NSW GOVERNMENT | Planning & Environment

DEVELOPMENT APPLICATION ASSESSMENT REPORT
Irrigation of Cooling Tower Effluent
DA 8354

Environmental Assessment Report
Part 4 of the
Environmental Planning and Assessment Act 1979

November 2017

Cover photo: BOC Kooragang cooling towers (*Cooling Tower Waste water Treatment Design Report*, MJM Environmental Pty Ltd, 16 November 2016)

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ABBREVIATIONS AND DEFINITIONS

AHD	Australian Height Datum
ANZECC 2000 Guidelines	*Australian and New Zealand Guidelines for Fresh and Marine Water Quality*
Applicant	BOC Limited
AS	Australian Standard
ASS	Acid Sulfate Soil
BCA	Building Code of Australia
BOD	Biochemical oxygen demand
Construction	The carrying out of works, including minor earthworks, and installation of pipeline and other infrastructure
Cooling tower effluent	Cooling tower blowdown wastewater as described in the SEE and RTS
Council	Newcastle City Council
DA	Development Application
Department	Department of Planning and Environment
Development	The development as described in the SEE and RTS for the irrigation of cooling tower effluent
DPI	Department of Primary Industries
Effluent Guidelines	*Environmental Guidelines, Use of Effluent by Irrigation* (DEC, 2004)
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPA	Environment Protection Authority
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development, as defined under the *Protection of the Environment Administration Act 1991*
HAZOP	Hazard and Operability Study
HNEPH	Hunter New England Population Health
Minister	Minister for Planning (or delegate)
OEH	Office of Environment and Heritage
Operation	The storage, treatment and irrigation of cooling tower effluent to a grassed area on the site
PASS	Potential Acid Sulfate Soils
POEO Act	*Protection of the Environment Operations Act 1997*
RTS	Response to Submissions titled *BOC Kooragang DA 8354 Response to Request for Response to Submissions* prepared by MJM Environmental Pty Ltd dated 22 June 2017
SEARs	Secretary's Environmental Assessment Requirements
Secretary	Secretary of the Department of Planning and Environment, or nominee
SEE	Statement of Environmental Effects titled *Cooling Tower Effluent for Irrigation – Statement of Environmental Effects* prepared by MJM Environmental Pty Ltd dated 15 March 2017
SEPP	State Environmental Planning Policy
Sensitive receiver	A location where people are likely to work or reside, this may include a dwelling, school, hospital, office or public recreational area
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
Three Ports SEPP	*State Environmental Planning Policy (Three Ports) 2013*
Waste	As defined in the *Protection of the Environment Operations Act 1997*
Waterlogging	The accumulation of excessive moisture in the soil within the zone or depth desirable for favourable root development of plants (DEC, 2004)

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1. BACKGROUND

1.1. The Department's Assessment

This report details the Department of Planning and Environment's (the Department) assessment of the development application (DA 8354) for the irrigation of cooling tower effluent at an existing gas facility on Kooragang Island. The development involves the construction and operation of an irrigation system using treated cooling tower blowdown effluent. The Department's assessment considers all documentation submitted by BOC Limited, including the Statement of Environmental Effects (SEE) and Response to Submissions (RTS), and submissions received from government authorities, stakeholders and the public. The Department's assessment also considers the legislation and planning instruments relevant to the site and the development.

This report describes the proposed development, surrounding environment, relevant strategic and statutory planning provisions and the issues raised in submissions. The report evaluates the key issues associated with the development and provides recommendations for managing any impacts during construction and operation. The Department's assessment of the development application has concluded that the development is in the public interest and should be approved, subject to conditions.

1.2. Development Background

BOC Limited (the Applicant) is seeking development consent to irrigate cooling tower effluent to a grassed area at its existing gas facility located on Kooragang Island in the Newcastle local government area (LGA) (see **Figure 1**).

The gas facility operates 24 hours a day, seven days a week and produces and supplies compressed and bulk gas products for industry, including:

- waste carbon dioxide, which is received from the neighbouring Orica facility via pipeline, liquefied and stored in aboveground tanks prior to processing;
- nitrogen gas, which is manufactured as a by-product, stored on-site and then sold as a product redistributed from the Applicant via pipeline to the nearby Cargill facility;
- liquid nitrogen gas, liquid argon gas and liquid oxygen gas, which are stored on-site and redistributed to industry.

Figure 1: *Site Location*

1.3. Site Description

The site comprises approximately 4.3 hectares (ha) of SP1 Special Activities zoned land under the *State Environmental Planning Policy (Three Ports)* 2013 (Three Ports SEPP). The site is located at 9 Egret Street, Kooragang in the Newcastle LGA and is legally described as Lot 5 in DP 1015754 (see **Figure 2**).

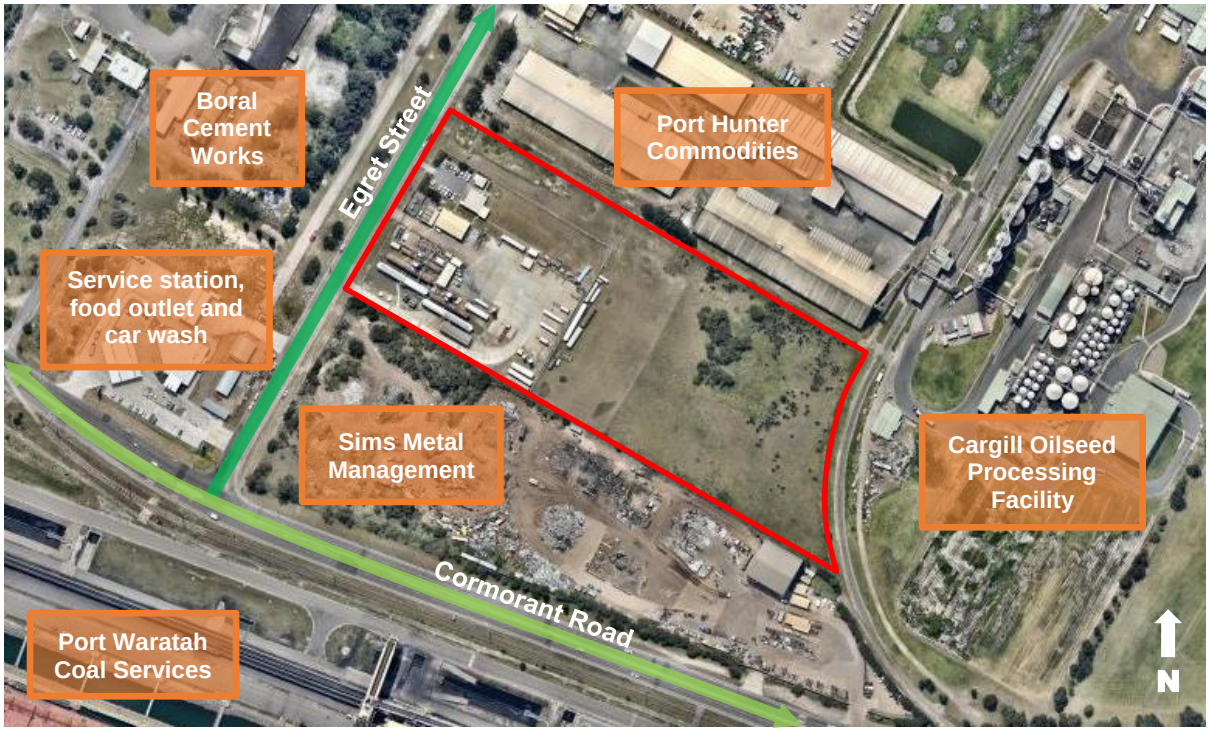

Figure 2: *Site (depicted in red outline)*

1.4. Surrounding Land Uses

Kooragang Island supports a wide range of major industrial developments including heavy and light industry, transport and distribution and other port related activities. Notable major manufacturers with facilities at Kooragang Island include Orica, Cargill and Boral.

The Port of Newcastle is located immediately adjacent to Kooragang Island and is one of the largest ports in Australia, acting as an economic and global gateway for the Hunter Valley and northern NSW. There are a number of vessel berths to the south of the site.

Environmental features within proximity of the site include the Hunter River, 300 metres (m) to the south, and the Hunter Wetlands National Park, 1.5 kilometres (km) to the north. The Hunter River originates in the Mount Royal Range, enters the sea at the Port of Newcastle and encircles Kooragang Island. The Hunter Wetlands National Park forms part of the Hunter Estuary Wetlands Ramsar site and occupies the northern portion of Kooragang Island.

The closest sensitive receivers are residents located approximately 1.8 km south-west of the site in Mayfield North.

The surrounding land uses are depicted in **Figure 1** and **Figure 2**.

1.5. Other Development Approvals

On 10 February 1975, Commonwealth Industrial Gases Limited was granted consent by Newcastle City Council (Council) for a carbon dioxide manufacturing plant and storage depot (DA 305/74). The site has been subdivided over time and the Applicant has occupied the site since the late 1990s.

The following additional Council consents apply to the site:

- DA 2013/904 – Replacement of one tank and additional liquid carbon dioxide storage tank;
- DA 05/2271 – Construction of office, amenities and forklift store buildings, truck wash building, car and truck parking facilities and associated driveway;

- DA 99/2795 – Subdivision of land into seven lots; and
- DA 90/0472 – Carbon dioxide purification and liquefaction plant.

SafeWork NSW must be notified where hazardous chemicals are stored and/or handled on a premise under the provisions of the *Work Health and Safety Act 2011* and *Work Health and Safety Regulation 2011*. The Applicant has been issued an acknowledgement of notification of hazardous chemicals on premises (Acknowledgement Number NDG037518).

An Environment Protection Licence (EPL) from the Environment Protection Authority (EPA) is required for activities identified under the *Protection of the Environment Operations Act* (POEO Act). The Applicant operates its existing gas facility under EPL 20165 for the following activities:

- scheduled activities: chemical production and chemical storage; and
- fee based activities: dangerous goods production, general chemicals storage and chemical storage waste generation.

While the proposed development is not a scheduled activity under the POEO Act, the EPA has advised the Applicant that a variation to the EPL would be required.

1.6. Cooling Tower Operation

The existing gas facility includes two cooling towers on-site (see **Figure 2**). The cooling towers are required to remove heat from the gas facility and produce around 18,200 litres (L) of cooling tower waste water (effluent) per week. The Applicant currently stores the effluent in two 10,000 L storage tanks on-site, where it is then collected by an approved waste contractor approximately once per week.

The disposal of cooling tower effluent makes up a significant operational cost. As such, the Applicant is proposing to use the cooling tower effluent for irrigation on-site and has lodged a DA with the Department which seeks approval to undertake this activity.

2. PROPOSED DEVELOPMENT

2.1. Description of the Development

The Applicant proposes to treat and irrigate cooling tower blowdown effluent at the existing gas facility site on Kooragang Island. The major components of the proposed development are summarised in **Table 1**, shown in **Figure 3**, **Figure 4** and **Figure 5**, and described in full in the Statement of Environmental Effects (SEE) included in **Appendix D**.

The proposal involves the installation of an irrigation system comprising additional storage tanks, a filtration system and irrigation pipework. The Applicant has indicated the majority of the pipeline infrastructure is existing on-site. An irrigation line would be installed above-ground, with a small portion underground to accommodate an existing footpath.

Table 1: *Irrigation Operations*

Aspect	Description
Development Summary	The irrigation of 18,200 L per week of cooling tower effluent on-site.
Infrastructure	• Two existing 10 kilolitre (kL) cooling tower blowdown water storage tanks; • Two additional 10 kL water storage tanks; • Existing cooling tower blowdown water pump facility; • Flow meter; • Two open gravity activated alumina filters; • Treated water storage tank submersible pump; and • Irrigation pipework.
Water Treatment	• The effluent would be pre-treated utilising activated alumina filters to remove fluoride.
Irrigation	• Effluent would be applied via drip irrigation to a 1,544 square metre (m^2) or 0.15 ha grassed area on-site for approximately two hours per day (see **Figure 4**).
Effluent Monitoring	• The existing gas facility currently operates under an EPL from the EPA. • The Applicant proposes to amend the EPL to include additional monitoring, including: – effluent, monitored from the irrigation system balance/buffer tank outlet; and – soil and groundwater, monitored from the same points utilised in the baseline monitoring program.

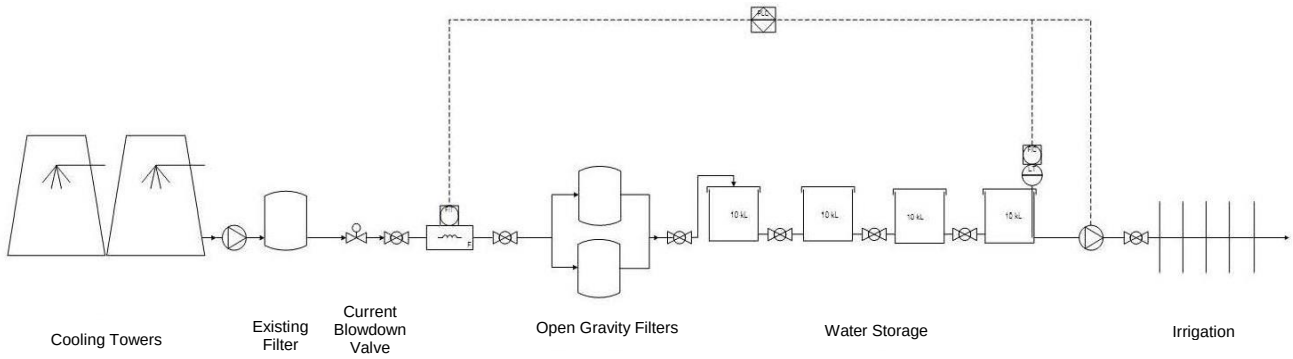

Figure 3: *Proposed Irrigation System*

Figure 4: *Proposed Irrigation Area*

Figure 5: *Proposed Irrigation Pipework System*

2.2. Applicant's Need and Justification for the Development

The Applicant has identified the disposal of cooling tower blowdown water off-site as a significant cost to its operations, estimated at approximately $40,000 per quarter. The volume of cooling tower blowdown water produced requires weekly disposal by a waste contractor. As such, the Applicant is seeking to utilise the blowdown water as effluent for irrigation on-site. In doing so, the Applicant proposes to adopt a 'full reuse scheme', including pre-treatment filtration prior to application to land.

3. STRATEGIC AND STATUTORY CONTEXT

3.1. Strategic Context

Hunter Regional Plan 2036

The *Hunter Regional Plan 2036* is a 20-year blueprint for the Hunter, which envisions a leading regional economy with a vibrant metropolitan city at the heart. Direction 15 is to sustain water quality and security. Action 15.1 is to protect water catchments to sustain high quality and dependable water supplies across the Hunter region. While the site is located just outside of Hunter Water's catchments, it is located within Hunter Water's area of operations.

The proposed development is consistent with the plan as it involves pre-treatment and ongoing monitoring of effluent prior to the application to land.

Lower Hunter Regional Strategy 2006-31

The *Lower Hunter Regional Strategy 2006-31* (LHRS) is a land use planning document which outlines the provisions for ensuring that sufficient, appropriately placed housing and employment land is available to cater for the region's estimated population growth projections over the next two decades. It is the NSW Government's current key strategic planning document for the Lower Hunter region.

The site is located on land identified as employment land in the LHRS. The proposed development is consistent with the strategy as it is a complementary service to the approved gas facility, allowing the continued employment for BOC personnel, initial construction and set-up contractors and ongoing employment for operation and maintenance work.

Newcastle Employment Lands Strategy 2013

The Newcastle Employment Lands Strategy was prepared by Hill PDA on behalf of the City of Newcastle. The strategy seeks to identify employment lands in strategic areas in the Newcastle LGA in order to meet the Lower Hunter Regional Hunter Strategy.

The site is located on Kooragang Island which has been identified as strategic industrial land in the strategy. The proposed development is consistent with the strategy as it is complementary to the existing gas facility, which forms part of a production chain with the other industrial manufacturers on Kooragang Island.

3.2. Part 4 Development

The site is located in the Port of Newcastle Lease Area as defined in *State Environmental Planning Policy (Three Ports) 2013* (Three Ports SEPP).

The Three Ports SEPP was created following the Government's decision to lease the three main ports in NSW to private operators. The Three Ports SEPP provides a streamlined planning and assessment framework for State significant port infrastructure facilities in Port Botany, Port Kembla and Port of Newcastle.

Under the Three Port SEPP, the Minister for Planning is the consent authority for development located within the Lease Area. The proposal is not considered to be State significant development (SSD) or State significant infrastructure (SSI) under the Three Ports SEPP. In addition, the proposal is not considered to be exempt or complying development under the Three Ports SEPP.

As such, the application is considered to be a development under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

3.3. Consent Authority

Under clause 8 of the Three Ports SEPP, the Minister for Planning is the consent authority for development on land within the Lease Area or land that is unzoned under the SEPP. As the site is located in the Port of Newcastle Lease Area, the Minister for Planning is therefore the consent authority for the proposed development.

3.4. Delegated Authority

On 11 October 2017, the Minister for Planning delegated the functions to determine applications under section 80 of the EP&A Act to Directors who report to the Deputy Secretary, Planning Services where:

- the relevant local council has not made an objection;
- a political disclosure statement has not been made; and
- there are no public submissions in the nature of objection.

The City of Newcastle (Council) did not object to the proposal and no political disclosure statement was made for this application or any previous related application, no reportable political donation disclosures were made by any persons who have lodged a submission and no public submissions in the nature of objection were received.

Accordingly, the application is able to be determined by the Director, Industry Assessments, under delegation.

3.5. Permissibility

The site is zoned SP1 (Special Activities) under the Three Ports SEPP.

The proposed development is ancillary to the existing gas facility and involves the irrigation of cooling tower blowdown water on the development site. Under the Three Ports SEPP, both the existing gas facility and the proposed irrigation activity are permissible with consent in the SP1 (Special Activities) zone.

3.6. Other Approvals

The EPA advised that while the development does not constitute a scheduled activity under the POEO Act, the existing gas facility currently operates under an EPL. As such, the existing EPL will need to be amended as part of this development application.

The storage, handling or processing of hazardous chemicals that exceed the quantities specified in the *Work Health and Safety Regulation 2011* requires SafeWork NSW to be notified. The proposed development does not involve hazardous chemicals. However, the proposal is ancillary to the existing gas facility. The Applicant has notified Safework NSW (acknowledgement number NDG037518) and must renotify of applicable changes.

The proposal involves treating cooling tower waste water to remove fluoride. As such, Council advised that approval may be required for the proposed waste water treatment system under section 68(1) of the *Local Government Act 1993*. The Applicant has committed to obtaining a section 68 approval with Council.

3.7. Considerations under Section 79C of the EP&A Act

Section 79C of the EP&A Act sets out matters to be considered by a consent authority when determining a development application. The Department's consideration of these matters is set out in Section 5 and **Appendix B**. In summary, the Department is satisfied the proposed development is consistent with the requirements of Section 79C of the EP&A Act.

3.8. Environmental Planning Instruments

Under Section 79C of the EP&A Act, the consent authority, when determining a development application, must take into consideration the provisions of any environmental planning instrument (EPI), draft EPI (that has been subject to public consultation and notified under the EP&A Act) that apply to the development and development control plan/s (DCP) that apply to the proposal.

The Department has also assessed the proposal against the relevant provisions of the EPIs that apply to the site, and is satisfied that, subject to the implementation of the recommended conditions of consent, the proposal is generally consistent with the aims, objectives and provisions of these instruments (see **Appendix C**).

3.9. Public Exhibition and Notification

There is no legislative requirement to formally notify or exhibit Part 4 DAs that are not designated development, advertised development or SSD under the EP&A Act. Upon receipt, the DA and SEE were placed on the Department's website. The Department sought comments from Council, the EPA, the Office of Environment and Heritage (OEH), the Department of Primary Industries (DPI), SafeWork NSW and Port of Newcastle (PON).

A total of four submissions were received from public authorities and Council during the notification period, none of which were objections.

3.10. Objects of the EP&A Act

In determining the application, the consent authority must consider whether the development is consistent with the relevant objects of the EP&A Act. The Department considers the following objects are most relevant to the assessment of this application:

(a) to encourage:
- *(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
- *(ii) the promotion and co-ordination of the orderly and economic use and development of land,*
- *(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- *(vii) ecologically sustainable development, and*

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

The Department has fully considered the objects of the EP&A Act, including the encouragement of Ecologically Sustainable Development (ESD), in its assessment of the application (see **Table 2**).

***Table 2**: Objects of the EP&A Act and relevance to the development*

Object	Consideration
5(a)(i)	The proposal would encourage the proper management and conservation of natural resources, as the Applicant has demonstrated the treated effluent can be applied to the proposed irrigation area while meeting the criteria/triggers of relevant guidelines. Ongoing monitoring would ensure corrective action is taken where necessary.
5(a)(ii)	The proposal would encourage the orderly and economic use of the land as it is located on Kooragang Island, which has been identified as strategic industrial land in the *Newcastle Employment Lands Strategy 2013*. The proposal is ancillary to an existing industrial site that forms part of a production chain with nearby industrial manufacturers.
5(a)(vi)	The Department's assessment in **Section 5** of this report demonstrates that with the implementation of recommended conditions of consent, the impacts of the development can be mitigated and/or managed to ensure an acceptable level of environmental performance.
5(a)(vii)	The development is consistent with the principles of ESD as the proposal is ancillary to an existing industrial use within an established industrial area. The principles of ESD are discussed further in **Section 3.11** of this report.
5(b)	The Department has assessed the development in consultation with, and giving due consideration to, the technical expertise and comments provided by Council and other government authorities. This is consistent with the object of sharing the responsibility for environmental planning between the different levels of government in the State.
5(c)	The Department provided the public with opportunity to comment on the proposal and considered all issues raised in the public submissions during its assessment of the application (**Section 4**).

3.11. Ecologically Sustainable Development

The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

(a) the precautionary principle;

(b) inter-generational equity;
(c) conservation of biological diversity and ecological integrity; and
(d) improved valuation, pricing and incentive mechanisms.

The potential environmental impacts of the development have been assessed and, where potential impacts have been identified, mitigation measures and environmental safeguards have been recommended.

As demonstrated by the Department's assessment in **Section 5** of this report, the proposed development is not anticipated to have any adverse impacts on native flora or fauna, including threatened species, populations and ecological communities, and their habitats. The proposed development involves filtration of the effluent prior to irrigation and ongoing monitoring of soil, groundwater and effluent. As such, the Department considers that the proposed development would not adversely impact on the environment and is consistent with the objectives of the EP&A Act and the principles of ESD.

4. CONSULTATION AND SUBMISSIONS

4.1. Submissions

During the notification period, the Department received a total of four submissions on the proposal from public authorities and Council. A summary of the issued raised in submissions is provided below.

4.1.1. Public Authorities

Newcastle City Council (Council) did not object to the proposal, however provided comments relating to the option to connect to the reticulated sewer system, designated development thresholds and groundwater monitoring. Council advised the need for Council approval for the waste water treatment system under section 68(1) of the *Local Government Act 1993*. Council also noted the presence of two existing human waste effluent systems on-site.

The **Environment Protection Authority (EPA)** did not object to the proposal, subject to minor amendments to the proposed baseline and ongoing effluent, groundwater and soil monitoring programs. The EPA also sought clarification on the proposed irrigation area and nitrogen balance assessment.

The **Department of Primary Industries (DPI)** did not object to the proposal, but raised concerns in regard to the cumulative contaminate loading assessment in accordance with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000) (the ANZECC Guidelines). DPI also sought clarification on the sample collection methodology and the laboratory results.

The **Hunter New England Population Health (HNEPH)** did not object to the proposal, but requested the Applicant prepare a Mosquito Management Plan to minimise the breeding of disease transmitting mosquitos.

4.2. Response to Submissions

The Applicant provided a Response to Submissions (RTS) on the issues raised during the notification period for the development (see **Appendix F**). The RTS included baseline soil and groundwater conditions, a revised site plan to clarify the proposed irrigation area and a Mosquito Management Plan. Additional information was also provided in regards to connection to the sewer system, monitoring parameters, nutrient balance calculations and sample methodology.

The RTS was made publicly available on the Department's website and was provided to key agencies to consider whether it adequately addressed the issues raised. Council and all submitting agencies advised the RTS addressed their concerns and no further comments were provided.

5. ASSESSMENT

The Department has considered the SEE, the issues raised in the submissions, the Applicant's RTS and supplementary information in its assessment of the development. The Department considers the key assessment issue is soil and water impacts. A number of other issues have also been considered. These issues are considered to be minor and are addressed in **Table 3**.

5.1. Soil and Water

The irrigation of cooling tower effluent has the potential to result in soil and water impacts to the site and surrounding area which could lead to poor plant growth, contamination, waterlogging and soil erosion. The irrigation of effluent also has the potential to impact the underlying groundwater or the quality of streams and rivers in the catchment, particularly when effluent contains high quantities of nutrients, salt, pathogens or other contaminates.

The proposed effluent irrigation system was developed in accordance with the *Environmental Guidelines, Use of Effluent by Irrigation* (DEC, 2004) (the Effluent Guidelines). To ensure the proposed effluent irrigation system is adequate, the Applicant considered the suitability of the site (including the existing soil and hydrological conditions), the quality of the effluent and the design of the irrigation system.

Site Suitability

The site suitability for irrigation is dependent on the receiving soil and the existing hydrological conditions. The Applicant undertook soil and groundwater sampling within the proposed irrigation area (see **Figure 4**) to determine the baseline conditions and suitability for irrigation.

With regard to soil baseline conditions, the SEE and RTS indicated the soil was subject to some limiting properties which would influence the quality of the effluent that can be applied, including:

- soil pH ranging from 7.8 to 8.9, which represents a moderate limitation and has the potential to impact optimum plant growth (which is between a pH of 6 and 7.5);
- the soil cation exchange capacity (which is the soil's ability to hold onto essential plant nutrients and relates to soil structure) was low, however the soils within the proposed irrigation area is capable of providing structure and stability for the existing grasses;
- the soil phosphorus sorption capacity was low which could potentially inhibit the soil's ability to immobilise excess phosphorus and could result in the contamination of groundwater and/or surface water; and
- fluoride was detected from 40 mg/kg to 90 mg/kg, which has potential risks to grazing animals.

In terms of the groundwater baseline conditions, the SEE indicated that the groundwater on-site does not exceed groundwater investigation levels for analytes like sulfate, phosphorus or certain metals outlined under the *National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013*.

The baseline soil sampling that was undertaken as part of the RTS indicated a low potential for acid sulfate soils (ASS) to be encountered in the proposed irrigation area. Further, the proposal does not involve excavation works to disturb soils on-site. Notwithstanding, if any ASS or potential ASS (PASS) is confirmed on-site, the Applicant has indicated it would prepare and implement an ASS Management Plan. The Department accepts the Applicant's commitment and has included it in the recommended conditions of consent.

The baseline soil and groundwater conditions of the proposed irrigation area indicate there are some limitations in regards to plant growth and the soil's ability to hold nutrients. However, the EPA, Council and DPI did not raise concerns regarding the baseline conditions. Department acknowledges that the proposed irrigation area is subject to some limitations and these limitations dictate the quality of the effluent that can be irrigated.

Effluent Quality

Effluent typically contains organic matter and nutrients, but can also contain contaminates, salts and pathogens which have the potential to impact the surrounding environment. The Applicant sampled the cooling tower effluent for a range of analytes such as pH, sodium, electrical conductivity and fluoride. The sampling results determined that fluoride was the main analyte of concern as it exceeded the

ANZECC Guidelines threshold values of 1.0 milligrams per litre (mg/L) (short term trigger value) and 2.0 mg/L (long term trigger value) with an average of 6.5 mg/L.

To make the effluent suitable for irrigation, the Applicant carried out a pilot trial to remove fluoride using an activated alumina filter media. The results of the pilot trial showed that the filter media successfully removed fluoride to acceptable levels, while also reducing phosphorus concentrations. As such, the treated waste water would fall within the acceptable irrigation thresholds of the ANZECC Guidelines and would be categorised as a low to medium strength effluent (according to its concentrations of nitrogen, phosphorus, and other potential contaminants) under the Effluent Guidelines.

The Applicant has committed to implementing a monitoring program for soil, groundwater and effluent and proposes to incorporate it in the site's existing EPL. The program would be used to confirm the suitability of the irrigation system and identify any potential impacts on the surrounding environment. The EPA and DPI Water deemed the proposed monitoring program to be adequate but also requested the Applicant consider factors such as biochemical oxygen demand (BOD), biocides and cumulative contaminate loading in the monitoring program. The EPA recommended that the specific biocides utilised in the cooling tower process be documented and included in the sampling regime. The Applicant has accepted these requirements.

The Department considers the quality of the effluent would be of a low to medium strength once treated with the proposed filtration system. The baseline soil and groundwater conditions of the site show some limitations in regards to plant growth and the soil's ability to hold nutrients. However, the Department is of the view that the Applicant has demonstrated the treated effluent would not have an adverse impact on the soil or groundwater, taking into consideration the baseline sampling results and the effluent pilot treatment trial.

The Department's assessment concludes the effluent can be irrigated on-site based on the baseline soil, groundwater and effluent quality. The Applicant has developed a monitoring program, to the satisfaction of relevant agencies, taking into consideration these baseline conditions. Further monitoring would also occur as part of the site's EPL once a variation is granted by the EPA. Having considered the existing soil and groundwater conditions, the Department considers the quality of the effluent being applied would have a negligible impact on the proposed irrigation area. To ensure this, the Department has recommended a condition requiring the Applicant to implement an effluent irrigation monitoring program.

Irrigation Design

The proposal involves a full reuse scheme, which is an irrigation scheme that fully utilises the effluent (see **Figure 3**). The SEE noted that if the irrigation system is ill-managed, it has the potential to cause adverse impacts to the surrounding environment such as:

- pooling and waterlogging of effluent on the irrigated area;
- flooding of effluent on the irrigated area;
- ineffective drainage on site;
- increased groundwater recharge and rising water table; and
- reduced water quality of the Hunter River.

The Applicant proposes a drip irrigation method for the proposed irrigation area. The SEE included a water balance to calculate the amount of water and nutrients that can be applied to meet crop requirements, while avoiding runoff and percolation or movement of water down the soil profile. The SEE indicated that the estimated percolation rate using the proposed irrigation system would be between 0.004 to 0.26 centimetres per hour (cm/hr), which would be below the typical percolation range for the soil type at the site (being 2-5 cm/hr). Hence, the soil type would be able to handle the capacity of the effluent and it is unlikely the proposed irrigation system would cause ponding or waterlogging.

In addition, the SEE noted the site is not flood prone and that the total effluent to be irrigated would only be 1 to 2% of historical rainfall events. However, two additional water storage tanks with a total capacity of 20,000 L would be installed to allow for an additional week of wet weather storage. The Applicant has committed to implementing flood management measures in line with best practice to minimise any potential flood risks, including but not limited to:

- implementation of an Effluent Irrigation Management Plan, which would include mitigation measures such as daily site inspections and ceasing irrigation operations during wet weather and rainfall events; and

- resume disposal of cooling water effluent off-site with a waste contractor during adverse weather conditions.

The Department is of the view that the Applicant has demonstrated the proposed irrigation scheme is suitably designed. Council and EPA did not raise any issues with regard to the irrigation design and management measures. The Department notes the Applicant may need to occasionally dispose of waste water via a licensed contractor as a contingency during adverse weather events (as per current practice), however this would be infrequent and intermittent. The Department is satisfied the Applicant's commitments would minimise any potential flooding impacts or discharges off-site and has recommended conditions formalising these commitments.

The Department's assessment concludes the potential soil and water impacts can be managed and the proposed irrigation system has been adequately designed. The recommended conditions include the requirement of an Effluent Irrigation Management Plan which would include monitoring programs, specific thresholds and contingency measures. As such, the Department is satisfied the recommended conditions provide sufficient safeguards to address the potential impacts of the proposed development.

5.2. Other Issues

The Department's assessment of other issues is provided in **Table 3**.

Table 3: *Assessment of Other Issues*

Consideration	Recommended Conditions
Waste Management	
• As part of its existing operations, the Applicant currently disposes of cooling tower effluent to an off-site licensed waste facility. • The proposed development would involve the on-site irrigation of cooling tower effluent which would remove the need for the effluent to be disposed off-site. • The SEE notes that the use of activated alumina as a filter media would generate an additional waste stream at the facility. Once spent, the filter media would require disposal off-site as per the EPA's *Waste Classification Guidelines*. • The Applicant has committed to implementing a number of waste management measures including development of a Waste Management Plan and the proper disposal of spent alumina filter media to a licensed facility. • The EPA and Council did not raise any issues concerning waste management at the site. • The Department is satisfied the Applicant's commitments would be adequate for managing the proposed development and has formalised these commitments in the recommended consent. • The on-site irrigation of effluent would also remove the need for the effluent to be disposed off-site The Department's assessment concludes waste impacts would be minimal and can be adequately managed, subject to conditions.	Require the Applicant to: • dispose of all waste to a facility that may lawfully accept it.
Mosquito Management	
• HNEPH raised concerns regarding the risk of nuisance biting mosquitoes and disease transmitting mosquitoes affecting employees, visitors and local population and recommended that the Applicant prepare a Mosquito Management Plan. • In its RTS, the Applicant provided a Mosquito Management Plan which included details about mosquito control programs and the mitigation measures to be implemented. The Applicant has committed to implementing this plan for the development. • The Department's assessment concludes the risk of nuisance biting mosquitoes and disease transmitting mosquitoes would be managed by the Applicant via the Mosquito Management Plan and has recommended conditions to formalise the Applicant's commitment.	Require the Applicant to: • implement the Mosquito Management Plan.
Biodiversity	
• The proposed irrigation area is located on 0.15 ha within an existing gas facility on Kooragang Island. The Hunter River is located at least 377 m south of the proposed irrigation area. • The SEE notes the proposed irrigation area is characterised by exotic grasses and there are no animals present that would use the area for grazing or habitat purposes (see **Figure 4**). • The proposal would not require any removal of vegetation or existing habitat, instead effluent would be regularly irrigated to the grassed areas only.	No conditions are required.

Consideration	Recommended Conditions
• Council did not raise any issues regarding potential impacts to biodiversity. • The Department considers the proposed development would not have a significant impact on biodiversity, given the site is largely disturbed and characterised by exotic grasses. The Department's assessment concludes the proposed development is not likely to impact on any significant vegetation communities.	
Hazards and Risk	
• The proposal involves the installation of new pipelines, water storage tanks and two filters at an existing gas facility. • The SEE indicated the proposed development is unlikely to interact with the existing gas facility nor would it pose additional hazards or risk issues. The SEE also noted there would be no additional chemical usage or storage on-site. • The Applicant has committed to undertaking a Hazard and Operability Study (HAZOP) at the concept design stage of the development to identify and evaluate any issues what may represent risk to personnel or equipment. • The Department reviewed the SEE and concludes the proposed development is not potentially hazardous. The Department also notes the Applicant's commitment to undertaking a HAZOP is appropriate. • The Department does not recommend any conditions.	No conditions are required.

6. CONCLUSION

The DA has been assessed in accordance with the matters for consideration under Part 4 and section 79C of the EP&A Act, and all relevant environmental planning instruments, and is considered to comply with all relevant items.

The proposed development enables the treatment and on-site irrigation of cooling tower effluent. The proposed development would remove the need for cooling tower effluent to be removed off-site and would have minimal soil and water impacts. The Applicant has identified the baseline conditions, established a monitoring program to the satisfaction of relevant agencies and has committed to the implementation of an effluent irrigation management plan.

The Department concludes the impacts of the development can be appropriately managed through implementation of the recommended conditions of consent. Consequently, the Department considers the development is in the public interest and should be approved, subject to conditions.

7. RECOMMENDATION

For the purpose of section 80(1)(a) of the *Environmental Planning and Assessment Act 1979*, it is recommended that the Director, Industry Assessments, as delegate of the Minister for Planning:

- consider the findings and recommendations of this report;
- approve the application in respect of DA 8354; and
- sign the attached development consent (**Attachment A**).

Recommended by:

7/11/17

Bianca Thornton
Planning Officer
Industry Assessments

Recommended by:

7/11/17.

Joanna Bakopanos
Team Leader
Industry Assessments

DECISION
The recommendation is: Approved by:

7/11/17

Chris Ritchie
Director
Industry Assessments
as delegate of the Minister for Planning

APPENDIX A: DEVELOPMENT CONSENT

APPENDIX B: CONSIDERATIONS UNDER SECTION 79C

Section 79C of the EP&A Act requires that the consent authority, when determining a development application, must take into consideration the following matters:

(a) the provisions of: (i) any environmental planning instrument, and (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Director-General has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and (iii) any development control plan, and	Detailed consideration of the provisions of all environmental planning instruments (including draft instruments subject to public consultation under this Act) that apply to the proposed development is provided in **Appendix C** of this report.
(iiia) any planning agreement that has been entered into under Section 93F, or any draft planning agreement that a developer has offered to enter into under Section 93F, and	The Applicant has not entered into any planning agreement under section 93F.
(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and	The Department has undertaken its assessment of the proposed development in accordance with all relevant matters as prescribed by the regulations, the findings of which are contained within this report.
(v) any coastal zone management plan (within the meaning of the *Coastal Protection Act 1979*) that apply to the land to which the development application relates,	The site is not located within a coastal zone and no coastal zone management plan applies to the development.
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,	The Department has considered the likely impacts of the development in detail in Section 5 of this report. The Department concludes that all environmental impacts can be appropriately managed and mitigated through the recommended conditions of consent.
(c) the suitability of the site for the development,	The development is an irrigation scheme, ancillary to an existing development, located on SP1 Special Activities zoned land under the *State Environmental Planning Policy (Three Ports) 2013* which is permissible with development consent.
(d) any submissions made in accordance with this Act or the regulations,	All matters raised in submissions have been summarised in Section 4 of this report and given due consideration as part of the assessment of the proposed development in Section 5 of this report.
(e) the public interest.	The development would facilitate the continued employment of operational staff and generate employment for the installation, operation and maintenance of the irrigation system. The environmental impacts of the development would be appropriately managed via the recommended conditions. On balance, the Department considers the development is in the public interest.

APPENDIX C: CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

State Environmental Planning Policy (Three Ports) 2013

The subject site is located in the Port of Newcastle Lease Area and the Three Ports SEPP therefore applies to the proposed development.

The proposal is consistent with key aims of the Three Ports SEPP which are to allow the efficient development, re-development and protection of land at Port for port purposes and to ensure that land around the Lease Area is maintained for port-related and industrial uses.

The site is zoned SP1 Special Activities under the Three Ports SEPP and the proposed development would be permissible with consent on the subject site. The proposed development would be consistent with key aims of this zone, including the provision of development that supports the operations of the Port of Newcastle.

Port of Newcastle is considered to be a significant resource that provides substantial direct and indirect economic benefits to the State of NSW. The proposal is ancillary to the existing gas facility, which forms part of a production chain with the other industrial manufacturers on Kooragang Island. Through the pre-treatment of effluent and the ongoing monitoring programs, the proposal would have negligible environmental impact. As such, the Department is satisfied that the proposed development is consistent with relevant provisions of the Three Ports SEPP.

APPENDIX D: STATEMENT OF ENVIRONMENTAL EFFECTS

See link: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8354

APPENDIX E: SUBMISSIONS

See link: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8354

APPENDIX F: RESPONSE TO SUBMISSIONS

See link: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8354