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8. Air Quality

8.1 Climate

One submission questioned statements in the EIS regarding the microclimate of Hummock Hill Island given that there was no site specific data presented in the EIS.

In the absence of site specific data, meteorological data from Gladstone and 1770 were used to describe the climate of the HHI Development area. The understanding of the microclimate of Hummock Hill Island is based on the climates of coastal and inland locations in Queensland. Coastal locations tend to be cooler than inland locations as a result of onshore sea breezes.

8.2 Dust Management

One submission requested that trucks with loads of spoil material be covered to minimise dust emissions.

The Proponent is committed to reducing the level of dust generated during the construction of the HHI Development. Consequently, all trucks and vehicles carrying loads of spoil will be required to cover their loads to minimise the generation of dust.

8.3 Odour

8.3.1 Wastewater Treatment Plant

One submission claimed that odour from the sewerage settling ponds may present a problem depending on the direction and strength of the wind even though it is over 300-500m away. Section 10.2.2.1 of the EIS identified odour emissions associated with the operation of the wastewater treatment facility as a potential impact of the project and as such identified a number of mitigation measures.

In order to minimise potential odour nuisance on residential, recreational and tourist receivers the proposed wastewater treatment plant will utilise dedicated utilities space outside any proposed residential precinct. Due to the prevailing winds at Hummock Hill Island being easterly to south-easterly, this location is downwind of potential receivers for the majority of the time. The wastewater treatment processes will be enclosed as such, odour emissions from storage of treated effluent, which are traditionally significant sources of odour (due to their exposed surface area) are expected to be minimal.

The EIS states that the wastewater treatment plant, including associated odour issues would require further detailed assessment as part of the specific development approvals and EAs for these facilities.

8.3.2 Desalination Process

One submission raised the issue that the EIS does not address the potential for odour from the desalination plant.

The air quality assessment did not identify the desalination plant as a potential odour source. The desalination plant is unlikely to generate any odours or fumes that would be detectable beyond the



boundary of the site. As such no mitigation measures are expected to be required for minimisation of odour impacts from operating the desalination plant.

Desalination is one of several possible options for supplying water to the HHI Development. The desalination process proposed in the EIS is a Mechanical Vapour Compression (MVC) Desalination Process (refer section 3.4.1.4 of the EIS). The MVC Desalination Process is one potentially viable technology, however a range of technologies will be considered during the detailed planning and design phases to ensure that the most appropriate technology is utilised.

8.4 Greenhouse Gas Emissions

8.4.1 Potential Impacts

Three submissions stated that the EIS has not estimated greenhouse gas emissions for a number of HHI Development activities including vegetation clearing, transport emissions and indirect emissions associated with electricity consumption during operation.

The greenhouse gas emissions associated with land clearing on Hummock Hill Island have been estimated for the Supplementary Report based on an above-ground biomass content of 290 tonnes of carbon per hectare. The total land to be cleared for the development area is 341 ha. For the purposes of this assessment, it has been assumed that all of the carbon in the biomass is released as carbon dioxide. The potential greenhouse gas emissions from land clearing are approximately 362,300 t CO₂-e.

A preliminary greenhouse gas inventory has been prepared for the operation of the HHI Development. The National Greenhouse Accounts (NGA) Factors (DCC, 2008) were used to prepare the greenhouse gas inventory. The relevant emission factors are presented in Table 8-1.

■ Table 8-1 Greenhouse Gas Emission Factors

Source	Emission Factor
Electricity end use (QLD)	1.04 kg CO ₂ -e/ kWh
Petrol	2.3 t CO ₂ -e/ kL

Source: Department of Climate Change, 2008

The main sources of greenhouse gas emissions for the operation of the HHI Development are:

- direct CO₂ emissions from transport; and
- indirect CO₂ emissions due to consumption of electricity within the HHI Development.

Estimates of annual petrol and electricity usage for the operation of the HHI Development are presented in Table 8-1 and corresponding greenhouse gas emission estimates are presented in Table 8-2. It is estimated to result in approximately 25,784t CO₂-e of greenhouse gases on an annual basis.



■ **Table 8-2 Indicative Greenhouse Gas Emissions from Operation of Hummock Hill Island**

Emissions Source	Value	Units	Annual GHG Emissions
Transport emissions	6.3	ML	14,500 t CO ₂ -e
Electricity for residences/tourists	10,000	MWh	10,400 t CO ₂ -e
Electricity for desalination	850	MWh	884 t CO ₂ -e
TOTAL			25,784 t CO₂-e

The greenhouse gas emissions from the HHI Development represent a small fraction of Queensland and Australia’s annual greenhouse gas emissions. Energy efficiency measures will be further developed during the detailed design phase. Strategies to maximise energy efficiency and limit greenhouse gas emissions during construction and operation will also be developed during the detailed design phase.

8.4.2 Upstream Greenhouse Gas Emissions

One submission raised the issue that the EIS does not provide estimates of upstream greenhouse gas emissions arising from the HHI Development.

The upstream greenhouse emissions associated with electricity consumption during operation have been estimated in Section 8.4.1 of the Supplementary Report.

The building materials used for construction have energy inputs with associated greenhouse gas emissions. The greenhouse gas emissions associated with the manufacture of these materials vary depending on a number of factors such as the manufacturing process, the source of raw materials and distances for transportation. For example, increasing the content of recycled material in concrete will lower the greenhouse gas intensity of the material. The quantities and source of the building materials is not known at this stage so greenhouse gas emissions associated with the building materials have not been estimated. These emissions will however be reportable by facilities and companies responsible for generating the emissions under the *National Greenhouse and Energy Reporting Act 2007*. The proposed introduction of a Carbon pollution Reduction Scheme for Australia will facilitate the offsetting of these greenhouse gas emissions.

8.4.3 Mitigation Measures

One submission sought further detail on measures to be implemented to reduce greenhouse gas emissions from individual households. The submission suggested measures such as the installation of photovoltaic cells or banning air-conditioning units for every household on Hummock Hill Island. Another submission questions the validity of the statement in the EIS that renewable energy sources have been maximised by the HHI Development.

The design of the HHI Development is currently at a concept phase. During detailed design a range of measures will be investigated to maximise the energy efficiency of the HHI Development. At this stage the Proponent is committed to incorporating renewable energy and energy efficiency in design measures such as designing commercial buildings to 5 star standards for energy conservation, including solar hot water heating, use of gas as a fuel for cooking, public awareness for programs



focused on ways of avoiding the need for space cooling and architectural building design which maximises natural lighting and ventilation and incorporates energy efficient appliances.

In selecting energy efficiency measures in design, annual greenhouse gas emissions will be maintained at a minimum and will represent emissions reductions in comparison with a similar sized development which do not include such measures.

Section 3.4.3 of the EIS did not state that renewable energy sources have been maximised by the HHI Development. The HHI Development will require a connection to mains grid to ensure security of supply. During the detailed design phase of infrastructure, further investigations and feasibility studies will be undertaken to examine alternative options for the HHI Development. The other options include on-Island generation using a gas fired cogeneration plant or diesel engine generators, solar/photovoltaic cell arrays and wind turbines.

8.5 Climate Change Risk Assessment

Climate change issues were considered in Section 7.3 of the EIS. Climate factors and risks associated with the region have been incorporated into the Master Plan of the HHI Development. Buildings will be designed in sympathy with current and anticipated climate. Aspects of the Great Barrier Reef Climate Action Plan have also been incorporated into the proposed HHI Development to reduce the ecological footprint and maintain the resilience of the surrounding ecosystems to climate change.

Risks to infrastructure from storm surge increases associated with climate change are discussed in Section 9.3 of the EIS, current erosion prone areas being considered sufficient with an allowance for climate change factors. Building pad levels and public infrastructure will be located above the Q100 storm surge level reducing potential risks from this source (refer **Section 7.4.1**). Risks associated with increased temperature and storm intensity are incorporated into infrastructure and development design minimising potential risks from these sources.