Commodity Logistics & Import Project

Water Impact Assessment

BlueScope Steel (AIS) Pty Ltd

09 November 2022

→ **The Power of Commitment**

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Executive summary

Background

BlueScope Steel (AIS) Pty Ltd (BlueScope) is one of Australia's leading manufacturers and is a global leader in finished and semi-finished steel products. Steelmaking operations are undertaken at the Port Kembla Steelworks (PKSW), within an industrial site of approximately 750 hectares located in the Wollongong Local Government Area.

Recent and emerging disruptions to key commodity supply chains have highlighted the importance of an upgrade to three of the five berths operated by BlueScope, which is proposed as a key component of the Number 6 Blast Furnace (6BF) Reline Project. This upgrade will allow for the berths to accommodate the increase in premium hard coking coal imports needed to replace the three-seam coal from South32's Dendrobium mine. This coal is currently transported by rail and is expected to cease supply by 2028. The proposed upgrade is urgently required to support continued operations at PKSW, thus maintaining the provision of steel to the domestic and export markets, and the continuation of economic benefit to the Illawarra region.

The upgrade of PKSW's raw material import capabilities is referred to as the Commodity Logistics and Import Project (CLIP) or the project. CLIP is part of a larger Critical State Significant Infrastructure (CSSI) project involving both the reline of 6BF and CLIP.

This Water Impact Assessment (WIA) report has been prepared by GHD Pty Ltd (GHD) as part of the Environmental Impact Statement (EIS) for the project. The purpose of this report is to assess the potential impacts to water resources from constructing and operating the project. The report:

– Addresses the relevant criteria in the SEARs for the project
– Describes the existing environment with respect to water resources
– Assesses the potential impacts of constructing and operating the project on water resources
– Recommends measures to mitigate and manage the impacts identified

Assessment of impacts from the project during construction

Potential risks to water resources during the construction phase of the project are excavation, stockpiling, construction works and vehicle movement. Specific risks related to water quality include:

– Release of sediment or poor-quality stormwater into drains and waterways that is impacted by excavation works and other construction activities.
– Potential mobilisation of existing contamination within soils via surface water or groundwater.
– Spills of hydrocarbons during relocation of the existing bunker fuel line operated by Park Fuels.
– Spills of hydrocarbons and other chemicals from construction plant and machinery.

All construction activities are proposed to take place in established areas with existing water management controls in place. As a result, potential impacts to surface and groundwater quality during the construction phase are expected to be readily manageable. As such, the risk associated with the proposed construction activities and effects on water resources is considered as low as reasonably practicable.

Assessment of impacts from the project during operations

There are no process water discharges associated with the elements of the project considered in this assessment. Following completion of the project, there will be no significant changes to the operation of the PKSW in relation to water resources. As a result, no additional mitigation measures or monitoring programs are considered necessary. The risks will be managed through BlueScope's well-developed operational controls and the existing stormwater drainage network and soakaways. As such, the risk associated with the operational phase of the project and effects on water resources is considered as low as reasonably practicable.

Conclusion

Construction and operational risks posed by the project in relation to water quality are in line with those of the existing operations, for which management measures are already in place. Based on the investigations and assessment undertaken by GHD and the conclusions drawn in this WIA report, it is considered that, subject to the recommended mitigation measures being applied, the risks to water resources associated with the project are considered as low as reasonably practicable.

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Abbreviations and acronyms

Term	Definition
AAT	Australian Amalgamated Terminals
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand Guidelines
AS	Australian Standards
ASS	Acid sulphate soils
BS	British Standards
BlueScope	BlueScope Steel (AIS) Pty Ltd
BoM	Bureau of Meteorology
BSL	BlueScope Steel
°C	Degrees Celsius
CEMP	Construction Environmental Management Plan
CLM Act	Contaminated Land Management Act 1997
CO	Carbon monoxide
CO_2	Carbon dioxide
COG	Coke Oven Gas
COPC	Contaminants of Potential Concern
CSSI	Critical State Significant Infrastructure
DEC	Department of Environment and Conservation NSW
DECC	Department of Environment and Climate Change NSW
DECCW	Department of Environment and Climate Change and Water NSW
DGV	Default Guideline Values
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved oxygen
DP	Deposited Plan
DPI	Department of Primary Industries
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
EPA	Environment Protection Authority NSW
EPL	Environmental Protection Licence
IMED	Ironmaking East Drain
ISO	International Organization for Standardisation (Organisation internationale de normalisation)
km	Kilometre
LBL	Load Based Licensing
LNAPL	Light Non-Aqueous Phase Liquid
LOSP	Level of Species Protection
LOR	Limit of reporting
m	Metre

Term	Definition
mg/L	Milligrams per litre
mm	Millimetres
m^3/hr	Cubic metres per hour
NTU	Nephelometric Turbidity Units
NSW	New South Wales
pH	Acidity
PKHD	Port Kembla Height Datum
PKSW	Port Kembla Steel Works
PRP	Pollution Reduction Program
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
SWMP	Soil and Water Management Plan
TSS	Total Suspended Solids
µg/L	Micrograms per litre
WQIA	Water quality impact assessment
5BF	Blast Furnace Number 5
6BF	Blast Furnace Number 6

1. Introduction

1.1 Background

BlueScope Steel (AIS) Pty Ltd (BlueScope) is one of Australia's leading manufacturers and is a global leader in finished and semi-finished steel products. Steelmaking operations are undertaken at the Port Kembla Steelworks (PKSW), within an industrial site of approximately 750 hectares located in the Wollongong Local Government Area.

PKSW is the largest steel production facility in Australia and is the only plant in Australia manufacturing upstream flat iron and steel products. PKSW supplies the essential feedstock that keeps all other domestic manufacturing facilities owned by BlueScope's parent entity, BlueScope Steel Limited (BSL), operational.

Recent and emerging disruptions to key commodity supply chains have highlighted the importance of an upgrade to three of the five berths operated by BlueScope, which is proposed as a key component of the Number 6 Blast Furnace (6BF) Reline Project. The upgrade will allow for the berths to accommodate the increase in premium hard coking coal imports needed to replace the three-seam coal from South32's Dendrobium mine. This coal is currently transported by rail and is expected to cease supply by 2028. The proposed upgrade is urgently required to support continued operations at PKSW, thus maintaining the provision of steel to the domestic and export markets, and the continuation of economic benefit to the Illawarra region.

The upgrade of PKSW's raw material import capabilities is referred to as the Commodity Logistics and Import Project (CLIP) or the project. CLIP is part of a larger Critical State Significant Infrastructure (CSSI) project involving both the reline of 6BF and CLIP.

The project has been declared CSSI in accordance with Section 5.13 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Schedule 5 of the *State Environmental Planning Policy (Planning Systems) 2021*.

1.2 Purpose of this report

This WIA report has been prepared by GHD on behalf of BlueScope for inclusion in the EIS to support the application for project approval under the Part 5, Division 5.2 of the EP&A Act.

The purpose of this report is to assess the potential impacts to water resources from constructing and operating the project. The report:

– Addresses the relevant criteria in the SEARs for the project as listed in Section 2.1
– Describes the existing environment with respect to water resources
– Assesses the potential impacts of constructing and operating the project on water resources
– Recommends measures to mitigate and manage the impacts identified

1.3 Limitations

This report: has been prepared by GHD for BlueScope and may only be used and relied on by BlueScope Steel (AIS) Pty Ltd for the purpose agreed between GHD and BlueScope Steel (AIS) Pty Ltd as set out in Section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than BlueScope Steel (AIS) Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

2. Methodology

2.1 Overview

This section outlines the methodology used in the water impact assessment of the project. The approach included the following key tasks:

Assessment scope:

– Review potential surface and groundwater impacts of the project.
– Characterise water quality discharges, including quality and quantity of all pollutants from the project.
– Document details of the stormwater and wastewater management systems.
– Undertake a site water balance.

Existing environment:

– Identify the study area relevant to the water quality assessment, including sensitive receiving environments.
– Characterise the existing water quality of Allans Creek and the Inner Harbour based on previous numerical modelling and monitoring programs undertaken in the vicinity of the study area.
– Identify and classify existing intake and discharge points within the study area.
– Review the completed and ongoing Pollution Reduction Programs of relevance to the study area.
– Identify where relevant criteria for receiving waters are being met.
– Identify where relevant criteria for receiving waters are not being met and what activities are being undertaken to work toward their achievement over time.

Water impact assessment:

– Document relevant criteria for assessment of potential water quality impacts.
– Compare expected discharge characteristics to the relevant criteria.
– Where the relevant criteria are not met, describe potential mitigation measures that will limit impacts to water quality and may enable the criteria to be met in time, thereby avoiding or minimising impacts to sensitive receiving environments.
– Describe the proposed erosion and sediment controls during construction.
– Provide recommendations for any required water quality controls for implementation during construction and future operations.

2.2 Legislative and policy context

2.2.1 Secretary's Environmental Assessment Requirements

The SEARs relevant to water resources, together with reference to where they are addressed in this report are summarised in Table 2.1.

Table 2.1 Water Resources SEARs

Requirement	Where addressed in this report
An assessment of potential surface and groundwater impacts of the project	Section 5.2.2
Characterisation of water quality discharges, including quality and quantity of all pollutants from the project for comparison against relevant water quality criteria, and details of proposed water quality controls	Whilst there are no direct process water discharges associated with the project, stormwater discharges and potential spills are described in Section 5
A detailed site water balance, including a description of site water demands and any water licensing requirements	Section 3.9 and Section 5.2.4
Identification of an adequate and secure water supply for the life of the project	Section 5.2.4
Details of the stormwater and wastewater management systems and measures to treat, reuse or dispose of water	Section 3.10 and Section 5.2.1
A description of the proposed erosion and sediment controls during construction	Section 6.1
An assessment of potential flooding impacts, including measures that would be employed to minimise risk to life and ensure the safe evacuation of people	Section 5.2.1
Characterisation of the nature and extent of any acid sulphate soils or contamination on the site, the potential risks to human health and the receiving environment, and the measures that would be implemented to avoid and mitigated impacts	Section 3.4 Section 5.1

2.2.2 Guidelines and policies

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines listed below:

– Environmental Planning and Assessment Act 1979
– Water Management Act 2000
– NSW Marine Water Quality Objectives in NSW (DEC, 2006)
– Storing and Handling Liquids: Environmental Protection (DECC, 2007)
– Managing Urban Stormwater: Soils and construction – Volume 1 (Landcom, 2004)
– Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018a)
– Australian and New Zealand - Toxicant Default Guideline Values For Sediment Quality (ANZG, 2018b)
– Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000)
– National Environmental Protection (Assessment of Site Contamination) Measure 1999, as amended in 2013 (NEPC, 2013)
– NSW Floodplain Development Manual (2005)
– Australian Rainfall and Runoff (ARR, 2019)

Further details regarding the relevant environmental values, indicators and associated guideline values or criteria for Port Kembla are provided in Section 2.3.

2.3 Guideline assessment criteria

The National Water Quality Management Strategy (NWQMS) provides a national framework for improving water quality in Australia's waterways. The main policy objective of the NWQMS is to achieve sustainable use of the nation's water resources, protecting and enhancing their quality, while maintaining economic and social development.

There are a number of national guideline documents under the NWQMS that aim to provide a consistent approach to the management of significant water quality issues. Those of relevance to the project and this water quality impact assessment are summarised below:

– Management of water quality for natural and semi-natural water resources is guided by the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018 or Water Quality Guidelines).
– Management of groundwater quality is guided by the National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (AG, 2013).

At a state level, the Marine Water Quality Objectives (WQOs) were adopted by the NSW Government in 2005 and are intended as a guideline tool for strategic planning and development assessment (DEC 2005)[1]. The WQO's define the following marine water quality values:

– Aquatic ecosystems i.e. aquatic ecosystem health
– Primary contact recreation i.e. swimming, surfing
– Secondary contact recreation i.e. boating, wading
– Visual amenity i.e. aesthetic qualities of waters
– Aquatic foods i.e. water suitable for growing seafood

Relevant guideline levels for ambient water quality relating to Port Kembla Harbour are presented in Figure 2.1.

Marine Water Quality Objectives	**Aquatic ecosystem health** **To maintain or improve the ecological condition of ocean waters.**	**Visual amenity** **To maintain or improve ocean water quality so that it looks clean and is free of surface films and debris.**
Examples of indicative guideline levels for environmental (ambient) water quality The indicative guideline levels (indicators and numerical criteria) listed are examples onl of some of the relevant water quality guideline levels recommended in the ANZECC ARMCANZ Guidelines 2000. Fc a full list, refer to the appropriat tables as referenced in the ANZECC & ARMCANZ Guidelines 2000. These are available at www.deh.gov.au/water/quality/nwqms/index.html	**Biological** • Frequency of algal blooms – no change from natural conditions • Bioaccumulation of contaminants – no change from natural conditions. **Physico-chemical** • **Nutrients** Total Nitrogen < 120 µg/L Total Phosphorous < 25 µg/L • **Turbidity** 0.5–10 NTU* **Toxicants in coastal waters** • **Metals** Copper < 1.3 µg/L Lead < 4.4 µg/L Zinc < 15 µg/L • **Pesticides** Chlorpyrifos < 0.009 µg/L **Toxicants in bottom sediments** • **Metals** Copper < 65 mg/kg dry weight Lead < 50 mg/kg dry weight Zinc <200 mg/kg dry weight Mercury < 0.15 mg/kg dry weight • **Organochlorines** Chlordane < 0.5 µg/kg dry weight Total PCBs < 23 µg /kg dry weight	**Indicators to ensure water looks clean and free from pollutants** • **Surface films and debris** Oils and petrochemicals should not be noticeable as a visible film on the water, nor should they be detectable by odour. Waters should be free from floating debris and litter. • **Nuisance organisms** Macrophytes, phytoplankton scums, filamentous algal mats, blue-green algae, and sewage fungus should not be present in unsightly amounts.

Figure 2.1 Relevant guideline levels for ambient water quality (DEC, 2006)

[1] It is noted that the NSW Government is reviewing the NSW Water Quality Objectives across coastal catchments, as a key action under Initiative 1 of the NSW Marine Estate Management Strategy 2018–2028. At the time of assessment no updated information was available.

At the time of publication, the WQO's were intended to be used in conjunction with the supporting information provided by the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000), which were superseded by the revised ANZG 2018 Water Quality Guidelines.

It should also be noted that the environmental values and respective numerical indicator values represent objectives for ambient background water quality and are not intended to be applied to point source discharges or mixing zones. Further details are provided in Section 3 regarding the existing water quality conditions and receiving environments of Port Kembla.

For the purposes of this assessment, with the exception of temperature (as the project will have no impact on water temperature), it is proposed to rely on the WQOs for definition of the relevant values for Port Kembla Harbour (as defined in Figure 2.1) and to rely on the ANZG 2018 Water Quality Guidelines for the Default Guideline Values (DGV's) summarised in Table 2.2.

Table 2.2 Relevant water quality criteria

Water quality parameter	DGVs (ANZG 2018)[2], [3]				NSW water quality objective
Aquatic ecosystems					
Biological					
Frequency of algal blooms	Not listed				No change from natural conditions
Bioaccumulation of contaminants	Not listed				No change from natural conditions
Physico-chemical and Nutrients					
Dissolved oxygen	90-110 % saturation				Not listed
pH	8.0-8.4				Not listed
Temperature	80th %ile of reference system*				Not listed
Turbidity (TSS proxy)	0.5-10 NTU				0.5-10 NTU
Ammonia as nutrient stressor	20 µg/L[4]				Not listed
Total Nitrogen	120 µgN/L				<120 µg/L
Total Phosphorous	25 µgP/L				<25 µg/L
Biochemical Oxygen Demand	80th %ile of reference system*				Not listed
Chemical Oxygen Demand	80th %ile of reference system*				Not listed
Chlorophyll-a	1 µg/L				Not listed
Toxicants					
LOSP	80% LOSP	90% LOSP	95% LOSP	99% LOSP[5]	N/A
Ammonia (NH_3)	1700 µg/L	1200 µg/L	910 µg/L		Not listed
Cyanide (CN)	14 µg/L	7 µg/L	4 µg/L		Not listed
Cadmium (Cd)	36 µg/L	14 µg/L	5.5 µg/L	0.7 µg/L	Not listed
Chromium (VI) ($Cr6^+$)	85 µg/L	20 µg/L	4.4 µg/L		Not listed
Copper (Cu)	8 µg/L	3 µg/L	1.3 µg/L		<1.3 µg/L
Lead (Pb)	12 µg/L	6.6 µg/L	4.4 µg/L		<4.4 µg/L
Zinc (Zn)	43 µg/L	23 µg/L	8 µg/L		<15 µg/L
Mercury (Hg) (inorganic)	1.4 µg/L	0.7 µg/L	0.4 µg/L	0.1 µg/L	Not listed

[2] Values, targets and actions in these guidelines are not mandatory, but support a nationally-agreed framework for water quality planning and management.
[3] DGVs for groundwater ecosystems have not been developed as part of the 2018 ANZG. It is noted that generally, the Water Quality Guidelines should apply to the quality of both surface water and of groundwater, since the community values which they protect relate to above-ground uses (e.g. irrigation, drinking water, farm animal or fish production and maintenance of aquatic ecosystems). The 2013 Australian Government groundwater guidelines do not provide guideline values for toxicants in groundwaters, but rather provide guidance on how existing DGVs for other community values might be applied, or where new guideline values might need to be derived, in order to inform the setting of appropriate water quality objectives (ANZG, 2018).
[4] Default trigger value for physical and chemical stressors for south-east Australia for slightly disturbed ecosystems ANZECC 2000.
[5] DGVs presented for toxicants that can bioaccumulate only.

3. Existing environment

3.1 Project location

PKSW is located within an industrial site of approximately 750 hectares in the Wollongong Local Government Area (LGA), approximately 80 kms from Sydney and 2.5 kms from the City of Wollongong.

The PKSW site comprises the No.1 Works, No.2 Works, Steelhaven and the Recycling area as shown in Figure 3.1. The No.2 Works is divided into two sections by Allans Creek. The southern half of the No.2 Works comprises the Cokemaking, Ironmaking and Steelmaking facilities, while the northern half contains the Recycling Area and the Rolling Mills section. All sectors of PKSW are internally linked by road and rail and are currently supplied with electricity, water and gas services.

The land to which this project applies is within the southern section of the No. 2 Works and the BlueScope leased berths in Port Kembla, located within Lot 1 DP606434 and Lot 72 DP1182824, respectively.

3.2 Existing land use

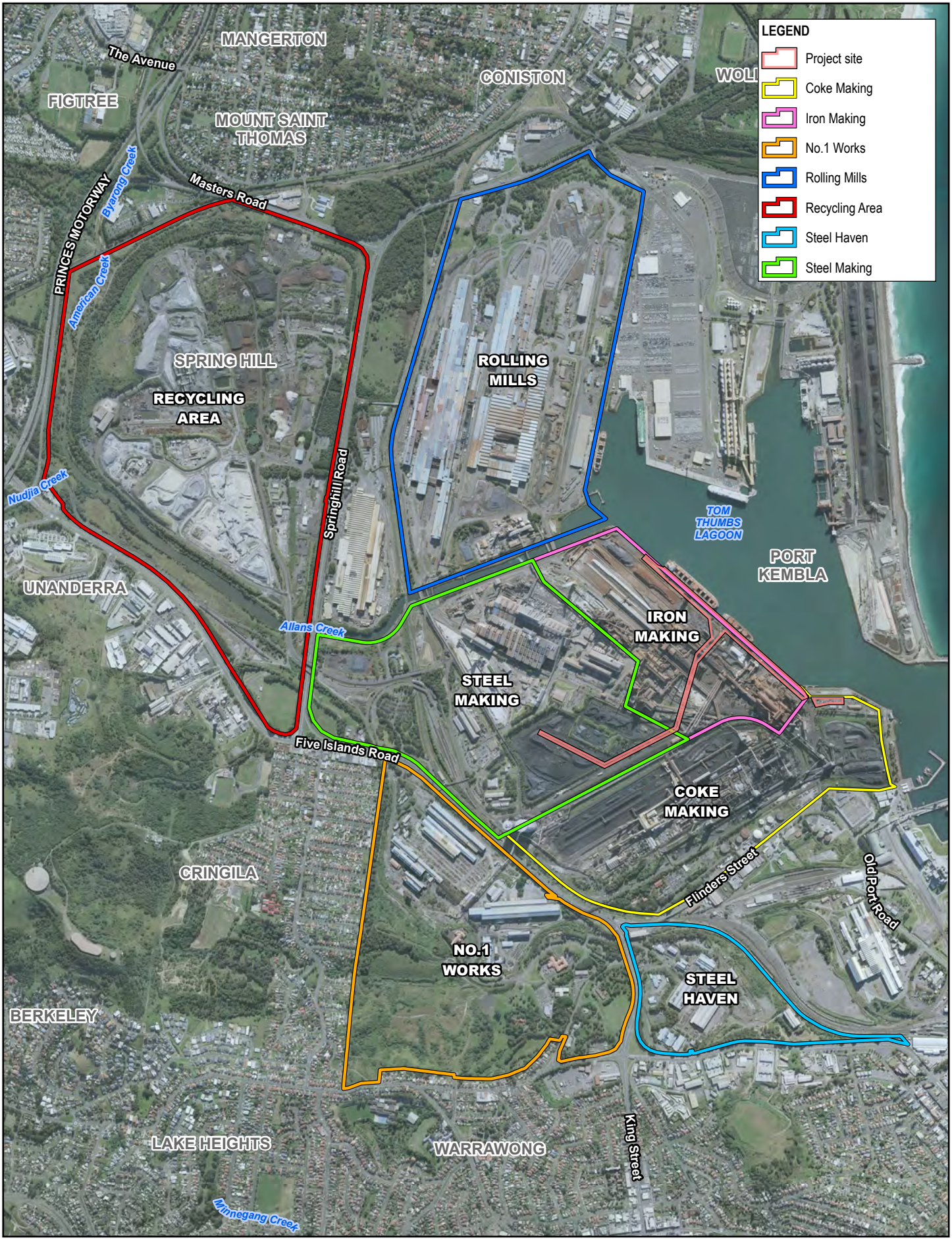
Port Kembla lies in the coastal plain which is bounded to the west by the Illawarra Escarpment and to the east by the Pacific Ocean. Key features of Port Kembla include the heavy industrial area and the port. The heavy industrial area is constructed around the port and includes industrial developments such as PKSW, fertiliser production facilities and petroleum hydrocarbon storage and wholesaling.

The project site is zoned IN3 – Heavy Industrial and SP1 - Special Activities under *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) which replaced *State Environmental Planning Policy (Three Ports) 2013* (Three Ports SEPP) in March 2022. PKSW and the adjacent Springhill Works together comprise the largest site in the Port Kembla industrial area, occupying approximately 750 ha and are mostly built around the western and northern side of Port Kembla's Inner Harbour. The PKSW site is a multiuse industrial area which includes storage, manufacturing, port berths, private internal roads, and offices. Access to PKSW is provided by Springhill Road, Five Islands Road and Flinders Street, and then private internal roads in PKSW.

The port of Port Kembla is located between the Pacific Ocean and the Port Kembla heavy industrial area. The Inner Harbour, specifically developed as an all-weather shipping port, covers approximately 60 ha with around 2,900 m of commercial shipping berths. BlueScope currently leases five berths, which are used for import and export of materials.

More broadly, NSW Ports and the Port Authority of NSW manage the development and operation of the Port. Adjacent berths and trade types are shown in Figure 3.2 and summarised below (NSW Ports, 2021):

– Australian Amalgamated Terminals (AAT) manage Berths 103, 105, 106 and 107 located within the north portion of the Inner Harbour. The terminal is designed as a multi-purpose facility, handling motor vehicles and general cargo.
– Graincorp and Quattro Ports operate grain handling facilities through Berth 104 and Berth 103 respectively, which are located within the northern portion of the Inner Harbour. Berth 104 is a common user berth operated by NSW Ports and includes a bulk liquid facility, which handles a range of liquid products including chemicals and oils.
– Port Kembla Coal Terminal (PKCT) operates a coal exporting facility from Berth 102 located on the eastern shoreline of the Inner Harbour.
– Australian Industrial Energy has signed a long-term lease for Berth 101 and is proposing to develop a gas import terminal on the eastern shoreline of the Inner Harbour.



Paper Size ISO A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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BlueScope Steel (AIS) Pty Ltd
Commodities Logistics Infrastructure Project
Water Impact Assessment

Project No. **12555409**
Revision No. **0**
Date **13/10/2022**

Existing site layout

FIGURE 3-1

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Data source: Roads, Suburbs, Waterbodies - LPI: DTDB, 2019. Imagery -Metromap Tile Service: 2022. Created by: pfernandes

Paper Size ISO A4

0 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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BlueScope Steel (AIS) Pty Ltd
Commodities Logistics Infrastructure Project
Water Impact Assessment

Project No. **12555409**
Revision No. **0**
Date **13/10/2022**

Berth locations

FIGURE 3-2

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Data source: Roads, Suburbs, Waterbodies - LPI: DTDB, 2019. Imagery -Metromap Tile Service: 2022. Created by: pfernandes

3.3 Contamination overview

A search of contaminated land records of notices and records of sites notified to the Environment Protection Authority (EPA) was conducted on 24 March 2021. The PKSW site is listed as a contaminated site by the EPA. The site has had four notices issued to it, the last being in March 2018, which was a notification to cease the Voluntary Management Plan for the site on the basis that regulation of the site under the *Contaminated Land Management Act 1997* (CLM Act) is no longer warranted. Ongoing management of site contamination occurs under EPL 6092.

Previous investigations undertaken at the project site (Egis, 2001; GHD, 2004; GHD, 2009; JBS&G, 2016) have identified potentially contaminated areas and Contaminants of Potential Concern (COPC) within the project site. JBS&G (2016) found areas of hydrocarbon contamination in soils to the south-east of the saltwater channel.

Elevated concentrations of heavy metals, TPH, PAHs, VOCs, cyanide, ammonia, nitrate, nitrogen and fluoride have been found within groundwater across the PKSW site (JBS&G, 2016; Senversa, 2019). Additionally, the hydrocarbon contamination at the Sinter Plant, Cokemaking and Gas Processing area has resulted in associated groundwater impacts, with a light non-aqueous phase liquid (LNAPL) plume identified in each of these areas (JBS&G, 2016; Senversa, 2019). BlueScope undertakes regular monitoring and remediation of this known contamination and provides annual reporting to the EPA.

Further discussion regarding levels of contaminants within groundwater and surface waters is provided in Section 3.5 and Section 3.6.

3.4 Acid sulphate soils

A series of historical photographs taken during the construction of Berth 113 (the eastern most berth utilised by BlueScope), shows that the natural soils in the vicinity of the proposed works were removed down to an elevation of approximately 15m below Port Kembla Height Datum (PKHD) and replaced with select fill as part of the construction of the berth. Figure 3.3 shows an example photo from the series looking south-east along the present-day alignment of Berth 113.

Review of acid sulphate soil (ASS) risk mapping (DPE) indicates that the project site is classified as disturbed terrain at an elevation of greater than four metres.

Areas classified as disturbed terrain may include filled areas, which often occur during reclamation of low-lying swamps for urban development. The potential ASS to occur in such areas is not known. However, as the terrain contains filled areas resulting from the reclamation of Tom Thumb Lagoon, which is mapped as having high probability of acid sulphate bottom sediments, it is probable that some acid sulphate soil material may be present below the layers of fill at the site however, these are unlikely to be disturbed as part of the proposed works.

Figure 3.3 Construction of Berth 113 (source: BlueScope records)

3.5 Groundwater

A Conceptual Site Model of groundwater at PKSW was developed in 2004 and refined in 2009 (GHD, 2009). This Conceptual Site Model was used as the basis for development of later targeted groundwater investigations (JBS&G 2016). The site's aquifer system can be summarised as comprising two primary aquifers overlying bedrock:

– A combined fill / shallow estuarine aquifer (the estuarine component of which comprises mostly sands and silts); underlain by
– A deeper estuarine aquifer (predominantly comprising estuarine clays and muds) (JBS&G 2016)

Groundwater recharge predominantly occurs from rainfall infiltration and infiltration of water used for operational purposes, including dust suppression water (used primarily on raw materials stockpiles) and drainage waters. Groundwater recharge may also occur via the deeper (bedrock) aquifers (GHD, 2009).

Groundwater flow at the site generally trends in an easterly direction toward the inner harbour. However, topography, subsurface geology, and unlined surface water drainage channels result in localised variations to this trend, particularly along the perimeter of the site and adjacent to Allans Creek. The central portions of the site, characterized by extensive deposits of graded fill and deeper clay deposits, exhibit much flatter and more uniform hydraulic gradients (GHD, 2004).

BlueScope undertakes a groundwater monitoring program in line with condition E3.1 of EPL 6092 *Contamination Monitoring and Assessment Program*. This condition requires BlueScope to assess groundwater monitoring results against relevant criteria, assess for changes against historical results and evaluate the effectiveness of the monitoring well network. Wells which contain COPC are monitored annually while other wells are monitored less frequently. Monitoring is undertaken to inform assessment of the following:

– The nature and extent of groundwater contamination across PKSW.
– The direction of groundwater movement.
– The potential risks posed by the contamination to sensitive receiving environments.
– Changes in groundwater contaminant concentration over time.
– Surface water contaminant concentrations within Allans Creek to assess the potential for groundwater contamination to impact adjacent waterways.

Targeted groundwater investigations were undertaken in the vicinity of 6BF during 2016. These investigations defined COPC within PKSW groundwater as heavy metals, TPH/BTEX, PAHs, VOCs, OCPs, phenols, PCB's, ammonia, benzene, cyanide, fluoride.

Locations of groundwater monitoring wells are presented in Figure 3.4.

Figure 3.4 Groundwater sampling locations (modified from JBS&G, 2016)

3.6 Receiving environment

The PKSW site is generally flat and resides upon a base of artificial fill, including dredged sand and mud, rocks and local soil materials. The project site is generally sealed, with small areas of exposed soil and drains into the Ironmaking East Drain (IMED) and the Raw Materials Handling area. The IMED discharges to, Allans Creek and subsequently the Inner Harbour via the No. 2 Blower Station Drain, and during prolonged rain events can discharge directly into the Inner Harbour.

Allans Creek is a heavily modified waterway measuring approximately 30 m to 35 m in width with less than two metres of water depth at lowest astronomical tide in the vicinity of PKSW (Australian Hydrographic Service Chart AUS194). Allans Creek is classed as Good Freshwater Fish Community Status and Allans Creek and the Inner Harbour (former areas of Tom Thumb Lagoon) are key fish habitats (DPI, 2016). As a result, both are considered sensitive receiving environments and consideration has been given to strategies to avoid or minimise impacts to these waterways.

Allans Creek is the predominant source of freshwater inflow into Port Kembla Harbour and is subject to elevated temperature industrial discharges. As a result, water temperatures within the Inner Harbour are generally one to two degrees warmer than sea temperatures beyond the entrance to the harbour. Port Kembla's Inner Harbour is considered a relatively low energy environment with relatively low discharges from creeks and drains and relatively little wave energy propagation into the Inner Harbour. Sediment movement within the Inner Harbour is largely controlled by shipping movements and dredging activities including sweep-bar operations.

Detailed studies into the ecology of Allans Creek and the Inner Harbour were undertaken as part of BlueScope's investigations into a once-through seawater cooling system (NSG, 2006). The study found the Inner Harbour of Port Kembla is indicative of a stressful environment however, fish assemblages do resemble other estuaries within NSW (CH2M HILL, 2008).

A follow up study was completed in June 2012 as part of PRP 146: Assessment of the ecological condition of Port Kembla (UNSW, 2012). The objective of the study was to describe ecological communities and contaminant concentrations at multiple study locations in Port Kembla for comparison with study locations from reference estuaries and creeks. Key findings of the ecological health report cards for Port Kembla and Allans Creek are summarised in Table 3.1 and Table 3.2 respectively.

Table 3.1 Summary of Port Kembla ecological health report card findings (modified from UNSW, 2012)

Ecological community	Summary of historical results
Benthic larval fish	Communities are different, but no evidence of reduced ecological condition
Benthic and pelagic adult fish	Communities do not differ in composition or diversity measures
Planktonic larval fish	Communities may differ and evidence of reduced ecological condition
Epibiota	Communities are different, but no evidence of reduced ecological condition
Infauna	Communities may differ and evidence of improved ecological condition
Phytoplankton and microphytobenthos	Communities may differ and evidence of reduced ecological condition

Table 3.2 Summary of Allans Creek ecological health report card findings (modified from UNSW, 2012)

Ecological community	Summary of historical results
Epibiota	Communities are different, but no evidence of reduced ecological condition
Infauna	Communities do not differ in composition or diversity measures
Phytoplankton and microphytobenthos	Communities may differ and evidence of reduced ecological condition

3.7 Port Kembla Harbour Water quality

Water quality within Allans Creek and Port Kembla has been historically impacted by urban and industrial discharges as well as ongoing port activities. These past activities led to contamination of marine sediments, groundwater and harbour waters.

Water quality monitoring studies have been previously undertaken to define ambient water quality within the port and to monitor water quality parameters during previous dredging campaigns. Key water quality monitoring programs undertaken within the Inner Harbour and Outer Harbour of Port Kembla since 2002 are summarised below:

– Monitoring and Assessing the Water and Sediment Quality of Port Kembla Harbour According to the ANZECC & ARMCANZ (2000) Guidelines undertaken by M. Phillips (2002)
– Port Kembla Harbour Water Quality Monitoring Program undertaken by the Port Kembla Harbour Environment Group[6] between 2002 and 2005
– Berth 107 Dredging Water Quality Monitoring Program undertaken by Cleary Bros on behalf of Port Kembla Port Corporation between 2006 and 2008
– Outer Harbour Tug Berth Dredging Water Quality Monitoring Program undertaken on behalf of Port Kembla Port Corporation in 2011
– Outer Harbour Stage 1A Reclamation Water Quality Monitoring Program (including baseline and impact monitoring) undertaken on behalf of Port Kembla Port Corporation between 2011 and 2012
– Maintenance Dredging Water Quality Monitoring Program undertaken by ENRS on behalf of NSW Ports in late 2014
– Port Kembla Berth 103 Stage 2 Dredging and Spoil Disposal turbidity monitoring undertaken by Boskalis Australia 2015
– AIE Port Kembla Gas Terminal Construction Water Quality Monitoring Program under EPL21529 June 2021 – July 2022 (ongoing at the time of issue of this report)

In many instances the historical laboratory Limits of Reporting (LOR) adopted during the previous studies listed above were greater than the assessment criteria, meaning that it was not possible to assess whether contaminant concentrations were above or below the current relevant criteria (GHD, 2018a). Nevertheless, it is possible to summarise the key issues relating to existing water quality within the port through review of these previous investigations which are summarised in Table 3.3.

The 2002-2005 monitoring program undertaken by the Port Kembla Harbour Environment Group is considered the most comprehensive study of ambient water quality conditions within the broader harbour. The program aimed to establish benchmarks to determine trends and future improvements in water quality and assess whether contaminant concentrations exceed the ANZECC / ARMCANZ Guidelines (2000). The program identified monitoring locations within the Inner and Outer Harbours of Port Kembla which have been subsequently adopted by a number of programs and are presented below in Figure 3.5.

Results of the 2002 – 2005 sampling were compared to relevant trigger values for the following analytes:

– Metals (Al, Cr, Mn, Fe, Ni, Cu, Zn, Sn, Pb, Cd, As, Se)
– Total Suspended Solids (TSS)
– Cyanide
– Ammonia
– Phenols

The most recent water quality monitoring data within Port Kembla has been collected by AIE as part of the Port Kembla Gas Terminal Construction Water Quality Monitoring Program under EPL21529. At the time of this report, data has been collected between June 2021 and July 2022 at a number of impact and background locations. Background data from locations at the entrance to Port Kembla and Allans Creek show that whilst concentrations of aluminium, copper, chromium, lead, and zinc have been recorded in excess of relevant DGV's in some instances, no exceedances have been recorded in relation to a number of contaminants that have been historically reported as being problematic within Port Kembla Harbour such as cadmium and arsenic.

[6] The Port Kembla Harbour Environment Group (PKHEG) was formed in 1998 from the previous Port Kembla Harbour Catchment Management Committee as a forum for port stakeholders and community to work collaboratively towards a sustainable and healthy waterway and harbourside environment (NSW Ports, 2020).

Figure 3.5 *Monitoring locations within the broader port*

Table 3.3 Historical water quality within Port Kembla (GHD, 2018a)

Parameter	Summary of historical results
Contaminants	Water samples collected under ambient conditions during the 2002-2005 monitoring program undertaken by the Port Kembla Harbour Environment Group identified concentrations of aluminium, cadmium, copper, lead, zinc, tin and arsenic in excess of the 95% trigger values for protection of marine waters. Concentrations of all other analytes were below the adopted trigger values. Elevated levels of adverse water quality parameters were generally found in the vicinity of creeks and waterways that drain industrial and stockpile areas such as the entrance to Allans Creek (Site 1), Gurangaty Waterway (Site 5), near No. 1 Products Berth (Site 3), the Cut (Site 7) and Darcy Road Drain (Site 15).
Suspended Solids / Turbidity	Total Suspended Solids concentrations are known to be influenced by shipping movements and freshwater flood events. Long term data collected during the 2002-2005 monitoring program undertaken by the Port Kembla Harbour Environment Group measured average TSS concentrations of 5.9 mg/L and 3.2 mg/L within the Inner and Outer Harbours respectively. TSS concentrations within the Inner Harbour were shown to vary between 1.0 mg/L and 17.9 mg/L. TSS concentrations within the Outer Harbour were shown to vary between 0.5 mg/L and 11.8 mg/L. Previous dredging campaigns (Berth 103) established a relationship between NTU and TSS of 1 NTU = 2 mg/L TSS. It is critical to note that the relationship between NTU and TSS is highly dependent on the material properties of the sediments in suspension.
pH	Previous monitoring campaigns have recorded pH levels within the Inner and Outer Harbour ranging between 7.6 and 8.1, and in some instances below the recommended ANZECC criteria for harbour waters (8.0-8.5). Previous investigations concluded that pH levels are lower in the Inner Harbour than the Outer Harbour, indicating pH levels within the Inner Harbour are likely influenced by freshwater discharges from existing waterways.
Temperature	Water temperatures within Port Kembla are generally higher than those measured offshore due to tidal flushing patterns and existing industrial discharges to the Inner Harbour. As a result, water temperatures within the Inner Harbour are generally one to two degrees warmer than sea temperatures beyond the entrance to the harbour. The Outer Harbour benefits from greater tidal flushing and is generally less than 0.25 degrees warmer than ocean temperatures beyond the entrance to the harbour. Thermal water numerical modelling undertaken as part of the Port Kembla Gas Terminal EIS indicated that the release of cool water from the FSRU would have minor impacts on seawater temperatures. At the discharge point from the FSRU, the water will be up to 7 degrees cooler than ambient ocean temperatures and on average, temperatures within the port are generally expected to decrease by 0.1 to 0.2 degrees (GHD 2018).
Salinity	Total Dissolved Solids (TDS) concentrations assessed during the 2014 maintenance dredging campaign ranged from 31.15g/L to 35.38g/L. Concentrations have been shown to vary with depth indicating density stratification within the water column. Concentrations are also known to be influenced by freshwater flood events.

3.8 Existing port facilities

Port Kembla is a deep-water port that operates across two harbours (the Inner Harbour and Outer Harbour). NSW Ports is responsible for port infrastructure at the port, while the NSW Port Authority manage functions including harbour control, vessel tracking, pilotage and navigation. Overall, there at 18 berths within Port Kembla. Two grain terminals operate in the northern part of the Inner Harbour, along with bulk liquid facilities and a number of multi-purpose berths. Port Kembla Coal Terminal (PKCT) is located on the eastern side of the Inner Harbour and operates two berths. Six berths operate in the Outer Harbour for fuel discharge and loading, bulk, and break bulk cargo. BlueScope operates Berths 109, 110, 111, 112 and 113, which are located on the western side of the Inner Harbour. The berths are shown on Figure 3.2.

These berths are leased from NSW Ports and are operated 24 hours a day, seven days a week. There is currently no facility for coal import. A summary of the BlueScope leased berths is provided in Table 3.4.

Table 3.4 Berths operated by BlueScope

Berth	Length (m)	Breadth (m)	Depth (m)	Description
109	220	35	12.2	This berth is located to the north of the three Berths which are the subject of this EIS. The berth is increasingly used to discharge imported and domestic scrap and to load steel coils for export and plant via land or ship-based crane. There are no works proposed to this berth.
110	145	35	11	This berth was previously used for the Roll On Roll Off or RORO ships (ships designed to carry wheeled cargo) that were previously owned by BHP Limited. This berth is no longer used and there are no works proposed to this berth as its design is not suitable for the current shipping fleet.
111	285	60.9	15.5	The largest of the five berths, this berth is currently used to unload iron ore only as there are no facilities for truck unloading or a conveyor system to handle other materials without contaminating the iron ore stream. Vessels are typically unloaded using No.3 Ore Unloader (3OUL) although it is possible to also use No.2 Ore Unloader (2OUL).
112	300	45.7	12.8	This is a mid-sized berth suitable for Panamax vessels that are partially loaded, or smaller Supramax and Handymax vessels. It is used for multiple materials including coal, limestone, iron ore pellets, scrap steel and other materials as required. Vessels are also loaded with export coke via this berth. Vessels are typically unloaded onto conveyors for delivery to the primary yard stockpiles which are close to the ironmaking operations. Materials that are used or stockpiled elsewhere are loaded into trucks using 2OUL. Currently, 3OUL cannot be used on this berth because it lacks a truck loading chute and there is not enough space to fit all 3 Ship unloaders on the one berth. This berth currently has the highest utilisation of the BlueScope operated berths.
113	190	36.6	10.8 minimum	This is a small-sized berth suitable for Handymax vessels. As there are no berth mounted crane rails in this area, berth unloading cranes cannot operate in this area. Ship mounted cranes or land-based mobile cranes are used to handle cargos. It is used for scrap steel and some limestone cargos but has a low utilisation due to infrastructure and berth depth restrictions.

3.9 Site water balance

PKSW sources industrial and domestic water from Sydney Water, which is Australia's largest water utility provider and owned by the NSW Government. All water supplied by Sydney Water is from appropriately authorised sources. Approximately 600 m^3/d of potable water is used at PKSW.

PKSW uses industrial water comprised of both recycled water and unfiltered Avon Dam water. Recycled water comprises over 85% of the current industrial water mixture and is sourced from the Wollongong Water Recycling Plant. The dual recycled / dam water supply provides the reliability required for the steel manufacturing process, and Sydney Water is able to adjust supply volumes to reflect PKSW's site needs. Domestic water is a less significant water input to PKSW, comprising less than 3% of the total industrial and domestic water consumption and is a minor component of the overall domestic water reticulation network across the Illawarra region.

Approximately 26,000 m^3/h of seawater from the Outer Harbour is used at PKSW for saltwater cooling. This water is returned to the Inner Harbour after use.

A diagram of the existing site water balance is shown in Figure 3.6.

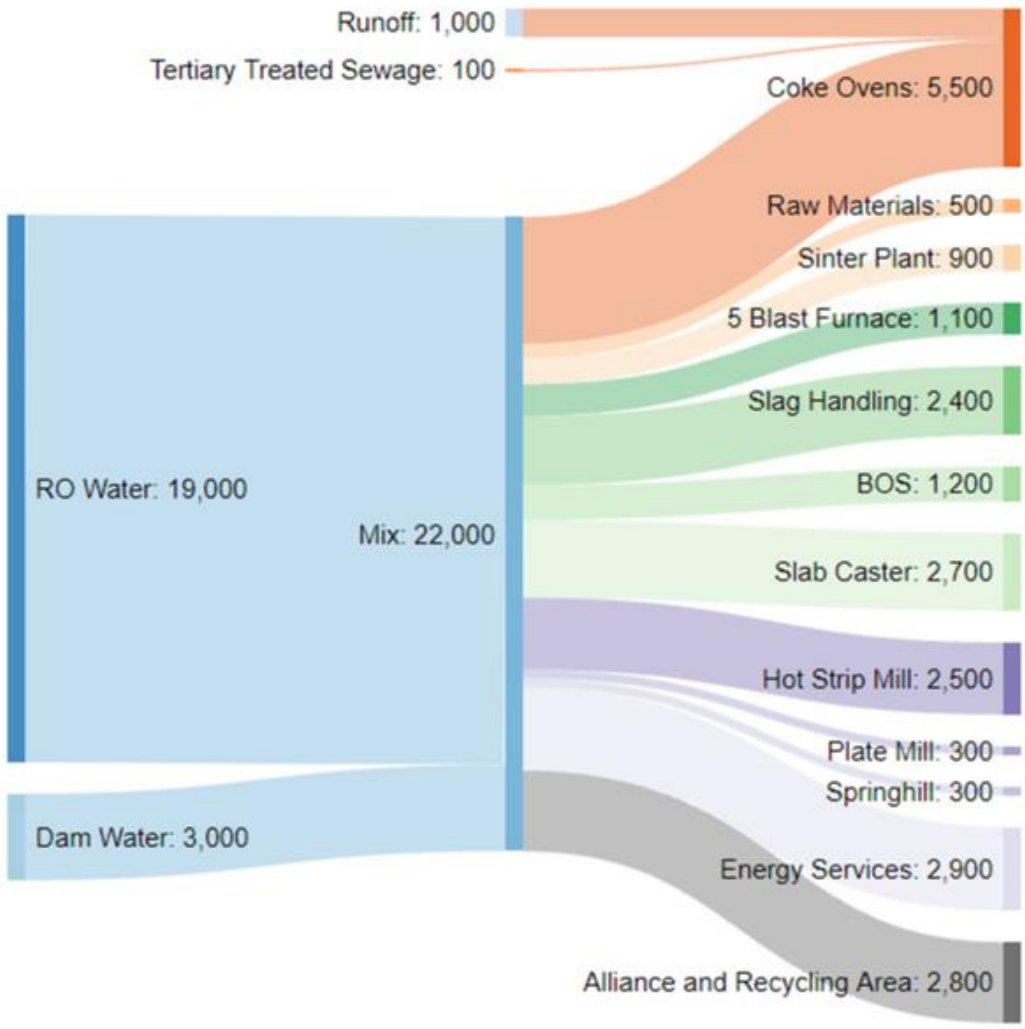

Figure 3.6 Existing site water balance at PKSW

PKSW currently operates under a Water Stewardship Plan (Plan) which sets out the catchment and site challenges at the PKSW site which is described in greater detail in Section 3.9. The purpose of the Plan is to define key targets in relation to water management which will be reviewed regularly both internally and externally with key stakeholders. The Plan has been developed using the International Water Stewardship Standard as a basis and in collaboration with various stakeholder groups. As a Water Steward, BlueScope is committed to sustainable water management for the PKSW site, in addition to contributing to efforts within the catchment and region. The Plan identifies the site and catchment risks, key stakeholders, and water-related environmental and social adverse impacts.

3.10 Hydrology and stormwater management

The project is located immediately adjacent to Port Kembla Harbour. Two water courses drain into the harbour, namely Main Drain and No. 2 Blower Station Drain via Allans Creek. Allans Creek is the predominant source of freshwater inflow into Port Kembla Harbour, with a catchment area of 41 km^2. Industrial activities (including PKSW) discharge water into the creek. The majority of the water discharged from PKSW is saltwater sourced from the outer Harbour that has been used for indirect cooling.

There are also several constructed drains servicing the PKSW site, which drain into Allans Creek and the Harbour. The site is relatively flat and four to six metres above sea level. PKSW is located above the 1 per cent AEP level.

Stormwater management is undertaken across the PKSW site, including the BlueScope leased berths, in accordance with EPL 6092.

4. Project description

4.1 Project summary

The project will involve upgrade of raw materials berths, unloading and conveying infrastructure, which will allow BlueScope to import raw materials for continued operations following depletion of supply from Dendrobium Coal Mine and increased scrap usage.

The project includes construction of a new CSU at Berth 111, new conveying infrastructure to facilitate transportation materials from the berth to stockpiling areas, and modifications to the berth to allow the relocation of the existing Coke Loader, No.2 Ore Unloader (2OUL) and No.3 Ore Unloader (3OUL). The project includes the following major components:

– Installation of a new CSU at Berth 111.
– Relocation and modifications to 2OUL and 3OUL to operate across Berths 111, 112 and 113.
– Installation of new conveyors to allow the separate transportation of iron ore to existing stockpiles and coal to the 4 Area storage location.
– New truck wash at the exit of 4 Area.
– Installation of crane rails, and relocation of the Coke Loader and its supply conveyors to Berth 113.
– Modifications to berth infrastructure and supporting services infrastructure.

Receival of coal and distribution to the Cokemaking area will be undertaken within existing PKSW transportation and materials storage areas.

Each of the project components are described below with key project features shown on Figure 4.1. A flow diagram showing how the CSU operates as part of the site wider raw materials supply chain is provided in Figure 4.2. The proposed location and route of the new conveyors is shown in Figure 4.3.

LEGEND

- Existing feature
- Proposed feature
- Relocated feature
- Project site

Paper Size ISO A4

0 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

BlueScope Steel (AIS) Pty Ltd
Commodities Logistics Infrastructure Project
Water Impact Assessment

Project No. **12555409**
Revision No. **0**
Date **09/11/2022**

Key project features

FIGURE 4-1

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Data source: LPI: DTDB, 2019. Metromap Tile Service: .
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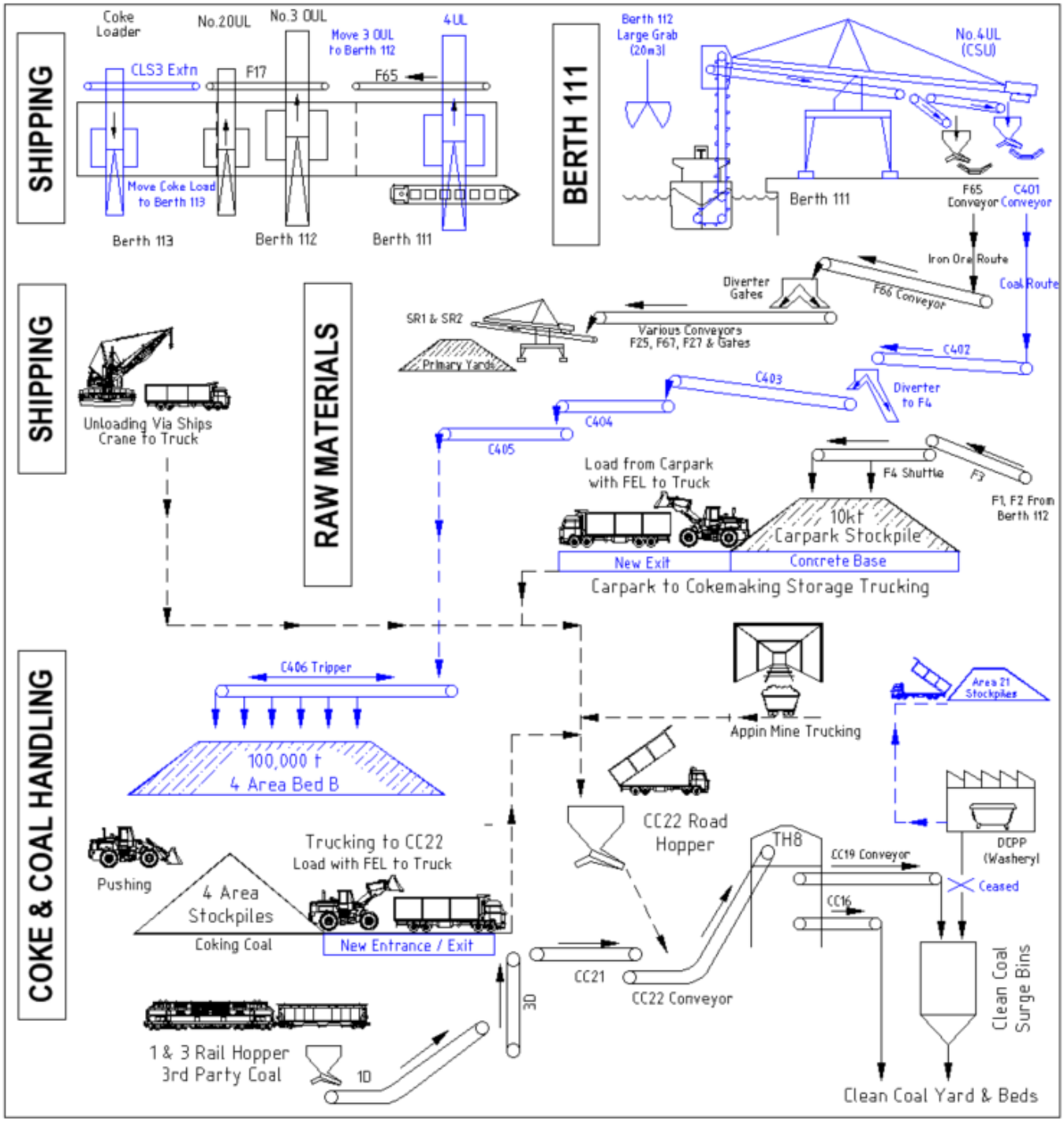

Figure 4.2 ***Simplified process flow diagram***

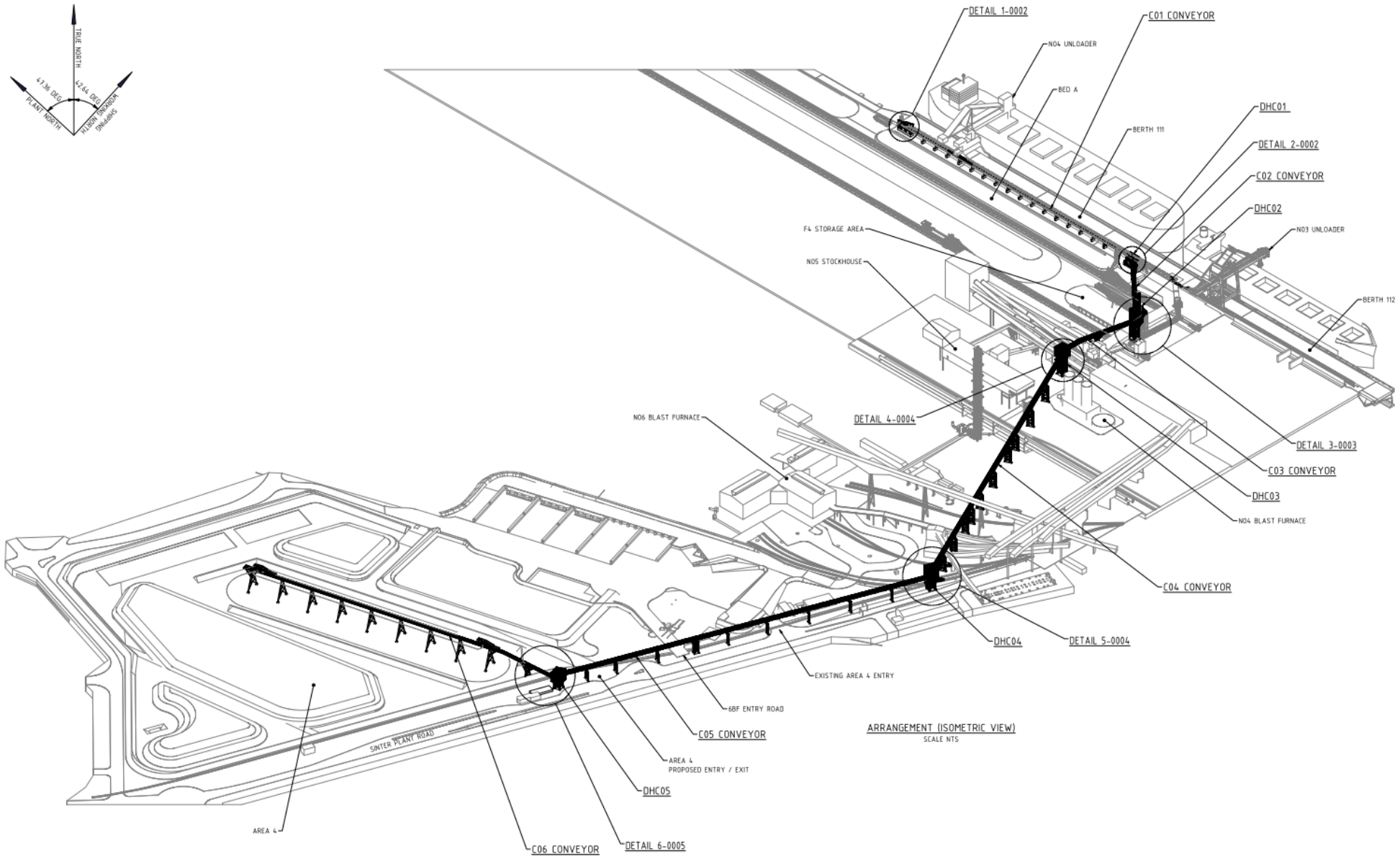

Figure 4.3 Coal conveyor route from Berth 111 to 4 Area

4.2 Construction of the project

Currently, Berth 111 is the main berth for importing high volume raw materials for the operation of PKSW. The current infrastructure is only suitable for iron ore transport as discharges of coal and iron ore cannot be mixed due to the risk of contamination and its impact on the ironmaking process. As such, new conveyor infrastructure is required for transporting coal that is unloaded on Berth 111 to the coal stockpiling areas. To facilitate the discharge of multiple materials, it is proposed to partially duplicate the iron ore materials handling system in the conveying chain along Berth 111 and then install a new conveyor route to the main coal stockpiling area (referred to as 4 Area).

It is proposed to split the works into 2 stages:

– Stage 1- Relocation of the Coke Loader and associated Ship Unloader movements.
– Stage 2- Purchase and installation of a CSU and associated coal conveyors to 4 Area.

A detailed description of the construction activities and schedule is provided in Section 5 of the EIS.

4.2.1 Stage 1 - Relocation of Coke Loader

This stage will involve the relocation of the Coke Loader at the earliest possible time to provide greater flexibility across the berths for the importation of raw materials and to provide capacity for long berth outage periods resulting from structural works to the berth walls and support structures. Construction of this stage will be undertaken in the following phases:

1. Pre-work and site preparation. The time frame for this step will be approximately 1 to 6 months from project approval. Activities are expected to occur during standard construction hours and include:
    - Mobilisation of contractors and equipment and removal of temporary structures within the proposed work site.
    - Establishment of construction facilities, including fencing, site offices and temporary infrastructure (such as lighting and power).
2. Berth modifications at Berth 113. The commencement of this step will occur approximately 6 to 18 months from project approval with a duration of 18 to 28 months. Activities will occur both during and outside standard construction hours and include:
    - Excavation, piling and construction of reinforced concrete structures to support new crane rail beams, which will allow the extension of crane rails from Berth 112 to Berth 113
    - Installation of below ground infrastructure.
3. Coke Loader relocation. The time frame for this step will be approximately 12 to 24 months from project approval with a duration of 12 to 24 months. Activities will occur both during and outside standard construction hours. Work outside of standard construction hours will usually be associated with large crane lifts. Activities include:
    - Relocation of the existing conveyors and transfer house.
    - Construction of new connecting conveyor and transfer house.
    - Relocation of electrical supplies for the Coke Loader.
    - Modifications to allow 2OUL to operate on Berths 112 and 113.
    - Modifications to allow 3OUL to operate on Berths 111 and 112.
    - Modifications to facilitate these works at Berth 113.
    - Reconfiguration of internal roads.
    - Commissioning of Coke Loader and 2OUL in new positions.
4. Demobilisation of construction site:
    - Removal of construction compound and layout down areas.
    - Return of construction areas to their previous use.
    - Fine tuning equipment.
    - Commence operation.

4.2.2 Stage 2- Installation of CSU and conveyor sequence

Commencement of this stage will occur three to four years prior to the CSU being required for use, which could be as early as 2028 depending on the expected cessation of 3-seam coal production by South32. This stage is anticipated to be undertaken over the following sequence:

1. Pre-work and site preparation. The time frame for this step will be approximately 36 months prior to the formal date for the cessation of 3-seam coal with a duration of 6 months. Activities are expected to occur during standard construction hours and include:
    - Removal of temporary and mobile structures within the proposed work site.
    - Establishment of construction facilities, including fencing, site offices and temporary infrastructure (such as lighting and power).
2. Commodity clearance from the berth and transfer to 4 Area. The time frame for this step will be approximately 24 to 36 months prior to the formal date for the cessation of 3-seam coal with a duration of 18 to 28 months. Activities will occur both during and outside standard construction hours. Work outside of standard construction hours will usually be associated with large crane lifts. Activities include:
    - Construction of new conveyors and transfer houses.
    - Piling and excavation.
    - Establishing foundations and retaining walls.
    - Installation of electrical services.
    - Minor modifications to the Berths to accommodate the new conveyors.
3. Installation of CSU at Berth 111. The time frame for this step will be approximately 12 to 20 months prior to the formal date for the cessation of 3-seam coal with a duration of 12 to 18 months. Activities will occur both during and outside standard construction hours. Work outside of standard construction hours will usually be associated with large crane lifts. Activities include:
    - Unloading of CSU from ship onto Berth 111.
    - Connection of services to CSU.
    - Relocation of 3OUL to Berth 112.
    - Reconfiguration of internal roads.
4. Demobilisation of construction site and commission CSU and conveyors:
    - Removal of construction compound and layout down areas.
    - Return of construction areas to their previous use.
    - Commissioning of overall system, including trial unloading of ships and trial of distribution systems.
    - Fine tuning equipment.
    - Commence operation.

4.2.3 Construction storage / laydown areas

Laydown areas for construction equipment and materials would be wholly within the PKSW site. The delivery of materials and equipment to the work sites will be staged as required with minimal storage close to the berths. Indicative laydown areas are shown in Section 5.4 of the EIS and are summarised in Table 4.1.

Table 4.1 Ancillary facilities existing and proposed use

ID	Location	Activity	Size (m^2)	Indoor/Outdoor
1	Berth 113 laydown	Main construction area laydown and staging area, equipment, materials and site sheds	5,806	Outdoor
2	Sinter Plant laydown	Piles, conveyors and large equipment, excavation spoil	2,328	Outdoor
3	Tug berth laydown	Piling rig, piles and equipment	1,278	Outdoor

ID	Location	Activity	Size (m^2)	Indoor/Outdoor
4	Christy Dr laydown	Containers for covered storage, equipment	845	Indoor using containers
5	21 Area Laydown A	Large equipment, excavation spoil	7,430	Outdoor
6	21 Area Laydown B	Large equipment, excavation spoil	4,864	Outdoor
7	Carpark Laydown	Materials, equipment, excavation spoil	3,616	Outdoor
8	4BF Laydown	Materials, equipment, excavation spoil, piles	1,161	Outdoor
9	Energy Services Laydown	Materials, equipment, excavation spoil, piles	1,617	Outdoor
10	4 Area Laydown	Materials, equipment, excavation spoil, piles	8,726	Outdoor

4.2.4 Indicative equipment list

A list of indicative equipment required for the installation construction activities are presented in Table 4.2 and categorised into general construction equipment and high-impact construction equipment for modelling purposes.

Table 4.2 Indicative construction equipment

Construction equipment		
Excavators- Various Sizes	Concrete Trucks	Welding machines
Bulldozers	Contractor service vehicles	Site Sheds
Semi-trailers and rigid body trucks	Concrete trucks	Vacuum Trucks
Dump Trucks	Rollers – compactor and vibratory	Boring machines
Mobile Cranes-up to 750 tonnes	Piling Rigs	Asphalting machines
Elevated Work Platforms	Semi-Trailers	Rockbreakers
Concrete pumps	Welding machines	Forklifts up to 5 tonnes
Excavators up to 50 tonnes	Heavy lift ship (for import of CSU only)	-

5. Impact assessment

5.1 Construction impacts to water resources

Potential risks to water resources during the construction phase of the project are general construction risks relating to vehicle movements, excavation, stockpiling, general construction and demolition works. Specific risks include:

– Release of sediment or poor-quality stormwater into drains and waterways where it is impacted by excavation works and other construction activities.
– Potential mobilisation of existing contamination within soils via surface water or groundwater.
– Spills of hydrocarbons during the relocation of a section of the existing Park Fuels bunker line by approximately two metres.
– Spills of hydrocarbons and other chemicals from construction plant and machinery.

All construction activities are proposed to take place in established areas. The proposed laydown areas and carparks are existing infrastructure on the site with existing water management controls in place. As a result, soil disturbance associated with the project has limited potential to cause localised soil erosion. The erosion risk is considered relatively low as the site is flat, and predominantly sealed with concrete or bitumen and the level of disturbance will be minor.

Given the industrial land use of the site and the results of previous soil investigations, it is expected that a portion of the excavation works may encounter areas of contamination during construction. This has the potential to impact the health of the construction workforce and potentially mobilise contaminants elsewhere during strong winds and rain. Additional site investigations are currently being undertaken to better define the nature and extent of contamination, which will be used to inform the design and development management measures during construction. Given the known extent of diesel contamination to the south of the project area, and minor nature of proposed ground disturbing works, the likelihood of mobilising contaminants is low. The risk of exposure or mobilisation of contaminants from any isolated contaminated areas or unexpected finds will be managed during construction with an unexpected, contaminated finds procedure.

During construction, there will be a requirement for a number of fuel-powered vehicles and equipment as well as greases, lubricants and other chemicals. There is potential for accidental spillage or leaks of hydrocarbons or chemicals during works or from any stored hazardous materials in the compound areas. The volumes of potential spillages would be relatively minor so are not anticipated to result in a significant impact. Mitigation measures including spill management procedures are already in place at PKSW operated berths and will continue to be implemented during construction to manage this risk.

Excavation or disturbance to natural material below the level of fill (approximately 5-metres below ground level (bgl)) are unlikely and therefore ASS is unlikely to be encountered during construction of the project. In the unlikely event that any ASS was uncovered, the confined nature of the excavation works and predominantly sealed site will enable ASS to be contained and managed appropriately.

A site-specific Soil and Water Management Plan (SWMP) will be developed and implemented prior to construction in accordance with the *Managing Urban Stormwater: Soils & Construction, vol. 1* (Landcom 2004). This plan will outline the established controls that will be in place for the duration of construction works, as well as any targeted controls specific to the project. For example, bunding and storage requirements for chemical management will be in accordance with the relevant EPA requirements, Australian Standards and manufacturers' requirements.

Mitigation measures relating to construction impacts to water quality are described in Section 6.1.

5.2 Operational impacts to water resources

There are no process water discharges to the Harbour from this project. Potential risks to water resources during the operational phase of the project are in line with those of the existing operations which relate to management of vessel movements, spills, stormwater, groundwater, dust suppression water, wheel wash water and washdown water associated with the proposed CSU.

5.2.1 Operational spills, stormwater and flooding

Berths 111 and 112 are graded towards the Raw Materials Handling area where stormwater and potential spills can be managed away from the harbour environment. Some existing roads have formal stormwater drains leading to containment areas. The erosion risk is considered relatively low as the site is flat, and predominantly sealed with concrete or bitumen.

The Sinter Plant area behind Berth 113 has a series of yard drains that direct stormwater to the Effluent Station tank which pumps to a clarifier that is treated with flocculant. This overflows to the Ironmaking East Drain which provides a secondary settling opportunity before water is pumped to the No.2 Blower Station Drain. This approach provides numerous opportunities for capture of stormwater 'first flush' and any spills that may occur, reducing the risk of water quality impacts.

The CSU conveying system is enclosed from the pickup in the ship's hold until the material is discharged. As the CSU is not lifting a bucket of material over the side of the ship, the potential for spillage and dust emissions during unloading is minimised. This removes the need for additional controls such as catch tarpaulins or bins to be setup alongside the ship.

More generally, BlueScope currently implements the following stormwater management and spill mitigation measures:

– EPA compliant bunding of all hazardous chemicals.
– Spill kits readily available.

In relation to flood risk, the project would not increase the impervious area beyond negligible amounts and therefore no increase in stormwater peak flows or flood risks are predicted. The site is not identified as being vulnerable to flooding.

No additional mitigation measures relating to spill management or flooding during operations are considered necessary as described in Section 6.2.

5.2.2 Discharges to groundwater

Potential impacts to groundwater during the operational phase are in line with BlueScope's existing operations which relate to the quantity and quality of groundwater recharge from infiltration of rainfall and water used for dust suppression. The project will result in a negligible change in groundwater impacts compared to current operations.

Given the existing drainage controls, potential impacts to groundwater quality are expected to be adequately monitored and managed through ongoing groundwater monitoring under condition E3.1 of EPL 6092, the PKSW Water Stewardship Plan, and the continued implementation of BlueScope's ongoing ISO 14001 certified Environmental Management System and associated processes.[7]

No additional mitigation measures relating to discharges to groundwater during operations are considered necessary as described in Section 6.2.

5.2.3 Dust suppression and washdown water during operations

To mitigate the risk of cross-contamination of coal and iron ore and its impact on the ironmaking process, a 40 kL industrial water bucket wash similar to that shown in Figure 5.1 will be installed at Berth 111 to enable cleaning of the CSU between material types.

[7] ISO 14001 is the international standard that specifies requirements for an effective environmental management system (EMS).

In addition, a number of high and low-pressure industrial water cleaning facilities, cameras and sprays will be included on the machine to clean the buckets, conveyor transfers, conveyor returns and scrapers.

Return waters from these cleaning facilities will be collected and reused until no longer suitable for washdown purposes. Approximately six times per year, the water will be drained from the bucket wash and reused in dust suppression and fines capture activities at the Raw Materials Handling (RMH) area with no external discharge.

Fines recovered from the cleaning facilities contain valuable raw materials and will be and will be added, as currently occurs, in the raw material stockpiles that ultimately used to produce iron at the blast furnace.

Figure 5.1 Example bucket wash as proposed for installation at Berth 111

The coal transfer conveyor is enclosed on three sides to prevent spillage and dust emissions. The tripper conveyor is used to transfer the coal from the conveyor system to the 4 Area stockpile and is unable to be enclosed. As such, industrial water sprays will be used to suppress dust emissions along this conveyor. Minimal volumes of water will be used as needed to control dust but without excessively wetting the material. As a result, no external release of industrial water is expected from conveyor dust suppression sprays.

Within 4 Area, a mixture of stormwater, industrial water and truck wash overflow will be used for dust suppression of stockpiles per current operations. The truck wash will use industrial water and discharge to new sediment ponds. Overflow from the sediment ponds will discharge to the Coke Ovens Recovery Basin (CORB) for reuse at cokemaking with no external discharge under typical conditions. During wet weather events, water from the CORB can be directed to the No. 2 Blower Station Drain if capacity exceeds coke plant water requirements.

No additional mitigation measures relating to dust suppression and washdown water during operations are considered necessary as described in Section 6.2.

5.2.4 Site water balance

PKSW uses industrial water in the steel manufacturing process, which is comprised of both recycled water and unfiltered Avon Dam water. Recycled water comprises over 85% of the current industrial water mixture and is sourced from the Wollongong Water Recycling Plant. The dual recycled / dam water supply provides the reliability required for the steel manufacturing process, and Sydney Water is able to adjust supply volumes to reflect PKSW's site needs. Domestic water is a less significant water input to PKSW, comprising less than 3% of the total industrial and domestic water consumption and is a minor component of the overall domestic water reticulation network across the Illawarra region.

Following implementation of the project, BlueScope will continue to source industrial and domestic water from the existing sources identified in Section 3.9. Accordingly, water use during the operation of the project will be sourced from an appropriately authorised and reliable supply and does not trigger water licencing requirements.

No significant change is expected to the existing site water balance shown in Figure 3.6.

5.2.5 Vessel movements

The upgrade to the capacity of Berth 111 will maximise the use of this deeper berth to accommodate more frequent use of the larger class of Capesize ships and fully loaded Panamax ships. In addition, the installation of the higher capacity unloading equipment will reduce total berthing and wharfing time. Through improving the total ship discharge rate and berth flexibility, additional berthing days will become available, allowing for an estimated 15 to 18 additional ships (30 to 36 additional ship movements) per year.

NSW Ports 30-year Master Plan (NSWPorts, 2015) highlights Port Kembla's deep water shipping channel, short vessel transit time and minimal maintenance dredging requirements. The 30-year Master Plan states that Port Kembla has capacity to handle new trades and increased volumes of existing trades and forecasts that dry bulk vessels are expected to carry greater product volume per vessel within the existing size range of vessels (Handysize to Capesize vessels) currently calling at the Port.

Given the proposed additional vessel visits represent a proportionally small increase in the overall number of vessels visiting Port Kembla each year, potential impacts to port operations are expected to be easily managed. NSW Ports and the Port Authority of NSW have been consulted by BlueScope throughout the planning and design phases of the project.

Similarly, no significant changes to water quality impacts are expected to occur as a result of the proposed additional vessel visits given that there will be no additional dredging requirements and no change to the maximum vessel size, berthing, refuelling, de-ballasting and biosecurity arrangements.

No additional mitigation measures relating to vessel movements during operations are considered necessary as described in Section 6.2.

6. Mitigation measures

6.1 Construction phase mitigation measures

Management and mitigation measures that will be implemented prior to and during construction to minimise the impacts on water resources are provided in Table 6.1.

Table 6.1 Water resources management measures

Impact / Aspect	ID	Measure	Timing
Erosion and sedimentation	E1	Prior to construction commencing, a site-specific Soil and Water Management Plan (SWMP) will be prepared. The plan will include arrangements for managing wet weather events, specific controls and environmental inspection requirements. The SWMP will include an Erosion and Sediment Control Plan (ESCP) which will be prepared in accordance with the Blue Book -Managing Urban Stormwater: Soils and Construction (4th edition, Landcom, 2004) and Volume 2 (DECC, 2008).	Pre-construction
	E2	The ESCP will detail the erosion controls used for the project and where they will be established. The ESCP will include site specific measures to: – Prevent sediment moving off-site and sediment laden water entering any watercourse, drainage lines, or drain inlets – Prevent mixing of soils – Ensure soils are replaced in their pre-existing configuration during rehabilitation where possible – Reduce water velocity overland and capture sediment on site – Minimise the amount of material transported from site to surrounding pavement surfaces – Divert clean water around excavations where practical – Install measures and site entry and exit points to minimise movement of material onto public roads	Pre-construction
	E3	Erosion and sediment controls will be established prior to works commencing on site.	Pre-construction
	E4	Erosion and sediment controls will be inspected on a regular basis and replaced when their function is compromised.	Construction
	E5	Soil from excavation generated will be reused where applicable. Excess spoil not required or able to be reused onsite will be disposed of appropriately as per the EPA's Waste Classification Guidelines (2014).	Construction
	E6	Vehicles will be restricted to existing access routes where practical.	Construction
	E7	Disturbed areas will be returned to pre-existing condition following the completion of construction, where practicable.	Construction
Operational water management	E8	Water monitoring programs under licencing or approval conditions will continue during operation.	Operation

Impact / Aspect	ID	Measure	Timing
Contamination	C1	An incident emergency spill plan will be detailed in the CEMP.	Pre-construction
	C2	Spill response kits will be provided on site and will be located in a clearly defined location.	Construction
	C3	Plant and machinery will be inspected regularly to ensure that they are in sound working order.	Construction
	C4	If soils that appear to be contaminated are exposed during construction of the project, further investigation will be undertaken. The following factors are indications of potential contamination on site: – Stained or discoloured fill – Hydrocarbon or chemical odour Contaminated soils requiring disposal will be classified under the Waste Classification Guidelines (EPA,2014) prior to disposal.	Construction
	C5	All chemical/fuel brought to and stored on site for the project will be bunded or otherwise contained.	Construction, Operation
	C6	All plant personnel that may handle chemicals/fuels will be trained in required handling procedures.	Construction, Operation

6.2 Operational mitigation measures

There are no process water discharges associated with the elements of the project considered in this assessment. Potential risks to water resources during the operational phase of the project are in line with those of the existing operations which relate to management of vessel movements, spills, stormwater, groundwater, dust suppression water, wheel wash water and washdown water associated with the proposed CSU.

PKSW currently operates under a Water Stewardship Plan (Plan) which sets out the catchment and site challenges at the PKSW site which are described in greater detail in Section 3.9.

Ongoing monitoring programs have been developed and refined based on previous modelling and measured data collected to date. These are summarised in Table 6.2.

Table 6.2 Summary of ongoing monitoring programs

Area	Monitoring Programs
Surface waters	EPL 6092 contains individual discharge concentration limits for 14 surface water locations within the Port Kembla Steelworks site, 12 of which relate to water quality within the drainage network. Monitoring conditions specified in the EPL include monitoring parameters, locations, frequencies as well as discharge limits relating to the 50, 90 and 100 percentile concentrations for each discharge point.
Groundwater	BlueScope undertakes a groundwater monitoring program in line with condition E3.1 of EPL 6092, Contamination Monitoring and Assessment Program. This condition requires BlueScope to assess groundwater monitoring results against relevant criteria, assess for changes against historical results and evaluate the effectiveness of the monitoring well network. Wells which contain COPC are monitored annually while other wells are monitored less often. Monitoring is undertaken to inform assessment of the following: – The nature and extent of groundwater contamination utilising existing monitoring wells nominated by BlueScope – The direction of groundwater movement – The potential risks posed by the contamination, where present, to off-site ecological receptors – Key changes (trends) in groundwater contaminant concentration – The presence of surface water contamination in Allans Creek at prescribed sample locations

Following completion of the project, there will be no significant changes to the operation of the PKSW in relation to water resources. As a result, no additional mitigation measures or monitoring programs are considered necessary.

7. Evaluation and conclusion

This WIA report has been prepared on behalf of BlueScope to support the EIS for the project and responds to the SEARs relating to surface and groundwater quality. It describes the existing ambient and background water quality and assesses the potential impacts to water quality associated with the construction and operations phases of the project with respect to the following guidelines:

– NSW Marine WQO's in NSW (DEC, 2006)
– Storing and Handling Liquids: Environmental Protection (DECC, 2007)
– Managing Urban Stormwater: Soils and construction - Volume 2 (DECC, 2008)
– Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2018)

Recommended mitigation and management measures were identified in response to the impact assessment findings.

7.1 Impacts from the project during construction

Potential risks to water quality during the construction phase relate to the potential release of poor-quality stormwater into drains and waterways and the risk of mobilising existing contamination within soils and groundwater. These risks will be managed through the existing stormwater drainage network and soakaways that will enable capture of stormwater prior to release to the environment.

All construction activities are proposed to take place in established areas with existing water management controls in place.

As a result, potential impacts to surface and groundwater quality during the construction phase are expected to be readily manageable through development and implementation of a site specific SWMP in accordance with the *Managing Urban Stormwater: Soils & Construction, vol. 1* (Landcom 2004). As such, the risk associated with the proposed construction activities and effects on water resources is considered as low as reasonably practicable.

7.2 Impacts from the project during operations

There are no process water discharges associated with the project considered in this assessment. Potential risks to water resources during the operational phase of the project are in line with those of the existing operations which relate to management of vessel movements, spills, stormwater, groundwater, dust suppression water, wheel wash water and washdown water associated with the proposed CSU.

During operation of the project, there will be no significant changes to the operation of the PKSW in relation to water resources. As a result, no additional mitigation measures or monitoring programs are considered necessary. The risks will be managed through BlueScope's well-developed operational controls and the existing stormwater drainage network and soakaways. As such, the risk associated with the operational phase of the project and effects on water resources is considered as low as reasonably practicable.

7.3 Final conclusion

Construction and operational risks posed by the project in relation to water quality are in line with those of the existing operations, for which management measures are already in place. These are well understood by BlueScope who have a proven history of successful management of water via established management plan and practices that would be extended into the operation of the project. Based on the investigations and assessment undertaken by GHD and the conclusions drawn in this water resources impact assessment report, it is considered that, subject to the recommended mitigation measures being applied, the risks to water resources associated with the project are considered as low as reasonably practicable.

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