three outloading strings needing to be offline for an extended period. External portable racking motors require manual handling of the heavy portable device and aligning it to fit existing mechanisms. The flexible control umbilical cord is also subject to damage over prolonged use. Implementing arc flash detection is considered an engineering control for the risk however it is not considered ALARP when compared to removing the operator from the area completely.

It should be noted that the new SS2A 11SB01 (NR01) and SS9 11SB01 (NS01) switchboards will feature remote racking.

Arc Fault detection for 3.3kV drive contactors

3.3kV circuit breaker trucks are removed regularly during maintenance activities and fault finding. The arc fault containment properties of the switchgear is ineffective with doors open. The PPE requirement for the energy levels associated with the 3.3kV drives mandate the donning of restrictive coats, gloves and face shield for the maintainer whilst accessing the 325mm wide tier.

Arc flash detection lowers the energy levels to an acceptable level allowing the maintainer to wear standard issue clothing rated at 8cal/cm^2 with rated face shield and ductile gloves to perform work.

Alternatives considered include the installation of Ultra-Fast Earth Switch (UFES) devices mounted to each bus section. The UFES is a sacrificial device that once activated creates a direct short between bus and earth, moving the fault from being an arcing fault to a bolted fault, and results in the tripping of the earth fault element of the associated protection relay. The triggered UFES replacement times ruled out this option.

4 Cost Escalation

Since the development of the Arc Fault mitigation project, further development of the front-end engineering tasks and schedule have resulted in estimates increasing due to:

1. Detailed definition around scope, material costs and opportunities to access critical equipment.
    a. Works packages must be staggered over multiple equipment outage opportunities to align with terminal availability requirements, therefore increasing costs.
2. Resource and equipment shortage creating escalation in costs. Quotes that were sourced during 2019 prior to NR01 submission are now outdated with current market prices, even with previous price escalations factored in prior to what has been experienced since 2020.

7.3.1.2 Project Brief

This section provides the Project Brief for NS01

Project Brief
NS01 – Arc Flash Mitigation – Phase 2

1 Recommendation

Following on from the approved NR01 Arc Flash Mitigation – Phase 1 works, it is recommended to proceed with the Phase 2 component, under the provisions of the NECAP program. These projects aim to reduce the risk caused by arc flash energy levels that personnel are exposed to when performing works around electrical switchgear. The implementation of Arc Flash Mitigation Phase 2 works has an estimated cost of $4,791,000.

The concepts developed for the site arc flash mitigation strategy commenced with risk assessment #7719 "Arc Flash Hazards Around Electrical Installations". The risk assessment nominates how to operate and maintain all electrical switchgear on site safely, with the identified arc flash energy levels. External consultants were engaged to provide recommendations on mitigation and energy reduction [1].

2 Problem

Presently, site electrical workers are exposed to high levels of incident energy during operation and maintenance of electrical switchgear at DBCT. In the event a fault was to occur during the operation of this switchgear the potential outcome could be catastrophic for the personnel involved in the activity. Engineering solutions are required to reduce this incident energy. Phase 2 of this project is focussed on limiting or eliminating risk exposure in multiple key plant areas, each area requiring individual solutions. There are three main installation types where Arc Flash exposure is more prominent, namely older style HV switchgear, new HV switchgear and LV MCCs. These installation types are found in substations, yard machines, and shiploaders.

For background, an electrical arc fault is often referred to as an Arc Flash. Arc faults arise when current flows through the air between phase conductors or between phase conductors and neutral or ground. Put simply, an arc fault could be described as an unexpected, violent, electrical short circuit in the air that produces an arc and associated by-products. When arc faults occur, the resulting energy released may be enough to seriously burn or otherwise injure nearby persons, ignite flammable materials (including clothing), and cause significant damage to plant and equipment.

The potential energy release at the switchgear is called incident energy. Incident energy is a calculated value of the potential release of energy due to an arcing fault between phase conductors, phase/neutral conductors, or phase/earth conductors. The energy density of this incident energy is measured in cal/cm^2. A value of 1.2cal/cm^2 results in second degree burns to bare skin, and 8cal/cm^2 in third degree burns. DBCT P/L aims to reduce all incident energy exposure to below 8cal/cm^2 wherever possible

2.1 LV MCCs

There are three problem statements:

1. LV MCCs are based on the modular style motor control centres, with no arc fault containment certification. The associated LV switchgear is protected by electro-mechanical style protection relays with limited settings.
2. Most substation main incomers have high incident energies excessive of 12cal/cm^2.
3. Testing and fault-finding electrical equipment while powered is deemed by the Qld Electrical Safety Regulations as performing live work. There are occasions when it is necessary to perform live work while fault finding on the MCCs. To ensure that this is practically possible without exposing workers to hazardous situations, suitable arc flash protection techniques are required to be adopted within the bus sections of the MCC.

[1] refer WELCON report GJ2672-RP-01B, LV MCC Arc Flash Energy Reduction & Mitigation, dated 16 March 2020

In summary from above, the substation MCCs are not arc fault contained; switching operator personnel are exposed to high levels of incident energy, with a potential catastrophic outcome if a fault was to occur during a switching operation.

2.2 Shiploaders

There are two problem statements:

1. SL1 has onboard 3.3kV short circuit protection provided by modern ABB switchgear and an ABB REF610 protection relay supplying a 3.3kV/415V transformer. Fault clearance times are significantly reduced on SL1 compared to SL2 and SL3. Protection on SL2 and SL3 provided for the NSMS is via the original 3.3kV switchgear. This includes 150A fuse and HV contactor arrangements, supplying the 3.3kV/415V transformer.

   Table 1 – SL1, SL2, SL3 Incident Energy Levels (cal/cm^2)

Standard	SL1	SL2	SL3
NSMC	13.7	70.6	59.9

2. Additionally, there is a site wide strategy to replace all non-arc fault contained HV switchgear with appropriately rated switchgear. To perform isolations on boom conveyors for SL2 and SL3, isolators must wear the appropriate PPE to safely undertake the task. A larger floor space is required for both switchrooms on SL2 and SL3 to replace the existing switchgear with rated equipment identical to the equipment installed on SL1.

2.3 HV Switchgear (Old)

The 11kV reticulation system on site uses metal enclosed switchgear sets called Ring Main Units (RMUs) that are used at the load connection points of the ring type distribution network. These existing RMUs have no arc flash containment ratings, notwithstanding the issue of the units being discontinued (parts no longer available).

The 11kV HV switchgear in SS9 is metal enclosed switchgear with an exposed spout for the connection between the bus bar and the circuit breaker. There is no arc flash containment on this switchgear. The spouts are facing down which offers the operator protection while operating (arc blast is directed down instead of directly into the operator). Arc gases generated from an arcing event on the older style switchgear are not currently vented externally to the switchroom.

2.4 HV Switchgear (modern)

The modern ABB metal clad HV switchgear installed on site are arc fault contained. A common arc duct plenum is installed across the top of each suite of ABB panels, which is intended to expel explosive gases and vapours externally to the switchroom.

The common duct presents problems when completing internal inspections on HV switchgear. As an example, the entire HV board requires isolation even though the left-hand side bus may be electrically isolated from the right-hand side bus due to the common arc duct shared between both sections.

2.5 HV Switchgear (contactor & CB racking)

Presently the method of isolating 3.3kV conveyor drives is achieved by manually racking their associated 3.3kV contactors out of service. This practice is also undertaken by non-electrical personnel who have been provided the appropriate training. Returning a failed contactor back into service could have serious consequences for both personnel and equipment. Being able to remotely rack the equipment would greatly reduce the risk of injury to personnel during these routine tasks.

3 Solution

Phase 2 – This project

- Replacement of SS9 HV switchgear for modern ABB ZS1 arc fault contained gear.
- Replacement of RMU6 and complete design for the installation of RMU1, 2, 3, and 4.

- Installation of Arc Duct partitioning on SS3, SS4, and SS5B 3.3kV switchgear and SS2B 11kV switchgear.
- Remote operation and racking of 3.3kV contactors associated with L6, L4 and L2 conveyors to be completed as a trial prior to future works.
- Procurement of SL2 3.3kV ABB Unigear ZS1 switchgear. Installation of equipment in Phase 3.
- Replacement of older style LV ACBs with modern quicker operating ACBs including protection relay upgrade.
- Panel view installation in 6 substations and 12 yard machines to provide:
    - Arc flash detector status indication
    - Remote close facilities on all LV ACBs
    - Future remote racking for all LV ACBs

Phase 3 – Future

- Installation of RMU 1, 2, 3, 4.
- Installation of Arc Duct partitioning on remaining 3.3kV and 11kV switchboards in SS1.
- Procurement of SL3 3.3kV ABB Unigear ZS1 switchgear and installation of the switchgear on Shiploaders 2 and 3.
- Arc Flash Detection in 3.3kV switchgear for protection of persons while replacing contactors.
- Remote racking of various 3.3kV motor contactors and 3.3kV & 11kV circuit breakers.

Phase 4 – Future

- Remote operation and racking of the remainder of 3.3kV contactors & circuit breakers and 11kV circuit breakers across site.

3.1 LV MCCs

There are two targeted approaches of the same arc flash mitigation technique applied to LV MCCs.

Phase 2 – This Project

- Replacement of older style ACB's, reducing incident energy with faster operating times and improved protection relays for detecting fault currents. The new breakers will be in-line with current site standard with remote close/open facilities.
- Removing the operator from in front of the ACB with the installation of remote HMI.

3.2 Shiploaders

Replacement of SL2 and SL3 3.3kV switchgear with the modern ABB metal clad arc fault contained switchgear, including fast acting protection relays.

Phase 2 – This Project

- Procurement of the SL2 3.3kV ABB ZS1 Unigear and associated structural components ready for installation.

Phase 3 – Future

- Installation of SL2 3.3kV switchgear
- Procurement and installation of SL3 3.3kV switchgear.

3.3 HV Switchgear (Old)

11kV RMU

Complete project - Replacement of the 5 x RMU's on site with arc fault contained, metal clad enclosures.

Phase 2 – This Project

- Replacement of RMU6
- Engineering completed for the replacement of RMU1, 2, 3 and 4.

Phase 3 - Future

- Replacement of the remaining 4 RMU units.

11kV Switchgear

Phase 2 – This Project

- Replacement of SS9 11kV Hawker Siddley metal enclosed switchgear with the modern ABB *metal clad* arc fault contained switchgear, including fast acting protection relays.

3.4 HV Switchgear (Modern)

Complete Project - Installation of arc duct partitions between LHS and RHS arc ducts, inclusive of separate external-to-substation venting. Equipment outage requirements for this modification mandates arc duct works to be broken up over different stages to minimise operational delays.

Phase 2 – This Project

- Procurement and installation of arc duct partitions in SS3 3.3kV, SS4 3.3kV, SS5B 3.3kV and SS2B 11kV switchboards.

Phase 3 – Future

- Procurement and installation of arc duct partitions in SS1 3.3kV and SS1 11kV switchboards.

3.5 HV Switchgear (contactor & CB racking)

Complete Project - Engineering and installation to allow remote racking of 3.3kV conveyor motor contactors currently installed in ABB Unigear ZVC switchboards. This includes replacing the existing 3.3kV contactor trucks with units equipped with motor operators, modification of the control wiring to incorporate additional positional switches, and control system interface with the local switchroom HMI panel. Prior to this work it will be necessary to complete the arc duct partition installation works (other works in this phase), thus allowing partial shutdown of the section concerned without affecting operations.

Phase 2 – This Project

- Engineering and installation for remote racking of L6, L4 and L2 3.3kV conveyor contactors
- Identification and engineering for remaining site locations and planning for future phases

Phase 3 – Future

- To be determined from exploratory engineering works in Phase 2

Phase 4 – Future

- To be determined from exploratory engineering works in Phase 2

4 Justification

The objective of the Arc Flash mitigation strategy is to:

- Provide effective hazard management with consideration of operational practices on site.
- Remove electrical persons from donning arduous PPE (Bomb Suits). Arc flash hazard risks are managed by applying the hierarchy of risk control. PPE is the lowest order of priority.
- Standardise HV equipment operated on site, where all HV equipment is arc fault contained.
- Allow for the replacement of electrical equipment that has reached its end of service life.
- Remove personnel from the line of fire.

4.1 LV MCCs

This project provides engineering tools for maintenance teams to conduct isolations and perform maintenance activities on switchboards. The current PPE requirement contributes to restricted mobility and frustration when carrying out work, notwithstanding the time taken to don the PPE equipment.

4.2 Shiploaders

The target outcome is to achieve a significant reduction in risk to personnel and equipment by providing effective arc fault contained 3.3kV switchgear, inclusive of incident energy level reduction across the LV switchboard.

4.3 HV Switchgear (Old)

Ensure all HV equipment operated on site is arc fault contained with fast operating times of modern protection relays.

4.4 HV Switchgear (Modern)

Arc duct partitioning provides opportunities for HV maintenance and inspection activities that are otherwise difficult to complete due to the availability of terminal assets.

As the HV equipment ages, internal bus inspections become more important regarding early detection of possible disruptive failure modes of the electrical equipment.

4.5 HV Switchgear (contactor & CB racking)

Remote racking of HV contactors and circuit breakers will remove personnel from the direct line of fire should a fault develop in the switchgear at the same time they are completing racking operations.

5 Scope

Element of scope	How this scope supports the resolution of the problem
Scope of works	Fully develop the Scope of Works supported by design drawings for each of the projects
OEM Engagement	Engagement of OEMs for respective equipment using industry best practice to derive the method/equipment most appropriate for site implementation
Procurement	Procurement of 11kV switchgear for SS9, RMU6, 3.3kV switchgear for SL2 and contactors for L6, L4 and L2. Lead times for the some of the ABB equipment requires early planning and coordinating.
Contractors	Engagement of various contractors for the selected work- engagement of electrical, plumbing, fabrication, and civil trades to complete works.
Installation works	Work being conducted from on-shore to off-shore. Methodology will be different for each of the listed works. As work progresses, familiarisation packages will be released, and gradual awareness and support of the workforce is paramount.
Power Study	Updated power study performed on electrical plant to confirm reduction of incident energies across electrical apparatus
Redundant stock inventory	Identify stock obsolescence and review of critical spares for new equipment
Out of scope	Arc Flash mitigation phase three works: a. Procurement and installation of RMU1, RMU2, RMU3 and RMU4 switchgear b. Installation of Arc Duct partitioning on remaining 3.3kV and 11kV switchboards in SS1 c. Procurement of SL3 3.3kV ABB Unigear ZS1 switchgear and the installation of the switchgear on Shiploaders 2 and 3 d. Arc Flash Detection in 3.3kV switchgear for protection of persons while replacing contactors e. Execution works of switchgear for SL2 Arc Flash mitigation phase four works: a. Remote operation and racking of the remainder of 3.3kV contactors and circuit breakers across site

6 Cost Estimate

Item	Description	Estimate
1	Design work	$215,000
2	Material supply & fabrication	$1,425,000
3	Site installation	$1,647,000
4	Engineering Assistance	$493,000
5	Contingency	$304,000
Project Manager's Budget		**$4,084,000**
6	Project Management	$452,000
7	Contingency P95	$255,000
Total Project Estimate		**$4,791,000**

7 Schedule

Key activities for the project are listed below:

Activity	Start	Finish
User approval	Jan 2022	Jul 2022
Tender process and contract award	Jul 2022	Sep 2022
Material supply	Sep 2022	Jul 2023
Onsite installation	Jan 2023	Dec 2023
Handover into operation	Aug 2023	Dec 2023

8 Asset life assessment

The recommended asset life is 20 years, consistent with asset life typically assigned to electrical equipment. ABB switchgear has a recommended life expectancy of 20-30 years.

Equipment and methodologies adopted for this arc flash mitigation strategy are of latest industry standard.

9 NECAP Compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure, relating primarily to the upgrade to plant for safety reasons, but also to improve the whole of life cost of the asset
- It is capital expenditure that relates to improvements in support of good operations and maintenance practice.
- It is owner capital, being outside the OMC obligations and Operator's capex cap
- It does not change terminal capacity

10 Project Team

Role	Name
Project Manager	Bill Mackay / Selwyn Finn
Project Sponsor	Brett Jurd
DBCT Support	Dean Anderson
DBI Support	Wayne Russell

11 Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Bill Mackay/Selwyn Finn	Brett Jurd	Tim Ffrost
Position	Project Managers	DBCT P/L EM AM	DBIM NECAP Manager
Date	04 May 2022 | 9:33 AM AEST	04 May 2022 | 7:26 PM AEST	05 May 2022 | 11:36 AM AEST
Signature	DocuSigned by: DCD117F66388420...	DocuSigned by: Brett Jurd 51EC2B739C8546C...	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with good operations and maintenance practice, or complies with DBIM's obligations under the PSA.

7.3.1.3 Project Execution Plan

This section provides the Operator's PEP for NS01

Project Execution Plan
NS01 Arc Flash Mitigation – Phase 2

DOCUMENT HISTORY

The table below provides an indication of the document review and revision history:

REVISION	ISSUED	MODIFIED BY	COMMENTS/REVIEWERS
0	03/06/2022	C Lamperd	Issued for Approval
1	19/07/2022	C Lamperd	Issued for Signature

APPROVALS

The table below lists the approvers for this document:

NAME	TITLE	SIGNATURE	DATE
Bill Mackay	Project Manager	DocuSigned by: DCD117F66388420...	22 July 2022 | 11:20 AM AEST
Selwyn Finn	Project Manager	DocuSigned by: 8EC06F4ED4A44E8...	26 July 2022 | 5:40 AM AEST
Clint Lamperd	DBCT Site Project Planning Engineer	DocuSigned by: Clint Lamperd D10146D59D9748E...	26 July 2022 | 8:45 AM AEST
Brian Batley	DBCT PL Manager Engineering & Reliability	DocuSigned by: Brian Batley D6B09CCC84094CC...	28 July 2022 | 12:47 PM AEST
Tim Ffrost	DBIM Site Manager	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...	04 August 2022 | 4:37 PM AEST
Peter Wotherspoon	DBIM Project Director	DocuSigned by: CF277DF4CAE6487...	26 September 2022 | 3:17 PM AEST

TABLE OF CONTENTS

1 PURPOSE OF THE PEP

This document outlines the intended delivery method of the phase 2 Arc Flash Mitigation project. The project summary, scope, budget etc. can be found in the associated project brief. *Refer – NS01 Arc Flash Mitigation- Phase 1 Project Brief, attachment A.*

Project governance will be documented and controlled through the DBCT P/L project management framework along with the associated PR0031 Change of Plant and Equipment Procedure and associated FM0203 Approval Process Forms. Scope, cost, schedule, quality, and risk management will be controlled as per the DBCT P/L project management framework and associated site management plans including:

- MP0001 Health and Safety Management Plan
- MP0002 Quality Management Plan
- MP0003 Environmental Management Plan
- MP0014 Sustainability Management Plan

Contractor management will be controlled as per MP0007 Contractor Management Management Plan.

2 CONTRACTING STRATEGY

	STAGE	BUDGET	STRATEGY	JUSTIFICATION
OFF SITE WORKS	Replacement of SS9 HV switchboard with modern ABB ZS1. Replacement of RMU1, 2, 3 and 4 with ABB equivalent.	$215,000	Worley engaged on sole source basis under consultancy agreement (Schedule of Rates) to undertake design works	Worley sole sourced for HV switchgear works, based on site HV reticulation knowledge and history of delivery. Work completed on schedule of rates basis under existing consultancy agreement. Cost will be monitored against a detailed budget estimate completed by designer prior to commencement of work
	Remote operation and racking of 3.3kV contactors- design on L2, L4 and L6		ABB engaged on sole source basis to complete design, supply and installation on alump sum price.	ABB are sole sourced since they are the OEM of the switchgear, and their proprietary design.
	Replacement of older style LV ACBs with modern quicker operating ACBs design Remote panel view installation design		Cell Consultancy engaged on sole source basis under consultancy agreement (Schedule of Rates) to undertake design works	Cell Consultancy sole sourced due to work completed during phase 1. Work completed on schedule of rates basis however monitored against a detail budget estimate completed by designer prior to commencement of work

	Procurement	$1,425,000	ABB switchgear sole sourced for both HV switchboards and RMU's on a lump sum supply purchase order Replacement ACB's Tempower 2 and panel view selection (lump sum)	Switchgear selected consistent with existing site equipment preference, work familiarity and spares. Site standard components

	STAGE	BUDGET	STRATEGY	JUSTIFICATION
ON SITE WORKS	Replacement of SS9 HV Switchgear for modern ABB ZS1, consistent with the remainder of site	$1,647,000	Competitive tender, completed on a lump sum basis. Major components free issed as Company Supply	The scope of the works is well defined with minimal latent conditions and site interaction, competitive tender provides the best commercial outcome and project control.
	Replacement of RMU6		Competitive tender, completed on a lump sum basis. Major components free issed as Company Supply	The scope of the works is well defined with minimal latent conditions and site interaction, competitive tender provides the best commercial outcome and project control.
	Arc Duct Partitioning SS3, SS4, SS5B and SS2B HV switchgear		A mixture of on-site labour and contractors engaged on a schedule of rates basis to install.	Schedule of rates for existing service providers including ancillary tasks such as scaffold erection, wall penetrations and ducting installation. Tendering the package would be difficult to manage in alignment with shutdown outages with the varied scope.

	Remote operation and racking of 3.3kV contactors (L6A, L2 & L4)		ABB engaged on sole source basis to complete design, supply and installation on lump sum purchase order.	ABB are sole sourced since they are the OEM of the switchgear, and their proprietary design.
	Replacement of older style LV ACBs		Existing DBCT P/L service agreement contractor engaged on a schedule of rates basis	Using existing DBCT P/L service agreements allow a cost-efficient approach to performing short segments of work over an extended period to complete and commission the works within existing outage timelines.
	Project Management	$493,000	PM services supplied by the DBCT Projects Team.	15% PM costs as per existing agreement with DBIM. DBCT P/L has resources available with relevant experience for these works. Additional expertise will be outsourced on an as required basis.
	Contingency	$559,000	Approximately 15% contingency allowed.	
	Budget	$4,339,000		

7.3.1.4 Handover Certificates

This section provides the Handover Certificates for NS01

DALRYMPLE BAY
COAL TERMINAL
PTY LTD

MARTIN ARMSTRONG DRIVE
MS 283, MACKAY
QLD 4740
AUSTRALIA

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FAX +61 7 4956 3353
ACN 010 268 167
ABN 12 010 268 167

14 April 2023

ATTN: Brett Jurd
Executive Manager, Asset Management
Dalrymple Bay Coal Terminal Pty Ltd
MS 283 Martin Armstrong Drive
HAY POINT QLD 4740

Dear Brett

RE: NECAP PROJECT ASSET HANDOVER
PROJECT NUMBER NS01
ARC FLASH MITIGATION – (ARC DUCT PARTITION INSTALLATION)
HANDOVER CERTIFICATE

Arc Duct Partitions, Under NECAP Project NS01, have been installed to the following locations:

- SS3 3.3SBD01, placed into operational service on 22/03/23
- SS4 3.3SBD01, placed into operational service on 04/10/22
- SS5B 3.3SBD01, placed into operational service on 04/10/22

Pursuant to Clause 27.5 of the Operation and Maintenance Contract, this Handover Certificate certifies that the relevant works are safe to operate and/or maintain. The relevant works formed part of the Terminal on 22/03/22.

DBCT P/L internally verified completion of the partial works, as mentioned above, to Practical Completion.

Refer to change management form number 3969 for information related to the project.

Yours faithfully

Bill Mackay
Project Engineer
DBCT P/L

DALRYMPLE BAY COAL TERMINAL PTY LTD

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02/12/24

Brett Jurd
Executive Manager, Asset Management
Dalrymple Bay Coal Terminal Pty Ltd
Martin Armstrong Drive
HAY POINT, QLD 4740

RE: NECAP PROJECT ASSET HANDOVER
PROJECT NUMBER NS01
ARC FLASH MITIGATION – (INCOMER REPLACEMENT)
HANDOVER CERTIFICATE

Dear Brett,

The LV MCC incomer replacement, under NECAP Project NS01, have 2 of the 6 identified incomers placed into operational service on the 24th of October 2024.

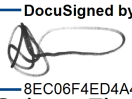
Pursuant to Clause 27.5 of the Operation and Maintenance Contract, this Handover Certificate certifies that the relevant works are safe to operate and/or maintain. The relevant works formed part of the Terminal on 24th of October 2024.

DBCT P/L internally verified completion of the partial works, as mentioned above, to Practical Completion.

- The replacement of the MCC02 incomer accounts for 33% of the LV MCC subsection of the overall project.

Refer to change management form 02030 number 3805 for information related to the project.

Yours faithfully,

DocuSigned by:

8EC06F4ED4A44E8...

Selwyn Finn
Project Engineer
DBCT P/L

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28 November 2024

ATTN: Brett Jurd
Executive Manager, Asset Management
Dalrymple Bay Coal Terminal Pty Ltd
MS 283 Martin Armstrong Drive
HAY POINT QLD 4740

Dear Brett

RE: NECAP PROJECT ASSET HANDOVER
PROJECT NUMBER NS01
ARC FLASH MITIGATION – (3.3kV Contactor Remote Racking Trial)
HANDOVER CERTIFICATE

The Substation 4 3.3kV Contactor Remote Racking works, under NECAP Project NS01, was placed into operational service on 21/11/24. This work involved the following equipment:

- Conveyor L6A Drive 1 MCC07 Panel 18.
- Conveyor L4 Drive 1 MCC07 Panel 19.
- Conveyor L4 Drive 2 MCC07 Panel 20.
- Conveyor L2 Drive 1 MCC07 Panel 21.
- Conveyor L2 Drive 2 MCC07 Panel 22.

Pursuant to Clause 27.5 of the Operation and Maintenance Contract, this Handover Certificate certifies that the relevant works are safe to operate and/or maintain. The relevant works formed part of the Terminal on 22/11/24.

DBCT P/L internally verified completion of the partial works to Practical Completion.

Refer to change management form number 4360 for information related to the project.

Yours faithfully

Bill Mackay
Project Engineer
DBCT P/L

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28 November 2024

ATTN: Brett Jurd
Executive Manager, Asset Management
Dalrymple Bay Coal Terminal Pty Ltd
MS 283 Martin Armstrong Drive
HAY POINT QLD 4740

Dear Brett

RE: NECAP PROJECT ASSET HANDOVER
PROJECT NUMBER NS01
ARC FLASH MITIGATION – (11RMU6 REPLACEMENT)
HANDOVER CERTIFICATE

The Substation 6 11kV RMU6 replacement, under NECAP Project NS01, was placed into operational service on 14/06/24.

Pursuant to Clause 27.5 of the Operation and Maintenance Contract, this Handover Certificate certifies that the relevant works are safe to operate and/or maintain. The relevant works formed part of the Terminal on 14/06/23.

DBCT P/L internally verified completion of the partial works to Practical Completion.

Refer to change management form number 4333 for information related to the project.

Yours faithfully

Bill Mackay
Project Engineer
DBCT P/L

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28 February 2024

ATTN: Brett Jurd
Executive Manager, Asset Management
Dalrymple Bay Coal Terminal Pty Ltd
MS 283 Martin Armstrong Drive
HAY POINT QLD 4740

Dear Brett

RE: NECAP PROJECT ASSET HANDOVER
PROJECT NUMBER NS01
ARC FLASH MITIGATION – (ARC DUCT PARTITION INSTALLATION)
HANDOVER CERTIFICATE

Arc Duct Partitions, Under NECAP Project NS01, have been installed to the following locations:

- SS2B 11SBD01, placed into operational service on 10/05/23

Pursuant to Clause 27.5 of the Operation and Maintenance Contract, this Handover Certificate certifies that the relevant works are safe to operate and/or maintain. The relevant works formed part of the Terminal on 10/05/23.

DBCT P/L internally verified completion of the partial works, as mentioned above, to Practical Completion.

Refer to change management form number 3969 for information related to the project.

Yours faithfully

Bill Mackay
Project Engineer
DBCT P/L

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28 February 2024

ATTN: Brett Jurd
Executive Manager, Asset Management
Dalrymple Bay Coal Terminal Pty Ltd
MS 283 Martin Armstrong Drive
HAY POINT QLD 4740

Dear Brett

RE: NECAP PROJECT ASSET HANDOVER
PROJECT NUMBER NS01
ARC FLASH MITIGATION – (SS9 11SBD01 REPLACEMENT)
HANDOVER CERTIFICATE

The Substation 9 11kV Switchboard replacement, under NECAP Project NS01, was placed into operational service on 03/11/23.

Pursuant to Clause 27.5 of the Operation and Maintenance Contract, this Handover Certificate certifies that the relevant works are safe to operate and/or maintain. The relevant works formed part of the Terminal on 03/11/23.

DBCT P/L internally verified completion of the partial works to Practical Completion.

Refer to change management form number 4299 for information related to the project.

Yours faithfully

Bill Mackay
Project Engineer
DBCT P/L

7.3.2 Documentation for NS06 Site Roads Upgrade program

7.3.2.1 Project Brief

This section provides the Project Brief for NS06

Project Brief
NS06 – Site Roads Upgrade Program

1. Recommendation

It is recommended to proceed with the Site Roads Upgrade project, for an estimated cost of $3,850,000 under the provisions of the NECAP Series S program.

The project delivers important capital improvements to three major site roadways to extend their service life and reduce the potential for premature pavement failure and subsequent replacement of the underlying road pavement.

2. Problem

The following three major site roadways are in extremely poor condition and have been assessed as the highest priority for urgent capital improvement.

- L1 road - southern lane
- Bund 4 centre road
- S4 road

The current condition of each roadway, and the problems associated, are discussed below in more detail.

2.1 L1 road – southern lane

The existing L1 roadway is a major roadway running the length of the northern end of the stockyard. It is a critical terminal roadway with significant daily traffic loads, and is the only road that provides vehicle access into the northern end of every stockyard row.

The northern lane (eastern traffic flow) is asphalt sealed but the southern lane (western traffic flow) has never been sealed because of the occasional need for the DBCT dozer to move between stockyard rows.

When two vehicles are required to pass each other, the western bound vehicle is forced off the single lane sealed running surface and onto the unsealed portion of the road which is prone to ruts, deep potholes and localised pavement failures. Drivers of site vehicles are often unaware of the potential pavement failure hazards, which can cause tyre and suspension damage to site vehicles and sudden and significant jarring to the occupants. Even when the hazards are detectable, the vehicles must be driven erratically to avoid the localised failures. Both circumstances are unacceptable from a safety perspective.

Despite frequent minor repairs, the pavement failures are continuous in nature due to the lack of a competent sealed running surface and are further exacerbated during wet weather. Localised pavement repairs only provide a short-term benefit, are quite expensive and are very reactive in nature, and so do not effectively fix the existing continuous cycle of temporarily correcting potentially unsafe conditions with no long-term solution.

2.2 Bund 4 centre road

The existing Bund 4 centre roadway is an original terminal roadway built in Stage 1 and is now approaching 40 years old. It only has a single lane bitumen seal down the centre of the 5.7m wide and 1300m long bund running surface. The existing unsealed edges either side of the old bitumen seal are in very poor condition. There are large portions of the unsealed road shoulders which need to be fully rebuilt to correct the existing ruts, potholes and depressions in the surface to facilitate effective long term drainage and correct the surface deficiencies.

The current road surface conditions also create an additional injury risk to maintenance personnel through the possibility of ankle injuries when boarding and dismounting the yard machines for routine servicing and maintenance activities, much of which occurs outside of daylight hours.

Significant historical repairs have been further complicated by the fact that standard size road construction equipment such as graders, rollers, trucks and watercarts are unable to access the narrow bund roadway during normal daily operations due to the limited height clearance constraints under the yard machines.

A focussed and coordinated project approach is needed to facilitate the necessary capital improvements, which must coincide with machine shutdown periods and agreed daily operational restrictions.

2.3 S4 Road

The existing S4 road is a two-lane asphalt sealed major roadway running the length of the southern end of the stockyard. It is a critical terminal roadway with significant daily traffic loads, and is the only road that provides vehicle access to the elevated inloading conveyors S3, S4 & S13 and into the southern end of every stockyard row. It is also subject to significant heavy vehicle loading, and forms part of the site road network for all traffic arriving at the terminal entrance destined for every other part of the terminal including offshore.

The S4 roadway pavement underneath overall is in relatively good condition, however the existing asphalt seal running surface is now more than 20 years old and is rapidly approaching end of life. The existing surface exhibits extensive crocodile cracking over the majority of the surface area with both transverse and longitudinal cracking prevalent and now requires significant maintenance patching.

If the running surface is not replaced soon, the existing sealed surface will deteriorate rapidly through ongoing use and will require an escalating level of maintenance and operational disruption to remove and repair patches and provide periodical sealing of cracked areas.

Such maintenance activities are highly reactive and expensive, and do not materially extend the service life of the roadway overall because if the underlying pavement started to fail, then a more significant and expensive road pavement rebuild would inevitably be required in the near future.

3. Solution

To ensure that major terminal roadways provide safe and efficient service at the lowest whole of life cost, the following targeted solutions for each roadway are proposed.

3.1 L1 Road

The soil forming the unsealed southern lane of the L1 roadway will be fully removed to the appropriate depth and replaced with competent pavement material and an asphalt seal to be consistent with the standard of the northern lane. The asphalt type and pavement depth will be selected to cope with the occasional movement of the DBCT dozer between rows and will be matched in level with the existing road surface and existing concrete dozer slabs.

This solution will create significant benefit to all terminal traffic users, will reduce the potential for tyre and suspension damage to site vehicles and reduce the likelihood of significant jarring to the occupants. It will also allow proper two-way lane delineation to be created for the finished running surface, and eliminate the risks associated with the sharing of a single sealed laneway for bi-directional traffic in a busy operating terminal.

3.2 Bund 4 Road

Suitable operational opportunities will be created to allow the existing Bund 4 pavement to be fully reworked, compacted and trimmed, and provide a two-coat bitumen seal over the full extent of the road width between R3 & R4 conveyors. The road will need to be rebuilt in sections when the opportunity is available (due to yard machine height constraints).

The finished road surface will be slightly raised back to the original design heights and profiled with a centre crown to ensure effective cross drainage is created for stormwater to pass under the yard conveyors and off the bund surface.

This solution will create significant benefit to all Bund 4 traffic users, will reduce the potential for ankle injuries to site personnel, provide an effective long term drainage solution, and provide a cost-effective pavement seal to maximise and significantly extend the service life of the existing roadway.

3.1 S4 Road

A technical assessment will be undertaken to confirm if the existing asphalt seal forming the running surface of the S4 roadway should be retained or removed, prior to the placement of a new asphalt seal running surface over the existing pavement.

Asphalt resealing the surface of the S4 roadway ensures that the underlying pavement does not deteriorate any further and can be retained for many years to come in a serviceable condition, thus avoiding a more significant and expensive road pavement rebuild in the future.

4. Justification

The nominated roadways require the specified capital improvements to extend their service life and reduce the potential for premature pavement failure and subsequent replacement of the underlying road pavement. Undertaking this scope in a timely manner ensures that these important terminal roadways provide safe and efficient service at the lowest whole of life cost.

5. Scope

In Scope	• Design, Project Management and Supervision • Survey for matching new road surfaces to existing structures. • Pavement and sealing works for the roadways nominated • Line marking, signage and any other minor miscellaneous road furniture needed to support the above scope.
Out of Scope	• Removal of coal or drainage maintenance • Service relocations • Replacement of existing guardrail

6. Cost Estimate

Item	Description	Estimate
1	Design work	$210,000
2	Site installation	$2,403,000
3	Engineering assistance	$392,000
4	Project Manager's Contingency	$265,000
Project Manager's Budget		**$3,270,000**
5	Project Management	$364,000
6	Series Contingency	$216,000
Total Project Estimate		**$3,850,000**

7. Schedule

Key activities for the project are listed below:

User approval	Jun 22	Jun 22
Survey, design & tender preparation	Mar 22	Aug 22
Tender process and contract award	Sep 22	Jan 23
Onsite installation	Feb 23	Dec 23
Handover into operation	Jan 24	Jan 24
Completion of all scope	Feb 24	Mar 24

8. NECAP Compliance

This project complies with the criteria for NECAP as defined in the procedure for Project Nomination which is consistent with the DBCT Access Undertaking. In particular:

- It is capital expenditure, relating to improvements in support of Good Operations and Maintenance Practice
- It is owner capital, being outside the OMC obligations and Operator's capex cap
- It does not change terminal capacity

9. Project Team

Project Manager	Jake Thompson
Project Sponsor	Brett Jurd
DBCT Support	Yuvaraj Devarajan
DBIM Support	Andrew Mecoles

10. Approvals

Status →	Initiated	Recommended [1]	Endorsed [2]
Name	Jake Thompson	Brett Jurd	Tim Ffrost
Position	Project Manager	DBCT P/L EM AM	DBIM NECAP Manager
Date	03 May 2022 | 3:43 PM AEST	04 May 2022 | 7:28 PM AEST	05 May 2022 | 11:40 AM AEST
Signature	DocuSigned by: Jake Thompson 5B6A39E66BF74E4...	DocuSigned by: Brett Jurd 51FC2B739C8546C...	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...

1. This project complies with the Project Nomination process and is recommended for implementation.
2. This project complies with the NECAP requirements and is consistent with Good Operations and Maintenance Practice, or complies with DBIM's obligations under the PSA.

7.3.2.2 Project Execution Plan

This section provides the Operator's PEP for NS06

Project Execution Plan
NS06 SITE ROADS UPGRADE PROGRAM

DOCUMENT HISTORY

The table below provides an indication of the document review and revision history:

REVISION	ISSUED	MODIFIED BY	COMMENTS/REVIEWERS
0	03/06/2022	C Lamperd	Issued for Approval
1	19/07/2022	C Lamperd	Issued for Signature

APPROVALS

The table below lists the approvers for this document:

NAME	TITLE	SIGNATURE	DATE
Jake Thompson	Project Manager	DocuSigned by: Jake Thompson 5B6A39E66BF74E4...	25 July 2022 | 6:59 AM AEST
Clint Lamperd	DBCT Site Planning Engineer	DocuSigned by: Clint Lamperd D10146D59D9748E...	25 July 2022 | 8:50 AM AEST
Brian Batley	DBCT PL Manager Engineering & Reliability	DocuSigned by: Brian Batley D6B09CCC84094CC...	28 July 2022 | 12:51 PM AEST
Tim Ffrost	DBIM Site Manager	DocuSigned by: Tim Ffrost 9ED9CFC9F00F43E...	04 August 2022 | 4:38 PM AEST
Peter Wotherspoon	DBIM Project Director	DocuSigned by: CF277DF4CAE6487...	26 September 2022 | 3:16 PM AEST

TABLE OF CONTENTS

1 PURPOSE OF THE PEP

This document outlines the intended delivery method of the Site Roads Program project. The project summary, scope, budget etc. can be found in the associated project brief, shown in attachment A.

Project governance will be documented and controlled through the DBCT P/L project management framework along with the associated PR0031 Change of Plant and Equipment Procedure and associated FM0203 Approval Process Forms. Scope, cost, schedule, quality and risk management will be controlled as per the DBCT P/L project management framework and associated site management plans including:

- MP0001 Health and Safety Management Plan
- MP0002 Quality Management Plan
- MP0003 Environmental Management Plan
- MP0014 Sustainability Management Plan

Contractor management will be controlled as per MP0007 Contractor Management Management Plan.

2 CONTRACTING STRATEGY

	STAGE	BUDGET	STRATEGY	JUSTIFICATION
OFF SITE WORKS	Design & Drafting Works	$210,000	Competitive tender on a schedule of rates basis.	Work completed on schedule of rates basis under existing consultancy agreement. Cost will be monitored against a detailed budget estimate completed by designer prior to commencement of work

	STAGE	BUDGET	STRATEGY	JUSTIFICATION
ON SITE WORKS	Site Contract for construction of upgraded site roads as per design documentation	$2,403,000	Excavation and pavement to be completed under fixed unit rates with provisional quantities confirmed during the works. All other scope including line marking, signage, and site support to be lump sum. The package will be let to market for competitive tender.	Due to the nature of the scope and having a completed IFC design, the major cost risks are weather and unknown ground conditions. Thus, having the earthworks on a unit rate allows for that risk. Other scope is defined and fixed, so a lump sum price is appropriate to minimise risk to DBCT/DBIM. Open tender to the local market will ensure the best value proposition is selected.
	Engineering Assistance	$392,000	PM services supplied by the DBCT Projects Team.	15% PM costs as per existing agreement with DBIM. DBCT P/L has resources available with relevant experience for these works. Additional expertise will be outsourced on an as required basis.
	Contingency	$481,000	Approx. 16% contingency allowed overall.	
	Budget	$3,486,000		

7.3.2.3 Handover Certificate

This section provides the Handover Certificate for NS06

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15th October 2024

Brett Jurd
Executive Manager, Asset Management
Dalrymple Bay Coal Terminal Pty Ltd
Martin Armstrong Drive
HAY POINT, QLD 4740

RE: NECAP PROJECT ASSET HANDOVER

PROJECT NUMBER NS06
SITE ROADS UPGRADE

HANDOVER CERTIFICATE

Dear Brett,

The upgraded Bund 4, L1 and S4 Road Upgrades, under NECAP Project NS06, were placed into operational service on 24th September 2024.

Pursuant to Clause 27.5 of the Operation and Maintenance Contract, this Handover Certificate certifies that the relevant works are safe to operate and/or maintain. The relevant works formed part of the Terminal on 24th September 2024.

DBCT P/L internally verified completion of the complete works to Practical Completion.

Refer to change management form 0203 number 4453 for information related to the project.

Yours faithfully,

J Thompson

Jake Thompson
Project Engineer
DBCT P/L