This document has been prepared on behalf of **Frasers Property Australia and Altis Property Partners** by:

Northstar Air Quality Pty Ltd,
Suite 1504, 275 Alfred Street, North Sydney, NSW 2060

www.northstarairquality.com | Tel: +61 (02) 9071 8600

Mamre Road Precinct, 657-769 Mamre Road, Kemps Creek

SSD Application – Greenhouse Gas Assessment

Addressee(s):	**Frasers Property Australia and Altis Property Partners**
Report Reference:	**18.1080.FR4V13**
Date:	**28 July 2020**

Quality Control

Study	Status	Prepared	Checked	Authorised
Introduction	Final	Northstar	GCG	MD
The Proposal	Final	Northstar	GCG	MD
Legislation, Regulation and Guidance	Final	Northstar	GCG	MD
Methodology	Final	Northstar	GCG	MD
Assessment Outcomes	Final	Northstar	GCG	MD
Conclusion	Final	Northstar	GCG	MD

Report Status

Northstar References		Report Status	Report Reference	Version
Year	Job Number	(Draft: Final)	(R*x*)	(V*x*)
18	1080	F	R4	V13
Based upon the above, the specific reference for this version of the report is:				**18.1080.FR4V13**

Final Authority

This report must by regarded as draft until the above study components have been each marked as final, and the document has been signed and dated below.

Martin Doyle **28th July 2020**

Non-Technical Summary

Frasers Property Australia and Altis Property Partners, have engaged Northstar Air Quality Pty Ltd to perform a greenhouse gas and energy efficiency assessment (GHG assessment), to support a State Significant Development (SSD) application, associated with the proposed development for a warehouse, logistics and industrial facilities hub in the Mamre Road Precinct, located at 657-769 Mamre Road, Kemps Creek, NSW (the Proposal Site).

The SSD application is submitted to allow development of the Proposal Site into a number of warehouses and industrial facilities and associated office, recreational and retail space (the Proposal).

This GHG assessment presents an assessment of the potential GHG emissions, which may result during the operation of the Proposal and provides measures to be adopted to minimise energy use and maximise energy efficiency.

The prediction of potential impacts associated with operational activities has been performed adopting GHG emission factors, as outlined within the National Greenhouse Accounts Factors Workbook, 2019. Emissions associated with all proposed warehouses/industrial facilities, are anticipated to represent less than 0.0034% of total NSW GHG emissions and less than 0.0009% of total Australian GHG emissions in 2017.

Emissions are further minimised by introducing a number of site-specific energy-efficiency measures with the proponents implementing a six-star Green Star Design and an As-Built V1.1 rating, from the Green Building Council of Australia for the development, ensuring efficient energy usage.

Contents

Tables

Figures

Units Used in the Report

All units presented in the report follow International System of Units (SI) conventions, unless derived from references using non-SI units. In this report, units formed by the division of SI and non-SI units are expressed as a negative exponent, and do not use the solidus (/) symbol. *For example*, 50 micrograms per cubic metre would be presented as 50 $\mu g \cdot m^{-3}$ and not 50 $\mu g/m^3$.

Common Abbreviations

Abbreviation	Term
CO_2-e	carbon dioxide equivalent
DoEE	Department of Environment and Energy
EPA	Environmental Protection Authority
ESS	Energy Savings Scheme
DP&E	Department of Planning and Environment
GHG	greenhouse gas
kWh	kilowatt hour
m^2	square metre
NGA	National Greenhouse Accounts
OEH	NSW Office of Environment and Heritage
PV	photovoltaic
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
WRI	World Resources Institute
WSEA	Western Sydney Employment Area

1. Introduction

Frasers Property Australia and Altis Property Partners, have engaged Northstar Air Quality Pty Ltd (Northstar) to perform a greenhouse gas and energy efficiency assessment (GHG assessment), to support a State Significant Development (SSD) application, consisting of development of a warehouse, logistics and industrial facilities hub (the Mamre Road Precinct), located at 657-769 Mamre Road, Kemps Creek, NSW (the Proposal Site).

The SSD application has been submitted, to allow development of the Proposal Site which would accommodate a number of warehouses and associated offices (the Proposal).

This GHG assessment presents an assessment of the potential GHG emissions, which may result during the operation of the Proposal and provides measures which when adopted, will minimise energy use and maximise energy efficiency.

1.1. Assessment Requirements

NSW Department of Planning and Environment (DP&E) (now Department of Planning, Industry and Environment (DPIE) issued the Secretary's Environmental Assessment Requirements (SEARs) for the Proposal in September 2018. Although no specific requirements associated with GHG and energy efficiency have been included in the SEARs, as **Table 1** below identifies, generic SEARs associated with previous proposals have been given due consideration within the performance of this assessment. Sections of the report, where generic requirements have been suggested to address GHG emissions is provided in **Table 1** below.

Table 1 Generic SEARS requirements for GHG and Energy Efficiency report

Issue	Requirement	Addressed
Greenhouse Gas and Energy Efficiency	• including an assessment of the energy use on site and demonstrate what measures would be implemented to ensure the proposal is energy efficient.	Section 5

Page left intentionally blank

2. The Proposal

The following provides a description of the context, location, and scale of the Proposal and the Proposal Site.

2.1. Environmental Setting

The Proposal Site is located at 657-769 Mamre Road, Kemps Creek, NSW. The Proposal Site is located within the Local Government Area (LGA) of Penrith. A map showing the location of the Proposal Site is provided in **Figure 1** below.

Figure 1 Proposal site location

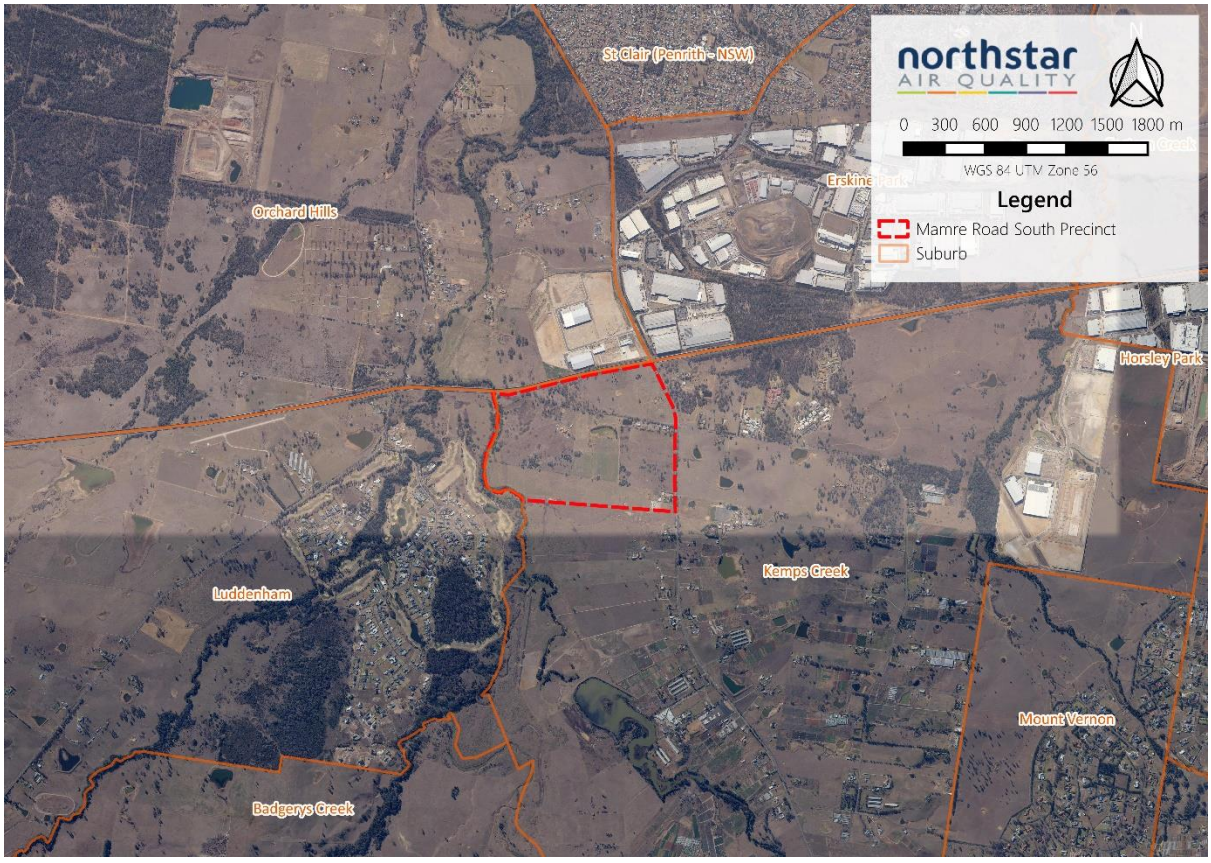


Image courtesy of Google Maps

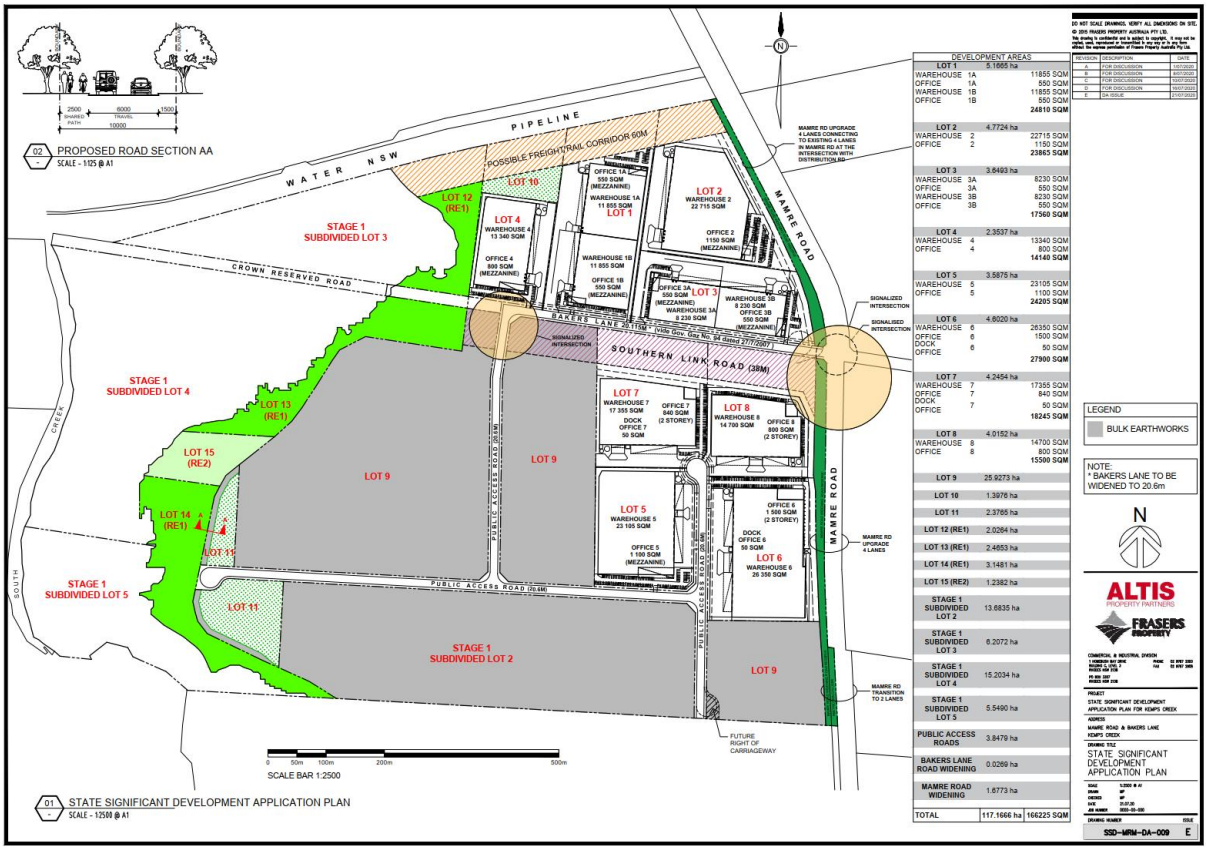
The land on which the Proposal Site is situated is currently zoned RU2 (Rural Landscape). Lands to the immediate north and northeast of the Proposal Site, are currently zoned IN1 (General Industrial) and contain fully-built and operating industrial and warehousing facilities.

2.2. Overview and Purpose

The SSD Proposal seeks to gain approval to develop the subject land, for a number of warehouses, logistics, and industrial facilities. Although the exact use and user of each of the proposed warehouse and industrial facilities, proposed under this SSD application is not currently known, it is anticipated that the site would be occupied and operated in a similar way to the approved Orchard Hills development, located to the immediate north, at 585-649 Mamre Road.

A layout of the Proposal Site is provided in **Figure 2** below.

Figure 2 Proposed site layout



3. Legislation, Regulation and Guidance

3.1. Federal Legislation

The Australian Government Clean Energy Regulator administers schemes legislated by the Australian Government for measuring, managing, reducing or offsetting Australia's carbon emissions.

The scheme administered by the Clean Energy Regulator of most relevance to this Proposal is the National Greenhouse and Energy Reporting (NGER) Scheme, under the *National Greenhouse and Energy Reporting Act* (2007) (NGER Act).

3.1.1. National Greenhouse and Energy Reporting Scheme

The NGER scheme, established by the NGER Act, is a national framework for reporting and disseminating company information about greenhouse gas emissions, energy production, energy consumption and other information specified under NGER legislation.

The objectives of the NGER scheme are to:

- inform government policy;
- inform the Australian public;
- help meet Australia's international reporting obligations;
- assist Commonwealth, state and territory government programmes and activities; and,
- avoid duplication of similar reporting requirements in the states and territories.

Further information on the NGER scheme, specifically the definitions of various scopes and types of GHG emissions, which have also been adopted for the purposes of this assessment, is provided in **Section 4** (on P15 of this report).

3.2. Relevant State Legislation

There is no specific GHG legislation administered within NSW. The NGER scheme is the applicable legislation within NSW.

The NSW Government is working to deliver economically efficient and environmentally effective policies and programs that do not duplicate initiatives of the Australian Government. They include:

- understanding NSW emissions;
- providing financial support through the Climate Change Fund;
- promoting energy efficiency (e.g. through the Energy Savings Scheme [ESS]); and,
- promoting soil carbon sequestration.

3.3. Guidance

The GHG accounting and reporting principles adopted, within this GHG assessment, are based on the following financial accounting and reporting standards:

- Australian Government Department of the Environment, Australian National Greenhouse Accounts, National Greenhouse Accounts Factors, August 2019 (DoEE, 2019a);
- The World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) GHG Protocol: A Corporate Accounting and Report Standard (WRI, 2004);
- ISO 14064-1:2006 (Greenhouse Gases – Part 1: Specification with guidance at the organisation level for quantification and reporting of GHG emissions and removal;
- ISO 14064-2:2006 (Greenhouse Gases – Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of GHG emission reductions or removal enhancements); and,
- ISO 14064-3:2006 (Greenhouse Gases – Part 3: Specification with guidance for the validation and verification of GHG assertions) guidelines (internationally accepted best practice).

Further detail is provided in **Section 4** (on P15 of this report).

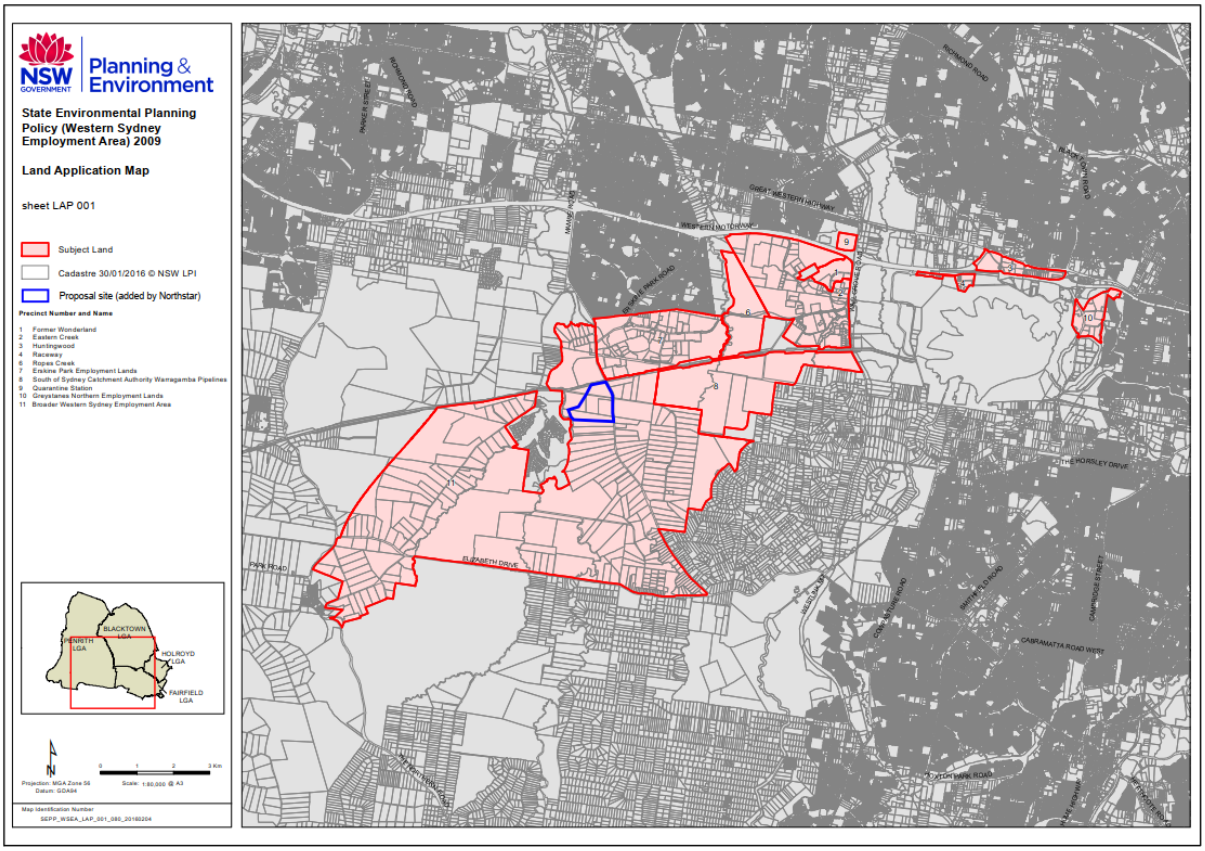
3.4. State Environmental Planning Policy (Western Sydney Employment Area) 2009

The Proposal Site is located within the Western Sydney Employment Area. State Environmental Planning Policy (Western Sydney Employment Area) 2009, otherwise known as the WSEA SEPP. The SEPP aims to protect and enhance areas within the Western Sydney Employment Area to encourage employment. The WSEA SEPP aims to (according to the WSEA SEPP):

- promote economic development and the creation of employment in the Western Sydney Employment Area, by providing for development, including major warehousing, distribution, freight transport, industrial, high technology and research facilities;
- provide for the co-ordinated planning and development of land in the Western Sydney Employment Area;
- rezone land for employment or environmental conservation purposes;
- improve certainty and regulatory efficiency by providing a consistent planning regime for future development and infrastructure provision in the Western Sydney Employment Area;
- ensure that development occurs in a logical, environmentally sensitive and cost-effective manner and only after a development control plan (including specific development controls), has been prepared for the land concerned; and,
- conserve and rehabilitate areas that have a high biodiversity or heritage or cultural value, in particular areas of remnant vegetation.

The Western Sydney Employment Area covers the area shown in **Figure 3** below. The location of the Proposal Site is also shown (as added by Northstar in a blue outline), indicating that the entirety of the site is located within the area covered by the WSEA SEPP and therefore the requirements and aims of the WSEA SEPP, apply in full to the Proposal Site.

Figure 3 Western Sydney Employment Area – land application map



Source: New South Wales Government (https://legislation.nsw.gov.au/#/view/EPI/2009/413/maps) SEPP_WSEA_LAP_001_080_20160204, and adapted by Northstar Air Quality

The Proposal Site is currently zoned RU2 (Rural Landscape) with rezoning to IN1 (General Industrial) and E2 (Environmental Conservation) being sought. Lands to the immediate north and northeast of the Proposal Site have already been rezoned to IN1 (General Industrial).

The WSEA SEPP outlines the objectives of each permitted zone. These have been set out below for both the IN1 (General Industrial) and the E2 (Environmental Conservation):

Zone IN1 General Industrial

According to the WSEA SEPP (2009), the objectives of zone IN1 (General Industrial) are to:

- facilitate a wide range of employment-generating development including industrial, manufacturing, warehousing, storage and research uses and ancillary office space;
- encourage employment opportunities along motorway corridors, including the M7 and M4;

- minimise any adverse effect of industry on other land uses;
- facilitate road network links to the M7 and M4 Motorways;
- encourage a high standard of development, that does not prejudice the sustainability of other enterprises or the environment; and,
- provide for small-scale local services such as commercial, retail and community facilities (including child care facilities) that service or support the needs of employment-generating uses in the zone.

Warehouse and distribution centres are permitted with consent within this land use zoning, as set out by the WSEA SEPP (2009).

Zone E2 Environmental Conservation

The objectives of zone E2 (Environmental Conservation) are to:

- provide for infrastructure and related uses; and,
- prevent development that is not compatible with, or that may detract from, the provision of infrastructure.

Roads are permitted with consent within this land use zoning.

The proposed development meets all the requirements and objectives of the WSEA SEPP. This GHG assessment seeks to demonstrate, that the proposed development would be constructed and operated, so as to not prejudice the sustainability of the environment and to minimise impacts upon the environment.

4. Methodology

4.1. Emission Types

The Australian Government Department of the Environment (DoE) document, "National Greenhouse Accounts Factors" Workbook (NGA Factors) (DoEE, 2019a), defines two types of GHG emissions (see **Table 2** below), namely 'direct' and 'indirect' emissions. This assessment considers both direct emissions and indirect emissions resulting from the operation of the Proposal.

Table 2 Greenhouse gas emission types

Emission Type	Definition
Direct	Produced from sources within the boundary of an organisation and as a result of that organisation's activities (e.g. consumption of fuel in on-site vehicles)
Indirect	Generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation (e.g. consumption of purchased electricity).

Note: Adapted from NGA Factors Workbook (DoEE, 2019a)

4.2. Emission Scopes

The NGA Factors (DoEE, 2019a) identifies two 'scopes' of emissions for GHG accounting and reporting purposes as shown in **Table 3** below.

Table 3 Greenhouse gas emission scopes

Emission Scope	Definition
Scope 1	Direct (or point-source) emission factors give the kilograms of carbon dioxide equivalent (CO_2-e) emitted per unit of activity at the point of emission release (i.e. fuel use, energy use, manufacturing process activity, mining activity, on-site waste disposal, etc.). These factors are used to calculate Scope 1 emissions.
Scope 2	Indirect emission factors are used to calculate Scope 2 emissions from the generation of the electricity purchased and consumed by an organisation as kilograms of CO_2-e per unit of electricity consumed. Scope 2 emissions are physically produced by the burning of fuels (coal, natural gas, etc.) at the power station.

Note: Adapted from NGA Factors Workbook (DoEE, 2019a)

A third scope of emissions, Scope 3 Emissions, are also recognised in some GHG assessments. The Greenhouse Gas Protocol (GHG Protocol) (WRI, 2004) defines Scope 3 emissions as "other indirect GHG emissions":

> *"Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of Scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services."*

Scope 3 emissions have not been considered within this assessment but are entirely optional.

4.3. Emission Source Identification

The geographical boundary set for this GHG assessment covers the Proposal Site and does not include the transport of materials to and from the Proposal Site (as defined above). Emissions associated with Proposal construction and all associated mobile plant and equipment, are not included in this assessment. This is because their usage is not quantifiable at the current time. The ongoing energy efficiency of the Proposal's operation has been considered the main focus of this assessment.

The GHG emission sources associated with the operation of the Proposal have been identified through the review of the proposed broad activities as described in **Section 2** (on P9). The individual tenants of each of the warehouses/industrial facilities is not yet determined, and information relating to the consumption of electricity has been assessed through review of similar, existing built and operating facilities in NSW, VIC and QLD (refer **Section 4.4** on P17).

The activities/operations being performed, as part of the Proposal, which have the potential to result in emissions of GHG, are presented in **Table 4** below.

Table 4 Greenhouse gas emission sources

Proposal Component	Scope	Emission Source Description
Consumption of purchased electricity	2	Emissions associated with the generation of electricity from fossil fuel combustion

A minor quantity of scope 1 emissions, associated with the consumption of unleaded fuel, diesel fuel or natural gas, would be anticipated during the operation of the warehouses. At this stage of development, that quantity is not able to be quantified exactly. Fuel would also be combusted in vehicles servicing the Proposal (i.e. heavy good vehicles etc.). This assessment however, has examined the energy efficiency of the Proposal Site rather than the transportation of goods and materials.

4.4. Emissions Estimation

Emissions of GHG from the source identified in **Table 4** (on P16) have been calculated using activity data for the source per annum (i.e. per kilowatt-hour (kWh) of electricity) and the relevant emission factor for each source.

The assumptions used in the calculation of activity data for the emission source and emission factors, are presented below.

4.4.1. Activity Data

The assumptions relating to activity data are outlined in **Table 5** below. This value represents the operation of all warehouse, logistics and industrial facilities (including offices) within the Proposal Site. This has been based on data for similar facilities in NSW, VIC and QLD as provided by Frasers. These data indicate that the operation of similar facilities results in the consumption of 34.5 kWh·m^{-2} of floor space per year, averaged across seven (7) facilities. This average value is close to the NSW value of 37.4 kWh·m^{-2} of floor space per year (Frasers, pers. comm.) and is considered to be appropriate as it covers a broad range of likely tenants and activities which may be located within the Proposal Site, during operation.

The total floor space of the Proposal, covering all warehouses and office areas is 157,735 m^2.

Table 5 Calculated activity data

Proposal Component	Assumptions	Activity	Units
Consumption of purchased electricity	Average of 34.5 kWh·m^{-2}·year^{-1} (Based on information provided by Frasers)	5,441,857	kWh

4.4.2. Emission Factors

Emissions factors used for the assessment of GHG emissions associated with the operation of the Proposal have been sourced from the NGA Factors (DoEE, 2019a) (refer to **Table 6**).

Table 6 Greenhouse gas emission factors

Emission Scope	Emission Source	Emission Factor
Scope 2	Electricity (NSW)	0.81 kg CO_2-e·kWh^{-1}

Page left intentionally blank

5. Assessment Outcomes

5.1. Quantification of Greenhouse Gas Emissions

Based on the activity data for the operation of the Proposal and the emission factor outlined in **Section 4.4**, (on P17), annual GHG emissions have been calculated and are presented in **Table 7** below.

Indirect (Scope 2) emissions are anticipated to be 4,408 t CO_2-e per annum.

Table 7 Calculated proposal GHG emissions

Emission Scope	Emission Source	GHG Emissions (t CO_2-e per annum)
Scope 2	Purchased electricity consumption	4,408
	TOTAL Scope 2	**4,408**

5.2. Greenhouse Gas Emissions in Context

A comparison of the calculated GHG emissions associated with the Proposal against Australian (DoEE, 2019b) and NSW (DoEE, 2019c) total emissions in 2017 is presented **Table 8** below.

These data indicate that the operation of the Proposal, in its entirety, would contribute less than 0.0034% of NSW total GHG emissions and less than 0.0009% of Australian total GHG emissions in 2017.

Table 8 Proposal GHG emissions in context

Proposal Phase	Emissions (t CO_2-e per annum)		
	Proposal	NSW (2017)	Australia (2017)
		Total 131,500,000	Total 534,700,000
Operation	4,408	<0.0034 %	<0.0009 %

5.3. Discussion

The GHG assessment indicates that during Proposal operation, emissions are likely to be small and contribute less than 0.0034% of the NSW 2017 total emission of GHG.

Emissions generated during the operation of the Proposal will be further minimised by the introduction of a number of energy efficiency measures. Frasers are targeting a Six-Star Green Star Design and an As-Built V1.1 rating, as defined by the Green Building Council of Australia, for the Proposal. The key initiatives that relate to the sustainability performance of the Proposal Site are outlined in **Table 9** below.

Table 9 Key initiatives for six-star Green Star Proposal

Energy	
Building fabric	10% improvement on BCA – double glazing, increased façade and roof insulation
Translucent sheeting	10% of warehouse roof
Hot water system	Heat pump (air source or geothermal)
Office heating and cooling	Geothermal – reverse cycle ducted
Office outside air	Min 50% increase on OA
Lighting – office	LED with individual control
Lighting – warehouse	LED with daylight control
Lighting – external	LED with time clock control
Renewable energy	Solar PV system (100 kW)
Energy storage	Customer dependent
Electric vehicle charging	Included
Water	
Water fixtures	5- & 6-star WELS rated
Recycled water	Rainwater for 80%+ irrigation and toilet flushing
Fire test water recycling	80%+ of fire test water recycled
Sub-metering	Electricity and water with web-based monitoring system
Commissioning	Commissioning manager and plan

6. Conclusion

Frasers Property Australia and Altis Property Partners, have engaged Northstar Air Quality Pty Ltd to perform a Greenhouse Gas and Energy Efficiency Assessment (GHG assessment), to support a State Significant Development (SSD) application, comprising of a warehouse, logistics and industrial facilities hub (the Mamre Road Precinct), located at 657-769 Mamre Road, Kemps Creek, NSW (the Proposal Site).

The SSD application has been submitted to allow development of the Proposal Site, which aims to deliver a number of warehouses, logistics, and industrial facilities and associated office space (the Proposal).

This GHG assessment presents an assessment of the potential GHG emissions which may result during the operation of the Proposal and provides measures which when adopted, will minimise energy use and maximise energy efficiency for the Proposal.

The prediction of potential impacts, associated with the Proposal's operational activities, has been performed adopting GHG emission factors, as outlined within the National Greenhouse Accounts Factors Workbook, 2019. Emissions associated with all warehouses/industrial facilities are anticipated to represent less than 0.0034% of total NSW GHG emissions and less than 0.0009% of total Australian GHG emissions in 2017. These have been assessed to be insignificant.

Emissions will be further minimised by introducing a number of energy efficiency measures and the proponents are targeting Six-Star Green Star Design and an As-Built V1.1 rating from the Green Building Council of Australia for the development, ensuring efficient energy usage.

The above measures, when adopted, will give the Proposal excellent energy and water efficiency credentials.

Page left intentionally blank

7. References

DoEE. (2019a). *National Greenhouse Accounts Factors, Australian National Greenhouse Accounts, August 2019.* Australian Government Department of the Environment and Energy.

DoEE. (2019b). *The Australian Government Submission to the United Nations Framework Convention on Climate Change, Australian National Greenhouse Accounts, National Inventory Report 2017, May 2019.*

DoEE. (2019c). *State and Territory Greenhouse Gas Inventories 2017, Australia's National Greenhouse Accounts, June 2019.*

WRI. (2004). A Corporate Accounting and Reporting Standard – Revised Edition. World Resources Institute / World Business Council for Sustainable World Business Council for Sustainable Development.