SECTION 3.0

Project Description

3.0 Project Description

3.1 Strategic Context

3.1.1 Need for the Project

The Stage 4 Project seeks to accommodate the anticipated growth in demand for coal internationally. The Hunter region coal industry has recently publicly reported (ARTC 2009) coal export forecasts in excess of 250 Mtpa within the medium term. Coupled with this identified increase in throughput demand, significant investment has been proposed to provide coal chain expansions in transport and handling infrastructure, which is expected to result in a significant increase in coal exports in the next few years.

The Australian Bureau of Agricultural and Resource Economics (ABARE), the Commonwealth government economic research agency, has predicted that international demand for Hunter Valley coal will maintain a strong level of growth in the medium term. In its study on *Infrastructure Issues in the Hunter Valley Coal Supply Chain* (ABARE 2005), ABARE forecasts that potential demand for coal from the Hunter Valley will increase at an annual rate of 2.8% to reach 122 Mtpa in 2015.

In addition, ABARE forecasts that international demand could drive Hunter Valley coal producers to supply between 130 Mtpa and 200 Mtpa by 2015, dependent on international coal prices and if unconstrained by coal chain capacity.

The ARTC has developed the 2009-2018 *Hunter Valley Corridor Capacity Strategy Consultation Document* (ARTC 2009), based on industry forecasts for total coal demand on the Hunter Valley network. These forecasts, although different to ABARE's, indicate that demand will increase to approximately 113 Mtpa in 2009, 226 Mtpa in 2013 and up to 265 Mtpa in 2018.

At a national level, constraints in coal transport and handling infrastructure in NSW and Queensland in recent years have limited, to some extent, Australia's ability to respond to strong growth in world thermal coal demand (ABARE 2006). Therefore the ability to meet continuing international demand for Hunter Valley coal is dependent on the capacity of the coal transport system.

For the Hunter Valley Coal Chain, ARTC estimates the current theoretical capacity of the rail network at approximately 189 Mtpa (ARTC 2009). For the 2009 period, the Hunter Valley Coal Chain Logistics Team (HVCCLT) declared capacity of 94.5 Mt (ARTC, 2009). This marked difference between the theoretical capacity and actual capacity is influenced by a range of factors including maintenance requirements, surge volume and system reliability (ARTC, 2009). ARTC forecasts demand for export coal from the Hunter Valley to reach around 265 Mtpa by 2018.

In identifying current issues with coal export infrastructure, ABARE (2006) identified the benefit of surge capacity, as it provides for the short term capacity required to accommodate recovery from temporary disruptions in the coal supply chain. This enables the system to respond to these changes whilst minimising impacts to overall capacity of the coal transport chain.

To address the identified constraints to the coal export chain, there are significant commitments for participants in the chain, and at all levels of government, to undertake projects to upgrade coal transport infrastructure.

For instance, the infrastructure upgrade project identified in ARTC (2009) is estimated to require a total expenditure of $2.29 billion over the 10 year period of the strategy. This commitment is also underlain by significant funds allocated by government, including $389 million committed in the 2009-2010 federal budget for port and freight facilities.

PWCS has identified a potential benefit to the current and approved KCT facility to have increased 'sprint capacity' (surge capacity) to meet the overall 120 Mtpa throughput following short term disruptions to operations. Short term delays in throughput result from a variety of occurrences, such as closures of the coal transportation chain, planned and unplanned maintenance outages and port and rail interruptions due to weather impacts.

As outlined in **Section 1.1**, there is a large variability in the amount of coal PWCS exports through KCT on a daily basis. In order to achieve the current approved nominal 120 Mtpa throughput at KCT, PWCS would have to achieve a throughput average of approximately 320,000 tonnes per day. In reality this can rarely be achieved due to a broad range of factors, both internal and external to KCT, that affect daily throughput rates at KCT. In the two years from October 2007, the daily throughput at KCT based on current operations has ranged from 3000 tonnes to approximately 300,000 tonnes of coal per day, and PWCS has achieved a daily throughput average of approximately 190,000 tonnes per day. Within this timeframe there have been 65 days on which throughput has been less than 100,000 tonnes per day.

The operational benefits associated with increased 'sprint capacity' will assist PWCS in responding to these short term disruptions to coal throughput and, in effect, will assist in improving the overall average daily throughput rate achieved at KCT. This will assist in providing greater opportunity to consistently reach the current overall approved 120 Mtpa throughput capacity at KCT. The increased 'sprint capacity' for coal loading is proposed to be achieved through the construction and operation of the Stage 4 Project.

The Stage 4 Project, with an estimated capital value of $500 million, represents a significant commitment from PWCS to improve coal handling efficiency at KCT and for the broader Hunter Valley Coal Chain.

3.1.2 Operational Context

Being the largest coal export company in Australia, PWCS is continually investigating alternative methods to improve the efficiency of the KCT facility on an ongoing basis. As part of this ongoing analysis, PWCS has investigated a range of alternatives to improve coal handling efficiency whilst achieving the approved 120 Mtpa throughput capacity.

PWCS has identified a potential benefit to the current and approved KCT facility to have increased 'sprint capacity' to meet the overall 120 Mtpa throughput following short term disruptions to operations. The increased 'sprint capacity' is proposed to be achieved through the construction and operation of the fourth dump station, fourth shiploader and associated coal handling infrastructure.

As outlined in **Section 2.2.1**, PWCS is currently implementing an ongoing expansion program for the design, construction and operation of the existing and approved infrastructure at KCT. The Stage 4 Project has been designed to be an additional coal handling stream at KCT that will integrate with existing and approved KCT operations.

Project design specifically has targeted integration with existing operations, in terms of integrated operational philosophies and processes, and minimisation of impacts on existing and approved operations. Once approved, the Stage 4 Project will be incorporated into PWCS's ongoing capital works expansion program for KCT to improve coal handling efficiency whilst achieving the approved coal throughput capacity.

3.2 Stage 4 Project Overview

PWCS proposes to construct and operate a fourth dump station for the receival of coal at KCT, a fourth shiploader to service the existing and approved berths, and associated coal handling infrastructure. The additional coal handling and loading infrastructure will allow PWCS to improve the efficiency of coal throughput at KCT. The project will include the construction and operation of additional infrastructure as shown on **Figures 3.1** and **3.2** including:

- fourth dump station, associated rail facilities, sample plant and inbound conveyors;
- augmentation to the rail loop to include an additional inbound track to and additional outbound tracks from the fourth dump station;
- shipping conveyor including the construction and operation of a conveyor bridge over Teal Street, above the southern approach to Stockton Bridge;
- transfer houses;
- buffer bin;
- outbound sample plant;
- shiploader wharf conveyor; and
- fourth shiploader to service the existing and approved berths.

The Stage 4 Project has been designed to minimise environmental impacts as far as practicable, and integrate with existing and approved KCT operations. A schematic providing an overview of the Stage 4 Project, and how it relates to the existing and approved infrastructure of KCT, is provided on **Figure 3.3**.

3.2.1 Project Objectives

Throughout the last 10 years of implementing the expansion of KCT, PWCS has consistently developed and implemented new approaches and technologies to improve operational capacities, minimise environmental impacts, and to ensure the safety and health of its workforce. PWCS remains committed to its obligations to its employees, neighbouring communities and the environment in which it operates. While the upgrade is operationally significant, with streamlining of systems and the use of new available technology, the projected impact on surrounding communities and the local environment are minimal, as discussed in **Section 6.0**. Key features of the Project that need to be borne in mind when considering potential impacts are provided below.

The project will:

- involve only minor changes to the approved footprint of KCT with additional infrastructure associated with the Project to be constructed on previously disturbed land (refer to **Figure 3.1** and **Figures 3.4** to **3.6**). These minor changes to the approved footprint of KCT primarily relate to the augmentation of the rail receival loop, with the remaining components of the Stage 4 project essentially within existing infrastructure areas;
- be encompassed by the existing environmental management systems including the water management system, air quality and noise mitigation strategies;
- maintain current internal road traffic movements as all coal will be moved by conveyors;

Source: Port Waratah Coal Services Limited (2008, 2009)

0 0.25 0.5 1.0km

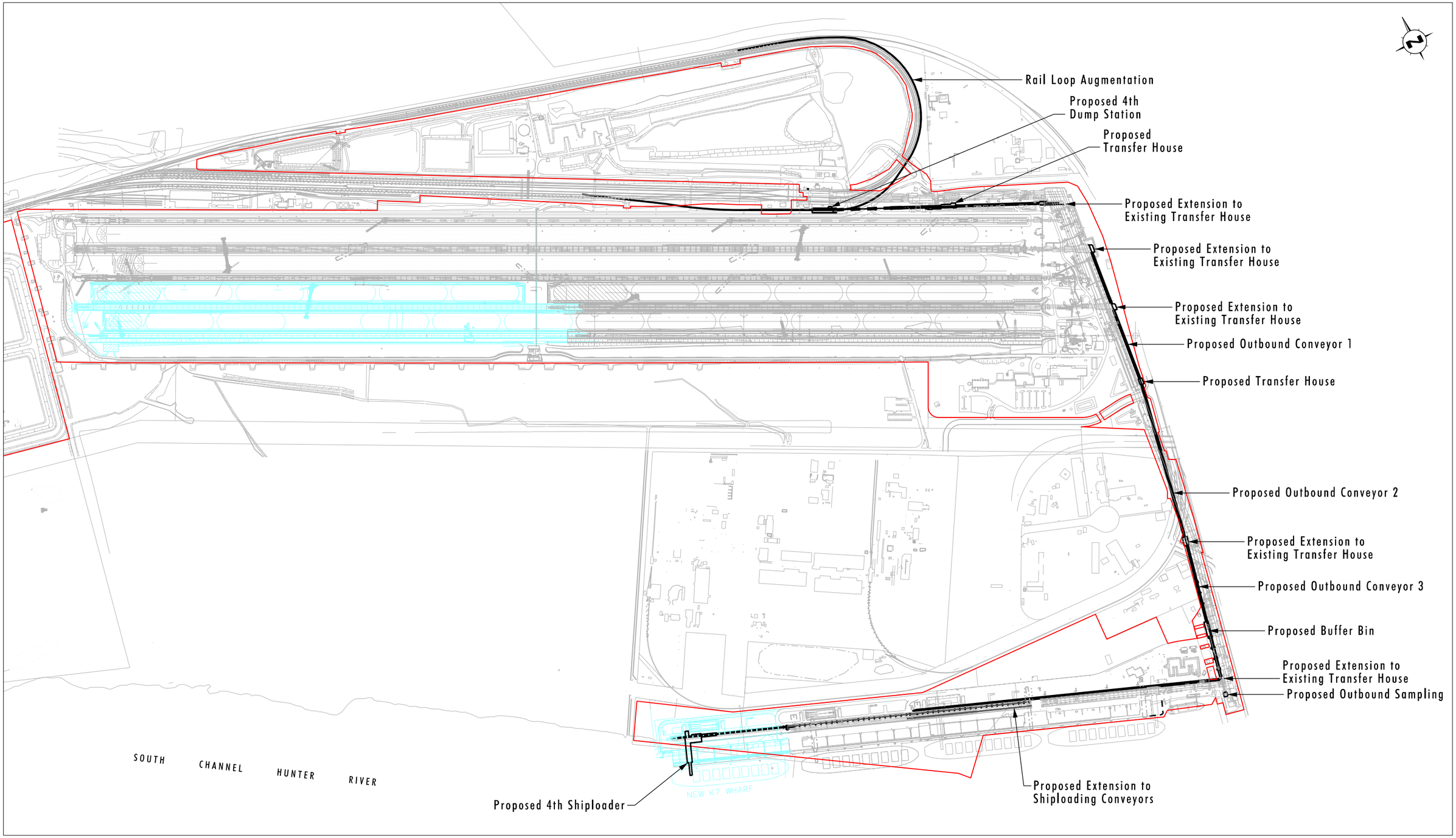
1:20 000

Legend

- Kooragang Coal Terminal
- Stage 4 Project Infrastructure
- Approved Infrastructure (Yet to be constructed)
- Newcastle Coal Infrastructure Group

FIGURE 3.1

Proposed Stage 4 Project



Source: Port Waratah Coal Services Limited (2009)

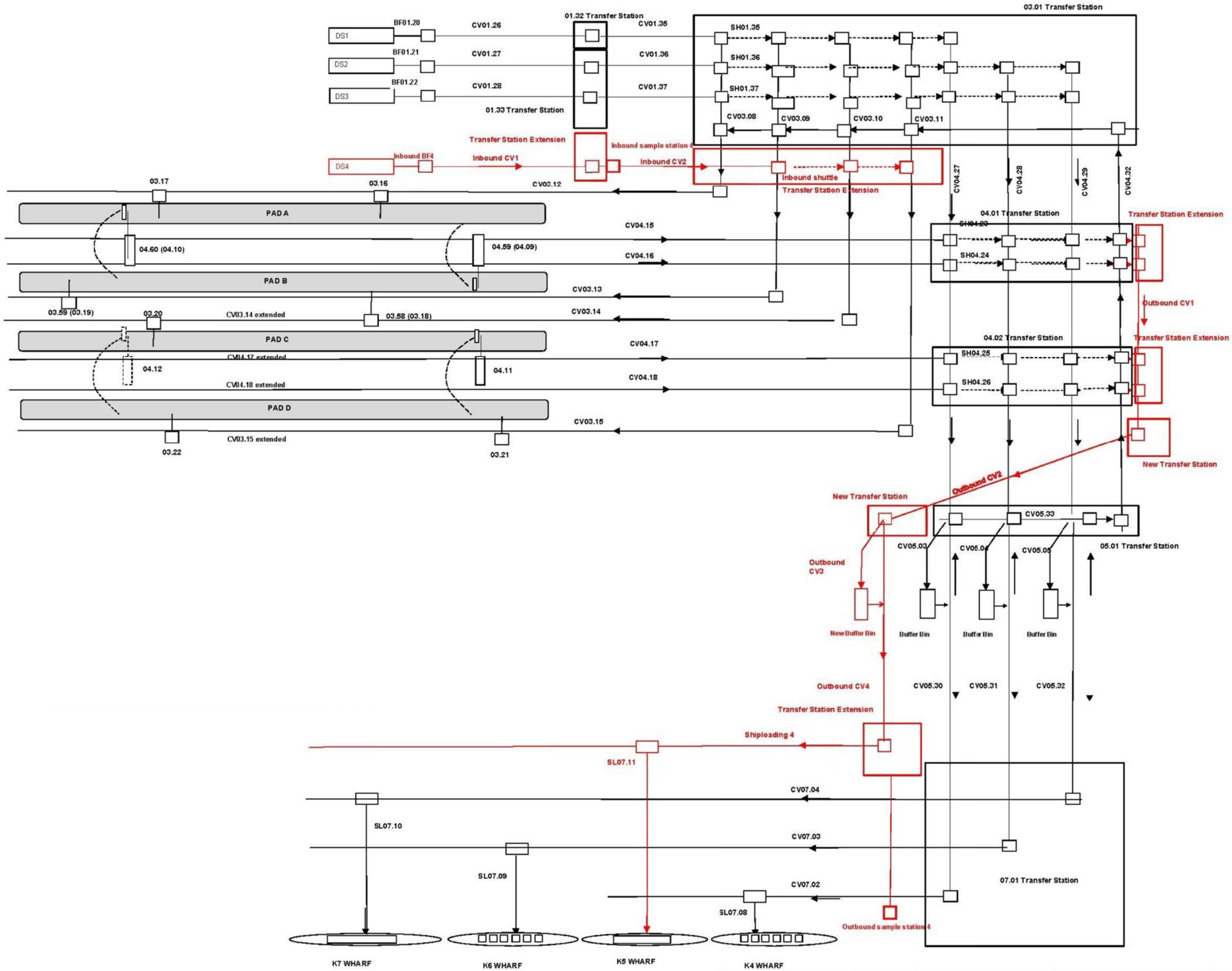
0 100 200 400m
1:10 000

Legend

- Kooragang Coal Terminal
- Stage 4 Project Infrastructure
- Approved Infrastructure (Yet to be Constructed)

FIGURE 3.2

Layout of Stage 4 Project



Legend

- Existing and Approved Kooragang Coal Terminal Infrastructure
- Proposed Stage 4 Infrastructure

FIGURE 3.3

Schematic of Stage 4 Project

Source: Minerva Engineers (2008)

Source: Port Waratah Coal Services Limited (2008, 2009)

0 100 200 300m
1:6 000

Legend

- Kooragang Coal Terminal
- Stage 4 Project Infrastructure
- Newcastle Coal Infrastructure Group

FIGURE 3.4

Proposed Rail Loop Augmentation and 4th Dump Station

Source: Port Waratah Coal Services Limited (2008, 2009)

0 100 200 300m
1:6 000

Legend

Kooragang Coal Terminal
Stage 4 Project Infrastructure

FIGURE 3.5

Proposed Outbound Conveyor System

Source: Port Waratah Coal Services Limited (2008, 2009)

Legend

- Kooragang Coal Terminal
- Stage 4 Project Infrastructure
- Approved Infrastructure (Yet to be constructed)
- Newcastle Coal Infrastructure Group

FIGURE 3.6

Proposed 4th Shiploader

- not require any change to the operational workforce and the facility will continue to operate on a 24 hours per day, 7 days per week basis;
- include installation of proven noise attenuation on new plant and equipment to reduce operational noise impacts;
- include installation of proven dust control measures on new plant and equipment to reduce the potential for dust generation;
- introduce soft flow chutes to eliminate coal 'boiling' typical of traditional chutes and so reduce dust at transfer points;
- continue to enclose coal transfer chutes within transfer houses;
- continue to receive rail deliveries in enclosed buildings and minimise unloading dust by minimising drop heights into receival bins;
- continue to control the dust from the stockpiled coal by ensuring the surface of stockpiles are kept appropriately moist by the stockpile yard spray system, controlled automatically from an on-site weather station;
- continue to limit stacker drop heights to minimise the 'drop zone' of the coal, thereby controlling dust. Automated stackers are used which assists with minimising this 'drop zone' and also provides for greater operational efficiency; and
- include shiploader infrastructure that has been designed to discharge coal within the hold of a ship, minimising the height of open free fall of coal and dust creation.

Further details on the key components of the Stage 4 Project are provided in the following sections.

3.3 Key Project Components

The Stage 4 Project has been designed to augment the existing and approved KCT operations to provide for increased 'sprint capacity' as part of the ongoing KCT operations. Once operational, the Stage 4 Project will be managed by PWCS as an integrated component of ongoing KCT operations. An overview of the operational philosophy of KCT is provided in **Section 2.2**, with additional details in relation to the operation of the specific components of the Stage 4 Project provided in the following sections.

Figures 3.4 to **3.6** provide a detailed layout of each of the key Stage 4 Project components and highlight the relationship of the proposed infrastructure to the existing and approved infrastructure at KCT and surrounding land uses.

3.3.1 Rail Loop Augmentation

A fourth rail loop is proposed to be built adjacent to the existing rail lines that currently service KCT (refer to **Figure 3.4** and **Plate 1**). The rail loop that services KCT is located outside of the approved footprint of KCT and is managed by ARTC. The rail loop will include an additional inbound and outbound track to the proposed fourth dump station. Once at the dump station trains unload their cargo of coal onto an underground conveyor located below the track. This fourth rail loop will allow coal trains to unload coal more efficiently once they arrive at KCT. The proposed outbound tracks will reconnect to the existing rail loop before departing Kooragang Island.

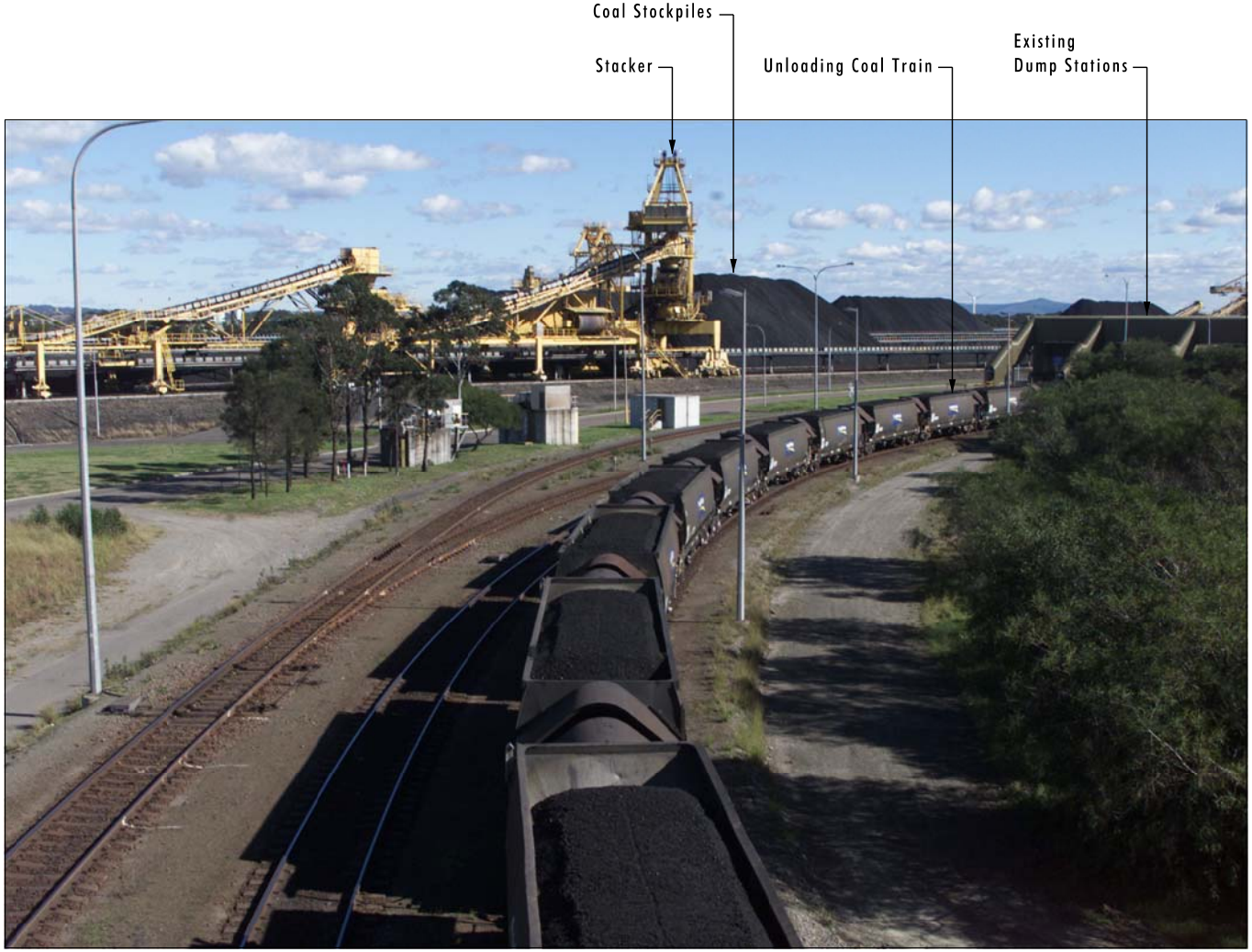


PLATE 1

Rail Loop and Dump Station

Source: Port Waratah Coal Services Limited (2009)

File Name (A4): R04_V1_/2551_052.dgn

The proposed rail line augmentation will provide for dedicated inbound and outbound paths to the proposed fourth dump station that will be integrated with the operation of the existing dump stations at KCT. The proposed rail loop augmentations are located within the existing rail corridor and on previously disturbed land.

3.3.2 Dump Station

The existing dump stations are located side by side and comprise rail lines passing over underground concrete hoppers, covered by a portal frame enclosed building structure. It is proposed to construct and operate a fourth dump station adjacent to the three existing dump stations (refer to **Figure 3.4** and **Plate 2**). The dump station will be fully enclosed to control dust emissions and attenuate noise. The proposed dump station is located immediately south of the existing dump station infrastructure, within the approved footprint of KCT (refer to **Figure 3.4**).

The proposed fourth dump station has been designed to minimise interactions with existing groundwater systems. It will be constructed by installation of diaphragm walls and the use of jet grout injection to create a temporary floor to the dump station that seals against the diaphragm walls. This allows for the material from within the walls to be excavated with minimal interaction with the existing groundwater system. Once the excavation of material from within the walls is completed then the construction of the permanent dump station floor can be carried out above the temporary floor. Material excavated from the dump station will be treated (where required) and re-used on site as construction material.

The dimensions of the dump station will be approximately 15 metres deep, 12 metres wide and 66 metres long, which is consistent with the design of the existing dump station infrastructure. There will be two floors, the upper floor will have a base level of an approximate RL -3.8 metres and the lower floor will have a base level of an approximate RL -10.7 metres. The dump station will link to an inbound conveyor for the transfer of coal from the rail receival facility to the stockyard.

3.3.3 Conveyors and Transfer Stations

A series of coal handling infrastructure components, including the extension of existing and approved facilities, and the construction and operation of new components, will be undertaken as part of the Stage 4 Project. These components, and how they relate to the existing and approved infrastructure, are shown on **Figures 3.5** and **3.6**.

From the fourth dump station an enclosed underground conveyor will transfer the inbound coal to the relevant stockpile areas referred to as the stockyard where it is stockpiled by the existing stackers (refer to **Plate 3**). The conveyor will run underground for approximately 200 metres from the dump station, from where it will continue above ground on trestles (refer to **Plate 4**). The proposed inbound conveyor will connect with an extension to the existing transfer house to provide for the transfer of inbound coal onto the stockyard. As shown on **Figures 3.1** to **3.3**, the proposed extension to the existing transfer house is within the existing approved footprint of KCT.

Existing and approved bucket wheel reclaimers (refer to **Plate 5**) in the stockyard will reclaim coal from the stockyard to the proposed outbound conveyor (refer to **Figure 3.3**). Coal will travel through two existing transfer houses that are proposed to be extended as part of the Stage 4 Project. As shown on **Figures 3.1** to **3.3**, the proposed outbound conveyor and associated extension to transfer house is located within the approved footprint of KCT.

To reach the wharf, coal will continue to travel on the outbound conveyor system through the proposed transfer house adjacent to Teal Street. The outbound conveyor will then be

PLATE 2

Dump Station

Source: Port Waratah Coal Services Limited (2008)

File Name (A4): R04_V1/2551_044.dgn

PLATE 3

Stacker

Source: Port Waratah Coal Services Limited (2009)

File Name (A4): R04_V1/2551_046.dgn

PLATE 4

Conveyors

Source: Port Waratah Coal Services Limited (2009)

File Name (A4): R04_V1_/2551_053.dgn

PLATE 5

Reclaimers

Source: Port Waratah Coal Services Limited (2009)

File Name (A4): R04_V1/2551_047.dgn

elevated to cross over the existing outbound conveyors and pass over Teal Street approximately 8 metres above the road surface to a proposed transfer station located immediately west to the existing transfer station to the south of Teal Street. The conveyor has been designed to prevent any coal spillage from falling on the roadway, which is consistent with existing design of sealed conveyor galleries that currently cross public roads.

From the proposed transfer station, the outbound conveyor system extends to the south along the western side of existing KCT outbound conveyors to deliver coal to a proposed new buffer bin or to the wharf conveyor system (refer to **Figures 3.5** and **3.6**). Buffer bins allow continuous coal reclaiming and transfer during the changing of ship hatches by the shiploader.

The proposed outbound conveyor system connects with the wharf conveyors at a transfer station located on the eastern extent of the PWCS berth area. To provide for the transfer of coal to shiploading conveyors, it is proposed to construct an extension to the western extent of the existing transfer house (refer to **Figure 3.5**). An additional outbound coal sampling plant will also be constructed to the south of the transfer station, to provide for sampling of all outbound coal associated with the proposed fourth coal handling stream (refer to **Figure 3.5**).

All conveyor and transfer facilities will be designed to be consistent with existing and approved KCT infrastructure.

All proposed conveyors will be elevated above ground and will be housed in sealed galleries, supported on trestles, with integrated floors and walls to contain spillage and wash down water. The conveyor belt will be covered on the top and sides to control dust and weather effects. The trestle footings will only require minor excavation during construction, comprising a 2 metre deep pile cap supported on driven piles up to 30 metres long.

All transfer stations, the buffer bin and sampling plant structures will be fully enclosed to provide noise and dust attenuation, which is consistent with the existing and approved KCT infrastructure.

3.3.4 Shiploader

A fourth shiploader is proposed to be constructed as part of the Stage 4 Project, and will be linked to the outbound coal stream from the stockyard via the proposed new conveyors and transfer stations and extensions (refer to **Figures 3.3** and **3.6**). The proposed fourth shiploader will be of the same construction as the existing shiploaders at KCT (refer to **Plate 6**). The fourth shiploader will be fed by its own dedicated wharf conveyor that will extend to the full extent of the existing and approved wharf facilities. This will enable the proposed fourth shiploader to service the existing berths. The ability to service multiple berths provides for a high utilisation of the shiploading/wharf facilities leading to increased overall coal load out efficiency.

As outlined on **Figure 3.6**, the proposed fourth shiploader and associated infrastructure will be located within the approved footprint of KCT.

PLATE 6

Shiploader

Source: Port Waratah Coal Services Limited (2009)

File Name (A4): R04_V1/2551_045.dgn

3.4 Construction Activities

The infrastructure associated with the Stage 4 Project will be constructed over an approximate 24 month period. The construction activities will be scheduled to minimise potential impacts on KCT operations and surrounding land uses. Construction of each component of the proposed Stage 4 infrastructure has been scheduled to occur concurrently, with the construction period for specific components of work ranging from 3 months to up to 18 months over the 24 month construction period.

Table 3.1 provides an overview of the proposed indicative construction schedule for the Stage 4 Project and outlines the conceptual sequencing of key construction activities and the likely duration of each scheduled construction activity. As outlined in **Table 3.1**, construction activities will peak dependent of the stage in the construction process. It is envisaged that the peak in construction activities will occur over a 6 month period within the overall 24 month construction schedule.

Table 3.1 – Indicative Construction Schedule for the Stage 4 Project

Key Construction Component	Approximate Construction Duration	Indicative Construction Schedule
Fourth Dump Station	18 Months	Months 1 to 18
Conveyors Sample Station and Transfer Stations	18 Months	Months 5 to 22
Fourth Shiploader	13 Months	Months 11 to 22
Rail Loop Augmentation	13 Months	Months 10 to 21
Commissioning	3 Months	Months 22 to 24

The construction activities will be undertaken by a construction workforce of up to 300 people under the management of PWCS. Construction workforce numbers will vary over the 24 month construction period and will be dependent on the specific construction activities (refer to **Figure 3.7**).

Construction activities will include:

- site preparation;
- construction of foundations and footings;
- assembly and erection of structural components;
- mechanical fit out;
- electrical fit out;
- installation of services e.g. power, water, fire systems, controls etc; and
- commissioning.

During the construction phase a range of equipment will be utilised including mobile cranes, drilling and piling rigs, trucks, forklifts, dozers, rollers, graders, compactors and excavators. **Table 3.2** outlines the typical equipment that will be utilised during the construction phases of the Stage 4 Project.

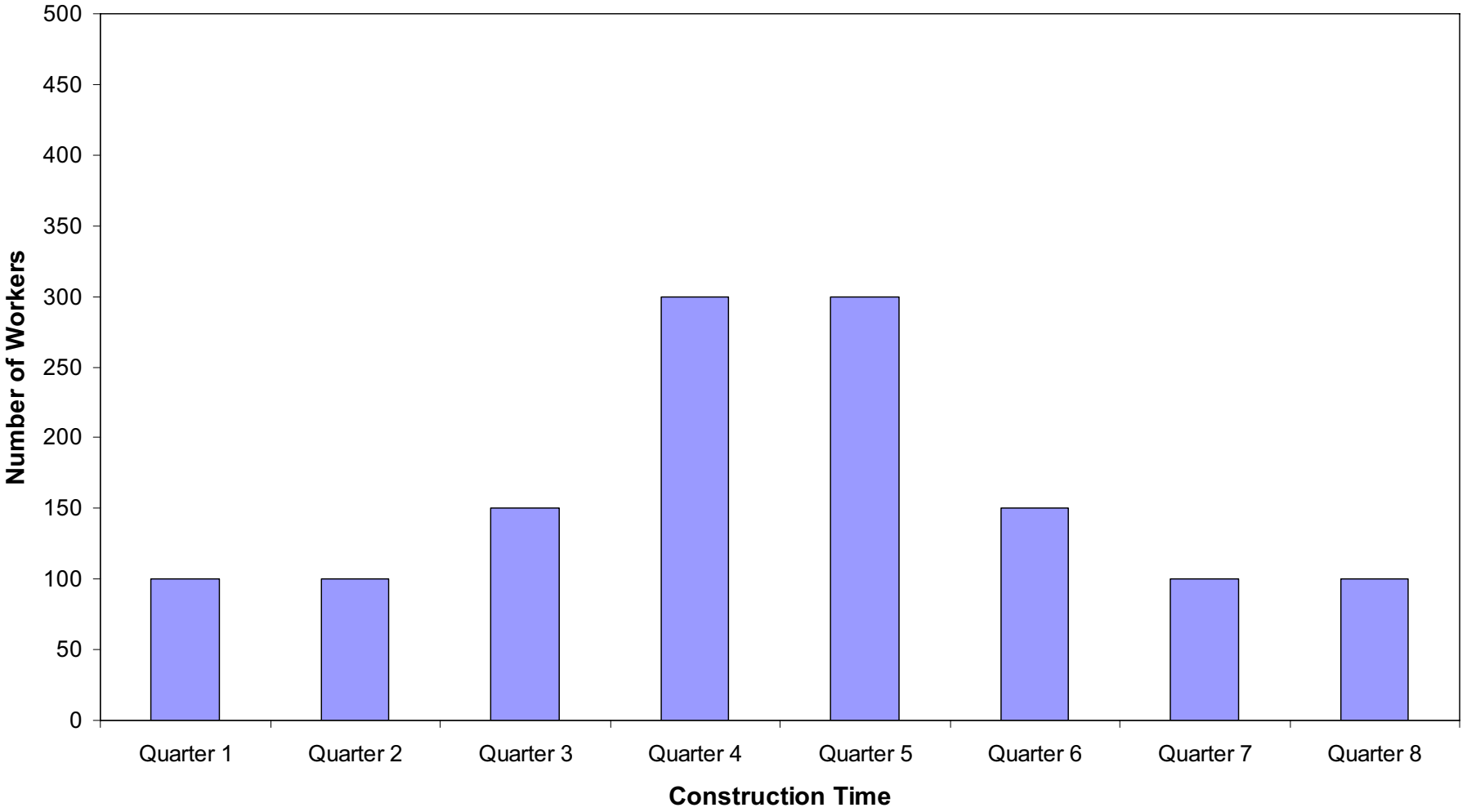


FIGURE 3.7

Indicative Construction Workforce for Stage 4 Project - Conceptual 24 Month Construction Timeframe

Table 3.2 – Proposed Typical Construction Equipment

Equipment Type	No.	Equipment Type	No.
Mobile Cranes (25t – 50t)	6	Excavators	4
Mobile Cranes (50t – 150t)	6	Graders	3
Mobile Cranes (150t – 300t)	1	Compactors	5
Elevated Work Platform	8	Track Laying Machine	1
Water Truck	1	Drill Rigs	3
Dump Truck	4	Impact Piling Rigs	4
Dozers	1	Loaders	3

Note: The table outlines typical types and numbers of equipment for the peak construction scenario with similar and/or comparable equipment to be utilised. There may be variation in numbers and types of equipment provided relevant assessment criteria are maintained. Various ancillary equipment would also be utilised i.e. assorted light vehicles.

The construction of the Stage 4 Project will require the transportation and delivery of a range of significant structural components for assembly and commissioning at KCT. These components will be transported to site via heavy haul trucks and also via sea borne barge transport on Newcastle Harbour to the KCT shipping berths. Infrastructure delivered via barge may require transport to other areas of KCT through the use of heavy haul trucks on the existing road network. Construction components will either be delivered to the specific construction area, or will be stored at existing equipment laydown areas prior to delivery to the specific construction area, located within the existing approved KCT site.

During the construction phase of the Stage 4 Project a range of temporary site facilities will be utilised, including temporary offices, amenity facilities and off-road car parking areas. As part of the ongoing expansion works undertaken at KCT, there is existing infrastructure located within the approved KCT site that will be maintained and utilised for the construction phase of the Stage 4 Project.

3.5 Project Timing

The Stage 4 Project will be undertaken in response to coal demand as part of the ongoing expansion of the Hunter Valley Coal export industry (refer to **Section 3.1.1**).

3.6 Alternatives Considered

Central to the design of the Stage 4 Project has been the minimisation of potential impacts to community and environment and KCT operations. A range of alternatives were considered during the design process in order to optimise the identified benefits of the Stage 4 Project whilst minimising potential impacts. A number of these alternatives are outlined below.

3.6.1 Dump Station Alternatives

There have been a number of alternate design concepts investigated for the proposed fourth dump station, including:

- location of the fourth dump station on the northern side of the existing dump station infrastructure and feeding coal into the eastern end of stockpiles through the existing stacking plant and equipment; and

- location of the fourth dump station at the western end of the stockyard, or some intermediate location between the existing rail receival facilities and the western extent of KCT.

These alternate locations for the fourth rail receival facility were not preferred due to significant interruptions to existing KCT operations during construction, economic viability and the loss of design optimisation associated with these alternate designs.

3.6.2 Shipping Conveyor

The existing shipping conveyor infrastructure is located under Teal Street and consists of three coal transfer conveyors and an additional return conveyor. South of Teal Street the existing conveyor infrastructure traverses a range of infrastructure including the Cormorant Road reserve and rail infrastructure.

A number of design alternatives for the proposed outbound coal conveyor infrastructure to transfer coal from the stockyard to the shipping yard have been investigated. These alternatives include:

- replacement of the existing return coal conveyor under Teal Street with the proposed fourth coal handling stream – this option was not considered viable as current operating practice at KCT would prevent PWCS from locating the conveyor under Teal Street and it would create the need for an alternative location for the existing return coal conveyor;

- construction of the proposed shipping conveyor to the east of existing conveyor infrastructure under Teal Street – this option was not preferred due to the need to slew existing road and rail track infrastructure around the proposed conveyor and limitations to providing adequate clearance to the Cormorant Road reserve.

3.6.3 Preferred Option

The detailed options assessment undertaken through the design of the Stage 4 Project has demonstrated that the preferred design option described in **Section 3.3** provides the most cost efficient option whilst minimising impacts on existing KCT operations. As outlined in **Section 6.0**, detailed environmental studies indicate that the proposed Stage 4 Project can be constructed and operated with minimal environmental impact.

3.6.4 Not Proceeding with the Project

The need for increased sprint capacity in coal handling and shiploading capacity to meet projected export demand has been clearly identified in **Section 3.1**. The Project provides a cost efficient option to increase the 'sprint capacity' of the KCT facility whilst maintaining current approved throughput capacity, and with minimal environmental and community impact (refer to **Section 6.0**). On this basis, there is no reason for PWCS not to proceed with the Stage 4 Project. If the Stage 4 Project was not approved, the opportunity to yield substantial additional coal supply capacity, with minimal environmental and community impact and substantial economic benefits to the local community, region, state and nation (refer to **Section 3.1**), will be lost.