APPENDIX K

# Greenhouse Gas Assessment (SLR, 2015c)

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global environmental solutions

# Proposed Small Stock Abattoir Development & Continued Operation of the Blayney SeaLink Cold Store Complex

## Greenhouse Gas Assessment

Report Number 610.13744-R1

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Version: Revision 2

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# Greenhouse Gas Assessment

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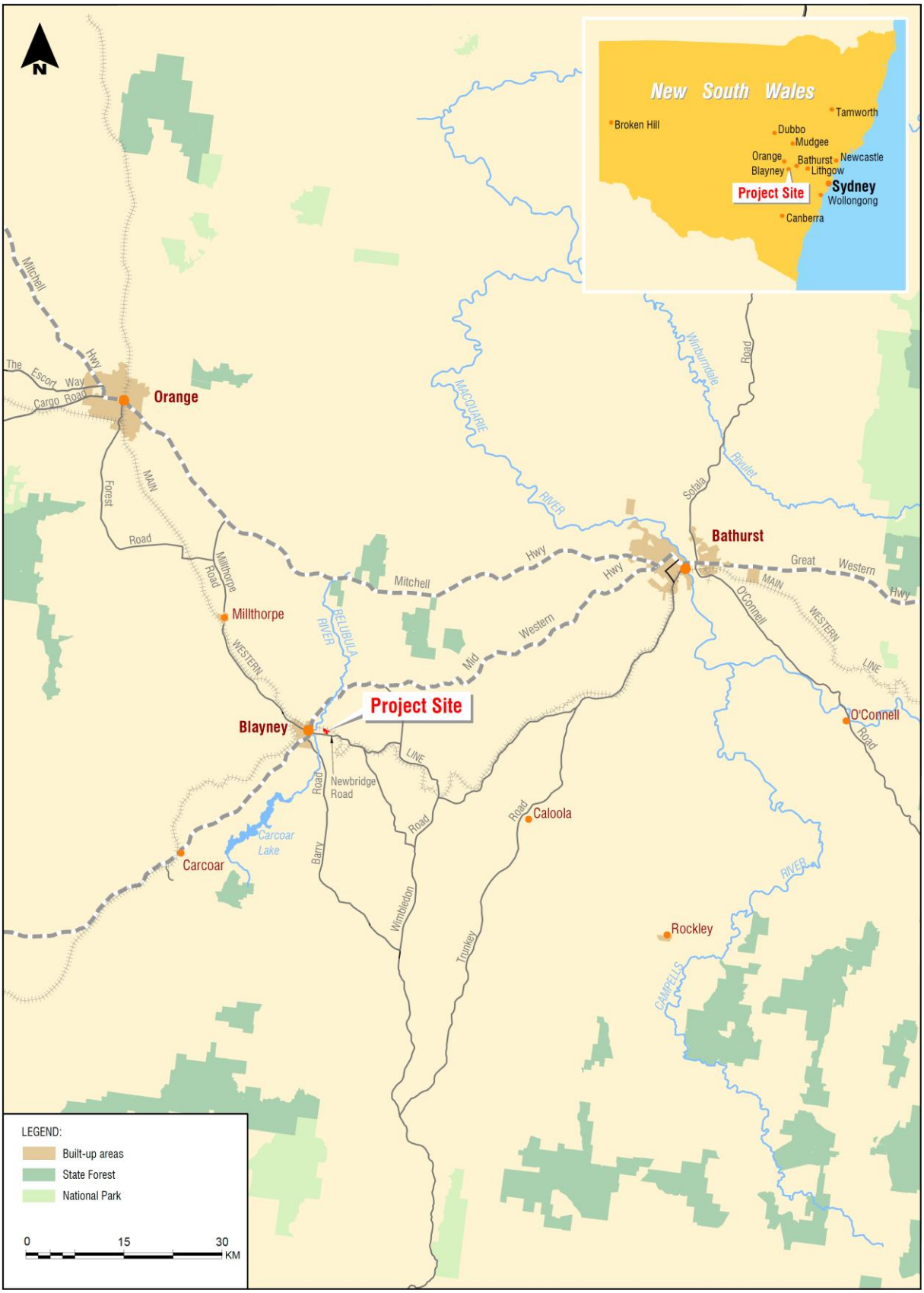
# 1 INTRODUCTION

## 1.1 Overview

This Greenhouse Gas (GHG) assessment has been prepared by SLR Consulting Australia (SLR) on behalf of Metziya Pty Limited (Metziya), as part of the Environmental Impact Statement (EIS) that will accompany an application for State Significant Development (SSD 6594) to the NSW Department of Planning and Environment (DP&E) seeking Project Approval under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The application relates to the Blayney SeaLink Cold Store Complex, located approximately one kilometre east of the Blayney township in the Central West region of New South Wales (NSW), as shown on **Figure 1**.

Metziya is now seeking a single new Project Approval for the continuing operation and use of the existing Blayney SeaLink Cold Store Complex, previously approved under numerous development applications determined by Blayney Shire Council, and to develop a small stock abattoir within the site (herein collectively referred to as the Project). The abattoir will have the capacity to process up to 4,500 head per day, comprising rangeland goats and some lambs, and will be only the second purpose built goat abattoir in Australia, servicing the increasing demand for goat meat around the world.

**Figure 1 Regional context**



## 1.2 The Project

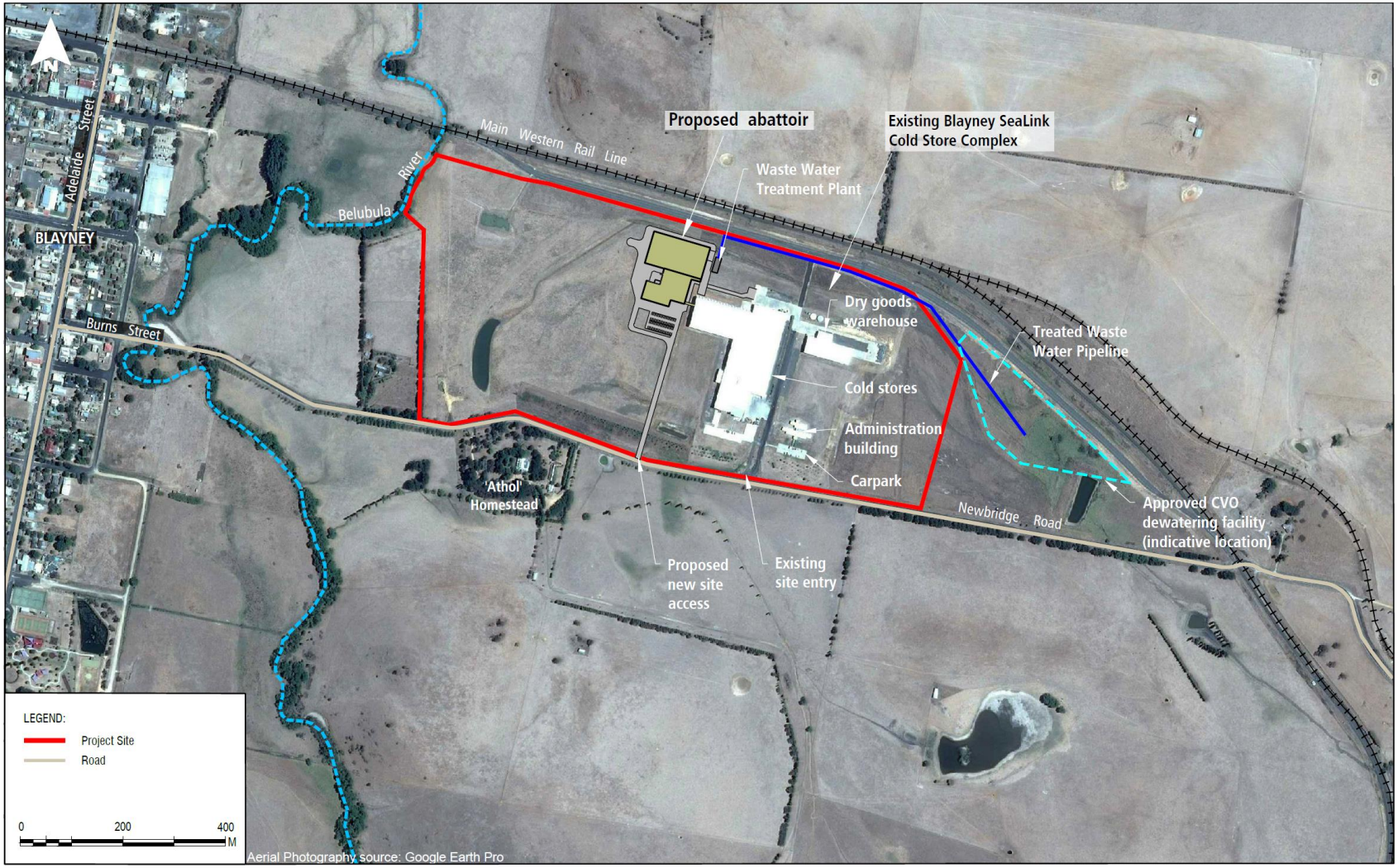
Metziya's primary objective is to develop an abattoir complex that is integrated with the company's existing Blayney SeaLink Cold Store Complex. The siting and design of the proposed abattoir has been formulated to maximise the use of existing site infrastructure (see Figure 2), which will provide the chiller, freezer and storage requirements of the abattoir, as well vehicular access and servicing provisions.

The key aspects of the Project are:

- Development of a small stock abattoir with the capacity to process up to 4,500 head per day, comprising rangeland goats and some lambs.
- Consolidation of the multiple development approvals relating to the existing Blayney SeaLink Cold Store Complex into a single new development consent under Part 4 of the EP&A Act.
- Construction of ancillary infrastructure to support the abattoir and cold stores operations, including separate vehicular ingress and egress from/to the adjoining Newbridge Road, heavy vehicle manoeuvring and turning areas, car parking, services, administration offices and a waste water treatment system.

The overall development footprint, including the existing Blayney SeaLink Cold Store Complex and proposed abattoir, will comprise approximately 9.5 hectares (ha).

**Figure 2 Development site**



### 1.2.1 Existing Blayney SeaLink Cold Store Complex

The existing complex comprises six freezer rooms each 90 metres long and 30 metres wide, capable of operating at temperatures to minus 30 degrees Celsius, two temperature controller load-out marshalling rooms with loading docks, a temperature controlled food packaging facility complete with automated cardboard recycling, internal offices and staff amenities. There is also a separate 2700 square metre ($m^2$) dry goods warehouse and an administration building, which incorporates a food services call centre. Development consent has also been granted to increase the dry goods warehouse by 19,128 $m^2$ and construct a vehicle weighbridge.

### 1.2.2 Proposed Blayney Export Meats Abattoir

The disturbance footprint for the proposed new abattoir will be relatively small at approximately 3.1 ha, including the roofed building area, vehicle manoeuvring and parking areas and wastewater treatment plant. The commercial activities associated with the abattoir will also be largely confined to this area.

The abattoir will have two different levels, with the primary areas or components on each level being:

- Ground level – undercover stock receipt and holding area, pelt sorting area, carton room and offal packing, along with staff amenities and offices; and
- Level 1 – raised stock pens, kill floor and boning room, and chillers along with staff amenities and lunch rooms.

The complex will produce three types of meat products as demanded by the serviced export markets – (i) whole bone-in carcass with skin on; (ii) whole bone-in carcass with skin off; and (iii) six way cut of carcass in cartons.

Importantly, there will be no on-site rendering of the raw animal waste products from the abattoir (offal, bone, blood, fat and trimmings) or any on-site skins processing.

#### Stock Holding Area

Livestock will be transported to the Project Site in semi-trailers and/or B-doubles and off-loaded at ground level within the abattoir building via an undercover unloading bay. Animals will be mustered into a series of level undercover holding pens split over the two levels of the abattoir building. Mesh fencing between pens will allow for adequate ventilation and observation.

#### Refrigeration

The current SeaLink operation has temperature controlled areas comprising six freezer rooms, two loading docks and a food packaging room. Refrigeration in the freezer rooms takes the room temperature to -30 degrees Celsius while the loading docks and food packaging room operate at +10 degrees Celsius. Refrigeration is achieved through a closed ammonia system. The compressors are located in a plant room in the north east corner of the current building.

The operational area of the abattoir will be temperature controlled by an enclosed Glycol refrigeration system. New refrigeration equipment will be located in the existing plant room. The area designated for freezing of meat product will be within the existing Freezer Room 5 where refrigeration will be achieved by the enclosed ammonia system.

**Wastewater Management**

All operational waste water generated by the Project will be treated on-site in a wastewater treatment system designed specifically for the abattoir operation, which will involve gross solid separation through a series of screens followed by fat, oil and suspended solid removal through via Dissolved Air Floatation or similar process, followed by biological treatment and membrane filtration before final disinfection.

### 1.2.3 Hours of Operation

The existing Blayney SeaLink Cold Store Complex will continue to operate 24 hours a day, seven days per week.

The abattoir is proposed to operate 24 hours a day, seven days per week. However, activities during the hours of 11pm-6am will generally be limited to stock delivery and operation of the wastewater treatment plant.

### 1.2.4 Vehicular Access and Parking

Separate heavy vehicular ingress for livestock and egress for product from/to the adjoining Newbridge Road will be provided. Heavy vehicles will enter the site from Newbridge Road via a new access road to be constructed in front of the abattoir complex. Heavy vehicles loaded with product will exit the site via the existing access road and weighbridge constructed as part of the Blayney SeaLink Cold Store Complex.

Staff and visitor cars and service vehicles to the Project site will utilise the proposed new access roads for both ingress and egress.

A new car parking area will be constructed as part of the abattoir complex for use by abattoir employees and visitors. Staff and visitors to the Blayney SeaLink Cold Store Complex will continue to use the existing car park in front of the administration building and food packaging facility. While there will generally be no requirement for heavy vehicle parking, particularly for any length of time, adequate area will be available to ensure that heavy vehicle parking requirements can be met within the Project Site. At no time will it be necessary to park heavy vehicles on the adjoining Newbridge Road.

All new access roads and manoeuvring areas will be appropriately designed to carry the anticipated heavy vehicle movements and will be sealed.

### 1.2.5 Traffic Generation

The primary operational activities that will generate traffic to and from the Project Site will be:

- Delivery of livestock in semi-trailer and/or B-doubles;
- Delivery of livestock feed (as needed) in semi-trailers;
- Removal of meat products from the abattoir in refrigerated containers on semi-trailers to Port Botany;
- Removal of meat waste products (offal, bone, blood, fat and trimmings) in enclosed semi-trailers for off-site processing;
- Removal of skins in rigid trucks for off-site treatment;
- Continued delivery of goods to be chilled/frozen and stored at the existing Blayney SeaLink Cold Store Complex in refrigerated semi-trailers and/or B-doubles;
- Continued removal of other stored goods from the Blayney SeaLink Cold Store Complex in refrigerated semi-trailers and/or B-doubles;

- Continued delivery and removal of dry goods to and from the Blayney SeaLink Cold Store Complex in semi-trailers and /or B-doubles;
- Removal of general garbage in rigid trucks;
- Servicing/tradesman visits in utes/vans; and
- Staff visits by cars.

## 1.3 GHG Assessment Objectives

The purpose of this report is to undertake a greenhouse gas assessment that addresses Scope 1, 2 and key Scope 3 emissions relating to the operation of the Project.

The Secretary's Environmental Assessment Requirements (SEARs), issued by the Department of Planning and Environment (DP&E) for the Project (SSD 6594), include a requirement to specifically address greenhouse gases, as follows:

- *a quantitative assessment of the potential greenhouse gas emissions of the development, and a qualitative assessment of the potential impacts of these emissions on the environment;*
- *a detailed description of the measures that would be implemented on site to ensure that the development is energy efficient.*

# 2 GREENHOUSE GAS EMISSIONS

## 2.1 Emission types

The Australian Government Department of the Environment (DoE) document, "National Greenhouse Accounts Factors" Workbook (NGA Factors) (DoE, 2014) defines two types of greenhouse gas emissions (see **Table 1**), *direct* and *indirect*. This assessment seeks to consider both direct emissions and indirect emissions.

**Table 1 Greenhouse Gas Emission Types**

| Emissions | Definition |
|---|---|
| **Direct** | Produced from sources within the boundary of an organisation and as a result of that organisation's activities (e.g. consumption of petrol 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 2014*

## 2.2 Emission Scopes

The NGA Factors identifies two 'scopes' of emissions for greenhouse gas accounting and reporting purposes as shown in **Table 2**.

**Table 2 Greenhouse Gas Scopes**

| 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. |

A third scope of emissions – *Scope 3 Emissions* are also recognised in some greenhouse gas assessments. The *Greenhouse Gas Protocol (GHG Protocol)* (World Business Council for Sustainable Development 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 related to the transport of goods and materials to and from the Project Site are considered in this assessment. Whilst the emissions associated with these activities are from sources not owned or controlled by Metziya (e.g. generated by transport contractors), it is noted that these emissions occur as a result of the Project operations and should therefore be considered when conducting an assessment of this nature.

## 2.3 The Potential Impact of Greenhouse Gas Emissions on the Environment

Increased emissions of GHG are widely accepted to exert a warming influence on climate. Increasing concentrations of the long-lived GHG's (LLGHGs) ($CO_2$, $CH_4$, $N_2O$, halocarbons and $SF_6$)have led to a combined radiative forcing (RF) of +2.63 [±0.26] Watts per square metre (W $m^{-2}$) (IPCC 2007). A 9% increase in this RF since the publication of the Third Assessment Report of the IPCC (IPCC 2007) is the result of concentration changes since 1998 (IPCC 2007). The IPCC state that it is very likely that there has been a substantial anthropogenic (man-made) contribution to surface temperature increases in every continent except Antarctica since the middle of the 20th Century, although difficulties exist in the attribution of temperature changes on smaller than continental scales and on timescales of less than 50 years.

Scientists at the 2005 conference, 'Avoiding Dangerous Climate Change: Symposium on Stabilisation of Greenhouse Gases' concluded that at the level of 550 parts per million (ppm) $CO_2$ concentration, a 2°C increase in global mean temperature above present levels would be experienced, and that stabilisation at a concentration of 400 ppm would be necessary to avoid a 2°C warming. IPCC reports (IPCC 2007) have suggested that stabilising concentrations at 450 ppm by 2020 would only result in a 50% likelihood of limiting global warming to 2°C.

The *Garnaut Climate Change Review* (2008) provides a summary of anticipated impacts on the environment as a result of warming described in the IPCC reports:

> *For the next two decades or so, the major impacts of climate change are likely to include stressed urban water supply and the effects of changes in temperature and water availability on agriculture. All major cities and many regional centres are already feeling the strain of declining rainfall and runoff into streams. Most major cities are beginning to develop high-cost infrastructure for new water sources. In the absence of effective global mitigation, continued investment in expensive new sources of water is likely to be a necessity.*
>
> *By mid-century, there would be major declines in agricultural production across much of the country. Irrigated agriculture in the Murray-Darling Basin would be likely to lose half of its annual output. This would lead to changes in our capacity to export food and a growing reliance on food imports, with associated shifts from export parity to import parity pricing.*
>
> *A no-mitigation case is likely also to see, by mid-century, the effective destruction of the Great Barrier Reef and other reef systems such as Ningaloo. The three-dimensional coral of the reefs is likely to disappear. This will have serious ramifications for marine biodiversity and the tourism and associated service industries reliant on the reefs.*
>
> *By the close of the century, the impacts of a no-mitigation case can be expected to be profound (see Figure 6.2). The increased frequency of drought, combined with decreased median rainfall and a nearly complete absence of runoff in the Murray-Darling Basin, is likely to have ended irrigated agriculture for this region. Depopulation will be under way.*
>
> *Much coastal infrastructure along the early 21st century lines of settlement is likely to be at high risk of damage from storms and flooding.*

# 3 ASSESSMENT METHODOLOGY

This assessment considers Scope 1 and 2 emissions as well as key Scope 3 emissions from the operation of the abattoir.

Emissions from *construction* of the abattoir were not considered within the scope of the assessment. Estimates were not undertaken, however the emissions are *expected to be immaterial* (less than 5%[1]) in the context of the broader Project operating emissions, given the short construction timeframe, minimal use of construction plant and equipment, and relatively simple design of the abattoir building.

## 3.1 Source Identification and Boundary Definition

The boundary for the Project was determined to be the geographical boundary of the Project Site for Scope 1 and Scope 2 emissions. Scope 3 emissions associated with the transport of products and materials to and from the site as part of general operations were also considered within the broader reporting boundary.

### 3.1.1 Emissions Sources

The emissions sources identified for the assessment are shown in **Table 3**.

**Table 3 Scope 1 and 2 Emission Sources for Operation of Abattoir and SeaLink Complex**

| Scope | Activity | Source |
|---|---|---|
| Scope 1 | Abattoir operations | Consumption of purchased natural gas |
| | Wastewater treatment | Wastewater treatment plant |
| Scope 2 | Abattoir operations | Consumption of purchased electricity |
| | SeaLink operation | Consumption of purchased electricity |

**Table 4 Scope 3 Emission Sources for Operation of Abattoir**

| Activity | Source |
|---|---|
| **Heavy vehicles** | |
| Delivery of livestock | Diesel fuel for transport |
| Delivery of consumables | Diesel fuel for transport |
| Removal of meat products from the abattoir | Diesel fuel for transport |
| Removal of meat waste products | Diesel fuel for transport |
| Removal of skins | Diesel fuel for transport |
| Removal of general garbage | Diesel fuel for transport |
| Maintenance | Diesel fuel for transport |
| **Passenger vehicles** | |
| Employee travel | Unleaded fuel for transport |
| **Waste** | |
| Hair | Abattoir wastes |
| Wastewater solids | Abattoir wastes |

[1] 5% is a nominal, though commonly used, threshold for materiality in greenhouse gas accounting. The *National Greenhouse and Energy Reporting Act 2007* includes a threshold for reporting of energy consumption at 5%.

**Table 5 Scope 3 Emission Sources for Operation of Blayney SeaLink Complex**

| Activity | Source |
|---|---|
| **Heavy vehicles** | |
| Delivery of consumables | Diesel fuel for transport |
| Delivery of goods to Blayney SeaLink Cold Store Complex | Diesel fuel for transport |
| Removal of other stored goods from the Blayney SeaLink Cold Store Complex | Diesel fuel for transport |
| Removal of general garbage | Diesel fuel for transport |
| Maintenance | Diesel fuel for transport |
| **Passenger vehicles** | |
| Employee travel | Unleaded fuel for transport |

## 3.2 Quantitative Assessment

The quantitative assessment used the source data and emissions factors as outlined in **Section** 4 to determine the overall emissions for each source.

## 3.3 GHG Management

This phase of the methodology involved identification of possible measures to minimise, mitigate or offset the Project emissions and is discussed in **Section 6**.

# 4 SOURCE DATA AND EMISSIONS FACTORS

## 4.1 Source Data

The source data was determined by estimating potential fuel usage from a number of key activities as outlined in **Section 3.1.1**.

### 4.1.1 Transport of Materials and Products to and from Site (diesel)

Calculations for material and product transport were based on the source data shown in **Table 6** which was provided by Metziya.

**Table 6 Material and Product Transport Source Data**

| Activity | Origin / Destination | Round Trip Distance (km) | Vehicle Type | Annual Vehicles |
|---|---|---|---|---|
| **SeaLink Complex** | | | | |
| Delivery of consumables | Local / regional area. | 80 | Semi-trailer | 250 |
| Delivery of goods to Blayney SeaLink Cold Store Complex | 70% from Sydney<br>30% from Bathurst | 500<br>80 | Semi-trailer and/or B-double | 3,000 |
| Removal of other stored goods from the Blayney SeaLink Cold Store Complex | 30% to Sydney<br>70% to Bathurst | 500<br>80 | Semi-trailer and/or B-double | 3,000 |
| Removal of general garbage | Bathurst landfill | 80 | Rigid truck | 500 |
| Maintenance | Local / regional area. | 80 | Rigid truck | 250 |
| **Abattoir** | | | | |
| Delivery of consumables | Local / regional area. | 80 | Semi-trailer | 250 |
| Delivery of livestock | Bourke | 1,100 | Semi-trailer and/or B-double | 3,000 |
| Removal of meat products from the abattoir | Sydney | 500 | Semi-trailer and/or B-double | 1,500 |
| Removal of meat waste products | Registered composting facility<br>To render (170 km) | 20<br>340 | Rigid truck | 1,000 |
| Removal of skins | Blayney | 6 | Rigid truck | 1,000 |
| Removal of general garbage | Bathurst landfill (40 km) | 80 | Rigid truck | 500 |
| Maintenance | Local / regional area. | 80 | Rigid truck | 250 |

It was assumed that the fuel efficiency of a rigid truck was 28.7 L/100km (ABS 2013) and the semi-trailer and B-doubles was 57.7 L/100km (ABS 2013).

### 4.1.2 Employee Travel to and from Work

Calculations for employee travel were based on the source data shown in **Table 7** which was provided by Metziya. Employees are currently either based within Blayney Shire (~80%) or drive from Bathurst (~10%) or Orange (~10%). The proposed abattoir is conservatively assumed to include a higher proportion of employees from Bathurst and Orange (approximately 50% of the abattoir workforce).

**Table 7 Employee Travel Source Data**

| Destination | Round trip distance | Number of employees |
|---|---|---|
| **SeaLink Complex** | | |
| Orange | 80 km | 3 |
| Bathurst | 80 km | 3 |
| Blayney | 12 km | 24 |
| **Abattoir** | | |
| Orange | 80 km | 41 |
| Bathurst | 80 km | 41 |
| Blayney | 12 km | 83 |

It was assumed that employees each travelled by unleaded fuelled passenger vehicle with a fuel efficiency of 11 L/100km (ABS 2013) and conservatively assumed to work 24/7, i.e. 365 days per year.

### 4.1.3 Gas Delivered Via Pipeline

The source data for gas delivered via pipeline is shown in **Table 8** which was provided by Metziya.

**Table 8 Natural Gas Source Data**

| Facility | Source | Annual Consumption |
|---|---|---|
| Abattoir | Natural Gas | 19TJ |

### 4.1.4 Electricity Consumption

The source data for annual electricity consumption during operations is shown in **Table 9** which was provided by Metziya. Data for the Blayney SeaLink facility was based on current data, and data for the abattoir was an estimation of expected electricity consumption.

**Table 9 Electricity Consumption Source Data**

| Facility | Source | Annual Consumption |
|---|---|---|
| SeaLink Complex | Electricity | 2,174,000 kWh |
| Abattoir | Electricity | 4,200,000 kWh |

### 4.1.5 Waste Disposal

The source data for waste disposal is shown in **Table 10** which was provided by Metziya.

**Table 10 Waste Source Data for Abattoir**

| Facility | Source | Annual Quantity |
|---|---|---|
| Abattoir | Hair | 350 t |
| | Waste water solids | 563 t |

All other waste products are beneficially reused either on site or at another facility.

### 4.1.6 Wastewater Treatment

The source data for wastewater treatment is shown in **Table 11** which was provided by Metziya.

**Table 11 Wastewater Treatment Plant Source Data**

| Facility | Source | Annual Quantity |
|---|---|---|
| Wastewater Treatment Plant | Wastewater | 192 ML |

### 4.1.7 Aggregated Source Data

The aggregated estimations for source data are shown in **Table 12**.

**Table 12 Aggregate Source Data**

| Source | Abattoir | | SeaLink Complex | |
|---|---|---|---|---|
| | Quantity | Unit | Quantity | Unit |
| Diesel | 1,235 | kL | 840 | kL |
| Gasoline (unleaded fuel) | 219 | kL | 31 | kL |
| Natural gas | 19,000 | GJ | - | - |
| Electricity | 4,200,000 | kWh | 2,174,000 | kWh |
| Waste | 913 | t | - | - |
| Wastewater | 192 | ML | | |

## 4.2 Emission Factors

Emissions factors used for operation of the Project were taken from the NGA Factors (see **Table 13**).

**Table 13 Emissions Factors**

| Scope | Source | Emissions factor | Energy Content Factor[4] |
|---|---|---|---|
| Scope 1 | Natural gas | 51.33 kg $CO_2$-e /GJ | 39.3x$10^{-3}$ GJ/$m^3$ |
| | Wastewater | Multiple input equation[3] | N.A |
| Scope 2 | Electricity (NSW) | 0.86 kg $CO_2$-e/kWh | NA |
| Scope 3 | Diesel fuel for transport purposes | 69.9 kg $CO_2$-e /GJ | 38.6 GJ/kL |
| | Gasoline (unleaded fuel) | 69.6 kg $CO_2$-e /GJ | 34.2 GJ/kL |
| | Landfilling of waste[2] | 1.1 t $CO_2$-e / t | NA |

1. Transport purposes include machinery and vehicles which by law can drive on the road
2. Taken from the NGA Factors emissions factor for Commercial and Industrial waste
3. Refer to equation in Section 4.4 of the NGA factors and Department of the Environment's wastewater treatment calculator
4. Not all emission sources have an energy content factor, as per the NGA Factors this has been represented by an NA (Not Applicable).

# 5 GREENHOUSE GAS ASSESSMENT

## 5.1 Operational Emissions Quantitative Assessment

This assessment presents estimated annual GHG emissions for the two main operational elements of the Project:

- The existing Blayney SeaLink Complex; and
- The abattoir.

**Table 14 Existing Blayney SeaLink Complex Annual GHG Emissions**

| | Quantity | unit | Emissions (t $CO_2$-e) |
|---|---|---|---|
| **Scope 2** | | | |
| Electricity | 2,174,000 | kWh | 1,870 |
| **Scope 3** | | | |
| Diesel | 840 | kL | 2,267 |
| Gasoline (unleaded fuel) | 31 | kL | 74 |
| **Total** | | | **4,210 t $CO_2$-e per year** |

**Table 15 Abattoir GHG Annual Emissions**

| | Quantity | unit | Emissions (t $CO_2$-e) |
|---|---|---|---|
| **Scope1** | | | |
| Natural gas | 19 | TJ | 975 |
| Wastewater | 192 | ML | 1923 |
| **Scope 2** | | | |
| Electricity | 4,200,000 | kwh | 3,612 |
| **Scope 3** | | | |
| Diesel | 1,235 | kL | 3,333 |
| Gasoline (unleaded fuel) | 308 | kL | 732 |
| Waste | 913 | t | 1004 |
| **Total** | | | **11,579 t $CO_2$-e per year** |

The total estimated annual operational GHG emissions for the Project are **15,790 t$CO_2$-e per year.**

### 5.1.1 Emissions context

The NSW Office of Environment and Heritage (OEH) has published the NSW state emissions profile for 2010 as 157 million t $CO_2$-e. Therefore in the NSW state context **the Project represents approximately 0.0101% of the total state emissions**.

# 6 GHG MITIGATION AND MANAGEMENT MEASURES

GHG mitigation has been considered in the design of the Project, particularly in relation to energy efficiency and refrigeration. The greenhouse gas emission mitigation and management measures included in the design, as well as other measures recommended for consideration, are listed below.

## 6.1 Refrigerant Usage

### 6.1.1 Existing management and mitigation measures

The following measures are already in place on site, and will be incorporated into the proposed abattoir to reduce the emissions caused from refrigerant usage:

- Use of refrigerants (ammonia and glycol) that do not emit greenhouse gases

### 6.1.2 Other potential management and mitigation measures

- Undertake regular checks of seals on all refrigerated areas

## 6.2 Electricity Usage

### 6.2.1 Potential management and mitigation measures

The following points could be considered to reduce the emissions caused from on-site electricity usage:

- A percentage of the total electricity for the site could be offset through purchasing *green power* from an electricity supplier.
- Sensor lighting could be used in some areas to minimise the number of lights on during all hours of operation.
- Where possible, high efficiency lighting should be used.
- Investigate the option of installing solar panels at the abattoir within 3 years of commencement of operations.
- Undertake pre-feasibility or preliminary analysis for potential for tri-generation to meet energy and cooling needs.

## 6.3 Vehicles and Stationary Plant and Equipment

### 6.3.1 Potential management and mitigation measures

The following points could be considered to reduce overall fuel use from onsite and transport vehicles:

- All vehicles/plant and machinery should be turned off when not in use and regularly serviced to ensure efficient operation.
- Truck routes and loading capacity should be designed to reduce the distance and effort required by the vehicles.
- Encourage car-pooling by employees.
- Ensure correct vehicle mass limits not exceeded by use of the heavy vehicle weighbridge.
- Where possible, B5 and E10 fuel should be used in plant and equipment.

## 6.4 Wastewater Treatment

### 6.4.1 Potential management and mitigation measures

The following points could be considered to reduce the overall emissions from wastewater treatment:

- Consider flaring methane emissions
- Incorporate air blowers / aeration to improve bacteria functioning (reduces nitrous oxide).
- Consider capture of methane for on site energy generation.

# 7 CONCLUSIONS

This Greenhouse Gas (GHG) assessment has been prepared by SLR Consulting Australia (SLR) on behalf of Metziya Pty Limited (Metziya), as part of the Environmental Impact Statement (EIS) that will accompany an application for State Significant Development (SSD 6594) to the DP&E seeking Project Approval under Part 4 of the EP&A Act.

This assessment has determined Scope 1, 2 and key Scope 3 GHG emission estimates for the operation of the Project, and found the emissions to be minimal, particularly when compared to the emissions from the State of NSW as a whole. Annual emissions for the existing Blayney SeaLink Complex were determined to be **4,210 t CO2-e**, and predicted to be **11,579 t$CO_2$-e** for the proposed abattoir, totalling **15,790 t CO2-e per year**. Importantly, this represents just 0.0101% of the GHG emissions from NSW.

Key elements in the design of the abattoir have ensured that GHG emissions will be minimised where possible, in particular the incorporation of the energy efficient glycol refrigeration system. In addition, this report provides a suite of mitigation and management measures that, if implemented, could reduce GHG emissions further.