12. AIR QUALITY AND GREENHOUSE GASES

12.1. Air Quality Guidelines

One submitter questioned the suitability of the proposed air quality goals for the Project and in particular the dust deposition goal of 120 mg/m^2/day. The air quality guidelines for the Project presented in Section 11.2 of the EIS were based on the *Environmental Protection (Air) Policy 1997*. Since the publication of the EIS, The *Environmental Protection (Air) Policy 1997* has been superseded by the *Environmental Protection (Air) Policy 2008* (EPP (Air).

The purpose of the EPP (Air) is to protect the air quality environment for human health and wellbeing, the health and biodiversity of ecosystems, the aesthetics of the environment and for agricultural use. The air quality objectives in the EPP (Air) considered relevant to the construction and operation of the Project are presented in Table 12-1.

Table 12-1 Air quality objectives in the EPP (Air) relevant to the Project

Pollutant	Air Quality Objective	Averaging Period	Allowable Exceedances
Total Suspended Particulates (TSP)	90 µg/m^3	Annual	-
Particulates as PM_{10} (<10 µm)	50 µg/m^3	24 hours	5 per year

The dust deposition guideline of 120 mg/m^2/day (monthly average) has been recommended by the Department of Environment and Heritage Protection (DEHP) to determine potential for dust nuisance impacts from construction and mining projects since 2003 (EPA, 2003).

The proposed air quality monitoring and management during construction are outlined in Section 20.3.12 of the Environmental Management Plan.

12.2. Dust Management

One submitter has recommended additional dust mitigation measures to assist in the management of air quality impacts during construction. The Proponent has considered each of the recommended dust management in Table 12-2.

Table 12-2 Recommended Dust Mitigation Measures

Recommended dust mitigation measures	Proponent Response
Provide advance warning of burn events is required to enable us to remove washing from the line, close windows and to prepare accordingly	This has been accepted and incorporated in the Environmental Management Plan (Appendix J, Section 4.11).
Wetting stockpiles on a daily basis	This has been accepted and incorporated in the Environmental Management Plan (Appendix J, Section 4.11).
Consider relocation of stockpiles	It is recommended a buffer distance of 200 m be maintained from sensitive receivers to stockpile areas.
Reduce the speed limit of haul trucks on Fletcher Road and access roads to reduce diesel emissions and wheel-generated dust	Fletcher Road is predominantly a sealed road and limiting speeds will not significantly reduce dust emissions. Haul trucks speeds will be limited to 40 km/h on unsealed roads on-site.
Implement continuous air quality monitoring at residence	This has been accepted and incorporated in the Environmental Management Plan (Appendix J, Section 4.11).
Implement constant monitoring and sampling of rain water tanks	Water quality monitoring of rainwater tanks near construction projects typically does not exceed standard for Total Suspended Solids or metal concentrations in the Australian Drinking Guidelines. The Proponent proposes to take one water quality sample of rainwater tank prior to construction at the residence. In the event air quality monitoring during construction exceeds the air quality objectives an additional water quality sample will be undertaken. This has been accepted and incorporated in the Environmental Management Plan (Appendix J, Section 4.11).
Physical treatment of residence to maintain indoor air quality.	The Proponent considers air quality monitoring and management measures proposed in the EM Plan should achieve the air quality objectives in the EPP (Air). The Proponent may treat affected local residences if potential air quality impacts cannot be adequately managed. The Proponent will ensure all proposed treatment options are negotiated in a fair and equitable manner (e.g. air conditioning).

The proposed air quality monitoring and management during construction are outlined in the Environmental Management Plan (Appendix J, Section 4.11).

The potential for dust nuisance from the Project can be further reduced through:

- Effective communications with local stakeholders on air quality issues associated with construction activities;
- A clearly identified point of contact should local stakeholders have comments or complaints;
- Well defined process to ensure that any issues are dealt with promptly and to a satisfactory level; and
- Well defined system of recording any incidents or complaints.

All complaints about air quality will be investigated promptly and appropriate action will be taken to reduce legitimate dust nuisance. A register of dust complaints will be maintained. The processes for recording and investigating dust concerns are provided in Section 20.3.12 of the EM Plan.

12.3. Greenhouse Gas Emissions from clearing and flooding

Two submitters stated the EIS did not adequately consider the greenhouse gas implications of clearing and flooding of the vegetation on the dam site.

Section 11.5 of the EIS presented a greenhouse gas emissions inventory for the Emu Swamp Dam Project

Landuse change is a contributor to greenhouse gas emissions from dam construction due to the clearing of vegetation and the subsequent release of carbon from the decaying vegetation. The greenhouse gas emissions associated with both clearing and flooding are estimated using published emissions factors in the IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Agriculture, Forestry and Other Land Use (IPCC, 2006). These guidelines derive emission rates for methane and carbon dioxide based on landuse type and corresponding carbon content. The derived greenhouse gas emission factors for clearing and inundation are presented Table 12-3.

Table 12-3 Greenhouse gas emission factors for clearing and flooding

Source	Emission Factor	Source
Land clearing (woodland)	110.1 t CO_2-e/ha	IPCC, 2006
Land clearing (grassland)	10.5 t CO_2-e/ha	IPCC, 2006
CO_2 Emissions from flooded land	5.2 kg CO_2 ha^{-1} day^{-1}	IPCC, 2006
CH_4 Emissions from flooded land	0.044 kg CH_4 ha^{-1} day^{-1}	IPCC, 2006

Source: IPCC, 2006

The estimated greenhouse emissions associated with clearing and inundation of 196 ha for the Project are presented in Table 12-4. The greenhouse gas emissions from inundation are expected to occur over a 10-year period. These estimates should be considered as indicative only because there is considerable uncertainty around the factors as they do not account for differences in site-specific conditions.

Table 12-4 Indicative estimates of greenhouse gas emissions from clearing and flooding

GHG Source	Area	GHG Emissions
Land clearing (woodland)	106 ha	11,627 t CO_2-e
Land clearing (grassland)	90 ha	951 t CO_2-e
CO_2 Emissions from flooded land	196 ha	3,720 t CO_2-e
CH_4 Emissions from flooded land	196 ha	661 t CO_2-e
Total		16,959 t CO_2-e

12.4. Electricity Requirements for Pumping Water

Four submitters stated the EIS did not consider greenhouse gas emissions from the operation of the Project associated with electricity requirement for pumping water in the pipelines.

Sources of greenhouse gas emissions identified in the EIS from construction included direct emissions from diesel combustion and indirect greenhouse gas emissions from electricity usage.

The electricity demand during operation of the Project water was presented in Section 11.5.4 of the EIS. The annual electricity requirements for the Combined Urban and Irrigation Project have been estimated as 3,012 MWh. The electricity demand is driven by the energy requirements associated with pumping water. The associated greenhouse gas emissions from operations of Emu Swamp Dam are presented in Table 12-6.

The EIS used the Factors and Methods Workbook (AGO, 2006) to prepare the greenhouse gas inventory for the EIS. This document has been replaced by the National Greenhouse Accounts (NGA) Factors (DIICCSRTE, 2013). The relevant emission factors in the NGA Factors are presented in Table 12-5.

Table 12-5 Greenhouse gas emission factors

GHG Source	Emission Factor	Source
Diesel usage	2.698 t CO_2-e / kL	DCCEE, 2013
Electricity end use (QLD)	0.82 t CO_2-e / MWh	DCCEE, 2013

Source: DIICCSRTE, 2013

The revised estimates of greenhouse gas emissions from construction and annual operations of the Project are presented in Table 12-6.

Table 12-6 Greenhouse gas emissions from construction and operation

Project Phase	Emission Source	Usage	GHG Emissions
Construction	Diesel for dam construction	1,525 kL	4,114 t CO_2-e
	Electricity	95 MWh	78 t CO_2-e
	TOTAL		4,203 t CO_2-e
Operations	Electricity end use (annual)	3,012 MWh	2,470 t CO_2-e
	TOTAL		2,470 t CO_2-e

12.5. Greenhouse Gas Management

One submitter recommended a carbon management plan be developed for the Project.

Greenhouse gas management measures were presented in Section 11.5.3.1 and 11.5.4.1 of the EIS. Energy efficiency will be a key feature in the design of the Project and will be managed through further efficiency measures incorporated into the Project. The following energy efficiency opportunities have been identified to further minimise greenhouse gas emissions during operation of the Project:

- installation of high efficiency pumps to reduce energy consumption; and
- implementation of effective leakage management systems to minimise operational losses.

The following Commonwealth legislation are relevant for the reporting and management of greenhouse gas emissions in Australia:

- the *Energy Efficiency Opportunities Act 2006* (EEO Act) requires large energy-users to identify, evaluate and publicly report cost effective energy savings opportunities;
- the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) establishes a single, national system for reporting greenhouse gas emissions, abatement actions, and energy consumption and production by corporations; and
- the *Clean Energy Act 2011* establishes a pricing mechanism for greenhouse gas emissions and aims to increase investment in renewable energy.

SDRC will comply with the requirements of the EEO Act, NGER Act and *Clean Energy Act 2011*.