

Chullora Materials Recycling Facility

Environmental Impact Statement (SSD-10401)

Appendix R Greenhouse Gas Assessment



Greenhouse Gas Assessment of the Chullora Material Recycling Facility

Prepared for:

Arcadis

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Final

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Glossary

Term	Definition
GJ	gigajoules
kL	kilolitre
t	tonnes
tCO ₂ -e	tonnes carbon dioxide equivalents
tpa	tonnes per annum
m ²	square metres
m ³	cubic metres
m ³ /s	cubic metres per second
y	year
Nomenclature	Definition
CH ₄	Methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ -e	carbon dioxide equivalents
HFCs	hydro fluorocarbons
IPCC	Intergovernmental Panel on Climate Change
N ₂ O	nitrous oxide
Abbreviations	Definition
C&I	Commercial and industrial
EF	Emission factor
GHG	Greenhouse gases
MRF	Materials Recycling Facility
MSW	Municipal Solid Waste
NGER	National Greenhouse and Energy Reporting
NPI	National Pollutant Inventory database
RRP	Resource Recovery Park
UNFCCC	United Nations Framework Convention on Climate Change

EXECUTIVE SUMMARY

Proposal overview

SUEZ Recycling & Recovery Pty Ltd (SUEZ - the Applicant) is seeking to establish the state-of the art Chullora RRP located at 21 Muir Road, Chullora in Sydney. The Applicant are proposing to develop and operate the first phase of the Chullora RRP as a Materials Recycling Facility (MRF).

The MRF will have a material handling capacity of up to 172,000 tonnes per annum (tpa). Waste streams that would be processed at the MRF would all comprise dry recyclables from municipal and C&I sources, including:

- Co-mingled material collected from municipal and C&I sources
- Source separated paper and cardboard
- Mixed plastics.

General operational activities are proposed to occur concurrently with the MRF within designated operational activities area, including truck parking, container storage and other ancillary activities as required.

Purpose of this assessment

This Greenhouse Gas Impact Assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) as they relate to greenhouse gas emissions associated with the Proposal.

GHG assessment

Due to the short construction timeframe and lack of earthworks within the Proposal scope, GHG emissions associated with the construction of the MRF would be limited to the intermittent movement of materials on site. These emissions would be minor and insignificant.

GHG emissions associated with the operations of the MRF are as follows:

- Diesel use:
 - Transport of incoming materials
 - Haulage of processed materials/products
 - Materials handling.
- Electricity use for the operation of the MRF.

GHG emissions and energy use associated with the operations phase of the Proposal are summarised in the following table:

Emission source	Energy use (GJ)	GHG emissions (annual)	
		Scope	Emissions (tCO ₂ -e/year)
Diesel (Total) / Scope 1 (Total)	4,160 (18.0%)	1	293 (6.3%)
Electricity (Total) / Scope 2 (Total)	19,336 (82.0%)	2	4,351 (93.7%)
TOTAL	23,496	1 + 2	4,644

Conclusion

Maximum annual GHG emissions and energy use associated with the Proposal have been estimated to be 4,644 tCO₂-e/y and 23,496 GJ/y, respectively. Whilst GHG emissions associated with the Proposal would contribute to Australia's and New South Wales' annual emissions inventory, the emissions are not significant on

a state or national scale. The Proposal would contribute 0.0008% and 0.0032% to national and state emissions annually.

The majority of GHG and energy use associated with the Proposal are Scope 2 emissions associated with the use of grid electricity required for processing operations of the MRF.

The maximum annual GHG emissions and energy use associated with the Proposal do not meet the NGER program facility thresholds of 25 ktCO₂-e and 100 TJ, respectively. However, SUEZ has existing reporting obligations at the corporate level and will, therefore, be required to report on the GHG emissions and energy use of the Proposal, on an annual basis, as a component of its corporate reporting obligations under the NGER program.

The MRF will incorporate state-of-the-art-processing equipment and operational management to ensure that the energy efficiency and associated GHG emissions of required operations is optimised.

1. INTRODUCTION

SUEZ Recycling & Recovery Pty Ltd (SUEZ – the Applicant) is seeking to establish the state-of-the art Chullora Resource Recovery Park (Chullora RRP) located at 21 Muir Road (Lot 2 DP1227526), Chullora in Sydney (Figure 1). SUEZ is proposing to design build and operate the first phase of the Chullora RRP as a Materials Recycling Facility (MRF) (the Proposal) to process co-mingled recyclable municipal solid waste (MSW) and dry commercial and industrial (C&I) waste; with a material processing capacity of up to 172,000 tonnes per annum (tpa).

The Proposal would be considered state significant development (SSD) under Clause 23 (waste and resource management facilities) of Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011* being a recycling facility that handles more than 100,000 tonnes of waste per year. Accordingly, an Environmental Impact Statement (EIS) has been prepared to support the SSD Application for the Proposal. This Greenhouse Gas Impact Assessment has been prepared by Katestone Environmental Pty Ltd (Katestone) to support the preparation of the EIS and assess the Proposal's greenhouse gas emissions.

1.1 Proposal overview

The Proposal would comprise the construction and operation of a MRF with a material handling capacity of up to 172,000 tonnes per annum (tpa), comprising:

- Up to 115,000 tpa of co-mingled recyclables collected from municipal and C&I sources
- Up to 50,000 tpa of source separated paper and cardboard for baling
- Up to 7,000 tpa of external mixed plastics for secondary processing.

Once operational, the Proposal would receive waste from locally generated sources as well as the greater Sydney area. The total input in any year would not exceed 172,000 tpa, with the exact throughput from each source varying subject to the market conditions in that year and different Councils' recycling collection regimes.

The Proposal would represent a critical piece of waste management infrastructure that would mitigate significant capacity constraints currently impacting the Sydney region. The Proposal would provide advanced recycling processes to build resilience within the current network of recycling facilities as well as promote the principles of a circular economy through implementation of a pull-through model that conceives of the sorting, reprocessing and specified end uses of processed materials as an integrated, closed loop solution.

The key construction components of the Proposal would include:

- Establishment of a hardstand area and internal road network
- Construction of the enclosed MRF shed
- Installation and commissioning of fixed plant and equipment
- Installation of ancillary infrastructure, including weighbridges, pedestrian overbridge, and fire systems
- Installation and connection of site service infrastructure (electrical, water, sewer, gas and telecommunication services)
- Installation of signage.

The key operational components of the Proposal would include:

- Operation of a MRF 24 hours per day, seven days per week (including processing and waste delivery and collection)
- Product storage.

The key components of the Proposal are shown in Figure 2.

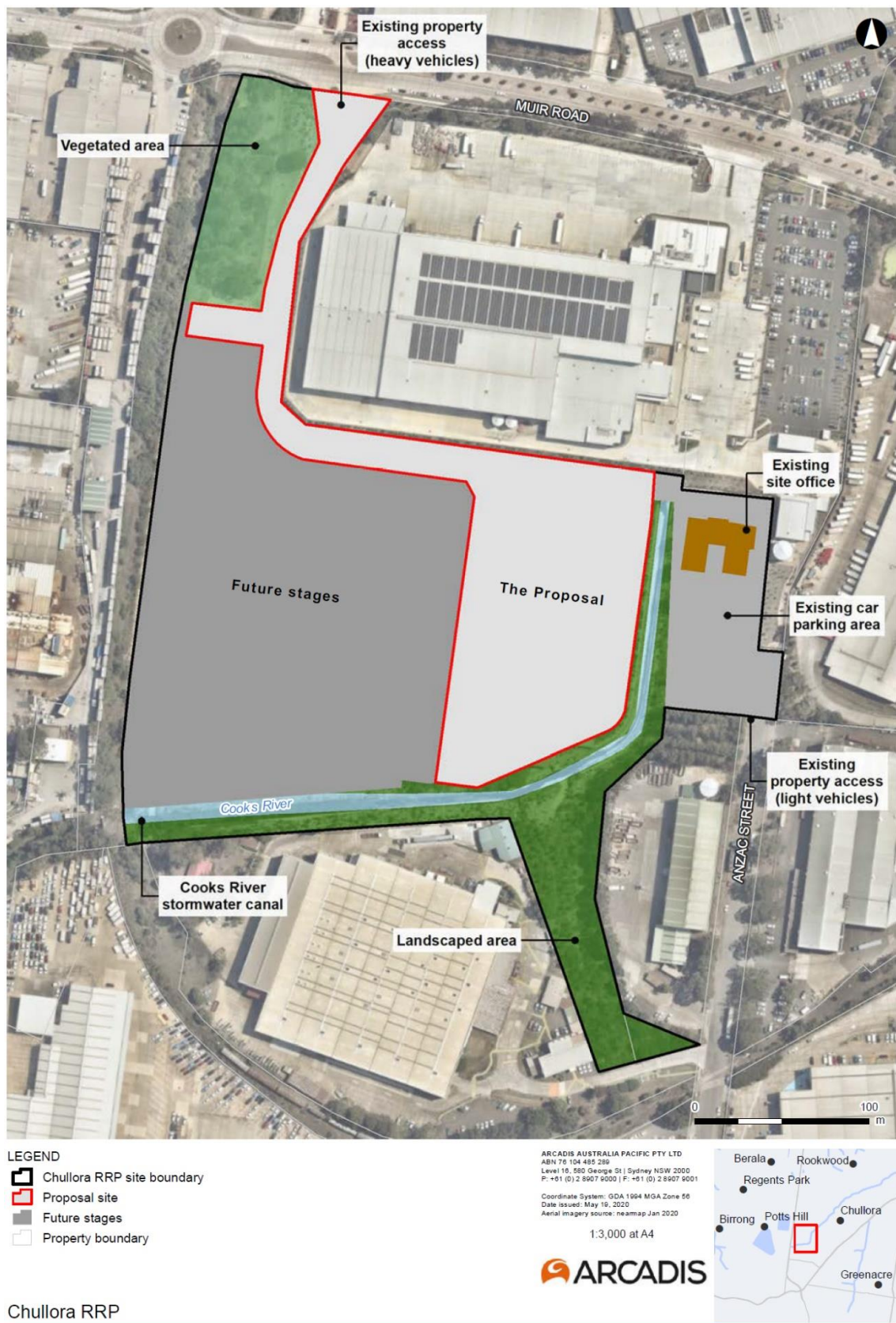


Figure 1 Chullora RRP (provided by Arcadis)

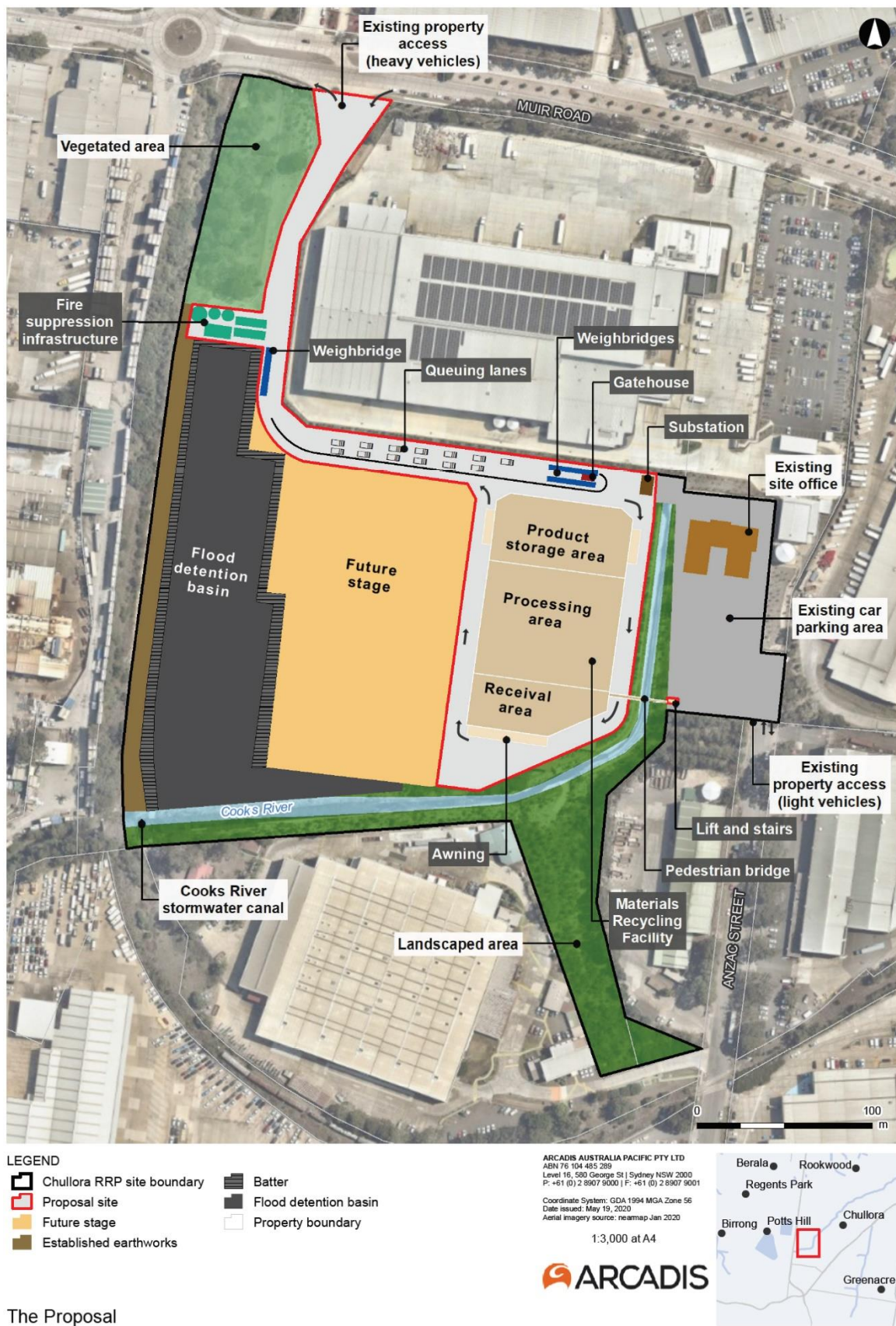


Figure 2 Proposed RRF layout (provided by Arcadis)

1.2 Site location

The Chullora RRP site boundary including the Proposal site, shown in Figure 2, comprises one parcel of land being 21 Muir Road, Chullora (Lot 2 in DP 1227526)). The Proposal site is located in the Canterbury-Bankstown Local Government Area (LGA) and is approximately 2.5 hectares (ha) in size and is located approximately 18 kilometres (km) west of Sydney Central Business District (CBD) and 10 km east of Parramatta CBD.

The Chullora site is bounded by Muir Road to the north, Anzac Street to the east and existing industrial development further east and to the south. A disused freight railway line forms the site's boundary to the west. The Proposal site forms the central portion of the Chullora RRP site.

The Chullora site is located within the Chullora Technology Park, and surrounded by a range of industrial developments including PFD Storage Warehouse, Tip Top Bakery, News Limited, Fairfax, Volkswagen Distribution Centre, Bluescope Steel and Veolia transfer station. Directly to the west of the Proposal site is a narrow strip of land owned by the State Railway Authority, which formed part of the former railway through this area. A number of other businesses are located further to the west, including a service station, fitness centre and a range of other industrial warehouse (refer to Figure 1-3).

The closest residential receivers are located approximately 455 m to the southwest and 600 m to the east of the site (refer to Figure 3).

The Chullora RRP site currently has two vehicular access points. The access point for heavy vehicles is via Muir Road, west of the roundabout at Muir Road/Dasea Street. A secondary access point for light vehicles is provided from Anzac Street. The Proposal site would utilise these existing access points. Primary access to the Proposal site from the north will remain via Muir Road from both directions, and egress is via left turn only. There are four major intersections along Muir Road including linkages to Rookwood Road (Metroad 6) and the Hume Highway:

- Two-lane roundabout at the intersection of Muir Road and Dasea Street
- Signalised intersection at Muir Road and Worth Street
- Signalised intersection at Muir Road and Rookwood Road
- Signalised intersection at Muir Road and Hume Highway.



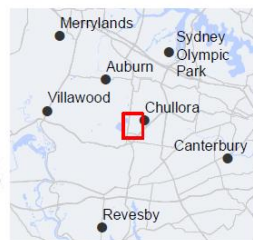
LEGEND

Chullora RRP site boundary	Education facility
Proposal site	Industrial receiver
Future stage	Recreational area
Flood detention basin	Sensitive residential receiver
Established earthworks	Cooks River stormwater canal
Existing car parking area	Landscaping area
Existing site office	Vegetated area

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 Aerial imagery source: nearmap Jan 2020

1:8,000 at A4

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Nearby sensitive receivers to the Proposal site

Date: 19/05/2020 Path: \\hc-aus-nz-fs-01\jobs\10036513\GIS\A_Current\B_Maps\Stage1_MRF\Technical_Assessments\G10036513_S1MRF_TSR_004_SensitiveReceivers_A4P_v1.mxd
 Created by: GC Updated by: GC QA by: RB

Figure 3 Surrounding land uses and residential receivers
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1.3 Site history

In 1996 the Waste Recycling and Processing Service of NSW took ownership of the Chullora RRP site and neighbouring site to the north (now occupied by the PFD storage warehouse). WSN Environmental Solutions, a State-owned corporation, operated the site in 1997 until 2011 when they were acquired by SITA Australia Pty Ltd (now SUEZ). From this time SUEZ, operated the previous Chullora RRC site which included a Transfer Station, MRF, Garden Organics platform and glass processing shed. In 2016, Frasers Property acquired both the Chullora RRP site and the site to the north, leasing the previous Chullora RRC back to SUEZ for ongoing use as a waste facility.

In 2017, the MRF component of the previous Chullora RRC, was subject to a fire and subsequently demolished, along with the former glass processing building and other waste infrastructure. At this time the site was subdivided with the northern portion developed as the PFD storage warehouse. Since demolition of the previous Chullora RRC, the Proposal site has been used for storage of residential waste bins, maintenance and parking of waste trucks, a heavy vehicle workshop, 5000 L diesel tank and wash bay to support truck maintenance activities.

On 12 May 2020 SUEZ lodged a development application (DA) (DA366/2020) with Council for the development of flood mitigation works across the Chullora RRP site (the flood mitigation works). The DA is seeking approval for early works and site establishment across the Chullora RRP site to provide flood immunity and stormwater infrastructure. The flood mitigation works include:

- Site clearance, including:
 - Demolition of temporary structures and general clean-up of the proposed site fill area and flood storage area
 - Removal of trees and other vegetation (within fill area and flood storage area)
 - Crushing of the existing concrete slab, temporary stockpiling of crushed material and reuse of it as a fill material.

Earthworks, including:

- Cut and fill for the flood storage area
- Construction of a flood detention basin and installation of stormwater infrastructure
- Filling the area to the required level using existing crushed recycled concrete material and imported shale / sandstone material.

The commencement of the construction of the Proposal would occur following completion of the flood mitigation works. Figure 4 shows the flood mitigation works; depicting the features of the Chullora RRP site upon commencement of the construction of the Proposal.



Figure 4 Chullora RRP site – current conditions

1.4 Purpose of this report

This Greenhouse Gas Impact Assessment supports the EIS for the Proposal and has been prepared as part of an SSD Application for which approval is sought under Part 4, Division 4.7 of the EP&A Act.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) (SSD-10401) for the Proposal, issued by NSW Department of Planning, Industry and Environment (DPIE) on 20 December 2019.

Table 1 provides a summary of the relevant SEARs which relate to greenhouse gases, and where these have been addressed in this report.

Table 1 **SEARs**

SEARs	Where Addressed
5. Air Quality and Odour	
A greenhouse gas assessment	Section 9

2. ASSESSMENT APPROACH

This section outlines the greenhouse gas policy background and regulatory framework, assessment approach, methodology and assessment boundary for the Proposal.

2.1 Background

The term greenhouse gases (GHG) comes from the 'greenhouse effect', which refers to the natural process that warms the Earth's surface. GHG in the atmosphere absorb the solar radiation released by the Earth's surface and then radiate some heat back towards the ground, increasing the surface temperature. Human activity, especially burning fossil fuels and deforestation, is increasing the concentration of GHG in the atmosphere and hence increasing the absorption of outgoing heat energy. Even a small increase in long-term average surface temperatures has numerous direct and indirect consequences for climate.

Australia is a signatory to United Nations Framework Convention on Climate Change (UNFCCC), the associated Kyoto Protocol signalling its commitment to reducing GHG emissions at a national level. Under the Paris Agreement, the most recent progression of the UNFCCC, Australia has set a target to reduce emissions by 26-28 per cent below 2005 levels by 2030, building on the 2020 target of reducing emissions by five per cent below 2000 levels. The objectives of the Paris Agreement include:

- a goal to limit the increase in global temperatures to well below 2 degrees and pursue efforts to limit the rise to 1.5 degrees
- a commitment to achieve net-zero emissions, globally, by the second half of the century
- differentiated expectations for developed nations, including Australia, that they will reduce their emissions sooner than developing nations
- a five-year review and ratchet process which is likely to lead to more ambitious commitments from countries in the future.

The main GHG associated with the Proposal is carbon dioxide (CO₂), with smaller contributions from methane (CH₄) and nitrous oxide (N₂O). These gases vary in effect and longevity in the atmosphere, however a system named Global Warming Potential (GWP) allows them to be described in terms of CO₂ (the most prevalent greenhouse gas) called carbon dioxide equivalents (CO₂-e). A unit of one tonne of CO₂-e is the basic unit used in carbon accounting. In simple terms the GHG emissions associated with the Proposal can be expressed as the sum of the emission rate of each GHG multiplied by its associated GWP (denoted in boxes). For example:

$$\text{tonnes CO}_2\text{-e} = \text{tonnes CO}_2 \times \boxed{1} + \text{tonnes CH}_4 \times \boxed{25} + \text{tonnes N}_2\text{O} \times \boxed{298}$$

While few, if any, individual Proposals would make a noticeable change to the Earth's climate, the summation of human activities increasing the concentrations of GHG in the upper atmosphere does. Climate change is an environmental concern at a global level. Governments and the global scientific community have established conventions for accounting for GHG emissions to enable the transparent and verifiable assessment of GHG emissions among all global jurisdictions. This assessment employs these established conventions so that the relative impact of the Proposal can be assessed and understood.

2.2 Policy framework

2.2.1 National policy

Australia will meet its GHG emissions reduction targets through the Government's Direct Action Plan. The Emissions Reduction Fund (ERF) is a central component of the Direct Action policies that is made up of an element to credit emissions reductions, a fund to purchase emissions reductions, and a Safeguard Mechanism.

The Safeguard Mechanism has been put in place to ensure that emissions reductions purchased by the Government through the ERF are not offset by significant increases in emissions by large emitters elsewhere in the economy. The Safeguard Mechanism commenced on 1 July 2016 and requires Australia's largest emitters to keep emissions within baseline levels. It applies to around 140 large businesses that have facilities with direct emissions (Scope 1 Emissions) of more than 100,000 tonnes of carbon dioxide equivalent (t CO₂-e) a year and is expected to cover approximately half of Australia's emissions.

Direct emissions associated with the Proposal are not anticipated to exceed 100,000 tCO₂-e per year for any year of operations. As a result, the Proposal would not be subject to the requirements of the Safeguard Mechanism.

2.2.2 National Greenhouse and Energy Reporting (NGER)

The *National Greenhouse and Energy Reporting Act 2007* (NGER Act) established a national framework for corporations to report GHG emissions and energy consumption.

The *National Greenhouse and Energy Reporting Regulations 2006* (NGER Regulations) recognises Scope 1 and Scope 2 emissions as follows:

- Scope 1 emissions – in relation to a facility, means the release of GHG into the atmosphere as a direct result of an activity or series of activities (including ancillary activities) that constitute the facility.
- Scope 2 emissions – in relation to a facility, means the release of GHG into the atmosphere as a direct result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that do not form part of the facility.

Registration and reporting are mandatory for corporations that have energy production, energy use or GHG emissions that exceed specified thresholds. GHG emission thresholds include Scope 1 and Scope 2 emissions. NGER reporting thresholds are summarised in Table 2. SUEZ currently has corporate reporting obligations under the NGER scheme associated with existing operations.

Table 2 NGER annual reporting thresholds – greenhouse gas emissions and energy use

Threshold level	Threshold type	
	GHG (kt CO ₂ -e)	Energy consumption (TJ)
Facility	25	100
Corporate	50	200

Notes: kt CO₂-e = kilotonnes of carbon dioxide equivalent. TJ = terajoules.

2.2.3 NSW context

The NSW Government endorses the Paris Agreement and has committed to taking action that is consistent with the level of effort required to achieve Australia's commitments to the Paris Agreement. This includes a goal to reach net zero emissions by 2050. NSW planned response to complement national action includes expanding renewable energy and energy efficiency for households and businesses.

2.3 Assessment methodology

Pollutants of importance to climate change, associated with the Proposal, are CO₂, CH₄ and N₂O the GWPs associated with these pollutants are summarised in Table 3. This study will assess the emissions of GHG from the Proposal during operation based on activity data representative of the proposed activities and the methods described in the following resources:

- The National Greenhouse Accounts, July 2019 (Commonwealth Department of the Environment and Energy, 2017)
- *National Greenhouse and Energy Reporting Regulations 2008* (NGER Regulations)
- *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (NGER Determination)
- The Greenhouse Gas Protocol

Table 3 Greenhouse gases and their Global Warming Potential

Greenhouse Gas	Chemical formula	GWP
Carbon Dioxide	CO ₂	1
Methane	CH ₄	25
Nitrous oxide	N ₂ O	298

Notes: Source: NGER Regulations October 2019

Scope 1 emissions result predominantly from diesel combustion for waste collection and product haulage. While electricity usage and associated Scope 2 emissions result from waste processing operations.

Emissions factor (EF) and energy content factors used for this assessment are summarised in Table 4.

Table 4 Emission factor summary (Schedule 1, NGER Determination)

Emission source description	Scope	Energy content	Units	Emission Factor	Units
Diesel	1	38.6	GJ/kL	70.5	kgCO ₂ -e/GJ
Electricity (NSW)	2	3.6	MJ/kWh	0.81	kgCO ₂ -e/kWh

Sources: NGER Determination (July 2019).

Notes: GJ/kL = gigajoules per kilolitre. MJ/kWh = megajoules per kilowatt hour. kg CO₂-e/GJ = kilograms of carbon dioxide equivalent per gigajoule. kg CO₂-e/kWh = kilograms of carbon dioxide equivalent per kilowatt hour.

3. EXISTING ENVIRONMENT

SUEZ has been required to submit NGER reports for a number of years, including the most recent 2018-19 reporting period. Table 5 provides a summary of recent NGER reporting for SUEZ's activities. Based on recent reporting periods, SUEZ will have ongoing reporting obligations under the NGER scheme that will need to include GHG emissions associated with Proposal related operations activities.

Table 5 Summary of recent National Greenhouse and Energy Reporting for SUEZ Holdings Pty Ltd

Reporting period	Energy consumed (GJ)	Scope 1 Emissions (tCO ₂ -e)	Scope 2 Emissions (tCO ₂ -e)	Total (tCO ₂ -e)
2017/18	2,112,518	685,158	62,003	747,161
2016/17	1,420,686	576,809	40,166	616,975
2015/16	1,308,258	531,244	36,046	567,290
Notes: 20018-2019 NGER Scheme reporting not available online at time of report				

GHG emissions from SUEZ controlled facilities contribute to State and National GHG inventories. A summary of New South Wales' and Australia's most recently published GHG emissions inventories including GHG emission categories relevant to the Proposal are provided in Table 6 (Commonwealth of Australia, 2019).

Table 6 Summary of GHG emissions for Australia and New South Wales – 2017

Category	Australia	New South Wales	
	Emissions (MtCO ₂ -e)	Emissions (MtCO ₂ -e)	Contribution to national emissions
Inventory total	554.1	144.1	26.0%

4. GHG ASSESSMENT

4.1 Construction

Construction phase activities at the Proposal site are limited to:

- Provision of parking and queuing spaces for trucks
- External works such installation of inbound and outbound weighbridges
- Construction of an enclosed 10,000 m² MRF shed, which would be approximately 125 m by 80 m and 15 m in height
- Installation and commission of fixed plant and equipment
- Construction of ancillary infrastructure such as fire safety infrastructure (storage tanks, pumps and valve room) and site services infrastructure (electrical, water, sewer, gas and telecommunication services)
- Installation of landscaping and signage.

As the construction phase would be short-lived and would not require any earthworks, any GHG emissions associated with the construction phase would be limited to the intermittent movement of materials on site. These emissions will be minor and insignificant.

4.2 Operations

The operation of the Proposal would involve processing of up to 172,000 tpa of co-mingled and source separated materials from C&I and municipal sources. It is anticipated the quantity of waste processed by the facility would be relatively consistent from one year to the next over the operational life of the facility. In order to provide a conservative estimate of annual GHG emissions, a representative annual GHG emissions inventory has been developed based on the processing capacity of 172,000 tpa. The GHG assessment of the Proposal considers activities commencing with receipt of waste material at the MRF up until stockpiling of product awaiting distribution. Waste collection activities connected to the Proposal are assumed to be captured by SUEZ's existing annual reporting under the NGER scheme. A summary of annual materials throughput that underpins the GHG assessment is provided in Table 7.

Table 7 Annual materials throughput

Material Description	Annual amount (tpa)
Annual design capacity	172,000
Co-mingled recyclables (C&I sources)	115,000
Separated paper and cardboard for baling	50,000
Mixed plastics for secondary processing	7,000
Glass product	67,200
All other product	103,500

GHG emissions associated with the operations phase of the Proposal are:

- Diesel use:
 - Transport of incoming materials
 - Haulage of processed materials/products
 - Materials handling equipment.
- Electricity use for the operation of the MRF.

The annual diesel use associated with the operations phase of the Proposal is summarised in Table 8 followed by details of the annual electricity requirements of the MRF.

Table 8 Operations phase - diesel use summary

Material type	Daily movements ^{1,2}	Annual mass transported (tonnes)	Diesel use (kL)
Incoming materials			
Comingled recyclables total	59	115,000	10.68
Cardboard	15	50,000	4.33
Plastics	3	7,000	0.75
Product Haulage			
Glass product	6	67,200	8.74
All other product	18	103,500	13.26
Materials Handling			
Front end loaders	-	-	42.00
Forklifts	-	-	28.00
Notes:			
1. Incoming materials are received for 7 days per week over 52 weeks per year			
2. Each movement is for one vehicle over a 1.131 km distance measured from when the vehicle enters the Chullora RRP until it exits			

MRF materials processing will operate for 16 hours per day, 5 days per week and 52 weeks per year. Annual electricity requirements for the MRF have been estimated to be 5,371,184 kWh/y.

A summary of estimated annual GHG emissions alongside energy consumption associated with the Proposal is provided in Table 9. The vast majority of annual GHG emissions (93.7%) for the Proposal are Scope 2 emissions attributable to electricity use required by the MRF. Similarly, 82.0% of energy use is associated with electricity use by the MRF.

Table 9 Operations phase - GHG emissions and energy use summary

Category	Application	Emission source		Energy use (GJ)	GHG emissions	
		Quantity	Units		Scope	Emissions (tCO ₂ -e)
Diesel	Incoming Materials					
	Comingled recyclables	10.68	kL	412	1	29
	Cardboard	4.33	kL	167	1	12
	Plastics	0.75	kL	29	1	2
	Product Haulage					
	Glass	8.74	kL	337	1	24
	Other	13.26	kL	512	1	36
	Materials Handling					
	Front end loaders	42.00	kL	1,621	1	114
	Forklifts	28.00	kL	1,081	1	76
Electricity	MRF	5,371,184	kWh	19,336	2	4,351
Diesel (Total) / Scope 1 (Total)				4,160 (18.0%)	1	293 (6.3%)
Electricity (Total) / Scope 2 (Total)				19,336 (82.0%)	2	4,351 (93.7%)
TOTAL				23,496	1 + 2	4,644

GHG emissions from the Proposal would contribute to Australia's and New South Wales' annual GHG emissions inventories. The maximum annual GHG emissions estimate for the Proposal of 4,644 tCO₂e are not significant on a state or national scale. A summary of the impact of annual GHG emissions from the Proposal at a state and national scale is provided in Table 10.

Table 10 Proposal contribution to annual GHG emissions for Australia and New South Wales

Category	Australia		New South Wales	
	Emissions (MtCO ₂ -e)	Proposal %	Emissions (MtCO ₂ -e)	Proposal %
Inventory total	554.1	0.0008%	144.1	0.0032%
Notes: State and Territory Greenhouse Gas Inventories 2017 (Commonwealth of Australia, 2019b)				

The maximum annual GHG emissions and energy use associated with the Proposal (4,644 tCO₂-e and 23,496 GJ) do not meet the NGER program facility thresholds of 25 ktCO₂-e and 100 TJ respectively. In terms of reporting obligations to the NGER program, SUEZ will be required to report annual GHG emissions and energy use for the Proposal as a component of its corporate NGER reporting obligations. The Proposal represents a minor increase to SUEZ corporate GHG emissions and energy use of 0.6% and 1.1%, respectively, compared SUEZ's emissions for the 2017-18 reporting period.

5. MITIGATION MEASURES

5.1 Construction

Given the limited duration and intensity of construction, the GHG emissions associated with construction are considered to be negligible. Where appropriate, mitigation measures to minimise emissions during construction will be reviewed and considered for incorporation into the Construction Environmental Management Plan.

5.2 Operation

The MRF will incorporate state of the art processing equipment ensuring that the energy efficiency and associated GHG emissions of required operations is optimised. The following mitigation measures will be reviewed and considered where appropriate for incorporation into the Operational Environmental Management Plan:

- Energy efficiency design aspects will be investigated, where practicable as part of the detailed design process in order to reduce energy and fuel consumption.
- Fuel efficiency of the construction plant/equipment will be assessed prior to selection, and where practical, equipment with the highest fuel efficiency and which uses lower GHG intensive fuel (e.g. biodiesel) will be used.
- Use of energy-efficient lighting and energy-efficient appliances in the site office spaces.

6. CONCLUSIONS

Maximum annual GHG emissions and energy use associated with the Proposal have been estimated to be 4,644 tCO₂-e/y and 23,496 GJ/y, respectively. GHG emissions associated with the Proposal would contribute to Australia's and New South Wales' annual emissions inventory however are not significant on a sector, state or national scale. The Proposal would contribute 0.0008% and 0.0032% to national and state emissions annually.

The majority of GHG and energy use associated with the Proposal are Scope 2 emissions associated with the use of grid electricity required for processing operation of the MRF.

The maximum annual GHG emissions and energy use associated with the Proposal do not meet the NGER program facility thresholds of 25 ktCO₂-e and 100 TJ, respectively. However, SUEZ has existing reporting obligations at the corporate level and will, therefore, be required to report on the GHG emissions and energy use of the Proposal, on an annual basis, as a component of its corporate reporting obligations under the NGER program.

The most significant initiative in terms of mitigation of GHG emissions will be the use of state-of-the-art processing equipment and the management of operations. These actions will minimise the energy use and associated GHG emissions associated with the Proposal. Additional GHG offsetting options will also be evaluated and implemented where practicable.

7. REFERENCES

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