This document has been prepared on behalf of Veolia and is to be used as an informational background document that has informed part of the draft Hampton Park Hill Development Plan. The transfer station has not been approved and is subject to the planning permit application process. Any questions regarding the document should be directed to Veolia.

GOLDER
MEMBER OF WSP

REPORT

Background Report Hampton Park Hill Development Plan

SUEZ Transfer Station Upgrade Overview

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19118091-002-R-Rev0

April 2022

Distribution List

Casey City Council

SUEZ

Golder

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1.0 INTRODUCTION

SUEZ Recycling and Recovery (SUEZ) is proposing to upgrade and significantly improve the existing public transfer station and develop a new commercial transfer station (the Proposal) at 290 Hallam Road, Hampton Park, Victoria (the 'site').

The Proposal will provide new infrastructure to support waste management in the region needed due to the impending closure of the Hallam Road Landfill where waste from City of Casey municipality and surrounding regions is currently taken. It is the last remaining major landfill accepting municipal solid waste (MSW) in the eastern suburbs of Metropolitan Melbourne. The alternative would be to long haul waste to the north west of Melbourne until an alternative waste disposal solution is catered for in the eastern suburbs. This is further discussed in Section 4.

The waste processed at the Proposal will be sourced from residential kerbside and commercial waste collections in the broader Casey Local Government area and surrounds. The Proposal will be a 'state of the art' facility to provide the required infrastructure to enable waste collected within the region to be efficiently consolidated, packaged and transported to future disposal locations including Energy from Waste facilities.

The site forms part of the Hallam Road Waste and Resource Recovery Hub and is subject to the Hampton Park Hill Development Plan (Version No. 5.1 dated 21 May 2019). This Report has been prepared to support exhibition of the amendment to the Hampton Park Development Plan prepared by Casey City Council (Council) and provides information about the Proposal. The proposal will be the subject of a Planning Permit Application in the future.

The Proposal will introduce a new commercial transfer station to consolidate municipal and commercial waste in the region for processing and disposal elsewhere. No processing of waste is proposed to occur on site.
The development of a transfer station is consistent with the long term planning goals for the site as it has been identified as a site of state significance for waste and resource recovery. The new commercial transfer station will be located approximately 250 m from the nearest residentially zoned land and will incorporate design measures to avoid odour and noise impacts on residents. Assessment of odour and noise from the facility shows that the potential for impacts on residents is low.

2.0 SUEZ

SUEZ is an international company that provides waste collection services across Australia to more than 4 million residents and businesses each week. SUEZ has more than 100 sites and facilities across Australia. With operations across all levels of the sustainable resource recovery chain, SUEZ is one of Australia's leading advanced resource recovery, recycling and waste management companies providing clients with integrated environmental and sustainable recycling and waste management solutions. SUEZ also invests heavily in partnerships that contribute towards minimising the impact of waste on the environment and promoting a circular economy.

SUEZ is committed to the reduction of waste streams currently going to landfill and is experienced in operating resource recovery and materials recycling facilities. The company recognises that communities are growing and changing at a rapid rate, and local councils are faced with increasing and diversified waste streams. Operating in all states and territories, SUEZ's services include:

- Collecting waste;
- Sorting waste in recoverable and residual material streams;
- Processing these valuable materials into products that can be reused; e.g. compost; and
- Disposing of residual material to landfill.

2.1 Experience operating Transfer Stations

SUEZ is experienced in operating large scale transfer stations across Australia. Table 1 lists these transfer stations.

Table 1: SUEZ Transfer Stations Across Australia

Facility	Type	Location
Auburn Resource Recovery Centre	Transfer Station	New South Wales
Belrose Resource Recovery Centre	Transfer Station	New South Wales
Eastern Creek Resource Recovery Park	Transfer Station	New South Wales
Rockdale Resource Recovery Centre	Transfer Station	New South Wales
Ryde Resource Recovery Centre	Transfer Station	New South Wales
Seven Hills Resource Recovery Centre	Transfer Station	New South Wales
Artarmon Resource Recovery Centre	Transfer Station	New South Wales
Paget Transfer Station (Mackay)	Transfer Station	Queensland
Ballarat Transfer Station	Transfer Station and Landfill	Victoria
Moorabool Resource Recovery Centre	Transfer Station	Victoria
Busselton Service Centre	Transfer Station	Western Australia
Welshpool Transfer Station	Transfer Station	Western Australia
Bibra Lake Resource Recovery Park	Transfer Station	Western Australia
Landsdale Resource Recovery Park	Transfer Station	Western Australia

2.2 SUEZ in the community

SUEZ has been operating the Hampton Park Resource Recovery Precinct since 1999 and has committed to contributing and making a difference in the local community.

One of SUEZ's key initiatives includes the onsite Education Centre which provides a venue for the presentation of site information to school groups, community groups, international visitors and businesses interested in recycling, resource recovery and sustainable environmental practices.

Further SUEZ has contributed to many local schools and community organisations, some examples include:

- Transformation of an unused garden at Strathaird Primary School in Narre Warren into a stimulating Discovery Garden for children to engage in nature play. The aim of the Discovery Garden is to create high levels of biodiversity to support bird, reptile and insect life while engaging students in activity that helps develop a love of nature and our natural environment. The students are actively involved in planning and designing the garden through their weekly environmental sustainability classes.
- Installation of solar panels and a battery to the Cranbourne Public Hall and Gardens Reserve making it the first community hall in the City of Casey to come off the grid and be self-sustainable in meeting its

electricity needs. The system enables a saving of more than $4,500 that can be passed on to community groups through reduced hire fees.

- Installation of disability access at Hampton Park Bowls Club.
- Installation of a solar system capable of fulfilling the 1st Cranbourne Scouts needs along with a battery system for use during a blackout or in the evening.

SUEZ is committed to further investing in local initiatives that will actively contribute to the sustainable well-being of communities either socially or environmentally as well as educating the future generation.

3.0 BACKGROUND AND SITE CONTEXT

3.1 Site Context

The site is located on part of 290 Hallam Road, Hampton Park and is zoned Special Use Zone – Schedule 1 (Earth and Energy Resources Industry). The Site forms part of the Hallam Road Waste and Resource Recovery Hub bound by Hallam Road to the west, Redwood Avenue to the north, residential land to the east and Golf Club and Glasscocks Road to the south.

Figure 1: Hallam Road Waste and Resource Recovery Hub *(Source: Hallam Road Waste and Resource Recovery Hub Plan, February 2021)*

SUEZ owns and operates the land referred to as Lots 1, 2A, 4 and 10A on Plan of Subdivision 517790K. Lot 6 is subject to a joint venture arrangement between SUEZ and Resource Co. Lot 7 is owned by Holcim.

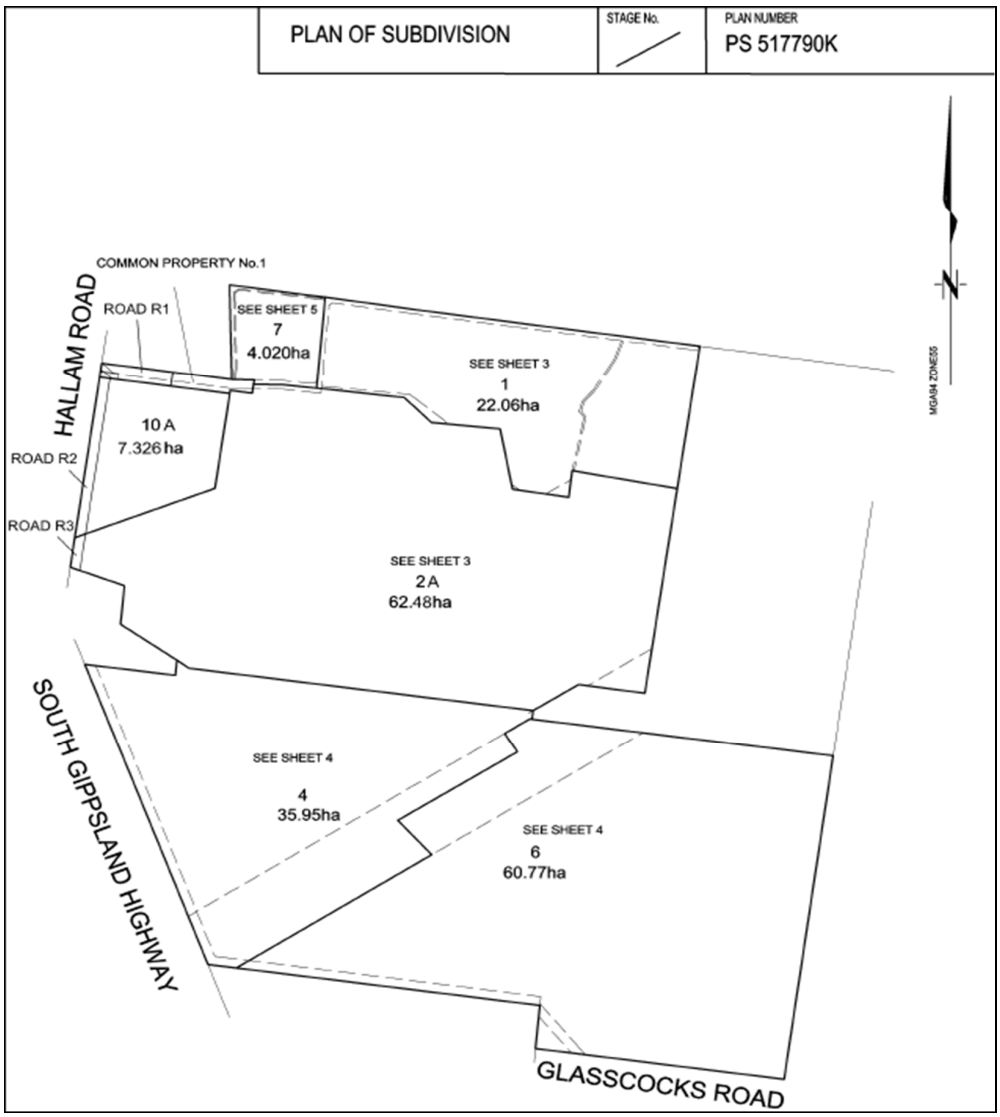

Figure 2: Existing uses of the site and surrounds

The existing uses on these lots are:

- Lot 1 – has been backfilled with slimes and capped after cessation of quarrying activity. This lot is currently used for activities ancillary to the operation of the landfill including storage of daily landfill capping material and drying of slimes.
- Lot 2 – Hallam Road Landfill operating under Planning Permit 930016A.
- Lot 4 – SUEZ-ResourceCo construction and demolition waste recycling facility operating under Planning Permit 737/07.
- Lot 6 – joint venture between SUEZ and ResourceCo, the former quarry holes are in the process of being rehabilitated. The eastern parts of Lot 6 are within the floodplain.
- Lot 7 – Holcim concrete batching plant.
- **Lot10A – The Proposal.** Details in Section 5 of this report.

In addition to the lots described above, there are two garden supply centres within the precinct. Lyndpark Garden Supplies located at 270 Hallam Road and Diaco's Discount Nursery and Garden Rock Supplies located at 320 Hallam Road.

The land uses surrounding this precinct include:

- General Residential zoned land to the north and west
- General Residential zoned to the east
- Vacant land adjacent to the Lot 6 southern boundary marked for future commercial development. General Residential zoned land further south.

3.2 Existing Conditions at the Site

The Proposal is to be located on Lot10A as shown on Figure 2 (the site). The Site has not been previously quarried and is currently used to dry slimes from former sand quarrying activities on adjacent lots. The existing Outlook Environmental transfer station is located along the eastern boundary of the site. There is also a retarding pond adjacent to the Outlook Environmental transfer station, which will remain as private open space as part of the Proposal.

A recent aerial photograph sourced from Nearmap (1 September 2021), showing the site is presented in **Figure 3**.

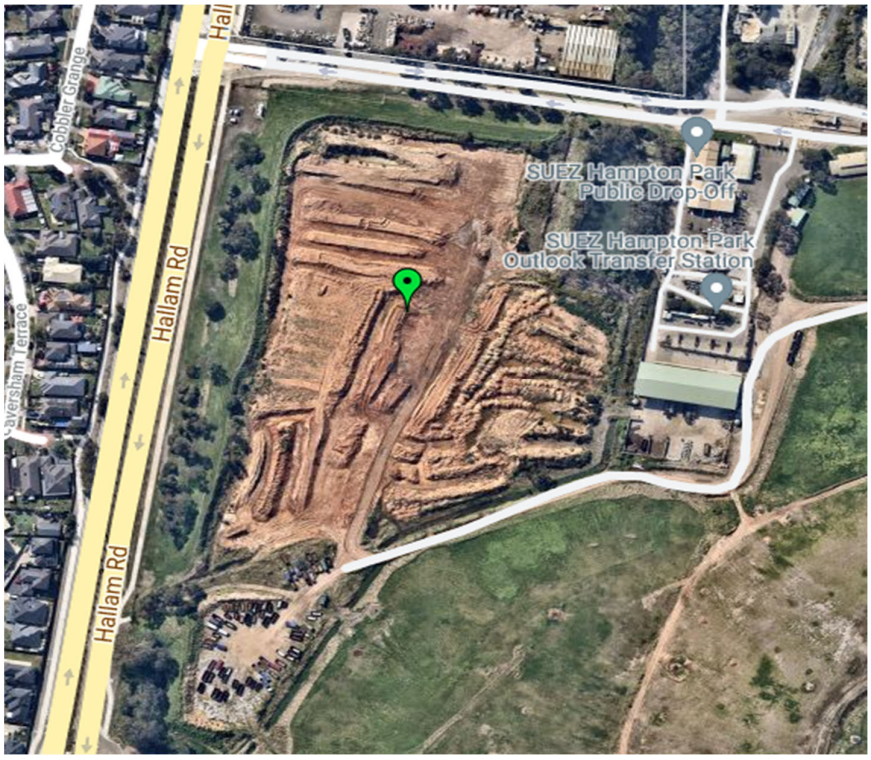

Figure 3: The Site

Access to the Proposal would be via the existing common access road shared between SUEZ and Holcim off Hallam Road.

4.0 NEED FOR THE TRANSFER STATION

Victoria's population is growing more than any other state or territory at up to 150,000 per annum (and at the highest rate of up to 2.5 per cent per annum). Victoria has grown by a million people since 2011 and is expected to add another million by 2026 (Victoria in the Future 2019). The state Government has responded to this by creating legislation and policies that provide the framework for waste management and resource recovery infrastructure and services into the future.

The impending closure of landfills in the south-east of Melbourne, in particular SUEZ's Hallam Road landfill in Hampton Park, presents a need for an alternative solution for waste disposal and resource recovery. The Proposal will provide infrastructure to enable the consolidation of waste collected within the region for processing or disposal elsewhere.

4.1 Victorian Government Directive

The state Government finalised the Statewide Waste and Resource Recovery Infrastructure Plan (SWRRIP) in 2016 and republished it in 2018. The SWRRIP sets out the current waste and resource recovery infrastructure at a state level and provides projections for future trends in waste generation, recovery and disposal of waste to landfill.

The SWRRIP is intended to provide a framework to support better integration of agencies responsible for planning Victorian waste infrastructure on a state-wide basis. In particular, the SWRRIP aims to "*guide planning and investment in waste and resource recovery infrastructure over the next 30 years.*"

The SWRRIP identified that the south-east of Melbourne had approximately eight years of landfill capacity remaining and that there is an immediate capacity issue that needs to be addressed. The SWRRIP states that solutions to be considered should include waste consolidation and resource recovery.

The site is located within the **Hallam Road Waste and Resource Recovery Hub of State Significance** as defined in the SWRRIP, which describes the hub as follows:

- *This is a major hub for reprocessing materials from C&D [construction and demolition] activities and is a significant putrescible and solid inert landfill serving the south-east area of Melbourne.*
- *The hub has capacity for improved resource recovery activities onsite, as maximising recovery will provide additional airspace for disposal. It is expected these opportunities will be further explored as the sites limited disposal capacity nears its end and landfill cells are progressively rehabilitated across the site.*

4.2 Hallam Road Waste and Resource Recovery Hub Plan (Hallam Hub)

The Hallam Hub Plan was published by the Metropolitan Waste and Resource Recovery Group in February 2021 to outline a strategy for the Hallam Hub, one of 22 hubs of State significance as outlined in the SWRRIP. One of the objectives of the hub plan is to support the long term waste and resource recovery activities on the site.

"The Hallam Road Waste and Resource Recovery Hub is a valuable, well placed site for waste and resource recovery infrastructure to service the City of Casey, the region and the state. As the Hallam Road landfill closes, the hub will transition away from waste disposal activities and focus on waste transfer activities and the resource recovery of inert materials, while also providing valuable public open space to the City of Casey."

The Hallam hub plan further supports the Proposal:

- Recommendation 10 states;

Given there are established transport routes to the site, population and waste growth, and the planned closure of landfilling operations on the site strong consideration should be given to supporting the development of a commercial scale waste transfer station.

The site has therefore been identified as site of state significance for future waste and resource recovery activities. The proposed development of a new commercial transfer station is consistent with established government policy.

5.0 OVERVIEW OF THE PROPOSAL

5.1 Site concept plan

SUEZ have designed a state-of-the-art facility at the Site in consultation with experts that have carefully considered the architectural, social, planning and environmental elements in designing this facility. Refer to Figure 4 below.

Figure 4: Indicative Concept Plan

The Proposal is setback approximately 250m from the nearest residential dwelling and located adjacent to the eastern boundary of the allotment. It is SUEZ's intent in the future to develop the balance of the Site along Hallam Road for light industrial or commercial use. This would provide a further separation between the Proposal and Hallam Road. The proposed siting of the facility meets the Environment Protection Authority (EPA) recommended separation distance for this type of facility.

Access to the site is via the existing common access road shared between SUEZ and Holcim. A dedicated turning lane at traffic signals is located at the intersection of Hallam Road and the access road. The access is intended to maximise pedestrian safety by ensuring that there is space between each vehicle crossing for pedestrians to stage their crossings, rather than having to try and cross one large expanse of vehicle crossing. The proposed access also provides good sight lines between pedestrians and vehicles, which will further assist with safety.

Upon closure of the Hallam Road landfill in approximately 10 years (based on current rates of filling) it is envisaged that the land shown as Lot 2A on Figure 2 will be transferred as parkland to City of Casey.

The Proposal will operate in two parts:

1. Outlook Environmental Public Drop-off Facility (existing operation)
2. Regional Transfer Station (new SUEZ operation. No public access).

5.2 Public Drop-off operated by Outlook Environmental (Existing Operation)

Outlook Environmental is one of the largest Social Enterprises in Victoria with a mission of creating and facilitating sustainable opportunities for people with disadvantaged backgrounds and has been working in the resource recovery sector for over 20 years. Around half of Outlook Environmental employees are assisted workers. Outlook Environmental operates the Hampton Park Resource Recovery Centre and the Outlook Market Recycled Goods Store in conjunction with SUEZ. As part of the upgrade a café is also proposed to be established.

The Outlook Market Recycled Goods Store allows members of the public to drop-off potentially re-usable items for recycling. Reusable items such as toys, sporting goods, and corrugated iron are also collected and sold in the Recycled Goods Shop. All of the proceeds from the Recycled Goods Shop go directly back into the work of Outlook Environmental and their work supporting local communities.

The Outlook Environmental Transfer Station is an existing public drop-off facility and will be separated from the larger Commercial Transfer Station. No change is proposed to the operation of the Outlook Environmental facility other than an upgrade to the buildings and the introduction of the cafe.

5.2.1 Wastes to be accepted

- Commingled waste
- Construction & Demolition
- E-Waste
- Fluorescent tubes
- Food Waste
- Garden vegetation
- Gas bottle

- Household and Car batteries
- Lead acid batteries
- Liquid Waste
- Mattress
- Metal
- Mixed putrescible
- Non putrescible
- Paints eligible under Paintback scheme
- Paper & Cardboard
- Soil
- TV's/ Computers and Peripherals
- Tyres
- Virgin Excavated Natural Material (VENM)
- Waste oil
- Wood waste.

No processing of any of these materials will occur on site.

5.3 Commercial Transfer Station

The proposed SUEZ Regional Transfer Station would accept approximately 550,000 tonnes of municipal solid waste and commercial and industrial waste per year within an enclosed building, located on land not previously landfilled and approximately 250m from the closest residential area. Waste trucks would enter the enclosed facility and unload onto the floor. A front- end loader will move the waste into compactors to compact the waste into sealed containers. Once sealed the containers are ready for transfer off site. Waste received is moved from the floor and compacted in a continual process as it arrives.

With the impending closure of landfills in the south east of Melbourne, in particular SUEZ's Hallam Road landfill in Hampton Park, there is a need for an alternative solution for waste disposal. The establishment of new transfer station such as proposed will recover large quantities of residual household waste materials, and reduce the volumes of remaining waste (and therefore transport) through compaction. The proposed commercial Transfer station will provide infrastructure to enable the consolidation of waste collected within the region for processing or disposal elsewhere. An option for the subsequent processing of waste includes the proposed Maryvale Mill Energy from Waste (EfW) project. The proposed regional transfer station at the site would transfer waste from Casey local government area and surrounds, to waste processing facilities such as the Maryvale Mill EfW plant or to landfill.

5.4 Hours of operation

SUEZ intend to operate:

- Commercial Transfer Station Monday to Friday 12.00am and 6.00pm and Saturdays 12.00am to 4.00pm.
- Public drop off facility Monday to Saturday 8.00am to 4.00pm and Sunday 9.00am to 4.00pm.

6.0 EPA APPROVALS

Under the *Environment Protection Act 2017* and *Environment Protection Regulations 2021*, large waste and resource recovery facilities will be required to obtain a Development Licence and an Operating Licence from EPA.

SUEZ is preparing a Development Licence Application for the Proposal which will be referred to Council as part of the EPA assessment process. SUEZ intends to run Development Licence and Planning Permit applications concurrently.

7.0 POTENTIAL AMENITY IMPACTS

This section discusses the potential amenity impacts from the Transfer Station. Relevant specialist reports have been prepared and summarised below. The design of the facility incorporates various 'state of the art' features that include:

- fully enclosed building under negative pressure and fitted with rapid shutter doors designed to reduce offsite odours
- building materials such as 150mm precast concrete walls slabs and roof sandwich panels designed to mitigate noise impacts.
- 20m single vertical exhaust ventilation stack to improve dispersion of emissions
- located approximately 250m from residentially zoned land
- incorporates environmentally sustainable design. See section 7.1 below.

7.1 Environmentally Sustainable Design (ESD)

The following list is a preliminary statement of the project design ESD Objectives. This will be further developed and added to as the project progresses. For clarity, the objectives have been grouped into categories typically used in many ESD frameworks.

7.1.1 Management

Design

An ESD consultant will be involved in the design phase of the project and will attend design team meetings to identify opportunities to enhance Ecologically Sustainable Design.

Commissioning

All building systems will be commissioned and tuned to operate to full efficiency before handover of the building.

Building Management System

A Building Management System will be installed that will allow monitoring of all key systems to optimize and adjust to increase building efficiency and occupant comfort.

Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) will be developed and implemented, to assist the Head Contractor and its service providers to manage environmental performance, conditions and impacts

arising from demolition, excavation and construction. The CEMP will define management practices to mitigate potential environmental and amenity risks to the site and surrounds arising from construction works.

Waste

Construction waste streams will be fully managed and directed to a range of recovery options including recycling and EfW initiatives.

7.1.2 Indoor Environment Quality – Enhancement of the Workplace

- Low VOC paints and low formaldehyde glue in engineered timber products will be used to enhance occupant health
- Office roof trusses will be exposed to enhance the visual amenity of the space, and will be left with a raw finish to avoid additional paint chemicals
- Natural daylight will be introduced through shaded glazing to the north which will reduce glare and provide outlook onto the preserved mature forested area around the wetlands. The glazing will be equipped with occupant adjustable blinds to allow full glare control to 100% of the area.
- Ceiling fans will be installed and tuned to allow a constant temperature zone throughout. The north facing glazing will be provided with occupant operated openable doors/windows to allow additional ventilation when appropriate.
- The office building will be separated from the processing building by an external walkway, to ensure that there is full acoustic separation from the industrial noise to the office.

7.1.3 Energy Use Reduction

Energy Modelling

The buildings energy usage will be assessed and modelled to demonstrate that energy usage will be less than a standard practice building of this type.

Office

Office will be oriented with majority of glazing to the north, which will be protected by shading in summer to ensure there is no direct sun on the glass in summer. Double stud walls will be used for office exterior to provide insulation. In winter, sun will be allowed to penetrate the building for passive heat gain, however, will be controlled by glare reducing blinds where necessary by occupants.

Lighting

Processing areas will be provided with LED lighting with daylight adjustment based on natural light levels provided by translucent roof sheeting to 10% of the roof. The office area will be provided with daylight adjustment based on the zone proximity to the north glazing. Office lighting will also be fitted with motion detection.

Solar Hot Water System

A solar hot water system will be provided to the office roof to provide the hot water requirements.

Solar Photovoltaic System

A solar photovoltaic system will be provided to the main building roof to generate electricity to reduce power consumption and specifically reduce peak energy demand.

7.1.4 Sustainable Transport

Bicycle Transport

Bicycle transport will be encouraged and facilitated by providing the following facilities:

- Undercover and secure staff bicycle parking
- Undercover and visible visitor bicycle parking
- A minimum of 2 showers each for male and female staff as well as locker facilities
- A separated bicycle/pedestrian path from the property boundary to the proposed bicycle parking facilities.

Public Transport

There are public transport connections within walking distance of the proposed facility. A shared pedestrian/bicycle path will be provided from the street entry to the building entry to facilitate public transport use. Adjoining connections are as follows:

- 2.3 km to Lynbrook Railway Station on the Cranbourne Railway Line
- 950 m to bus stop on South Gippsland Highway with bus routes 893 (Cranbourne Park Shopping Centre - Dandenong Station) and 982 (night bus Dandenong - Endeavour Hills – Hampton Park – Cranbourne)
- 950 m to bus stop on Lynbrook Boulevard with bus route 893 (Cranbourne Park Shopping Centre - Dandenong Station)
- 980 m to bus stop on Ormond Road with bus routes 892 (night bus Dandenong - Endeavour Hills - Hampton Park – Cranbourne) and 895 (Narre Warren South - Fountain Gate Shopping Centre via Narre Warren Station).

7.1.5 Water

Roof rainwater will be collected in tanks for reuse for toilet flushing and irrigation purposes. No mains water will be used for irrigation.

Water Efficiency Labelling and Standard (WELS) Ratings

All fixtures will be high efficiency with WELS ratings as stated below:

- Taps 6 Star
- Urinals 6 Star
- Toilet 5 Star
- Showers 3 Star (> 4.5 but <= 6.0)**
- Clothes Washing Machines 5 Star
- Dishwashers 6 Star.

7.1.6 Materials

- Office structure will be constructed of sustainable timber from certified plantations.
- Steel usage in the office will be minimized.
- All timber used in the office will be responsibly sourced.
- Feature external timber cladding to the office will be sourced from recycled timber from a secondhand source.
- All steel for the process building will be sourced from a Responsible Steel Maker and a Responsible Steel Fabricator.
- As the processing areas will require a large amount of concrete, the project team will work with the structural engineer during the design phases to identify ESD initiatives to be applied to the concrete design.
- The amount of construction waste sent to landfill will be minimized.

7.2 Environmental Management Plan

SUEZ has developed its Operational Environmental Management Plan (EMP) to set out the environmental management controls it intends to implement for the facility.

The purpose of this EMP is to describe the environmental management of operational activities at the Waste Transfer Station that may have an impact on the environment. The EMP sets out procedures and measures that must be taken to manage potential impacts to human health and the environment such as:

- Waste acceptance procedures
- Environmental Management and Monitoring of:
  - Leachate
  - Water including stormwater and firewater
  - Air Quality including dust and odour
  - Litter
  - Noise
  - Pests and vermin
  - Fire

7.3 Air Quality - Odour

SUEZ has engaged Golder Associates Pty Ltd (Golder) to undertake assessments of environmental impacts associated with the operation of the proposed WTS. Golder has undertaken plume dispersion modelling to predict the odour ground level concentrations (GLC) at nearby sensitive receptors.

The primary means of managing odour at the proposed WTS is that the building will be fully enclosed, thereby reducing the potential for fugitive odour emissions to impact on residences. Waste trucks would enter the

enclosed facility and unload onto the floor. Waste will be compacted into sealed containers. All waste received is moved from the floor and compacted each day. Waste will not be stored or recovered. It is envisaged that under normal operating conditions a short-term (one to two hours) maximum of approximately 300 tonnes of waste be located within the transfer station during operating hours. Air will leave the building via single discharge point (stack) to improve dispersion of emissions.

Predicted odour GLCs outside the site boundary are below the *State Environment Protection Policy (Air Quality Management)* Schedule A Design criteria. These design criteria are based on odour detection thresholds. Therefore, the potential for odour impacts beyond the site boundary was assessed to be low.

Refer to Appendix A – Air Quality and Noise Assessment for details of the assessment.

7.4 Noise

Golder has undertaken an assessment of the potential noise impacts from the proposed upgrade to the transfer station. Noise impacts were assessed by determining existing noise levels at nearby sensitive receptors and conducting noise modelling to predict noise impacts from the transfer station at the sensitive receptors.

The predicted noise levels at the closest sensitive receptors are below noise limits for the day, evening and night periods, under the modelled operational scenario in the *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (EPA Publication 1826.4, May 2021) (Noise Protocol), which is incorporated into the *Environment Protection Regulations 2021*.

The potential for noise to adversely impact nearby residents was assessed to be low for all periods.

Refer to Appendix A – Air Quality and Noise Assessment for details of the assessment.

7.5 Visual Impact

Golder has assessed the potential visual impact from 5 viewpoints east of the Proposal. These locations are shown on Figure 5.

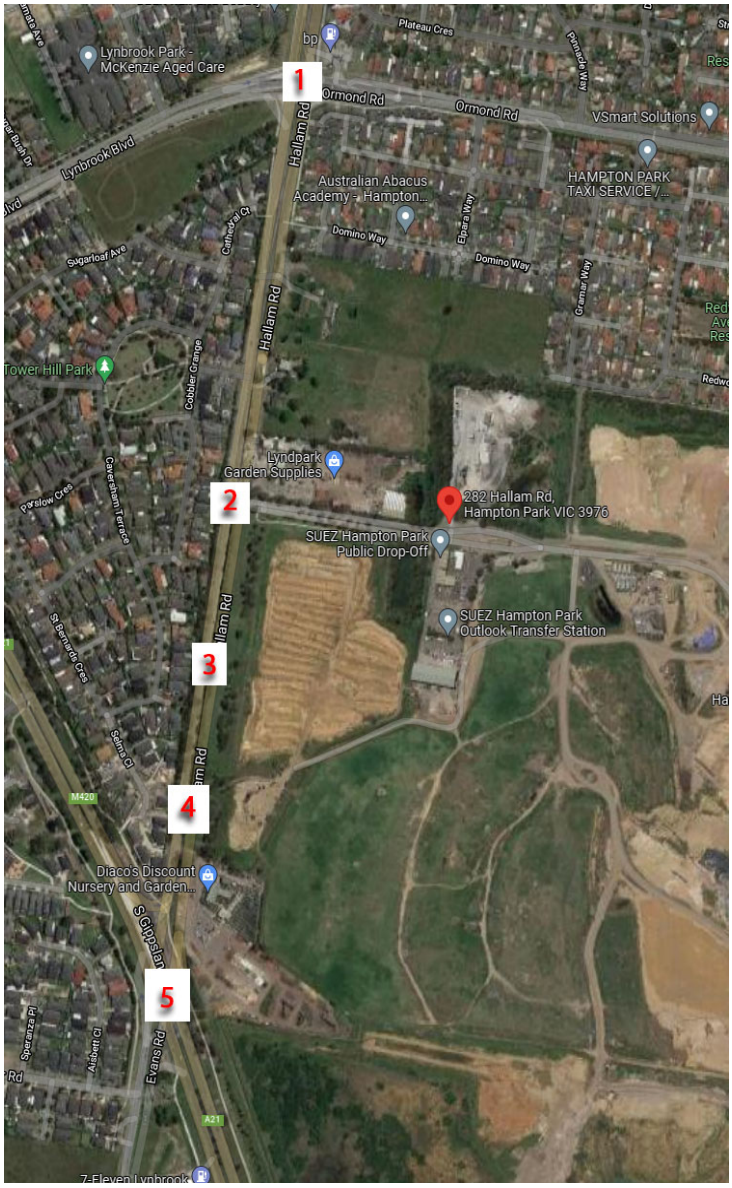

Figure 5: Viewpoint locations

Viewpoint 1 – Intersection of Hallam Road and Ormond Road

Figure 6 shows an aerial view of Proposal from the intersection of Hallam Road and Ormond Road. An aerial view has been used here as the Proposal is not visible from this intersection or along Ormond Road. The Proposal is well screened by existing and proposed vegetation.

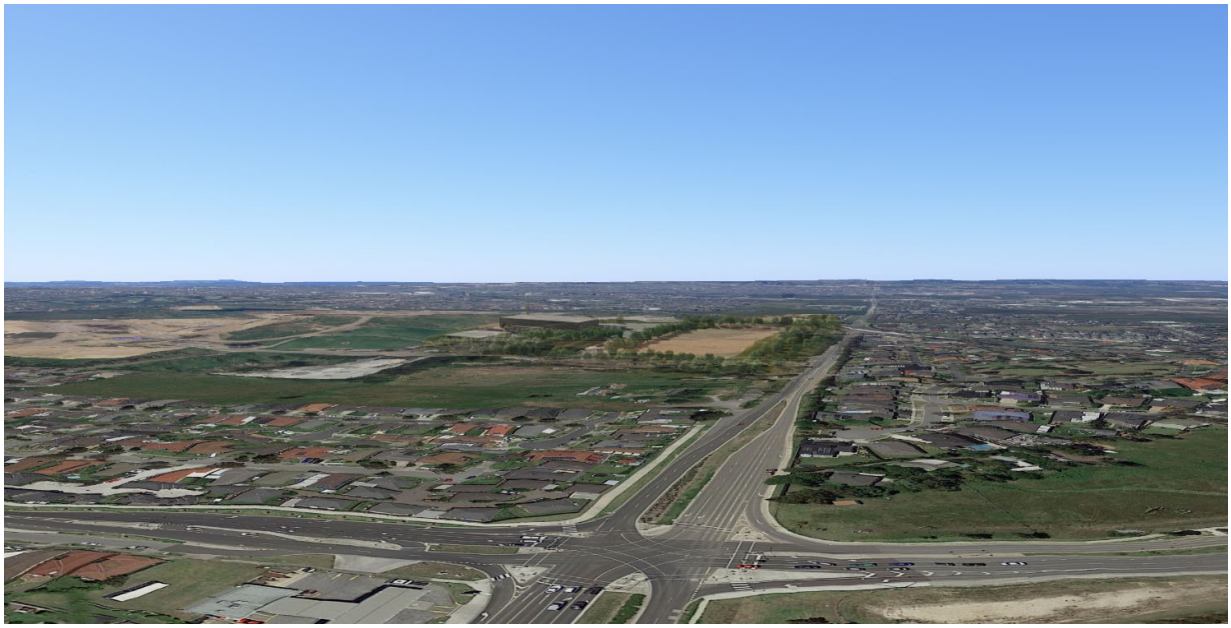

Figure 6: Aerial view of intersection of Hallam Road and Ormond Road

Viewpoint 2 – Intersection of Hallam Road and Access Road

Figure 7 shows a view of the Proposal from the Hallam Road and Access Road intersection. The proposal is well screened from this viewpoint by the existing and proposed vegetation along the site boundary. The ventilation stack for the Commercial Transfer Station can be seen in the distance.

Figure 7: Viewpoint from Hallam Road and Access Road Intersection

Viewpoints 3 and 4 – Hallam Road

Figures 8 and 9 show the view of the Proposal along Hallam Road. The Proposal is well screened by the vegetated bund wall along the boundary of the site from these two viewpoints along Hallam Road. The ventilation stack of the Proposal can be seen in the distance.

Figure 8: Viewpoint 3 from Hallam Road

Figure 9: Viewpoint 4 from Hallam Road

Viewpoint 5 – Intersection of Hallam Road and South Gippsland Highway

Figure 10 shows an aerial view of Proposal from the intersection of Hallam Road and South Gippsland Highway. An aerial view has been used here as the Proposal is not visible from this intersection.

Figure 10: Aerial view of Intersection of Hallam Road and South Gippsland Highway

Summary

Views of the Proposal are either negligible or not visible as it is well screened by an existing vegetated bund wall and as the footprint of the Proposal is setback approximately 200m from Hallam Road.

7.6 Landfill Gas

Golder has undertaken a landfill gas risk assessment as the proposed transfer station is in close proximity to the Hallam Road Landfill. The assessment is intended to assess the risk of landfill gas on the proposed transfer station building, the transfer station itself is not a source of landfill gas. The assessment targeted the area of the proposed transfer station and analysed landfill gas data provided by SUEZ. Golder concluded that based on the information provided by SUEZ, the level of reported gas concentrations were typically low and below the EPA action levels. However, due to the acute risks posed by landfill gas, mitigation measures are required to be incorporated into the building design. The landfill gas mitigation measures recommendation by Golder have been incorporated into the design of the transfer station. These will include measures such as incorporation of a gas resistant membrane in the building floor.

7.7 Traffic

GTA Consultants now Stantec undertook an assessment of the anticipated traffic implications and the suitability of vehicle access arrangements of the Proposal.

The existing operation of the Hallam Road landfill and the transfer station generates in the order of 1460 vehicle movements during a typical weekday, with ~50% of these movements being heavy vehicles.

With waste volumes of approximately 550,000 tonnes per annum, the Proposal is expected to generate approximately 576 movements on an average weekday which is than associated with the landfill.

Trucks leaving the transfer station will not leave mud on local roads as they will have travelled on sealed surfaces to dispose of waste or to collect waste for onward disposal.

Having regard to the Hallam Road upgrade which included the installation of new traffic signals at the South Gippsland Highway and Hallam Road intersection, installation of traffic signals at the access road to the

Hallam Hub and that the Proposal is likely to generate similar traffic volumes to the existing operation, GTA concluded that there will be adequate capacity in the adjacent road network to accommodate the traffic expected to be generated at the site.

7.8 Groundwater and Surface water

Stormwater

Stormwater will be managed on site, to ensure potentially contaminated stormwater will be captured and subsequently treated (bunds, sumps, grading), and will be isolated from the stormwater system and from the wetlands.

Groundwater

As the Transfer station is only intended to process solid wastes and most activities will occur on hard stand the risk of impacts to groundwater is low.

7.9 Lighting and Glare

External lighting will be designed to shield glare from the night sky.

8.0 COMMUNITY ENGAGEMENT

8.1 Community Reference Group

SUEZ operates a Community Reference Group (CRG) for the Hallam Road Hub in particular historically related to the operation of the Hallam Road landfill. The CRG provides an interactive, consultative forum for members of the community to keep up to date on the operation of waste management in their area, and have a say.

The CRG aims to:

- Facilitate community awareness of operations, environmental performance and short, medium and long term developments;
- Create an open dialogue between SUEZ and community representatives on issues of concern;
- Offer a practical avenue for community input into decisions around SUEZ facilities;
- Unite SUEZ and community representatives in minimising the impact of facilities on the local communities.

The Hampton Park CRG meets quarterly and members include the Lynbrook Residents Association, elected local members and representatives from SUEZ, EPA and Council. The Hampton Park CRG has been briefed on the Proposal and SUEZ will continue to engage with the CRG as the Proposal develops.

8.2 Online

In addition to the CRG, SUEZ will create a project page for the Proposal on its website providing a overview of the proposal and a frequently asked questions (FAQs) section. The community will have the opportunity to send an email to SUEZ should there be a query not covered by the FAQs section. SUEZ is committed to working with Council and engaging with the community throughout the process.

Signature Page

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APPENDIX A

Air Quality and Noise Assessment

REPORT

Air Quality and Noise Assessment

Hallam Road - Proposed Waste Transfer Station

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19118091-008-R-Rev5

March 2022

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1 electronic copy - SUEZ Recycling and Recovery

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DEFINITIONS

A-weighted	A measuring instrument response which modifies sound in such a way that the resulting level is similar to that perceived by the human ear.
dB	Decibel.
dB(A)	A-weighted sound pressure level measured in decibels.
L_{Aeq}	The A-weighted sound pressure level of the same acoustic energy as the A-weighted time varying sound pressure level when determined over the same period.
L_{Amax}	The maximum A-weighted sound pressure level reached during a measurement period.
L_{A10}	The A-weighted noise level exceeded for 10% of the measurement period L_{A10} is regarded as the best descriptor of traffic noise and is normally used to characterise average maximum noise levels.
L_{A90}	The A-weighted noise level exceeded for 90% of the measurement period. L_{A90} is regarded as the best descriptor of background noise.

1.0 INTRODUCTION

Golder Associates Pty Ltd (Golder) was commissioned by SUEZ Recycling and Recovery (SUEZ) to provide an air quality and noise assessment report to assist with the siting and approvals of an upgrade proposed to the existing waste transfer station (WTS) at the SUEZ site located at 290 Hallam Road, Hampton Park (herein referred to as the 'site').

This air quality and noise assessment report has been developed to assist SUEZ confirm the appropriate location of the upgraded WTS within the site.

The primary potential environmental impacts of the WTS operations on nearby sensitive receptors (nearest residential properties, approximately 250 m from the proposed WTS) are odour from the waste streams received and noise from the waste movements and compaction.

The odour impacts were assessed using plume dispersion modelling to predict the odour ground level concentrations (GLC) at nearby sensitive receptors.

Noise impacts were assessed by determining existing noise levels at nearby sensitive receptors and conducting noise modelling to predict noise impacts from the WTS operations at the sensitive receptors.

The assessment outcomes were then compared to relevant criteria. The results of the odour and noise assessments are described in the following sections of this report.

2.0 PROJECT DESCRIPTION

With the impending closure of landfills in the south east of Melbourne, in particular SUEZ's Hallam Road landfill in Hampton Park, there is a need for an alternative solution for waste disposal.

The proposed regional transfer station is planned to accept approximately 550,000 tonnes per annum (tpa) of municipal (putrescible), commercial and industrial waste and operate at a maximum capacity of 18 hours a day, 6 days a week (Monday to Saturday).

Waste trucks would enter the enclosed facility and unload onto the floor. A front- end loader will move the waste into one of four waste compactors (approximately 6 m below the floor level of the transfer station building) to compact the waste into sealed containers. Once sealed the containers are ready for transfer to the Maryvale EfW facility for processing or to other disposal locations. All waste received is moved from the floor and compacted each day. No waste will be stored or recovered and limited sorting may occur at the proposed transfer station. It is envisaged that under normal operating conditions a short-term (one to two hours) maximum of approximately 300 tonnes of waste be located within the transfer station during operating hours.

2.1 Transfer station location

The proposed location of the transfer station has been provided by SUEZ and is presented in Figure 1. This location has been used to assess the potential impacts of the WTS operations on nearby sensitive receptors; residential areas located beyond the northern and western site boundaries. A site layout showing the location of the WTS building, vehicle routes and container loading area is provided in APPENDIX A.

Figure 1: Approximate Proposed location of transfer station

3.0 EXISTING AMBIENT NOISE

Unattended noise monitoring was undertaken at two locations during the period 18 October 2019 to 31 October 2019 to establish the existing ambient noise levels in the area. Monitoring locations are presented in APPENDIX B and were considered representative of the nearest noise sensitive receivers to west and north of the site (residential properties located on Hallam Road and The Parkway). During the background noise monitoring programme, day & night road works were in progress for the widening of Hallam Road, therefore, an background monitoring location along the south-eastern site boundary, adjacent to Harrington Drive, (rather than near Hallam Road) was employed. The use of this alternative monitoring location may underestimate the background noise levels for residential areas along Hallam Road and conservatively reduce the assigned noise limits.

Noise monitoring was undertaken using Type 2 noise loggers and continuous noise levels were logged over a period of seven to ten days to assess the variability of L_{A90}, L_{Aeq} and L_{Amax} levels at the noise monitoring

locations. Monitoring was undertaken in accordance with AS1055.1 "*Acoustics – Description and Measurement of Environmental Noise*".

Results of the noise monitoring for day, evening and night periods are presented in Table 1. Data identified to be affected by adverse weather conditions or likely extraneous noise was excluded from the subsequent calculations.

Table 1: Noise monitoring results

Monitor ID	GPS Co-ordinates (UTM)	Description	Period	Sound pressure level (dB(A))	
				L_{90}	L_{eq}
Logger 1	349054, 5785574	South east corner of site	Day	41	53
			Evening	38	47
			Night	35	44
Logger 2	348926, 5786977	North east corner of site	Day	45	65
			Evening	45	51
			Night	45	49

Background noise levels measured at Logger 2, were found to be influenced by an unidentified noise source that was present during the day, evening and night periods and has therefore been excluded from further analysis. Therefore, the lower noise level results for Logger 1 was conservatively used to calculate noise limits for noise sensitive receptors.

4.0 POTENTIAL ENVIRONMENTAL IMPACTS FROM THE WTS OPERATION

Potential environmental impacts from the WTS operation include odour emissions to air from the presence of waste materials (decomposing material) as well as noise from heavy machinery, vehicle movement, the movement of waste (tipping of waste into the waste chute), the compaction of waste and other operational activities.

4.1 Odour emissions

To determine a site specific odour emission rate for the site, a literature review was conducted, based on the following sources:

i) Air Quality Assessment of the Proposed Ferntree Landfill, Katestone Environmental, September 2007.

ii) *Nambour Landfill Expansion – Air Quality Impact Assessment,* Golder Associates, July 2010.

iii) *Odour Emission Factors: Fundamental Tools for Air Quality Management,* Capelli et al, Chemical Engineering Transactions, Vol 40, 2014.

iv) *Commercial waste management study: Volume 1, Private transfer station evaluations. Appendix E - Odour modelling methodology*, Henningson, Durham and Richardson Architecture and Engineering, P.C. and its sub consultants for New York City Department of Sanitation, March 2004.

v) *Odour Emission Factors for the Prediction of Odour Emissions from plants for the Mechanical and Biological Treatment of MSW*, Sironi et al, Atmospheric Environment, Vol 40, 2006.

vi) *Desktop Dispersion Modelling Assessment of Proposed Waste-to-Energy Facility*, The Odour Unit, April 2012.

A study conducted for the New York City Department of Sanitation (reference iv) conducted across four WTS found the maximum odour emission factor was 42.9 OU/s per tonne waste stored. This odour emission rate is considered conservative and has been adopted for the odour assessment.

Suez propose to operate the WTS over an 18 hour period (00:00 to 18:00 Monday to Friday) and a 16 hour period (00:00 to 16:00 Saturday), with four waste compactors processing approximately 1,800 tonnes of waste per day. Waste is delivered to the WTS by Heavy Rigids delivering waste at an average of 8.9 tonnes per load at a maximum frequency of 26 per hour giving a maximum waste load 250 tonnes per hour. Four waste compactors will process 160 tonnes per hour.

The waste composition is a mixture of municipal solid waste (MSW) and commercial and industrial waste (C&I). The putrescible waste (PW) fraction of the MSW and C&I waste streams is estimated to be 41% and 11% respectively. An hourly breakdown of the MSW and C&I waste delivered[1], the total waste stored on the WTS floor, the estimated PW content and the calculated hourly odour emission rate is provided in Table 2.

Table 2: Hourly waste processing and odour emission rate (Monday to Friday)

Hour starting	Waste delivered (tonnes)			Waste stored on floor (tonnes)	% MSW stored on floor	% PW stored on floor	Odour emission rate (OU vol/s)
	MSW	C&I	Total				
00:00	0	43	43	0	0%	0%	0
01:00	0	43	43	43	0%	31%	571
02:00	0	43	43	85	0%	31%	1142
03:00	0	43	43	128	0%	31%	1713
04:00	0	43	43	171	0%	31%	2284
05:00	0	43	43	214	0%	31%	2855
06:00	0	72	72	286	0%	31%	3822
07:00	0	64	64	190	0%	31%	2536
08:00	38	48	87	116	44%	69%	3433
09:00	77	51	128	84	60%	82%	2970
10:00	154	84	238	162	65%	86%	5985

[1] Waste categories and quantities supplied by SUEZ

Hour starting	Waste delivered (tonnes)			Waste stored on floor (tonnes)	% MSW stored on floor	% PW stored on floor	Odour emission rate (OU vol/s)
	MSW	C&I	Total				
11:00	115	137	252	254	46%	70%	7629
12:00	77	90	167	260	46%	70%	7859
13:00	115	52	167	268	69%	90%	10298
14:00	154	36	190	297	81%	100%	12749
15:00	38	95	133	270	29%	56%	6452
16:00	0	46	46	156	0%	31%	2087
17:00	0	5	5	1	0%	31%	12
18:00	0	0	0	0	0%	0%	0
Total	**769**	**1037**	**1806**				

The odour emission rate for each hour was calculated by assigning the maximum MSW percentage hour (81% at 14:00) to the maximum odour emission rate adopted from the literature search (42.9 ou/s per tonne of waste) and adjusting for the percentage of organics (PW) in each waste stream delivered at each hour.

The estimated PW content was calculated from the percentage of organics contained in each waste stream multiplied by the percentage of each waste stream delivered, then normalised for PW content at the maximum hour. It was assumed that proportions of waste delivered at each hour would be representative of the waste stored on the WTS floor during that hour.

For example, at 10:00 am the delivered waste is comprised of 65% MSW and 35% C&I. The PW content at the maximum hour (14:00 hours) is:

- Maximum PW = (0.81 x 41% + 0.19 x 11%) = 35%.

The normalised PW content at 10 am is:

- PW (10:00 hours) = (0.65 x 41% + 0.35 x 11%)/0.35 = 86%.

The odour emission rate is then:

- 238 tonne waste x 86% x 42.9 ou/s per tonne = 5985 ou/s.

4.2 Noise

To assess potential noise emissions from the proposed facility, spectral sound power levels of key noise generating sources (i.e. trucks, extraction system, roller doors etc) were obtained from available published information and equipment suppliers.

5.0 ASSESSMENT CRITERIA

5.1 Odour

The *Environment Protection Act 2017* came into effect on 1 July 2021, replacing the previous *Environment Protection Act 1970* and its subordinate policies and guidelines. The Environment Protection Authority, Victoria (EPA), published the draft Guideline for assessing and minimising air pollution in Victoria, Publication 1961, May 2021 (draft guideline). This draft air pollution guideline, when finalised, is intended to replace parts of the *State Environment Protection Policy (Air Quality Management)* (SEPP(AQM)). Currently EPA is yet to provide environmental objectives for ambient odour to be applied under the provisions of the *Environment Protection Act 2017* and the draft guideline does not address odour compliance and therefore the criteria set out in the SEPP(AQM) will be adopted to assess odour impacts.

The SEPP (AQM) set out design criteria for the purpose of assessing proposals for new emission sources. Schedule A of the SEPP (AQM) stipulated that for odour, the design criterion is 1 odour unit (OU) (99th percentile, 3 minute average) at the boundary of the premises.

5.2 Noise

Criteria for noise emissions from industrial facilities within the Melbourne Metropolitan area are established in the *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (EPA Publication 1826.4, May 2021) (Noise Protocol), which is incorporated into the *Environment Protection Regulations 2021*.

The assessment of noise emission under the Noise Protocol is based on the calculation of a noise limit at a noise sensitive location. The noise limit is based on the *Zoning Level*[2], which considers the land use in the surrounding area, the existing background noise level and the time of day.

The time of day defined by the Noise Protocol are presented in Table 3.

Table 3: Noise protocol criteria application

Criteria	Time / day
Day	7 am – 6 pm Monday to Friday
	7 am – 1 pm Saturday
Evening	6 pm – 10 pm all days
	1 pm – 6 pm Saturday
	7 am – 6 pm Sunday and public holidays
Night	10 pm – 7 am all days

5.3 Zoning level

The site is currently zoned Special Use Zone (SUZ1) under the City of Casey planning scheme and is classified in the Noise Protocol as a Type 3 (earth and energy resources). Surrounding land uses to the west

[2] *Zoning Level*' refers to the term used in SEPPN-1 and not to land use zoning under the local council planning scheme

and north are zoned General Residential Zone (GRZ1) and designated Type 1. A principal road (Hallam Road) lies between the site and the residential zone to the west and is designated Type 2.

The zoning levels for the selected time periods were calculated by the following formulae:

- Day period(0700-1800 hours)18 x IF + 50;
- Evening period(1800-2200 hours)17 x IF + 44; and
- Night period(2200-0700 hours)17 x IF + 39.

Where;

The influencing factor (IF) is a measure of the proportion of land zoned for industrial or commercial use around the measurement point.

The influencing factor is assessed by drawing two concentric circles around the measurement point, at 400 metres and 140 metres. The areas contained in each circle of Type 1, Type 2 or Type 3 (as described in the Noise Protocol) are then calculated, and the influencing factor calculated from the following equation:

$$IF = \frac{1}{2}\left\{(Area\ type\ 3) + \frac{1}{2}\ (Area\ Type\ 2)\right\} 140m\ circle + \frac{1}{2}\left\{(Area\ type\ 3) + \frac{1}{2}\ (Area\ Type\ 2)\right\} 400m\ circle$$

Figure 2 presents the 140 m and 400 m circles located over the City of Casey planning scheme.

Figure 2: Zoning Scheme

The noise sensitive receptors located along Hallam Road are situated in a residential area, bordering a principal road reserve and a special use zone. Taking the land use types into account the influencing factor was calculated as 0.39 and the corresponding zoning levels are presented in Table 4.

Table 4: Zoning levels

Period	Day	Evening	Night
Zoning level	57	51	46

5.4 Noise limits

Noise limits that apply at the sensitive receptors are determined from the calculated zoning level and the background ambient noise level (outlined in Section 3.0). The background noise is considered neutral if it is at least 6 dB(A) and not more than 12 dB(A) below the zoning level for the day period, and at least 3 dB(A) and not more than 9 dB(A) below for the other periods. If this criteria is met and the background noise level is neutral, then the noise limit is the zoning level.

The permissible noise level (noise limit) is determined for non-neutral backgrounds by taking the background level plus an adjustment.

The background noise is considered low when the zoning level for the day period is 13 dB(A) or more above the background level for that period. In such circumstances the noise limit is calculated from the following formula:

- Noise limit = ½ (zoning level + background level) + 4.5 dB(A)

when the zoning level for the evening period or night period is 10 dB(A) or more above the background level for that period, the noise limit is calculated from the following formula:

- Noise limit = ½ (zoning level + background level) + 3 dB(A)

The background noise is considered high when the background level is less than 6 dBA below the zoning level for the day period or less than 3 dBA below the zoning levels for the evening or night periods. The noise limits for high background are calculated as follows:

- Day period: Noise limit = background level + 6 dB(A);
- Evening period: Noise limit = background level + 3 dB(A); and

Night period:Noise limit = background level + 3 dB(A).

Table 5 presents the zoning level, background noise level and the derived noise limits for each period of day.

Table 5: Noise limits

Period	Day	Evening	Night
Zoning level	57	51	46
Background noise level dB(A)	41	38	35
Background status	Low	Low	Low
Noise Limit dB(A)	54	49	45

6.0 PLUME DISPERSION MODELLING – ODOUR

The potential impact of odour from the proposed facility was assessed by constructing a plume dispersion model to predict the odour concentration at nearby sensitive receptors. The plume dispersion modelling was conducted in accordance with Schedule C of the SEPP (AQM) ("*Modelling Emissions to Air*") utilising the EPA Victoria regulatory model, AERMOD (Version 8.7), based on the guidance contained in EPA Victoria Publication 1551 '*Guidance notes for using regulatory air pollution model AERMOD in Victoria*'.

A site representative meteorological file was constructed using data obtained from nearby Bureau of Meteorology (BOM) stations and compiled using The Air Pollution Model (TAPM) in accordance with draft EPA Victoria Publication 1550 '*Construction of input meteorological data files for EPA Victoria's regulatory air pollution model (AERMOD)'*. These guidance notes require five years of meteorological data to be used and consequently representative files were constructed for the years 2014 – 2018.

Dispersion modelling was conducted for each of the years 2014 – 2018, using the proposed waste transfer building as a volume source for predicted odour emissions. Modelling results for all years assessed were compared to the design criterion in the SEPP (AQM) of 1 OU (99.9th percentile 3 minute average).

One scenario was modelled to represent odour emissions from the proposed facility. Model results represent the maximum ground level concentration (GLC) at each receptor for the model period.

Operational information was supplied by SUEZ including predicted tonnes of waste delivered, truck fleet specifications, operating hours, frequency of waste deliveries, frequency of waste collection and building dimensions.

6.1 Discharge parameters

SUEZ has advised that the transfer facility will have a single vertical exhaust ventilation stack either located on the roof of the WTS or as a standalone stack located adjacent the WTS. The WTS will be under negative pressure and fitted with rapid shutter doors to minimise fugitive odour emissions. Therefore, the model was run with a single point source with a vertical release.

Other discharge parameters were provided by SUEZ and are shown in Table 6.

Table 6: Emission source parameters

Parameter	Emission source
Description	Waste transfer station stack
Source type	Point
Release type	Free vertical
Co-ordinates (UTM)	348983, 57866967
Release height (m)	20
Gas exit temperature (ºC)	ambient
Diameter (m)	2.0
Gas exit velocity (m/s)	24
Exhaust flow rate m^3/hour	265,880
Odour emission rate (OU m^3/s)	Hourly varying (refer Table 2)

6.2 Building downwash

Building downwash is a phenomenon caused by structures near to emission sources influencing atmospheric turbulence. Airflow is rapidly mixed to the ground as frictional forces and pressure gradients cause the development of stagnations and eddies in the wake of buildings downwind of elevated sources.

AERMOD contains the PRIME algorithm, which is used to predict building downwash effects. Influencing building dimensions were calculated using the USEPAs Building Profile Input Programme (BPIP).

To evaluate the occurrence of building downwash, the position and dimensions of each structure relative to the source must be identified for each possible direction of wind flow. Table 7 provides details of the buildings that may influence the emission source and have been included in the model.

Table 7: Modelled building

Building	Height (m)	Dimensions (m)
Waste transfer station	12.4	105 x 70

6.3 Meteorological data

The simulation of air quality impacts from the site requires the use of representative hourly meteorological data spanning an entire calendar year for surface and upper air observations. AERMOD requires the input of two meteorological files; a ‘surface’ (.sfc) data file and a ‘profile’ (.pfl) data file.

Meteorological data files covering the five years 2014 to 2018 were developed in accordance with draft EPA Victoria Publication 1550, using the AERMOD meteorological pre-processor AERMET.

The following hourly surface observations are required for input into AERMET:

- wind speed
- wind direction
- standard deviation of horizontal wind direction (‘*sigma-theta*’)
- temperature
- cloud cover
- cloud ceiling height

EPA guidance requires on-site meteorological observations to be within 5 kilometres of the Site. The closest the Bureau of Meteorology (BOM) automatic weather stations are:

- Moorabbin Airport (Station No. 086077), approximately 16 km to the north-west of the Site.
- Frankston (Station 086371), approximately 16 km to the south-west of the Site.

For locations where site specific meteorological observations are not available within 5 kilometres of the Site, a prognostic meteorological model can be used to generate the data. Therefore, The Air Pollution Model (TAPM) developed at CSIRO Marine and Atmospheric Research was used to generate site specific data. Details of TAPM setup are provided in APPENDIX C.

Upper air (radiosonde) stations are sparse in Australia but typically represent a wider area (region), therefore twice-daily upper-air observations from Melbourne Airport (55 km to the northwest) were considered representative of the Site. Radiosonde data includes:

- height above ground
- pressure
- temperature

Together these datasets were used as inputs to AERMET to generate meteorological files covering the period 1 January 2014 to 31 December 2018 for input into AERMOD.

6.3.1 Meteorological summary

A summary of the meteorological data (temperature and wind speed) for 2014 to 2018 used in this assessment is provided in Table 8 and Table 9.

Table 8: Mean daily temperature (°C)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014	21.3	20.5	19.1	16.2	14.4	12.0	10.8	10.6	13.3	15.2	17.0	18.3
2015	20.2	21.1	17.3	14.2	13.0	10.4	9.7	10.6	12.4	17.3	17.0	20.6
2016	20.4	20.1	19.7	17.2	14.5	10.7	11.2	11.6	13.0	14.0	15.6	19.2
2017	20.4	19.5	20.6	16.0	12.6	10.5	10.1	10.6	12.7	15.4	19.6	19.1
2018	21.6	21.1	19.2	16.2	13.8	10.0	11.0	10.6	12.1	15.7	16.8	20.3

Table 9: Mean wind speed (m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014	3.3	2.8	2.6	2.7	3.0	3.4	3.9	2.4	3.0	3.1	2.9	3.1
2015	3.4	2.8	2.7	2.2	3.7	2.9	3.6	3.2	2.6	2.8	3.0	3.2
2016	2.7	2.2	2.3	2.3	4.1	3.5	4.4	3.2	3.0	4.3	2.9	2.9
2017	2.7	2.8	2.8	2.3	2.6	2.0	3.9	3.7	4.2	2.9	2.5	2.9
2018	2.7	3.0	2.9	2.2	3.0	2.8	4.5	4.0	3.1	2.8	2.8	2.7

Figure 3 presents annual wind roses and Figure 4 presents the seasonal wind roses showing the frequency and direction of winds for the past five years (2014 to 2018).

The wind roses at the site indicate the following:

- wind direction over 5 years (2014 to 2018) is predominately northerly-westerly and then northerly with an annual wind speed of 3.0 m/s.
- during summer, winds are predominately southerly to south-westerly with an average wind speed of 2.9 m/s.

- in Autumn, winds are most frequently northerly and north to north-westerly followed by south-easterly with an average wind speed of 2.8 m/s.
- during Spring, north-westerly followed by northerly wind directions are dominant with an average wind speed of 3.4 m/s.
- in Winter, northerly then westerly followed by south-easterly wind are most frequent with an average wind speed of 3.1 m/s.

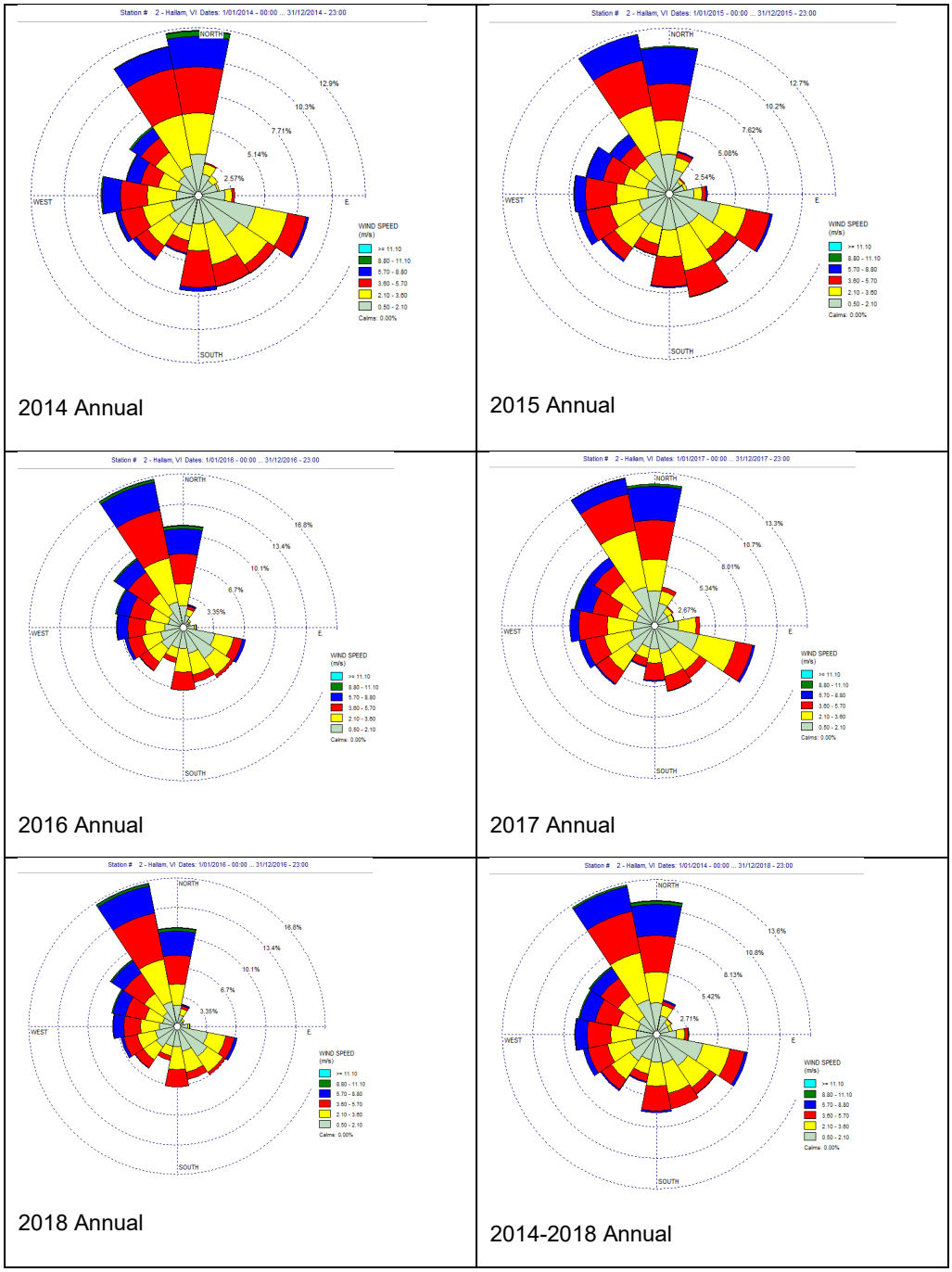
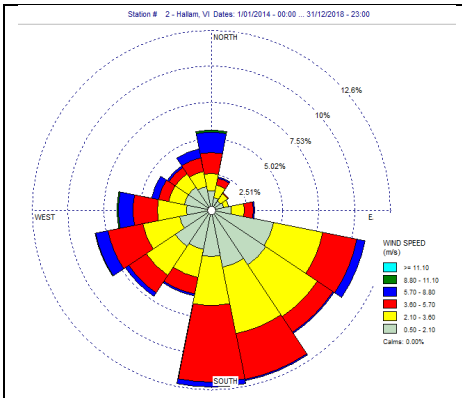
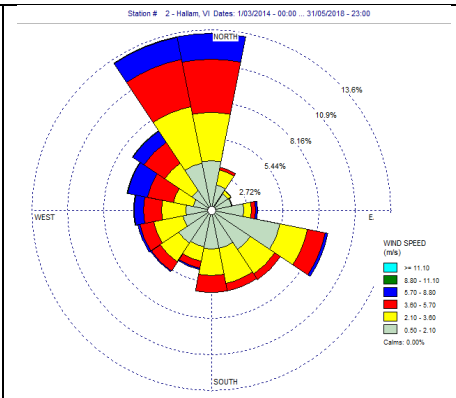


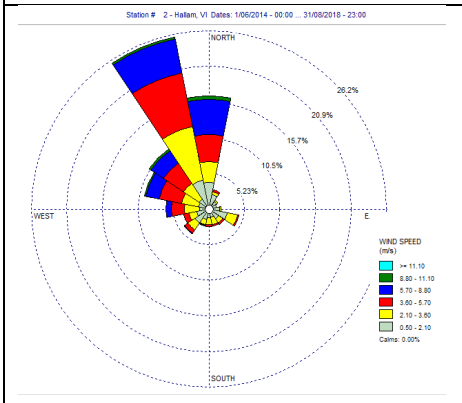
Figure 3: Annual wind roses 2014 – 2018



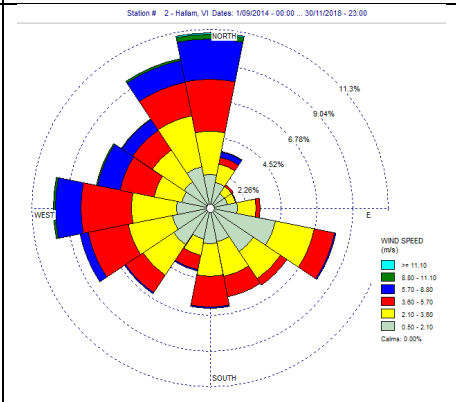
Summer 2014-2018



Autumn 2014-2018



Winter 2014-2018



Spring 2014-2018

Figure 4: Seasonal wind rose 2014 – 2018

6.4 Modelling Domain

In accordance with EPA Victoria Publication No. 1551, a modelling domain of approximately 2 km by 2 km was chosen, centred on the proposed waste transfer facility, with a Cartesian grid spacing of 50 m.

6.4.1 Topography

Shuttle Radar Topography Mission (SRTM) one arc-second (approximately 30 metres) global digital surface model elevation data was used to create a topographical Cartesian grid with a horizontal spatial resolution of 30 m and a vertical spatial resolution of 0.1 approximately centred on the site.

6.4.2 Receptors

Receptors are included in the modelling assessment to represent locations where predicted air quality impacts are calculated. Gridded receptors were included in the model as described above.

6.5 Model assessment results

The maximum predicted ground level concentrations (GLCs) for odour is presented in Table 10.

Table 10: Plume dispersion modelling odour results 3-minute average

Year	Rank	Maximum predicted GLC (OU)	UTM Coordinates (x,y)	Date (yyyy-mm-dd hh)
2014	9	0.52	347692, 5786859	2014-01-30 07
2015	9	0.49	350143, 5788226	2015-02-03 06
2016	9	0.49	350143, 5788226	2015-02-03 06
2017	9	0.49	350143, 5788226	2015-02-03 06
2018	9	0.53	347692, 5786859	2018-04-21 09

The maximum predicted odour GLC at the nearest sensitive receptor locations to the west of the site ranges from 0.49 to 0.53 OU (99.9th percentile, 3 minute average) for all years modelled (2014 to 2018). The modelling results indicate that predicted odour concentration would not exceed the design criterion of 1 OU for all assessed years, at and beyond the site boundary.

7.0 ACOUSTIC MODELLING

7.1 Modelling methodology

The CadnaA environmental noise prediction model (Version 4.0) was used to calculate the noise levels received at sensitive receptors within the vicinity of the proposed transfer station. This software is an internationally recognised state-of-the-art predictive tool that utilises approved algorithms for the calculation of noise attenuation through the built and natural environment (in this case International Organization for Standardization ISO 9613 *Acoustics – Attenuation of Sound during Propagation Outdoors*).

CadnaA requires a range of inputs including:

- modelling domain receptors.
- topographical data.
- source noise characteristics.

7.1.1 Noise limits

Table 11 presents the acceptable noise limit at the sensitive receptors based on the existing acoustic environment as measured during the noise monitoring programme.

Table 11: Sensitive receptor noise limit

Criteria	Noise limit
Day	54 dB(A)
Evening	49 dB(A)
Night	45 dB(A)

7.1.2 Meteorology

The default meteorological data set used in the CadnaA model has been adopted for this noise assessment. This comprises a temperature of 10 ºC, relative humidity of 70 per cent and downwind propagation, as specified in ISO 9613.

The default setting in the CadnaA environmental noise prediction model assumes a worst-case scenario, with all receptors downwind of all noise sources at wind speeds of one to five metres per second and above ground heights of three to 11 metres. The modelling results will, therefore, be maximum predicted sound levels at each receptor, regardless of the specific local conditions.

7.1.3 Model domain and receptors

A model domain of approximately 2 km x 2 km centred on the waste transfer facility with a grid spacing of 5 m was included in the model. Receptor heights were set to 2 m, representing single storey dwellings. Discrete receptors were positioned at selected residential receptors along Hallam Road to the west of the facility and Domino Way and Redwood Drive to the north of the facility. A list of the discrete receptors is presented in Table 12.

Table 12: Discrete receptor locations

Receptor	Description	X (metres)	Y (metres)
R1	Residence - Hallam Road	347649	5786969
R2	Residence - Hallam Road	347646	5786935
R3	Residence - Hallam Road	347640	5786901
R4	Residence - Hallam Road	347639	5786880
R5	Residence - Hallam Road	347635	5786855
R6	Residence - Hallam Road	347628	5786822
R7	Residence - Hallam Road	347620	5786796
R8	Residence - Hallam Road	347617	5786769
R9	Residence - Hallam Road	347612	5786735
R10	Residence - Hallam Road	347611	5786706
R11	Residence - Hallam Road	347607	5786677
R12	Residence - Hallam Road	347603	5786642
R13	Residence - Hallam Road	347723	5787054
R14	Residence - Hallam Road	347737	5787107
R15	Residence – Domino Way	347874	5787241
R16	Residence – Domino Way	348001	5787223
R17	Residence – Redwood Avenue	348107	5787104
R18	Residence – Redwood Avenue	348185	5787095

7.1.4 Noise Sources

The major noise sources identified at the waste transfer facility are:

- Waste compactors (inside WTS)
- Front end loaders (inside WTS)
- Building ventilation exhaust fan (WTS roof)
- Building ventilation exhaust fan motor (inside WTS)
- Commercial and Council waste trucks (waste delivery)
- Waste container trucks (waste collection)
- Waste container handling fork-lift (inside WTS)
- Waste container handling (container drop inside WTS)
- General forklift movement (hardstand outside WTS).

Waste delivery trucks, waste compactors and the building ventilation system was assumed to operate from 12 am to 6 pm Monday to Friday and 12 am to 4 pm Saturday.

Waste containers will be delivered by B-double trucks (two containers per truck). Containers will be delivered to the waste compactor pit (inside the WTS behind RSD) on B-double trailers to minimise container handling noise.

All equipment is assumed to operate simultaneously within their respective operating periods.

The sound power level for each item of equipment is presented in Table 13.

Table 13: Sound power levels of major noise sources

Source	Quantity	Hours of operation	Height above ground	Sound frequency (Hz)	Overall sound power level (dB(A)
Ventilation exhaust	1	12am – 6pm	20	500	100
Exhaust fan motor	1	12am – 6pm	2	500	120
Waste compactor	4	6am – 6pm	2	spectral	107
Waste delivery trucks (9 tonne)	26 per hour	12am – 6pm	2	spectral	104
Waste collection trucks (50 tonne)	3 per hour	7am - 6pm	2	spectral	111
General fork-lift	3 per hour	6am – 6pm	2	500	99

Equipment sound power levels were obtained from similar equipment listed in “Update of Noise Database for Prediction of Noise on Construction and Open Sites” United Kingdom Department for Environment Food and Rural Affairs- 2004 or Golder’s internal noise database.

The WTS building was modelled as four vertical area noise surfaces representing the walls of the WTS and one horizontal area source representing the roof of the WTS. The internal sound level of the WTS building was estimated to be 105 dBA and included noise emissions from the four waste compactors, front end loaders and waste delivery trucks. The building was assumed to be constructed of pre-cast concrete wall slabs with a sound reduction index of 45 dB and roof sandwich panels with a sound reduction index of 41 dB.

The stack was modelled attached to the roof of the WTS at a height of 20 metres with chimney directivity. The exhaust fan motor was located within a plant room inside the WTS building and therefore was assumed to be part of the building noise.

An existing approximately 2.5 metre high earthen bund running along the south side of the site entrance road from Hallam Road for approximately 100 metres and along the western boundary for a distance of approximately 350 metres was included in the model Figure 5 presents the location and layout of the modelled noise sources and location of the earthen bund.

Figure 5: Modelled noise sources

7.2 Assessment of noise impacts

The results of the noise modelling assessment are presented in Table 14 for receptor heights of two meters above ground. The predicted SPL is also compared against the noise limits (as described in Section 7.1.1) to assess compliance with the noise limits.

Table 14: Sound Pressure Levels (SPL) at sensitive receptors

Receptor	Predicted SPL [dB(A)][1]			Noise limit compliance		
	Day	Evening[2] Sat 1pm–6pm	Night	Day 54 dB(A)	Evening 49 dB(A)	Night 45 dB(A)
R1	42	40	38	✓	✓	✓
R2	42	40	38	✓	✓	✓
R3	42	40	38	✓	✓	✓
R4	42	41	38	✓	✓	✓
R5	43	41	38	✓	✓	✓
R6	43	41	38	✓	✓	✓
R7	42	41	38	✓	✓	✓
R8	42	40	38	✓	✓	✓
R9	42	40	38	✓	✓	✓
R10	42	41	39	✓	✓	✓
R11	42	40	39	✓	✓	✓
R12	42	40	39	✓	✓	✓
R13	42	41	38	✓	✓	✓
R14	42	40	38	✓	✓	✓
R15	42	40	38	✓	✓	✓
R16	42	40	37	✓	✓	✓
R17	42	40	37	✓	✓	✓
R18	42	40	37	✓	✓	✓

Note: 1 Including background noise.
2 No operation during evening period (Mon-Sat 6pm to 10pm)

The predicted SPLs at all receptors within the area modelled are compliant with the noise limits for the day evening and night periods.

8.0 CONCLUSION

The main outcomes from the odour and noise assessment are summarised below:

The predicted odour GLCs outside the site boundary are below the SEPP(AQM) Schedule A Design criteria. Therefore, the potential for odour impacts beyond the site boundary was assessed to be low.

The predicted noise levels at the closest sensitive receptors are below the Noise Protocol noise limits for the day, evening and night periods, under the modelled operational scenario.

The potential for noise to adversely impact nearby residents was assessed to be low for all periods.

The odour and noise models make a number of assumptions where no specific data has been provided. If the final design differs significantly from the modelled assumption the model outcomes may be affected.

9.0 IMPORTANT INFORMATION

Your attention is drawn to the document titled - “Important Information Relating to this Report”, which is included in APPENDIX D of this report. The statements presented in that document are intended to inform a reader of the report about its proper use. There are important limitations as to who can use the report and how it can be used. It is important that a reader of the report understands and has realistic expectations about those matters. The Important Information document does not alter the obligations Golder Associates has under the contract between it and its client.

Signature Page

Golder Associates Pty Ltd

Mark Tulau
Senior Air & Noise Specialist

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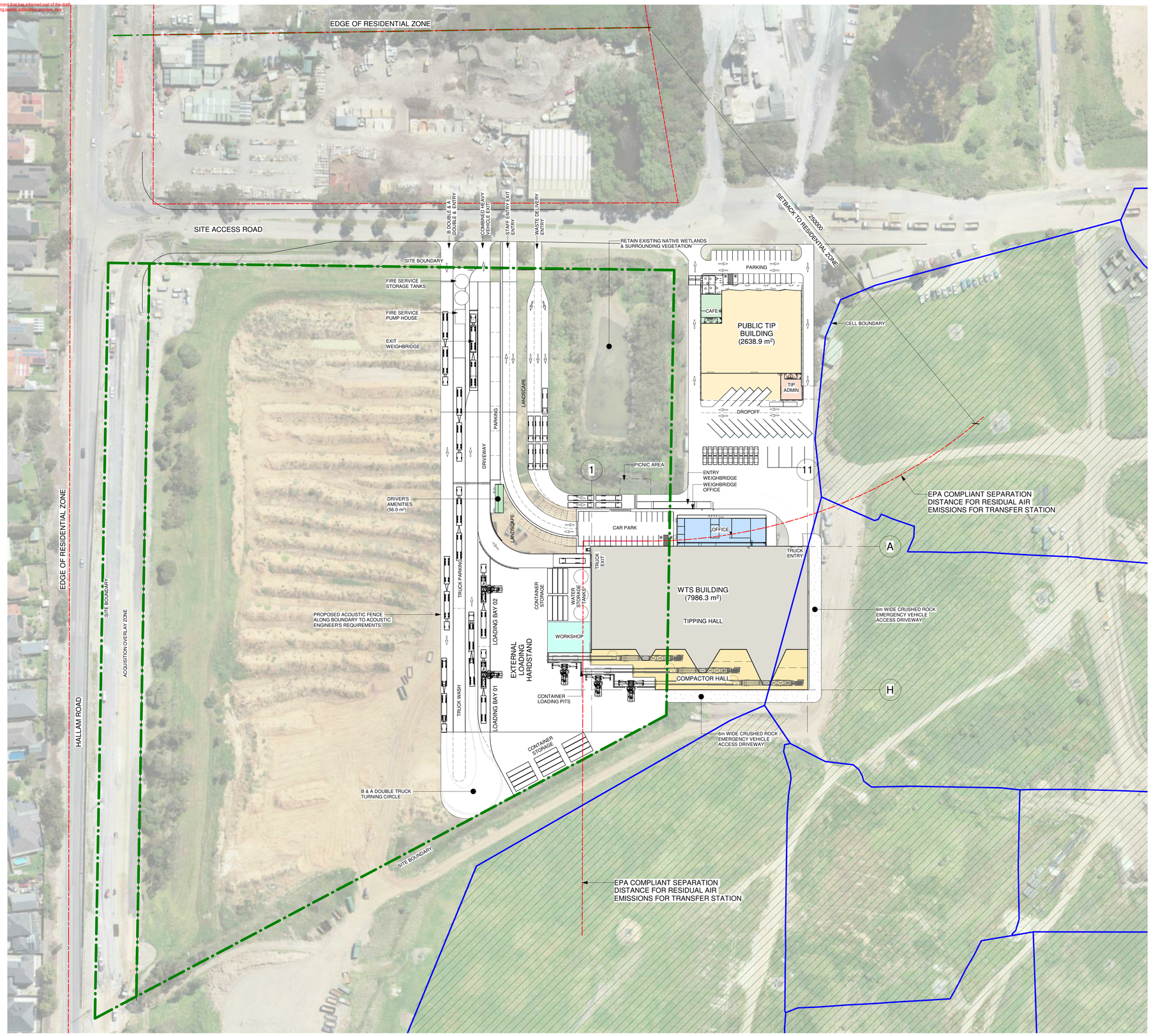
APPENDIX A

Site Layout



REV:	DETAILS	DATE	BY
P6	PRELIMINARY ISSUE	07/02/19	MC
P11	PRELIMINARY ISSUE	12/07/19	MC
P13	ISSUE FOR PRICING	26/07/19	AD
P14	DESIGN REVISIONS	16/12/19	IO
P15	PUBLIC AREA REVISIONS	24/02/20	AD
P16	ISSUE FOR CIVIL ENGINEERING	06/03/20	

PROJECT
HAMPTON PARK TRANSFER STATION

PROJECT NUMBER
1811

DRAWING NUMBER
A110

REVISION
P16

CLIENT
SUEZ RECYCLING & RECOVERY AUSTRALIA & NEW ZEALAND

DRAWING NAME
SITE PLAN

DRAWING STATUS
PRELIMINARY

NOT FOR CONSTRUCTION

SCALE
1 : 800 @ B1

DATE
05/03/20

DRAWN
MC/IO

davidson architecture
2/70 Kerr Street Fitzroy 3065
0415 12 57 56
ABN 29 600 077 487
ARBV Registration 51488
NSW Nominated Architect
Andrew Davidson 9345

APPENDIX B

Noise Monitoring Locations

APPENDIX C

TAPM Model Setup

Modelling of emissions was undertaken using AERMOD View Version 8.6[1] which provides a graphical interface for the USEPA AERMOD air dispersion model. The meteorological component of the model was created using The Air Pollution Model (TAPM) Version 4[2].

Further details on both components; meteorology and air dispersion, are presented in the following sections.

1.0 METEOROLOGICAL MODELLING

Due to the absence of continuous upper air meteorological observations for input into CALPUFF, the CSIRO meteorological and prognostic air pollution model, TAPM, was used to create the required data. The meteorological component of TAPM is an incompressible, optionally non-hydrostatic, primitive equation model with a terrain-following vertical co-ordinate for three dimensional simulations. The model is connected to "databases of terrain, vegetation and soil type, leaf area index, sea-surface temperature and synoptic –scale meteorological analysis for various regions around the world"[3]. These inputs were used to create a synthetic meteorological file for the period 1st January 2014 to 31st December 2018. TAPM output files were processed to extract meteorological data for the location of the Site and input into the pre-processor AERMET, for subsequent use in AERMOD.

1.1 TAPM model set up

Prognostic models, such as TAPM, solve the equations of atmospheric dynamics to produce physically realistic three-dimensional meteorological fields, such as wind, temperature, humidity, surface fluxes and boundary-layer structure. They are the models used in weather forecasting and climate research, and as a basis for dispersion modelling. Data from local climate stations are optional and local flows arise through the dynamic forcing simulated by the computational model. Larger-scale fields (up to global scale) are required for their initialization and ongoing boundary updates.

TAPM (Version 4.0.5) was used to generate synthetic meteorological data sets, which were pre-processed using CalTAPM software to create the meteorology data sets used by CALMET. TAPM is a PC-based model developed at CSIRO Marine and Atmospheric Research which is widely used throughout Australia for this purpose and is recognised by state regulatory authorities.

TAPM was run for the years 2014 to 2018 and initially configured with a nested model grid coverage designed to capture, broad scale synoptic flows, regional and broader scale sea breezes and land breezes, regional and broader wind channelling around terrain features and influence of land use.

The following TAPM setup was used:

- Outer grid resolution 10 km with nested grids of 3 km, 1 km and 0.3 km
- 41-by-41 horizontal grid points centred at the location of the required data point.
- 25 vertical levels
- Nine-second terrain height database

[1] Lakes Environmental, '*AERMOD View Version 8.6.0*'.

[2] CSIRO Marine and Atmospheric Research '*TAPM Version 4*', 2008.

[3] Hurley, Peter. TAPM V4. User Manual. CSIRO, Melbourne, 2008

- TAPM default databases for land use and sea surface temperature.

The parameters used for the model runs are shown in Table A1 and apply to the meteorological component of TAPM. The pollution dispersion components of TAPM have not been used. All other input parameters took default values. Graphical representations of the four grids are presented in **Error! Reference source not found.**.

Table A1: TAPM configuration parameters

Parameter	Value
Start and end dates	1 January 2014 – 31 December 2018
Grid Centre (Lat/Long, WGS84)	-38°3' N, 145°16' E
Grid Centre (UTM Co-ordinates [m])	(347790, 5786707) UTM zone 55
No. of grids	4
No. of horizontal grid points	41 x 41
Horizontal grid spacing	10 km, 3 km, 1 km, 0.3 km
No. of vertical levels	25 (up to 8000 m)
Monthly deep-soil moisture content (12 values)	0.15 m^3/m^{-3} (model default)
Topography	TAPM datasets
Vegetation and land use	TAPM datasets (manually adjusted with reference to aerial imagery)
Surface vegetation and precipitation processes	Included
Snow processes and non-hydrostatic processes	Excluded

APPENDIX D

Important Information Relating to this Report

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This document has been prepared on behalf of Veolia and is to be used as an informational background document that has informed part of the draft Hampton Park Hill Development Plan. The transfer station has not been approved and is subject to the planning permit application process. Any questions regarding the document should be directed to Veolia.

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