Kooragang Coal Terminal

Annual Noise Investigation Report:

2020/2021 Reporting Period

120Mtpa Project Approval (06_0189 MOD3): Condition 2.10

PORT WARATAH COAL SERVICES

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Revision History

Date	Review	Definition
April 2021	1	Original Document

1 Introduction

1.1 Requirements

Port Waratah Coal Services Ltd (Port Waratah) has approval to construct and operate the Kooragang Coal Terminal (KCT) at a throughput capacity of 120 million tonnes per annum (Mtpa) – the Project. The Project has been progressively developed over a series of stages to achieve the 120Mtpa throughput capacity. Each stage of development has been supported by a Development Consent/Project Approval, with the most recent, PA06_0189 MOD 3, being referred to as the KCT 120 Mtpa Modified Approval. Further details on the development of the Kooragang Coal Terminal can be found in the approved KCT Operation Environmental Management Plan.

The Stage 3 (DA 35/96) throughput trigger level of 77Mtpa was first exceeded on 21 April 2012, which initiated the commencement of operations under the original 120Mtpa Approval (PA 06_0189). As such, all noise related conditions nominated in the Stage 3 Development Consent (35/96) were superseded by the noise related conditions nominated in the KCT 120 Mtpa Modified Approval.

The objective of this document is to report on annual investigations (to the period end March 2020) in relation to feasible and reasonable noise mitigations in accordance with the KCT 120 Mtpa Modified Approval Condition 2.10. Furthermore, following the submission of the KCT Annual Noise Investigation Report (2011), the NSW Department of Planning Infrastructure (DP&I), now Department of Planning, Industry and Environment (DPIE) (refer Appendix A2) have requested that future Annual Noise Investigation Reports provide the following information:

- What feasible and reasonable mitigation measures have been implemented as part of the Continuous Noise Improvement Program in the preceding years and the resultant noise reductions that have been observed; and
- Results of noise monitoring surveys identifying the noise contributions from the project on the residential receivers of Fern Bay and Stockton in the preceding year and whether compliance with the maximum allowable noise contributions stipulated in condition 2.8 and the noise goals in condition 2.10 are being achieved.

In accordance with the KCT 120 Mtpa Modified Approval, Schedule 2 Condition 7.5b, the KCT Operation Noise Management Plan (ONMP) forms part of the KCT Operation Environmental Management Plan (OEMP) and was last approved by the DPIE in July 2019.

1.2 Objectives

The KCT 120 Mtpa Modified Approval, Schedule 2 Condition 2.10, states:

> *The Proponent shall investigate all feasible and reasonable mitigation measures, as defined in the New South Wales Industrial Noise Policy (EPA, 2000), to reduce noise impacts from the upgraded coal terminal at Fern Bay and Stockton to achieve noise contributions of no greater than 43 dB(A) (LAeq,(night)), and 45 dB(A) (LAeq,(15 minutes)) under adverse meteorological conditions specified under condition 2.8 of this approval.*
>
> *A report on investigations shall be submitted to EPA and the Director-General within 12 months of commencement of works the subject of this approval and annually thereafter, unless otherwise agreed by EPA and the Director-General, until levels specified above are achieved. A program for ongoing investigation and implementation of feasible and reasonable mitigation measures to reduce noise contributions at Fern Bay and Stockton shall be implemented. The program shall commence no later than six months following the EPA's agreement to a noise reduction program, unless otherwise agreed by the EPA and the Director-General.*

The breakdown of Annual Noise Investigation Report requirements are presented in **Table 1** together with the DPIE's supplementary information.

Table 1: *Annual Noise Investigation Reporting Requirements and Supplementary Information*

Condition 2.10 Reporting Requirements	Reference
The Proponent shall investigate all feasible and reasonable mitigation measures, as defined in the New South Wales Industrial Noise Policy (EPA, 2000).	**Section 3.1** INP - Applying Noise Mitigation Strategies
A report on investigations shall be submitted to EPA and the Director-General within 12 months of commencement of works the subject of this approval and annually thereafter, unless otherwise agreed by EPA and the Director-General, until levels specified above are achieved.	**The subject of this report**. Commencement of construction, in accordance with the KCT 120 Mtpa Modified Approval Schedule 2, was April 2008 and Port Waratah has taken "construction" and "works" to be equivalent.
A program for ongoing investigation and implementation of feasible and reasonable mitigation measures to reduce noise contributions at Fern Bay and Stockton shall be implemented.	**Section 4** An INP-based Continuous Noise Improvement Program (Noise Reduction Program) was implemented at the commencement of Stage 3 and is ongoing in the maintenance of KCT.
The program shall commence no later than six months following the EPA's agreement to a noise reduction program, unless otherwise agreed by the EPA and the Director-General.	
DP&I (DPIE) letter dated 25 May 2011 Supplementary Information	
What feasible and reasonable mitigation measures have been implemented as part of the Continuous Noise Improvement Program in the preceding years and the resultant noise reductions that have been observed; and	**Section 4** and **Section 6**
Results of noise monitoring surveys identifying the noise contributions from the project on the residential receivers of Fern Bay and Stockton in the preceding year and whether compliance with the maximum allowable noise contributions stipulated in condition 2.8 and the noise goals in condition 2.10 are being achieved.	**Section 7**

1.3 Port Waratah Roles and Responsibilities

Accountabilities relevant to the management of noise at Port Waratah's Kooragang Terminal are detailed in Section 8 of the approved KCT Operation Noise Management Plan**.**

1.4 Community Enquiries

Consistent with the requirements of the KCT 120 Mtpa Modified Approval Condition 6, Port Waratah monitors community enquiries in accordance with the Port Waratah Environmental Management System (EMS).

During the 2020/2021 reporting period, no community enquiries were received by Port Waratah that may have been attributed to noise from operations at KCT.

2 Project Overview

2.1 Receiver Areas

The Land Use Aerial Plan (**Figure 1**) indicates the distribution of potentially affected residential, commercial and industrial receiver areas beyond the KCT site boundary. The full list of these receiver areas and assessment locations is contained in the approved KCT Operation Noise Management Plan.

2.2 Project Noise Sources

The Project includes all Stage 1, 2, 3 and Project 145 infrastructure on-site installed under existing site planning approvals DA35/96 and PA 06_0189 MOD 3, which include rail receival (coal wagon unloading), stacking, reclaiming and shiploading conveyor systems, transfer stations as well as mobile equipment (i.e. stackers, reclaimers and shiploaders) operating within the KCT site.

The Australian Rail Track Corporation (ARTC) maintains operational control of the Hunter Valley Coal Chain Rail Network, which includes the operation of the KCT rail loop. Coal trains operating on the KCT rail loop including locomotives and wagons (while not directly within the operational control of Port Waratah) are assessed simultaneously with the KCT's operations as an industrial noise source.

2.3 Noise and Meteorological Environments

The Kooragang Coal Terminal Stage 4 Project Fourth Dump Station and Fourth Shiploader Environmental Assessment dated November 2009 prepared by Umwelt Environmental Consultants (KCT Stage 4 EA 2009) has a comprehensive site-specific assessment of the ambient noise environment and meteorological conditions at the KCT in accordance with the requirements of the INP.

Figure 1: *Kooragang Coal Terminal Land Use Aerial Photo*

3 Approved Noise Limits

The KCT 120 Mtpa Modified Approval residential noise limits and meteorological constraints are listed by Conditions 2.8 and 2.9, which can be found in **Appendix A1.**

The limits listed by Condition 2.8 are identified by the KCT 120 Mtpa Modified PA as the Operational Noise – Maximum Allowable Noise Contributions. Therefore, all noise monitoring conducted is compared to these values and associated compliance assessments.

3.1 Applying Noise Mitigation Strategies

Condition 2.10 requires the Proponent to investigate all feasible and reasonable mitigation measures, as defined in the INP Section 1.4.5 Applying Noise Mitigation Strategies, as follows:

> *Where noise impacts are predicted, noise-source managers should seek to achieve the criteria by applying feasible and reasonable mitigation measures. In this context feasibility relates to engineering considerations and what can practically be built, and reasonableness relates to the application of judgment in arriving at a decision, taking into account the following factors:*
>
> - *Noise mitigation benefits - amount of noise reduction provided, number of people protected*
> - *Cost of mitigation - cost of mitigation versus benefit provided*
> - *Community views - aesthetic impacts and community wishes*
> - *Noise levels for affected land uses – existing and future levels, and changes in noise levels.*

Furthermore, the INP focuses on achieving the desired environmental noise outcomes without prescribed management or mitigation strategy to achieve Project Specific Noise Levels (PSNLs). In this way, the Proponent is given maximum flexibility when designing and implementing a program of noise management and control applicable to its operations.

4 Improvement Program Implementation

4.1 Continuous Noise Improvement Program

The Port Waratah INP-based Continuous Noise Improvement Program began at the commencement of the KCT Stage 3 Expansion and involves plant and equipment acoustical performance as part of design, procurement, construction and commissioning together with monitoring and reporting to demonstrate compliance with relevant operational noise requirements. An overview of the Program and improvement initiatives implemented and explored to date is presented in **Error! Reference source not found.**.

In accordance with the requirements of the INP (refer Section 3.3), noise improvements (i.e. noise control and management measures) are prioritised and implemented based on feasible and reasonable assessments including:

- acoustical benefit;
- community concerns;
- operational requirements; and
- cost considerations.

Through the implementation of the Program, Port Waratah has extended the boundaries of Best Available Technology by initiating research and development of practical acoustical solutions not previously commercially available or considered economically achievable for large scale coal handling infrastructure. In particular, the development of low noise technology in relation to the design of conveyor structures, conveyor components and conveyor drive assemblies and equipment start up alarms. These items since developed are now implemented as the procured items for installation or maintenance as required.

Based on the plant and equipment installed during the Stage 3 and Stage 4 Expansion Projects, Port Waratah has demonstrated the level of noise performance achievable with current low noise equipment technology. As such, the opportunistic retrofitting of the remaining Stage 1 and Stage 2 plant with demonstrated current technology low noise plant will allow Port Waratah to continue to improve its noise performance at KCT.

Ongoing noise reduction investigations are being undertaken to identify the potential items for retrofit or attenuation and feasible noise controls which may be implemented to improve the noise performance at KCT. The ongoing findings of these investigations are being used to guide the works required to manage KCT on-site sound power levels (SWLs) and off-site environmental noise emissions. Additionally, Port Waratah has established an internal noise objective and target to promote continuous improvement in relation to noise.

Furthermore, low noise equipment is continually investigated and rolled out across the site as part of ongoing maintenance activities where considered reasonable and feasible. Engineering specifications at Port Waratah have been formalised to ensure that any new plant and equipment meets the required noise specifications. The formalisation of these standards ensures that the procurement of low noise plant and equipment at Port Waratah is standard procedure.

Table 2: *Implementation of the Continuous Noise Improvement Program*

Equipment Type	Improvement
Conveyor Drives	• Low noise drive specification and compliance program prior to acceptance on site • Noise reductions to gearbox, motor, coupling/brake, frame/ guards and lubrication systems
Stockyard and Shiploading Conveyors (Open Steel Assembly)	• Low noise idler specification and compliance program prior to acceptance on site • Soft-mount noise barriers • Staggered return idler spacing and fixed return idler support frame
Transfer Conveyors (Concrete and Metal Pan Assembly)	• Low noise idler specification and compliance program prior to acceptance on site • Low noise prefabricated (PPAG) conveyor gantry
Stackers, Reclaimers and Shiploaders	• Low noise idler specification and compliance program including conveyor drives and idlers. • Demonstration of noise compliance by machine supplier at design stage
Buffer Bins, Chutes	• Soft flow conveyor transfer and loading chutes • Vibrating feeder opposing phase control to "cancel" noise effects
Receival, Sample and Transfer Station buildings	• Enclosed with minimum penetrations, double cladding where required • Maintenance access doors closed when operating plant and equipment
Equipment start up and travel alarms	• Install and maintain alarms with frequency and volume control • Design and install alarms systems[1]
Management	• Maintenance and operational staff - noise awareness training • Noise awareness included in the site induction training • Integrated community enquiries and response program • Regular noise monitoring program and analysis of results • Equipment SWL database updates as required to maintain accurate measurements • Environmental and OHS acoustical specifications for major equipment types including in-shop and in-situ testing to ensure conformance • On-site operator-attended noise surveillance measurements of acoustically significant plant • Off-site operator-attended noise monitoring program including representative locations at Fern Bay and Stockton • Quantify monthly on-site and off-site acoustical performance based on measured equipment SWLs, weather conditions and KCT plant operating logs

Note 1: Alarms are subject to procurement specifications detailing the tone frequency, noise emission levels, directionality and coverage. They are installed to optimise safety and to minimise off-site noise propagation. In the unlikely event that alarm noise remains a source of disturbance, then further on-site optimisation and fine adjustments are implemented to achieve further noise reductions without compromising safety standards.

5 Plant and Equipment Sound Power Levels

The potential for machinery to emit noise is quantified as the sound power level (SWL) expressed in A-weighted decibels (dBA) relative to 1 pW. At the receptor, the received noise is quantified as the sound pressure level (SPL) expressed in dBA re 20 μPa. In general terms, any variation in the on-site SWLs will produce a similar variation in the off-site noise level at the receiver.

The focus of the Improvement Program was to design, construct and operate sustainable at source noise controls for the Stage 3 and Project 145 expansion projects. The Program ensured that regular noise surveys and performance monitoring of the plant and equipment was conducted as each stage of expansion works were completed.

In particular, the development of low noise technology in relation to conveyor assemblies (i.e. open-steel, concrete-pan, and PPAG), conveyor drive assemblies as well as stackers, reclaimers and shiploaders has been applied throughout the development of Stage 3 and Project 145 with demonstrated source noise reductions and incremental improvement with each phase of installed infrastructure. As presented in **Table 3** typical component source noise reductions are described as follows:

Table 3: *Component Source Noise Reductions*

Component	Previous Typical SWL (dBA)	Typical SWL Reduction Level
Conveyor Assemblies (PPAG)	110	100dBA per 100 m
Conveyor Assemblies (Stockyard)	114	103dBA per 100 m
Conveyor Assemblies (Shiploading)	115	103dBA per 100 m
Conveyor Drives (630 kW)	116	96dBA per drive
Conveyor Drives (800 kW)	117	98dBA per drive
Stacker	117	106dBA per machine
Reclaimer	117	107dBA per machine
Shiploader	115	111dBA per machine

The installed sound power levels (SWLs) for the existing KCT Stages 1, 2, 3 and Project 145 plant and equipment are presented in **Table 4**. Plant and Equipment schematics are provided in **Appendix B**.

The SWLs presented in **Table 4** show the KCT total site SWL of 135 dBA at the completion of Stage 2 has reduced (by 1 dB) with the introduction of Stage 3 and Project 145 infrastructure. The reduction of the KCT total site SWL has been achieved by the progressive development and implementation of low noise technology throughout the various expansion projects and maintenance activities in accordance with the Program.

Table 4: *Existing KCT Stage 1, 2, 3, Project 145 Plant and Equipment LAeq SWLs (dBA re 1pW)*

As at completion of	Stage 1 (installed)	Stage 2 (installed)	Stage 3 Expansion			Project 145 (Current site SWLs as installed and measured as at December 2020)[2]
			Stage 3A, Steps 1-4, 3D (installed)	Stage 3Exp (installed and measured as at December 2011)	MasterPlan Completion (installed and measured as at September 2013)	
Stage 1	132	132	132	130	130	129
Stage 2	-	131	131	129	129	129
3A, Steps 1-4, 3D	-	-	126	125	125	127
3Exp	-	-	-	121	121	122
MasterPlan	-	-	-	-	120	122
Project 145	-	-	-	-	-	117
Total Site[1,2]	**132**	**135**	**135**	**134**	**134**	**134**
Typical SWL Range of Equipment in each Stage:						
Comparative Component Noise Source SWLs	Conveyor drives 630kW: 104-116 dBA Conveyor drives 800kW: 107-114 dBA Receival/Transfer Conveyors (per 100m): 105-110 dBA Shiploading Conveyors (per 100m): 115 dBA Stockyard Conveyors (per 100m): 109-113dBA Shiploader, Reclaimer, Stacker: 113, 115, 114-117 dBA	Conveyor drives 630kW: 105-110 dBA Conveyor drives 800kW: 104-117 dBA Receival/Transfer Conveyors (per 100m): 104-108 dBA Shiploading Conveyors (per 100m): 113-115dBA Stockyard Conveyors (per 100m): 103-114dBA Shiploader: 115 dBA	Conveyor drives 630kW: 98-107 dBA Conveyor drives 800kW: 99-105 dBA Receival/Transfer Conveyors (per 100m): 97-100 dBA (PPAG) Shiploading Conveyors (per 100m): 108 dBA Stockyard Conveyors (per 100m): 107 dBA Shiploader, Reclaimer, Stacker: 111, 108, 105 dBA	Conveyor drives 630kW: 90-99 dBA Conveyor drives 800kW: 97-99 dBA n/a n/a Stockyard Conveyors (per 100m): 98 dBA Reclaimer, Stacker: 108, 101-106 dBA	n/a Conveyor drives 800kW: 97 -101 dBA Receival/Transfer Conveyors (per 100m): 100 dBA (PPAG) Shiploading Conveyors (per 100m): 103 dBA Stockyard Conveyors (per 100m): 103 dBA Reclaimer, Stacker: 107, 106 dBA	Conveyor drives 630kW: 99-104dBA Conveyor drives 800kW: 97-107 dBA n/a n/a Reclaiming Conveyer: 113-121 dBA Stacking Conveyer: 108-114 dBA Stacker, Reclaimers: 101-107, 100-101 dBA

Note 1: Total Site SWL exclusive of coal trains and wagons operating on the KCT Rail Loop.

Note 2: Some Stage 1 and 2 items of plant and equipment was modified and reclassified during 3Exp and MPC but were not subject to noise controls (i.e. conveyors sped up). These items of plant and equipment have been reclassified back to their original construction stage for the purpose of identifying Stage 1 and Stage 2 noise controls.

6 Implementation of Noise Improvements

6.1 The Current Improvement Program Status

As discussed in **Section 4**, following the completion of the KCT Expansion Projects, the Program is now being implemented through:

- Investigation and ongoing assessment of noise improvements to the existing plant and infrastructure including Stage 1 and Stage 2 items; and
- Maintenance work associated with all plant and equipment.

6.2 2020/2021 Noise Improvements

The noise improvements implemented at KCT in 2020/2021 are summarised in **Table 5.**

Table 5: *Summary of Noise Improvements Implemented during 2020/2021*

Equipment Type	Noise Improvements Implemented during 2020/2021	Objective / Outcomes
Conveyor Drives	• Conveyor drive SWL measurement updates as required to maintain updated model.	• Used in strategic planning to update noise modelling databases and prioritise maintenance and improvements.
Stockyard and Shiploading Conveyors (Open Steel Assembly)	• Idler change-outs as required during maintenance activities • Detailed sound pressure level mapping of 4.16 and 7.03 conveyors to identify 'hot-spot' areas as part of a targeted approach to conducting idler purges • Ongoing investigation of engineering solutions to provide a safe solution to access idlers in difficult locations at the KCT Wharf.	• Worn idlers replaced as identified and required. • Identified 'hot-spot' areas to be strategically replaced during maintenance campaigns. • A total of 5,587 idlers were replaced across the KCT site during maintenance in the 2020/21 reporting period.
Transfer Conveyors (Concrete and Metal Pan Assembly)	• Idler change-outs as required during maintenance activities • Detailed sound pressure level mapping of 4.27, 4.31, 4.32 conveyor to identify 'hot-spot' areas as part of a targeted approach to conducting idler purges	• Worn idlers replaced as identified and required. • Identified 'hot-spot' areas to be strategically replaced during maintenance campaigns. • A total of 5,587 idlers were replaced across the KCT site during maintenance in the 2020/21 reporting period.
Stackers, Reclaimers and Shiploaders	• Idler change-outs as required during maintenance activities • Maintenance activities on reclaimer gearboxes in accordance with the adopted Engineering specifications	• Worn idlers replaced as identified and required. • A total of 5,587 idlers were replaced across the KCT site during maintenance in the 2020/21 reporting period. • Procurement and integration of the engineering specifications that identify noise criteria of equipment and facilitates the management of site noise generation.

Equipment Type	Noise Improvements Implemented during 2020/2021	Objective / Outcomes
Buffer Bins, Chutes	• Replacement of hardened steel wear plates with advanced tiling and adhesive technology to reduce wear and improve noise performance. • Initial noise assessments of 4.27/5.31 conveyor transfer chute ahead of its scheduled replacement	• Initial trial of the hardened steelwear plates in 4.27/5.30 chute has proven successful in 2017 and is now being implemented at other similar high flow chutes.
Receival, Sample and Transfer Station buildings	• N/A	• N/A
Equipment start up and travel alarms	• Ongoing implementation of adjustable alarms across the site. • Development and adoption of a cross Terminal procedure for the installation, operation and maintenance of start-up alarms. • Testing and implementation of updated alarms due to discontinuation of older siren models	• Effective management of start-up and travel alarms • Cross terminal alarm installation procedure complete and adopted to manage maintenance of alarms. • Ensure consistency with alarm specifications for updated alarm types
Management	• Continued implementation of KCT's noise monitoring program and analysis of results, consistent with the Approved KCT Operation Noise Management Plan. • Integration of the adopted engineering standards into relevant procurement systems to facilitate the purchase of items which consider noise generation. • Daily Operations and Shift Start meetings consider maintenance and operational activities may have the potential to generate noise, as well as consider the forecast weather conditions for the coming days. • Audit of ONMP noise controls as part of Port Waratah's internal Environmental Management System Audit Program.	• All site personnel and contractors actively consider noise emissions that are likely to occur from their tasks and implement appropriate noise mitigation controls. • Automated management systems to facilitate procurement of low noise items. • Work planning mechanisms consider and effectively manage noise generating activities. • Introduce noise reducing equipment and plant where considered reasonable and feasible. • Verification of noise control implementation and adequacy

6.3 2021/2022 Program of Works

The noise improvements currently programmed for the 2021/2022 reporting period at KCT are summarised in **Table 6**. Additional noise improvements will be investigated and implemented as appropriate.

Table 6: *Summary of Noise Improvements Programmed for 2021/2022*

Equipment Type	Noise Improvements programmed for 2021/2022
Conveyor Drives	• Continued investigation to prioritise conveyor drives for retrofit / replacement / modification as considered feasible and reasonable.
Stockyard and Shiploading Conveyors (Open Steel Assembly)	• Continued idler change-outs as required during maintenance. • Ongoing engineering investigations to provide a safe solution to access idlers in difficult locations at the KCT Wharf. • Continuation of 'hot-spot' monitoring of selected conveyors to assist with targeted idler changeouts
Transfer Conveyors (Concrete and Metal Pan Assembly)	• Continued idler change-outs as required during maintenance. • Continuation of 'hot-spot' monitoring of selected conveyors to assist with targeted idler changeouts
Stackers, Reclaimers and Shiploaders	• Continued idler change-outs as required during maintenance. • Continued maintenance activities on reclaimer gearboxes in accordance with the adopted Engineering specifications. • Continued preventative maintenance and testing of installed start up and long travel alarms
Buffer Bins, Chutes	• Replacement of hardened steel wear plates with advanced tiling and adhesive technology to reduce wear and improve noise performance.
Receival, Sample and Transfer Station buildings	• N/A
Equipment start up and travel alarms	• Continued roll out of modified start-up sirens across the site.
Management	• Maintenance of updated SWLs for major plant and equipment items for inclusion in modelling and prioritisation activities. • Strategic assessment of potential noise improvements and prioritisation of projects during 2021 for staged inclusion in future Business Plans. • Audit of ONMP noise controls as part of Port Waratah's internal Environmental Management System Audit Program. • Continued implementation of the Program.

7 Operational Noise Monitoring and Compliance

7.1 KCT Operating Noise Management Plan

As discussed in **Section 1.1**, the KCT ONMP forms part of the KCT OEMP and includes quarterly on-site and off-site noise monitoring of current KCT operations. In addition, the KCT Environmental Noise Model is maintained and updated with the noise data obtained from on-site noise monitoring to enable the calculation of noise levels at selected receivers under specific operating and meteorological conditions.

7.2 Off-Site Attended Noise Monitoring 2020

The off-site attended noise monitoring results at selected residential locations (Q1 2020 to Q4 2020) are presented in **Table 7** together with the relevant operating noise limits.

The operator estimated intrusive LAeq(15minute) and LA1(1minute) contributed noise levels presented in **Table 7** indicate ongoing compliance at all residential locations relative to Condition 2.8 approved operating noise limits.

Noise levels above the Condition 2.10 noise goals are shown in **bold**.

Table 7: *KCT Operator Attended Estimated Intrusive LAeq (15minute) and LA1 (1minute) Contributed Noise Levels (dBA re 20 µPa)*

Period	Q1		Q2		Q3		Q4		Condition 2.8 Noise Limits		Condition 2.10 Noise Goal
Date	30/3/2020 to 31/3/2020		7/5/2020 to 8/5/2020		22/7/2020 to 23/7/2020		28/12/2020				
Location	LAeq (15min)	LA1 (1min)	LAeq (15min)	LA1 (1min)	LAeq (15min)	LA1 (1min)	LAeq (15min)	LA1 (1min)	LAeq (15min)	LA1 (1min)	LAeq (15min)
FN1 Bayway Village	43	44	38	40	<29	<31	39	40	46	55	45
FW1 Fullerton Lane	**48**	49	**48**	50	**48**	50	**47**	49	50	55	45
FE1 Braid Road	**48**	49	44	46	42	44	**46**	47	49	55	45
SW1 Fullerton Street	<41	<43	<37	<39	<37	<39	<42	<44	50	57	45
SE1 Eames Road	42	49	<35	<37	<38	<40	<42	<44	49	56	45
W1 Stevenson Avenue	<31	<33	<35	<37	<32	<34	<31	<33	41	56	N/A
M1 Bull Street	<33	<35	<38	<40	<37	<39	<34	<36	44	58	N/A
M4 Arthur Street	<35	<37	<40	<42	<36	<38	<35	<37	44	58	N/A
C1 Cnr Hargrave and Young	<31	<33	<38	<40	<37	<39	<37	<39	42	52	N/A

Note 1: Condition 2.8 Noise Limits not applicable due to non-applicable meteorological conditions with temperature inversion >3°C per 100m

Note 2: Results above in grey text indicate noise from KCT operations were not discernible at the time of the survey.

7.3 On-Site Sound Power Level Monitoring 2020

The on-site SWL monitoring results throughout 2020 were used to update the KCT plant and equipment SWL database as presented in **Table 8** including the KCT maximum and operating SWLs.

Table 8: *KCT Measured On-Site Sound Power Levels (dBA re 1 ρW)*

Period	Site Maximum Potential SWL[1]	Site Maximum Operating SWL[2]	Site Mean Operating SWL[3]
January 2020	134.0 dBA	132.7 dBA	131.1 dBA
February 2020	134.1 dBA	132.3 dBA	130.8 dBA
March 2020	134.0 dBA	132.8 dBA	131.3 dBA
April 2020	134.0 dBA	132.3 dBA	130.4 dBA
May 2020	134.0 dBA	132.2 dBA	130.0 dBA
June 2020	134.0 dBA	132.7 dBA	131.2 dBA
July 2020	134.0 dBA	132.0 dBA	129.9 dBA
August 2020	134.0dBA	132.8 dBA	131.1 dBA
September 2020	134.0 dBA	132.4 dBA	130.8 dBA
October 2020	134.0 dBA	132.7 dBA	131.3 dBA
November 2020	134.0 dBA	131.7 dBA	129.8 dBA
December 2020	134.1 dBA	132.9 dBA	131.5 dBA
12 month Average 2020	134.0 dBA	132.8 dBA	130.8 dBA

Note 1: *Site Maximum Potential SWL* - This is the **maximum** sound power level (SWL) assuming that all plant and equipment is operating simultaneously (in practice this would rarely occur).

Note 2: *Site Maximum Operating SWL* - This is the **typical maximum** SWL that actually occurred during the monitoring period. This value is dependent on the plant and equipment run-time derived from the KCT operating log.

Note 3: *Site Mean Operating SWL* - This is the **logarithmic mean** SWL that actually occurred during the monitoring period. This value is dependent on the same factors that determined the *Site Maximum Operating SWL*.

As presented in **Table 8** the ***Site Maximum Potential SWL***, which assumes that all plant and equipment is operating simultaneously, was 134.1 dBA (in practice this rarely occurs). Minor variations in the site maximum SWL occur due to changes in the SWLs of individual items of plant and equipment measured during the quarterly onsite noise monitoring.

The highest ***Site Maximum Operating SWL*** that actually occurred during the 2020 monitoring period was 132.9 dBA. The Site maximum operating SWL is the operating SWL which occurred for 10% of the time during the monitoring period.

Similarly, the ***Site Mean Operating SWL*** that actually occurred during the 2020 monitoring period was 130.8 dBA. The mean operating SWL is reflective of the typical operating emissions during the reporting period. Variations in the typical maximum and mean operating SWLs are reflective of the changes to overall plant and equipment SWLs as well as the amount of plant and equipment which is operating concurrently at any time.

7.4 Environmental Noise Modelling Results 2020

Based on the measured SWLs (refer Section 7.3), KCT operating log and prevailing meteorological conditions, the monthly operating intrusive noise levels have been modelled for the two (2) key residential locations of Fern Bay and Stockton as presented in **Table 9**. Included is a comparison with the relevant operating noise limits (Condition 2.8) as well as Condition 2.10 noise goals of intrusive 45 dBA LAeq(15minute) and night-time amenity 43 dBA LAeq(9hour). Noise levels above the Condition 2.10 noise goals are shown in **bold**.

Table 9: *KCT Modelled 2020 Intrusive and Amenity Residential Noise Levels (dBA re 20 µPa)*

Location	Month	Typical Maximum Intrusive SPL[1]			Amenity Level SPL[2]	Condition 2.8 Noise Limits (Condition 2.10 Noise Goals)	
		Day	Evening	Night	Night	Intrusive	Amenity
Fern Bay FW1 Fullerton Lane	Jan 2020	43	45	45	42	50 (45)	47 (43)
	Feb 2020	42	43	43	40		
	Mar 2020	43	44	44	42		
	Apr 2020	43	44	44	41		
	May 2020	43	43	44	41		
	Jun 2020	43	44	44	42		
	Jul 2020	43	43	43	41		
	Aug 2020	44	44	44	42		
	Sep 2020	43	43	44	41		
	Oct 2020	43	44	44	42		
	Nov 2020	42	44	43	40		
	Dec 2020	43	45	**46**	43		
	Annual Ave	42.9	43.9	44.1	41.5		
Stockton SW1 Fullerton Street	Jan 2020	42	44	44	40	50 (45)	47 (43)
	Feb 2020	43	43	43	40		
	Mar 2020	44	43	44	41		
	Apr 2020	45	44	44	42		
	May 2020	44	43	44	41		
	Jun 2020	**46**	**46**	**46**	42		
	Jul 2020	43	43	43	41		
	Aug 2020	**47**	**47**	**47**	**44**		
	Sep 2020	**46**	45	45	42		
	Oct 2020	**46**	44	44	41		
	Nov 2020	41	42	42	39		
	Dec 2020	43	44	45	41		
	Annual Ave	44.5	44.2	44.5	41.3		

Note 1: Typical Maximum Intrusive SPL: This is the **typical maximum intrusive** sound pressure level (SPL) taken to be the upper 10th percentile of the calculated noise levels during the relevant periods based on the actual operating time of plant and equipment and assessable weather conditions.

Note 2 Amenity Level SPL: This is the **logarithmic average** SPL based on the actual operating time of plant and equipment and assessable weather conditions.

The following information is concluded from the modelled intrusive LAeq(15minute) noise levels presented in **Table 9**:

- The modelled intrusive LAeq(15minute) noise levels remain compliant with the Condition 2.8 operating noise limit of 50 dBA at Fern Bay and Stockton throughout 2020.
- Similarly, the modelled night-time amenity LAeq(9hour) noise levels comply with the Condition 2.8 operating noise limit of 47 dBA at Fern Bay and Stockton throughout 2020.
- The modelled intrusive LAeq(15minute) noise levels were at or below the Condition 2.10 noise goal of 45 dBA at Fern Bay, with the exception of December 2020 for the night period.
- The modelled intrusive LAeq(15minute) noise levels were at or below the Condition 2.10 noise goal of 45 dBA at Stockton with the following exceptions:
    - June, August, September and October 2020 for the day period.
    - June and August 2020 for the evening and night periods
- In all cases, modelled noise levels were within 2 dB of the Condition 2.10 noise goal.

The following information is concluded from the night-time amenity LAeq(9hour) noise levels presented in **Table 9**:

- The modelled night-time amenity LAeq(9hour) noise levels were at or below the Condition 2.10 noise goal of 43 dBA at Fern Bay and Stockton throughout 2020 with the exception of Stockton during August 2020.

7.5 Noise Improvement Status

The annual average modelled intrusive and amenity residential noise levels for Fern Bay and Stockton from 2011 to present are shown in in **Figure 2**, **Figure 3**, **Figure 4** & **Figure 5**.

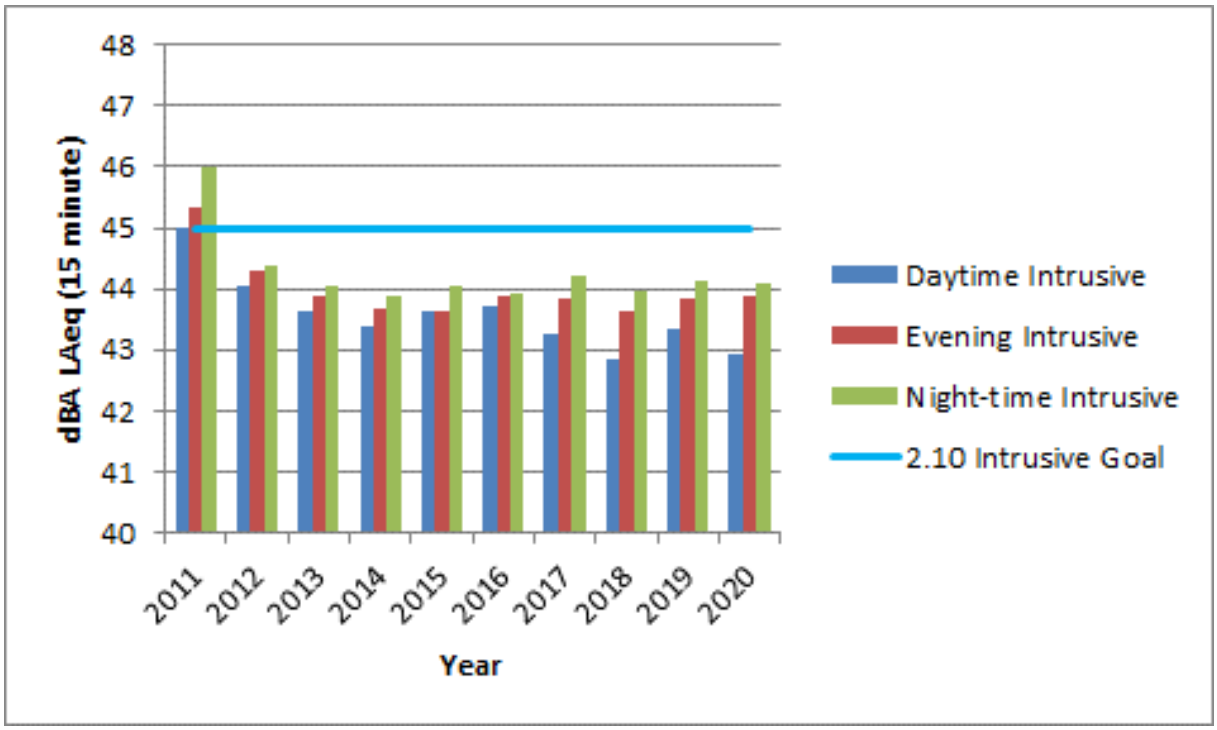


Figure 2: *Fern Bay - Annual Average Modelled Intrusive Residential Noise Levels (dBA re 20 µPa)*

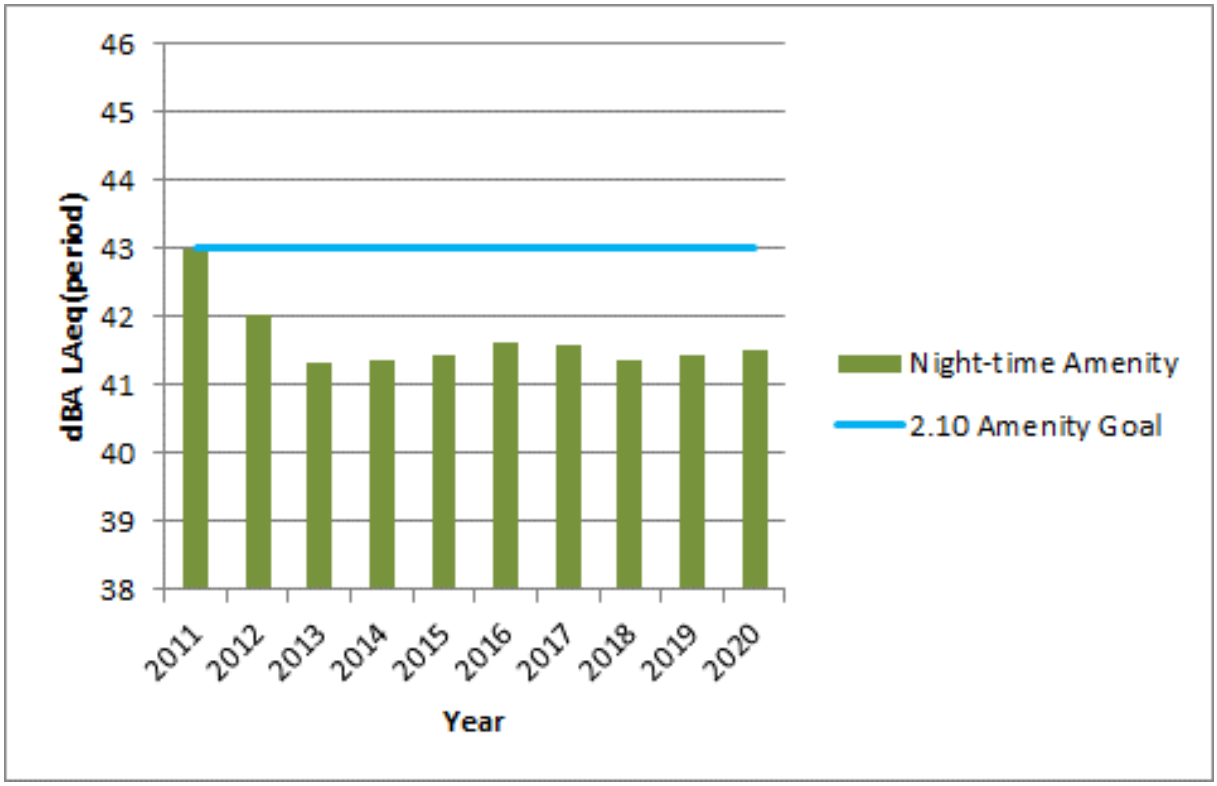


Figure 3: *Fern Bay - Annual Average Modelled Amenity Residential Noise Levels (dBA re 20 µPa)*

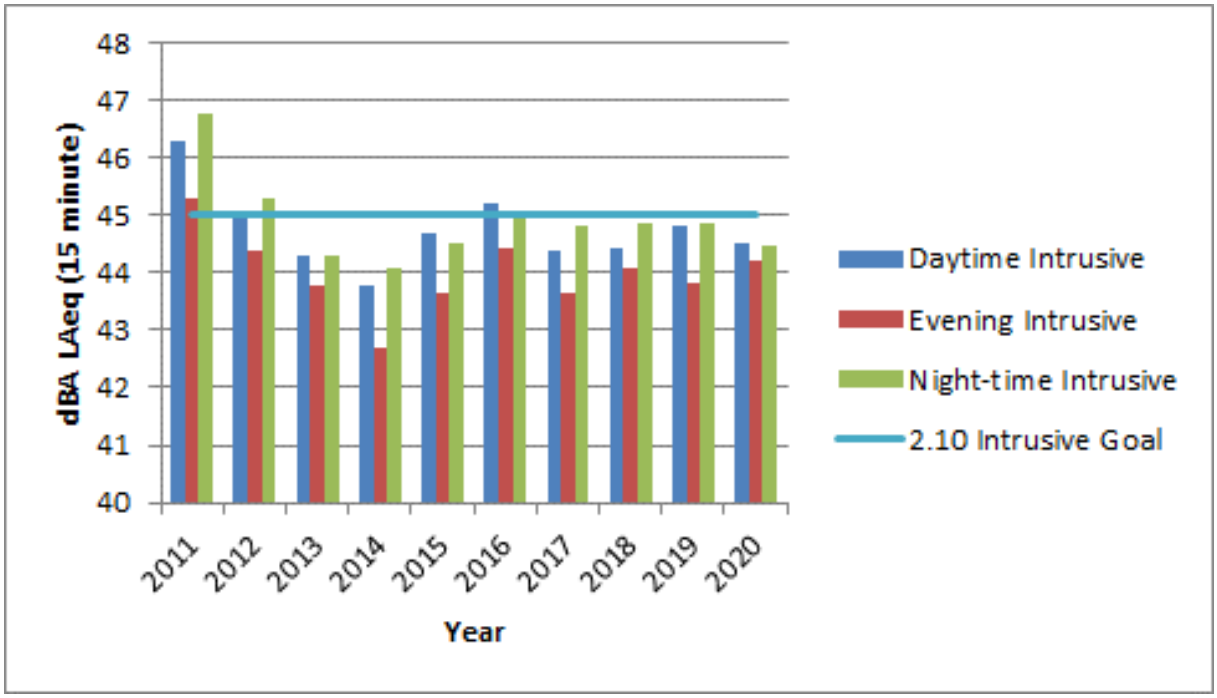


Figure 4: *Stockton - Annual Average Modelled Intrusive Residential Noise Levels (dBA re 20 µPa)*

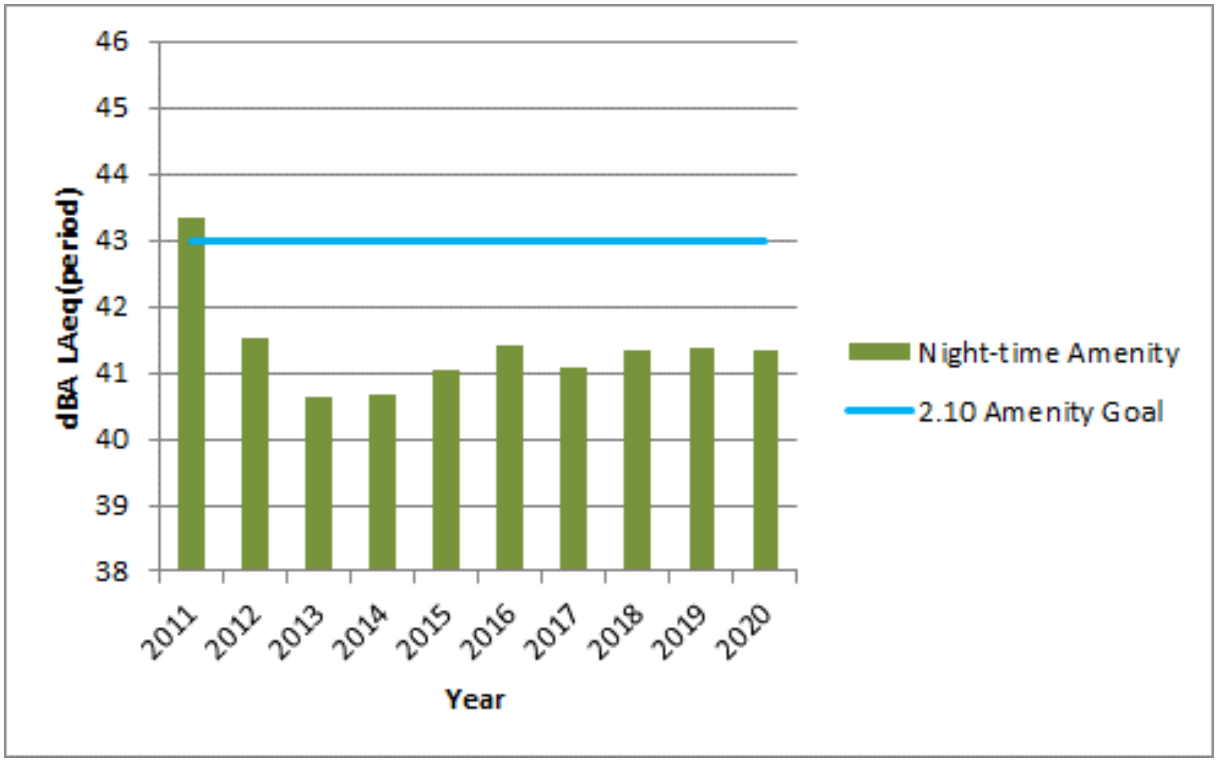


Figure 5: *Stockton - Annual Average Modelled Amenity Residential Noise Levels (dBA re 20 µPa)*

As presented in **Figure 2** and **Figure 3**, the annual average modelled noise levels were below the Condition 2.10 intrusive and amenity noise goals during 2020 at Fern Bay. Noise levels at Fern Bay were very similar to those modelled during 2019.

As presented in **Figure 4** and **Figure 5**, the annual average modelled noise levels were below the Condition 2.10 intrusive and amenity noise goals during 2020 at Stockton. Modelled noise levels at Stockton were lower during the day and night, and marginally higher during the evening during 2020 when compared to 2019.

As stated in **Section 7.4** modelled noise levels are calculated based on the KCT operating log, prevailing meteorological conditions and the KCT measured SWLs. As such, the marginal differences in modelled noise levels at Fern Bay and Stockton also reflect natural variation in the prevailing meteorological conditions over the various reporting periods. Notwithstanding, annual average noise levels have reduced since 2011.

8 Summary of Findings and Recommendations

Port Waratah implements a Continuous Noise Improvement Program at KCT which has delivered significant noise improvements (i.e. noise controls and management measures) through the Kooragang Expansion Projects associated with the 120 Mtpa Modification. The improvements developed and implemented during the construction phases of the site have been adopted where possible and incorporated into the ongoing maintenance and procurement systems at Port Waratah to continue the management of onsite noise generation.

Further noise reduction investigations are continuing to identify the potential items for retrofit or attenuation and feasible noise controls which may be implemented to improve the noise performance at KCT. The ongoing findings of these investigations are being used to guide the works required to manage KCT on-site sound power levels (SWLs) and off-site environmental noise emissions. Additionally, Port Waratah has an established environmental objective to reduce noise from its operations, and targets for the continual improvement in noise emissions as well as employee engagement regarding noise management.

Based on operator attended noise monitoring, intrusive $L_{Aeq(15minute)}$ noise levels are compliant with the Condition 2.10 noise goal during 2020. On an annual basis, average intrusive modelled noise levels are below the 2.10 noise goal at Fern Bay and Stockton. Furthermore, noise modelling indicates that on an annual basis night-time LAeq(9hour) noise levels are below the 2.10 noise goal of 43 dBA. It should be noted that natural variation in prevailing weather conditions during each reporting period also has an impact on annual results, as can be seen in the relative differences in modelled levels between the Fern Bay and Stockton receiver areas.

Through the implementation of the Improvement Program and as reported annually, Port Waratah shall continue to investigate all feasible and reasonable steps to reduce the noise emissions at KCT with consideration of the noise goal objectives nominated in PA Condition 2.10.

9 Appendix A1

9.1 Project Approval (06_0189 Mod 3) Dated 26 November 2012 Noise Extracts

Noise Impacts

2.6 The Proponent shall minimise noise emissions from plant and equipment operated on the Site in relation to the project according to the principles outlined in the NSW Government's *Industrial Noise Policy*.

Construction Noise

2.7 The Proponent shall only undertake construction activities associated with the project that would generate an audible noise at any residential premises between 7.00 am and 6.00 pm, seven days a week. Audible noise is defined as "noise that can be heard at the receiver". This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons.
Note: 'safety or emergency reasons' refers to emergency works which may need to be undertaken to avoid loss of life, property loss and/or to prevent environmental harm.

Operation Noise

2.8 The Proponent shall design, construct, operate and maintain the project to ensure that the noise contributions from the expanded coal terminal do not exceed the maximum allowable noise contributions specified in Table 1 below, at those locations and during those periods indicated. The maximum allowable noise contributions apply under:

a) meteorological conditions of: wind speeds up to 3 ms^{-1} at 10 metres above ground level; or
b) temperature inversion conditions up to 3°C per 100 metres and wind speeds up to 2ms^{-1} at 10 metres above the ground.

Table 1 - Maximum Allowable Noise Contributions (dB(A))

Location	Day, Evening, Night At all times	Night 10.00pm to 7.00am Monday to Saturday 10.00pm to 8.00am on Sundays and Public Holidays	
	LAeq(15minute)	LAeq(night)	LA1(1minute)
Fern Bay North	46	43	55
Fem Bay West	50	47	55
Fern Bay East	49	46	55
Stockton West	50	47	57
Stockton East	49	46	56
Mayfield West	41	37	56
Mayfield	44	38	58
Carrington	42	38	52

2.9 For the purpose of assessment of noise contributions specified under condition 2.8 of this consent, noise from the project shall be:

a) measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with LAeq(15 minute) night noise limits;
b) measured at one metre from the dwelling facade to determine compliance with LA1(1minute) noise limits; and

c) subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000), where applicable.

Notwithstanding, should direct measurement of noise from the development be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the DECCW (refer to Section 11 of the New South Wales Industrial Noise Policy (EPA, 2000)). Details of such an alternative noise assessment method accepted by the DECCW shall be submitted to the Director-General prior to the implementation of the assessment method.

2.10 The Proponent shall investigate all feasible and reasonable mitigation measures, as defined in the New South Wales Industrial Noise Policy (EPA, 2000), to reduce noise impacts from the upgraded coal terminal at Fern Bay and Stockton to achieve noise contributions of no greater than 43 dB(A) (LAeq,(night)), and 45 dB(A) (LAeq,(15 minutes)) under adverse meteorological conditions specified under condition 2.8 of this approval. A report on investigations shall be submitted to DECCW and the Director-General within 12 months of commencement of works the subject of this approval and annually thereafter, unless otherwise agreed by DECCW and the Director-General, until levels specified above are achieved. A program for ongoing investigation and implementation of feasible and reasonable mitigation measures to reduce noise contributions at Fern Bay and Stockton shall be implemented. The program shall commence no later than six months following the DECCW's agreement to a noise reduction program, unless otherwise agreed by the DECCW and the Director-General.

Train Noise Performance

2.11 The Proponent shall take all necessary actions to ensure that trains operated on the Site meet the noise performance criteria established under condition 2.8.

Noise Auditing

3.4 Within 90 days of the Commencement of Operations, and following the commissioning of the Stage 4 Project, as modified in accordance with condition 1.1f), or as otherwise agreed by the Director-General, and during a period in which the project is operating under normal operating conditions, the Proponent shall undertake a program to confirm the noise performance of the project. The noise program shall include, but not necessarily be limited to:

a) noise monitoring, consistent with the guidelines provided in the New South Wales Industrial Noise Policy (EPA, 2000), to assess compliance with condition 2.8 of this consent;
b) methodologies, locations and frequencies for noise monitoring;
c) identification of monitoring sites at which pre- and post-project noise levels can be ascertained;
d) details of any complaints and enquiries received in relation to noise generated by the project within the first 90 days of operation;
e) an assessment of night-time use of audible alarm systems;
f) a statement of whether the Site is in compliance with noise limits in condition 2.8; and
g) any additional noise mitigation measures and timetables for implementation.

3.5 Within 28 days of conducting the noise monitoring referred to under condition 3.4 of this approval, or as otherwise agreed by the Director-General, the Proponent shall provide the Director-General and the EPA with a copy of the report. If the noise monitoring report identifies any non-compliance with the noise limits imposed under this approval (refer condition 2.8), the Proponent shall detail what additional measures would be implemented to ensure compliance, clearly indicating who would implement these measures, when these measures would be implemented, and how the effectiveness of these measures would be measured and reported to the Director-General.

Operation Environmental Management Plan

7.4 Prior to the Commencement of Operations, the Proponent shall prepare and submit for the approval of the Director-General an **Operation Environmental Management Plan** (OEMP) to detail an environmental management framework, practices and procedures to be followed during the operation of the project. The Plan shall be consistent with the Department's *Guideline for the Preparation of Environmental Management Plans* (DIPNR 2004), and shall include, but not necessarily be limited to:

a) a description of all activities to be undertaken on the Site during operation including an indication of stages of operation, where relevant;
b) statutory and other obligations that the Proponent is required to fulfill during operation including all approvals, consultations and agreements required from authorities and other stakeholders, and key legislation and policies;
c) details of how the environmental performance of the operations will be monitored, and what actions will be taken to address identified adverse environmental impacts. In particular, the following environmental performance issues shall be addressed in the Plan:
i) measures to monitor and manage dust emissions;
ii) measures to monitor and minimise soil erosion and the discharge of sediment and other pollutants to lands and/or waters during operation; and
iii) measures to monitor and control noise emissions during operation.
d) a description of the roles and responsibilities for all relevant employees involved in the operation of the project;
e) the additional plans/protocol listed under condition 7.5 of this approval; and
f) complaints and enquiries handling procedures during operation.

The Operation Environmental Management Plan shall be made available for inspection by the public upon request following its approval by the Director-General.

7.5(b) A **Noise Management Plan** to outline monitoring, management procedures and measures to minimise total operational noise emissions from the project. The Plan shall also include, but not necessarily be limited to:

i. identification of all relevant receivers and the applicable criteria at those receivers commensurate with the noise limits specified under this approval;
ii. identification of activities that will be carried out in relation to the project and the associated noise sources;
iii. assessment of project noise impacts at the relevant receivers against the noise limits specified under this approval;
iv. details of all management methods and procedures that will be implemented to control individual and overall noise emissions from the Site during the project;
v. details regarding the procurement process to guarantee that equipment levels meet the noise levels as provided in the documents listed in condition 1.1;
vi. development of reactive and pro-active strategies for dealing promptly with any noise complaints and enquiries;
vii. noise monitoring and reporting procedures; and
viii. regular internal audits of compliance of all plant and equipment with acceptable design noise.

10 Appendix A2

10.1 DP&I Request for Supplementary Information

NSW GOVERNMENT Planning & Infrastructure

Contact: Ingrid Ilias
Phone: 02 9228 6411
Fax: 02 9228 6355
Email: ingrid.ilias@planning.nsw.gov.au

Our ref: 09/00631-2

Mr Nick Godfrey-Smith
Specialist Advisor Environment
Port Waratah Coal Services Limited (PWCS)
PO Box 57
CARRINGTON NSW 2294

Dear Mr Godfrey-Smith

Port Waratah Coal Services (PWCS) – Kooragang Coal Terminal 120 Mtpa Project (06_0189)
Annual Noise Investigation Report April 2011 (Condition 2.10)

I refer to your letter dated 11 April 2011 and the submitted report entitled Annual Noise Investigated Report dated April 2011, prepared to meet the requirements of condition 2.10.

The Department notes that Stage 4 (120 million tonnes per annum (mtpa)) operations have not yet commenced and that PWCS has pursued noise reduction measures associated with Stage 3 works resulting in improved compliance with the requirements of the development consent. The Department also notes that construction of Stage 4 works have commenced and that operations are due to commence in June 2011. Accordingly, the Department expects that PWCS will continue to investigate all feasible and reasonable mitigation measures to reduce noise impacts from the project and continue to implement the Continuous Noise Improvement Program and work towards the achievement of the approved noise goals.

To enable the Department to fully understand what PWCS is achieving through its Continuous Noise Improvement Program, the Department requires that future Annual Noise Investigation Reports provide the following information:

- what feasible and reasonable mitigation measures have been implemented as part of the Continuous Noise Improvement Program in the preceding years and the resultant noise reductions that have been observed; and
- results of noise monitoring surveys identifying the noise contributions from the project on the residential receivers of Fern Bay and Stockton in the preceding year and whether compliance with the maximum allowable noise contributions stipulated in condition 2.8 and the noise goals in condition 2.10 are being achieved.

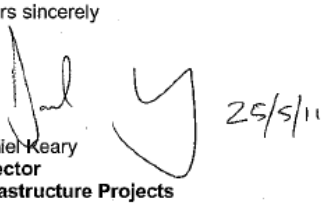
The Department also considers that future Annual Noise Investigation Reports should omit references to the predicted intrusive and amenity noise levels sourced from the Environmental Assessment, as outlined in Tables 5 and 7 of the report, and instead focus on the maximum allowable noise contributions and noise goals outlined in conditions 2.8 and 2.10 respectively. Similarly, the use of wording such as "approved" in relation to the noise levels outlined in the Environmental Assessment is considered to be misleading and should be avoided.

In noting that Stage 4 (120 mtpa) works are expected to commence operations in June 2011, PWCS are reminded that relevant operational project approval requirements, including the preparation and approval of the Operational Environmental Management Plan must be met.

Bridge St Office 23-33 Bridge St Sydney NSW 2000 GPO Box 39 Sydney NSW 2001
Telephone (02) 9228 6111 Facsimile (02) 9228 6191 Website planning.nsw.gov.au

If you have any questions on this matter, please call Ms Ingrid Ilias on the above contact details.

Yours sincerely

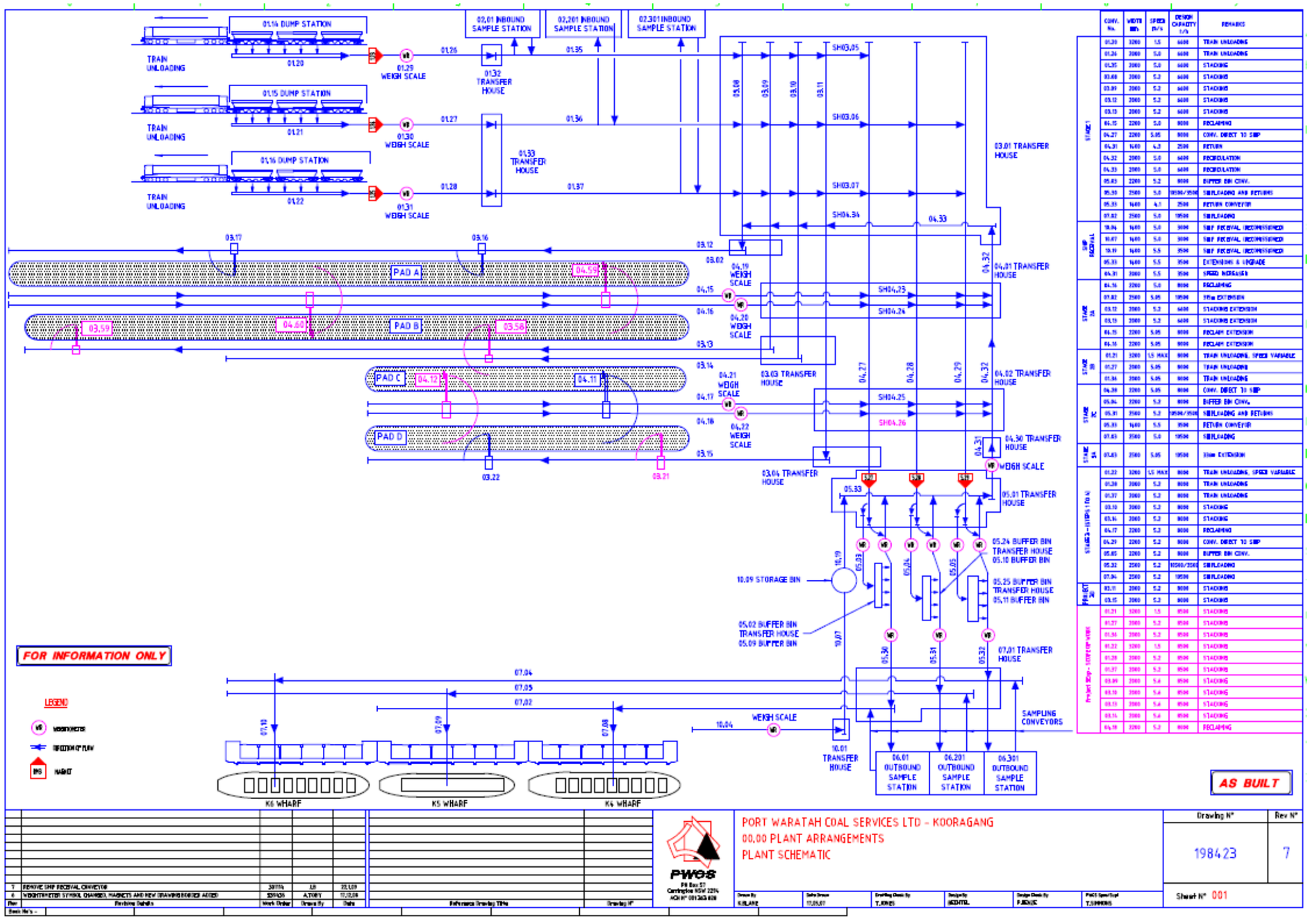


25/5/11

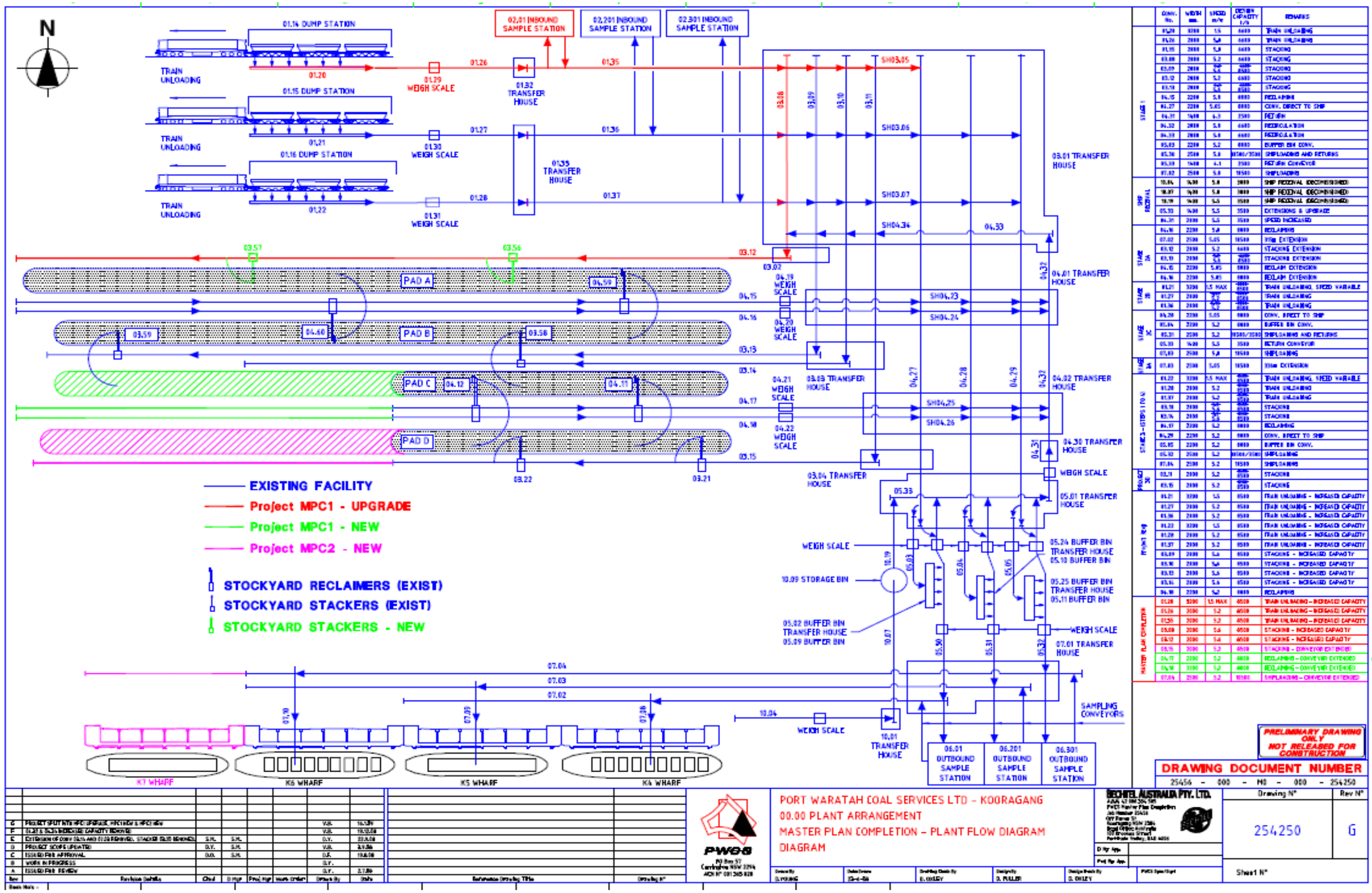
Daniel Keary
Director
Infrastructure Projects

11 Appendix B

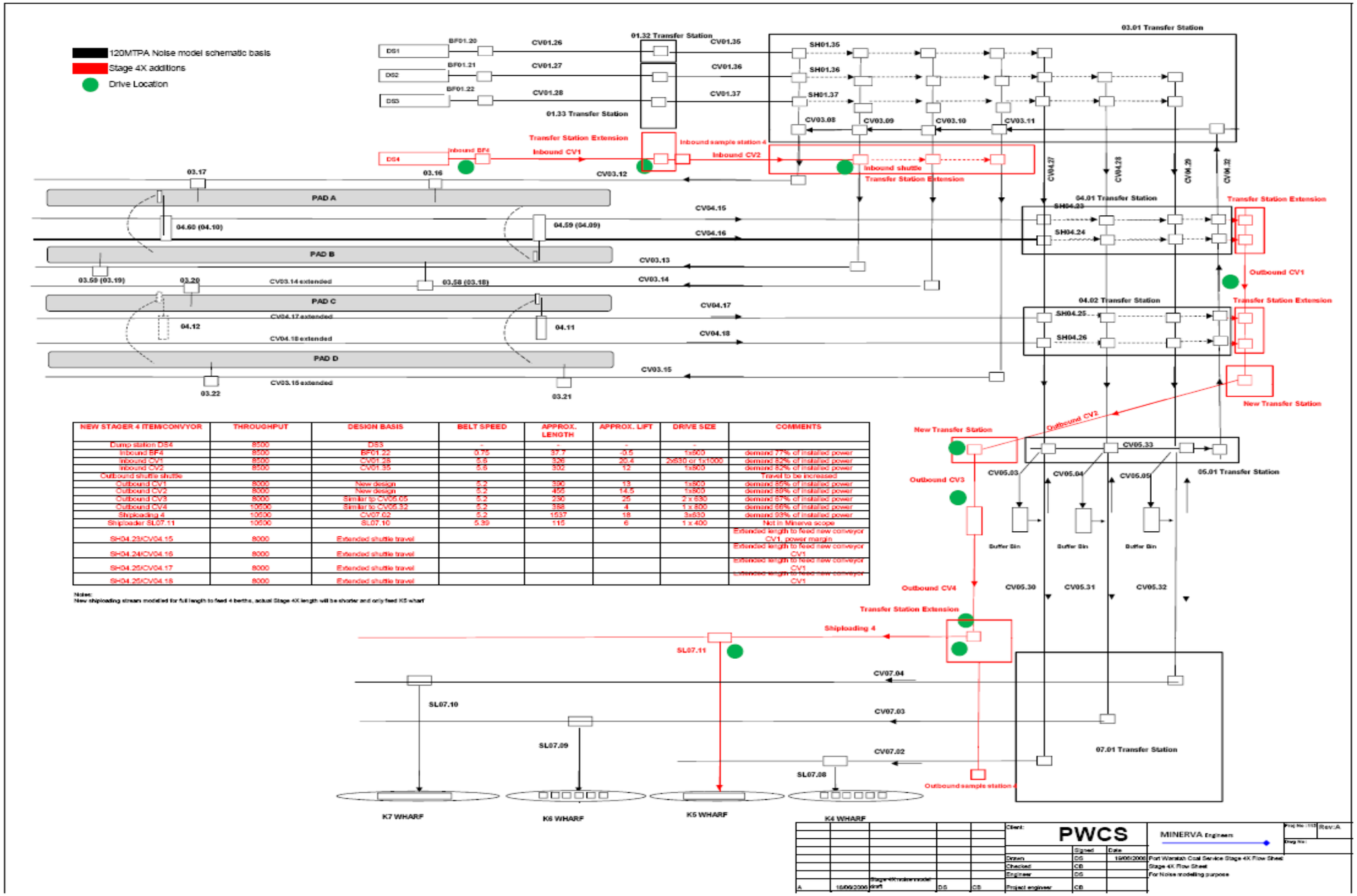
11.1 Project 3EXP Schematic Equipment Layout



11.2 Masterplan Completion Schematic Equipment Layout



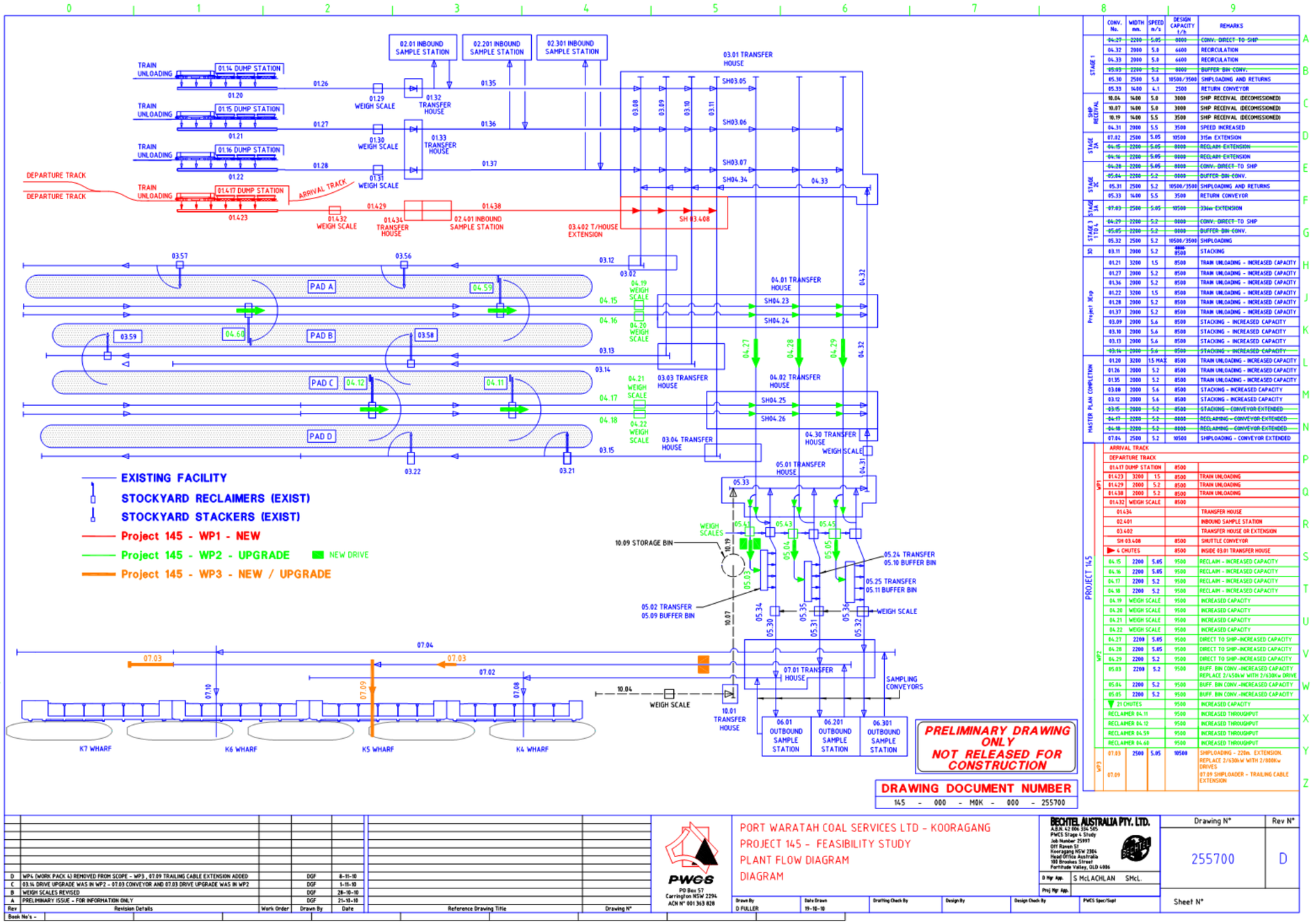
11.3 Stage 4 Project Schematic Equipment Layout



NEW STAGER 4 ITEM/CONVYOR	THROUGHPUT	DESIGN BASIS	BELT SPEED	APPROX. LENGTH	APPROX. LIFT	DRIVE SIZE	COMMENTS
Dump station DS4	8500	DS5	-	-	-	-	
Inbound BF4	8500	BF01.22	0.75	37.7	-0.5	1x500	demand 77% of installed power
Inbound CV1	8500	CV01.28	5.6	326	20.4	2x630 or 1x1000	demand 82% of installed power
Inbound CV2	8500	CV01.35	5.6	302	12	1x500	demand 82% of installed power
Outbound shuttle shuttle							Travel to be increased
Outbound CV1	8000	New design	5.2	390	13	1x500	demand 85% of installed power
Outbound CV2	8000	New design	5.2	455	14.5	1x500	demand 88% of installed power
Outbound CV3	8000	Similar tp CV05.05	5.2	230	25	2 x 630	demand 87% of installed power
Outbound CV4	10500	Similar to CV05.32	5.2	382	4	1 x 800	demand 66% of installed power
Shiploading 4	10500	CV07.02	5.2	1537	18	3x630	demand 93% of installed power
Shiploader SL07.11	10500	SL07.10	5.39	115	6	1 x 400	Not in Minerva scope
SH04.23/CV04.15	8000	Extended shuttle travel					Extended length to feed new conveyor CV1, power margin
SH04.24/CV04.16	8000	Extended shuttle travel					Extended length to feed new conveyor CV1
SH04.25/CV04.17	8000	Extended shuttle travel					Extended length to feed new conveyor CV1
SH04.25/CV04.18	8000	Extended shuttle travel					Extended length to feed new conveyor CV1

Notes:
New shiploading stream modelled for full length to feed 4 berths, actual Stage 4X length will be shorter and only feed K5 wharf

11.4 Project 145 Schematic Equipment Layout



	CONV. No.	WIDTH mm.	SPEED m/s	DESIGN CAPACITY t/h	REMARKS
STAGE 1	~~04.27~~	~~2200~~	~~5.05~~	~~8000~~	~~CONV. DIRECT TO SHIP~~
	04.32	2000	5.0	6600	RECIRCULATION
	04.33	2000	5.0	6600	RECIRCULATION
	~~05.03~~	~~2200~~	~~5.2~~	~~8000~~	~~BUFFER BIN CONV.~~
	05.30	2500	5.0	10500/3500	SHIPLOADING AND RETURNS
	05.33	1400	4.1	2500	RETURN CONVEYOR
SHIP RECEIVAL	10.04	1400	5.0	3000	SHIP RECEIVAL (DECOMISSIONED)
	10.07	1400	5.0	3000	SHIP RECEIVAL (DECOMISSIONED)
	10.19	1400	5.5	3500	SHIP RECEIVAL (DECOMISSIONED)
	04.31	2000	5.5	3500	SPEED INCREASED
STAGE 2A	07.02	2500	5.05	10500	315m EXTENSION
	~~04.15~~	~~2200~~	~~5.05~~	~~8000~~	~~RECLAIM EXTENSION~~
	~~04.16~~	~~2200~~	~~5.05~~	~~8000~~	~~RECLAIM EXTENSION~~
STAGE 2C	~~04.28~~	~~2200~~	~~5.05~~	~~8000~~	~~CONV. DIRECT TO SHIP~~
	~~05.04~~	~~2200~~	~~5.2~~	~~8000~~	~~BUFFER BIN CONV.~~
	05.31	2500	5.2	10500/3500	SHIPLOADING AND RETURNS
	05.33	1400	5.5	3500	RETURN CONVEYOR
STAGE 3 STAGE 3A	~~07.03~~	~~2500~~	~~5.05~~	~~10500~~	~~33m EXTENSION~~
STAGE 3 STAGE 3TO4	~~04.29~~	~~2200~~	~~5.2~~	~~8000~~	~~CONV. DIRECT TO SHIP~~
	~~05.05~~	~~2200~~	~~5.2~~	~~8000~~	~~BUFFER BIN CONV.~~
	05.32	2500	5.2	10500/3500	SHIPLOADING
3D	03.11	2000	5.2	~~8500~~ 8500	STACKING
Project 3Grp	01.21	3200	1.5	8500	TRAIN UNLOADING - INCREASED CAPACITY
	01.27	2000	5.2	8500	TRAIN UNLOADING - INCREASED CAPACITY
	01.36	2000	5.2	8500	TRAIN UNLOADING - INCREASED CAPACITY
	01.22	3200	1.5	8500	TRAIN UNLOADING - INCREASED CAPACITY
	01.28	2000	5.2	8500	TRAIN UNLOADING - INCREASED CAPACITY
	01.37	2000	5.2	8500	TRAIN UNLOADING - INCREASED CAPACITY
	03.09	2000	5.6	8500	STACKING - INCREASED CAPACITY
	03.10	2000	5.6	8500	STACKING - INCREASED CAPACITY
	03.13	2000	5.6	8500	STACKING - INCREASED CAPACITY
	~~03.14~~	~~2000~~	~~5.6~~	~~8500~~	~~STACKING - INCREASED CAPACITY~~
MASTER PLAN COMPLETION	01.20	3200	1.5 MAX	8500	TRAIN UNLOADING - INCREASED CAPACITY
	01.26	2000	5.2	8500	TRAIN UNLOADING - INCREASED CAPACITY
	01.35	2000	5.2	8500	TRAIN UNLOADING - INCREASED CAPACITY
	03.08	2000	5.6	8500	STACKING - INCREASED CAPACITY
	03.12	2000	5.6	8500	STACKING - INCREASED CAPACITY
	~~03.15~~	~~2000~~	~~5.2~~	~~8500~~	~~STACKING - CONVEYOR EXTENDED~~
	~~04.17~~	~~2200~~	~~5.2~~	~~8000~~	~~RECLAIMING - CONVEYOR EXTENDED~~
	~~04.18~~	~~2200~~	~~5.2~~	~~8000~~	~~RECLAIMING - CONVEYOR EXTENDED~~
	07.04	2500	5.2	10500	SHIPLOADING - CONVEYOR EXTENDED

PROJECT 145					
	ARRIVAL TRACK				
	DEPARTURE TRACK				
	01.417 DUMP STATION			8500	
WP1	01.423	3200	1.5	8500	TRAIN UNLOADING
	01.429	2000	5.2	8500	TRAIN UNLOADING
	01.438	2000	5.2	8500	TRAIN UNLOADING
	01.432	WEIGH SCALE		8500	
	01.434				TRANSFER HOUSE
	02.401				INBOUND SAMPLE STATION
	03.402				TRANSFER HOUSE OR EXTENSION
	SH 03.408			8500	SHUTTLE CONVEYOR
	4 CHUTES			8500	INSIDE 03.01 TRANSFER HOUSE
	04.15	2200	5.05	9500	RECLAIM - INCREASED CAPACITY
	04.16	2200	5.05	9500	RECLAIM - INCREASED CAPACITY
	04.17	2200	5.2	9500	RECLAIM - INCREASED CAPACITY
	04.18	2200	5.2	9500	RECLAIM - INCREASED CAPACITY
	04.19	WEIGH SCALE		9500	INCREASED CAPACITY
	04.20	WEIGH SCALE		9500	INCREASED CAPACITY
	04.21	WEIGH SCALE		9500	INCREASED CAPACITY
	04.22	WEIGH SCALE		9500	INCREASED CAPACITY
	04.27	2200	5.05	9500	DIRECT TO SHIP - INCREASED CAPACITY
	04.28	2200	5.05	9500	DIRECT TO SHIP - INCREASED CAPACITY
WP2	04.29	2200	5.2	9500	DIRECT TO SHIP - INCREASED CAPACITY
	05.03	2200	5.2	9500	BUFF. BIN CONV - INCREASED CAPACITY REPLACE 2/450kW WITH 2/630Kw DRIVE
	05.04	2200	5.2	9500	BUFF. BIN CONV - INCREASED CAPACITY
	05.05	2200	5.2	9500	BUFF. BIN CONV - INCREASED CAPACITY
	21 CHUTES			9500	INCREASED CAPACITY
	RECLAIMER 04.11			9500	INCREASED THROUGHPUT
	RECLAIMER 04.12			9500	INCREASED THROUGHPUT
	RECLAIMER 04.59			9500	INCREASED THROUGHPUT
	RECLAIMER 04.60			9500	INCREASED THROUGHPUT
WP3	07.03	2500	5.05	10500	SHIPLOADING - 220m. EXTENSION. REPLACE 2/630kW WITH 2/800Kw DRIVES
	07.09				07.09 SHIPLOADER - TRAILING CABLE EXTENSION

PRELIMINARY DRAWING ONLY NOT RELEASED FOR CONSTRUCTION

DRAWING DOCUMENT NUMBER
145 - 000 - M0K - 000 - 255700

Rev	Revision Details	Work Order	Drawn By	Date
D	WP4 (WORK PACK 4) REMOVED FROM SCOPE - WP3 , 07.09 TRAILING CABLE EXTENSION ADDED		DGF	8-11-10
C	03.14 DRIVE UPGRADE WAS IN WP2 - 07.03 CONVEYOR AND 07.03 DRIVE UPGRADE WAS IN WP2		DGF	1-11-10
B	WEIGH SCALES REVISED		DGF	28-10-10
A	PRELIMINARY ISSUE - FOR INFORMATION ONLY		DGF	21-10-10

Book No's -

PWCS
PO Box 57
Carrington NSW 2294
ACN N° 091 363 828

PORT WARATAH COAL SERVICES LTD - KOORAGANG
PROJECT 145 - FEASIBILITY STUDY
PLANT FLOW DIAGRAM
DIAGRAM

Drawn By	Date Drawn	Drafting Check By	Design By	Design Check By	PWCS Spec/Supt
D FULLER	19-10-10				

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