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Environmental Impact Statement

Elizabeth Drive Landfill Expansion

Prepared for:
SUEZ Recycling and Recovery Pty Ltd

July 2019

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Elizabeth Drive Landfill Expansion - Environmental Impact Statement

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Environmental Impact Statement

This Environmental Impact Statement (EIS) assesses the likely environmental impacts of the Project including the matters referred to in the Secretary's Environmental Assessment Requirements provided to the Applicant on 19 July 2018 under Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*.

Declaration

I certify that I have prepared the contents of this EIS in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* and *Environmental Planning and Assessment Regulation 2000* and that, to the best of my knowledge, the information contained in this report is not false or misleading.

Signature



Name

Jamie McMahon

Date

12 July 2019

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Executive Summary

The Project

SUEZ Recycling and Recovery Pty Ltd (SUEZ) owns and operates the Kemps Creek Resource Recovery Park at Badgerys Creek, NSW (the Site). The Site includes both the active landfill operation and the SUEZ Advanced Waste Treatment (SAWT) facility, which operates concurrently and independently of the landfill.

SUEZ proposes to increase the capacity of the existing Elizabeth Drive Landfill by raising the approved finished cap height by 15 metres, from Reduced Level (RL) 80 to RL 95 (the Project). SUEZ also propose to increase the filling rate of the landfill from a current rate of 750,000 tonnes per annum (tpa) to approximately 950,000 tpa. The increased landfill capacity would provide at least five and half years of additional operation, based on the increased rate of filling, extending final capping of the landfill from 2025 to 2031.

This Environmental Impact Statement (EIS) relates to the expansion and extension in duration of the landfilling operation only. The existing landfill currently receives non-putrescible general solid waste and restricted solid waste, which is not proposed to change under the Project. The operation of the SAWT is not included and would not be altered by the Project. The SAWT may continue to operate beyond the proposed closure date of 2031. Following the completion of capping the landfill would be closed and SUEZ would commence the 30 year aftercare phase.

AECOM Australia Pty Ltd have prepared this EIS for the Project on behalf of SUEZ. This EIS is intended to support a development application to be lodged with, and assessed by, Penrith City Council (PCC) prior to determination by the Sydney Western City Planning Panel under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This EIS has been prepared in accordance with the provisions of the EP&A Act and addresses the Secretary's Environmental Assessment Requirements (SEARs) for the Project, dated 20 July 2018.

Location of the Project

The Site is located in the suburb of Badgerys Creek, approximately 41 kilometres west of the Sydney Central Business District. The Site is within the Penrith Local Government Area and is accessed via the Site Access Road from Elizabeth Drive. The Site is 85 hectares, with the footprint of the Project occupying approximately 60 hectares, the SAWT facility 7 hectares, and the remainder of the Site being reserved for vegetation buffers and ancillary facilities (such as the landfill gas to energy system, administration offices, staff amenities, car parking, equipment maintenance workshop and weighbridge).

The surrounding area is currently comprised of primarily rural-residential and industrial land uses with smaller areas of residential and commercial development. The Site is approximately 600 metres from the construction site for Western Sydney Airport, which is driving a range of broad land use changes in the region. This includes changes in land use and the construction of infrastructure to support the airport such as the NSW Government's Western Sydney Aerotropolis and the proposed M12 and M9 Motorways (north and west of the Site).

Project justification

The Project is anticipated to extend operation of the landfill for at least five and half years, postponing the closure date from 2025 to 2031. The proposed increase in the total landfill capacity and subsequent extension of the landfill life would:

- support future demand for disposal of non-putrescible waste from the commercial and industrial and construction and demolition sectors in the Sydney Metropolitan Area
- delay the need for a new non-putrescible landfill to be commissioned within the greater Sydney area

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- provide a reliable disposal option for non-putrescible, general and restricted solid waste not able to be diverted for resource recovery
- support the construction of nearby major infrastructure projects, reducing transport needs and associated community and economic costs
- provide a final landform suitable for potential beneficial future economic and/or recreational uses (subject to separate planning approval)
- continue to support the operation of the landfill gas to energy system, contributing renewable energy to the National Electricity Market
- provide a continuation of local employment for existing staff for at least five and half years
- provide emergency waste disposal capacity for Sydney after 2025.

Benefits associated with the Project are relevant to SUEZ, its employees, the local area and region in general, particularly given the Site is the only publicly available restricted solid waste disposal site in New South Wales.

Consultation

A range of consultation activities have been undertaken to provide information about the Project to government agencies, the community and other stakeholders, and to support the development of this EIS. This included a community information event, face to face meetings with government and community stakeholders, consultation letters, notification in local newspapers, local area letter box drops, the provision of information on SUEZ' website and a dedicated project information line.

Consultation activities were broadly welcomed by all stakeholders. Particular issues raised by government stakeholders related to how the Project fits within the changing land use context, impacts it may have on future nearby infrastructure and environmental and amenity impacts. Community members considered the potential for odour, visual impact and traffic changes as matters to be to be addressed within the body of this EIS.

Environmental impact assessment

Land use

The surrounding area is currently comprised of primarily rural-residential and industrial land uses with smaller areas of residential and commercial development. The Site itself is industrial in nature, having been historically quarried and is now utilised solely for landfilling. Whilst the Project would prolong the life of the landfilling operation at the Site and alter the physical design of the final landform, the potential for the Project to alter the nature of the land use within the Site or its surrounds would be negligible.

The Site is located within an area subject to rapid land use change, driven primarily by the construction of Western Sydney Airport. This is expected to change the surrounding land use from rural land uses towards commercial and industrial land uses throughout the existing approved, and proposed extended, life of the landfill. The presence of the Project is not expected to influence or hinder this development due to the Project's low level of off-site impacts.

Overall the impact of the Project upon the existing and future use of surrounding land is considered to be negligible.

Landscape character and visual impact

Assessment of the Project's impact upon the landscape character and visual environment was undertaken based upon the existing nature of the surrounding environment and the raising of the final landform height by 15 m. Impacts upon the landscape character ranged between negligible to moderate based upon the additional bulk, height and shape of the final landform.

Visual impacts associated with the Project would range from low to medium-high, depending on the location of the receptor. Locations closer to the Site, such as Twin Creeks and the Badgerys Creek Road/Elizabeth Drive intersection, were would be subject to a greater degree of impact. These would

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be managed through maintenance of screening vegetation and appropriate vegetation management of the final cap.

Under a future land use scenario the landscape context of the Site would change dramatically. This would reduce the sensitivity of surrounding land uses, subsequently reducing the significance of both landscape character and visual impacts.

Air quality

Dust dispersion modelling shows that incremental dust impacts from the Project are relatively minor and are fairly typical for a landfilling operation such as the Project. The inclusion of background particulate matter levels pushes predicted cumulative concentrations higher, but the majority of days are still well below the respective dust fraction criteria.

The nature of the waste to be received at the landfill would continue to generally be non-odorous. Should odorous waste be deposited the implementation of measures such as covering of trucks and rapid covering of deposited waste would reduce the potential for impacts. Additionally the expansion of the landfill gas collection system and the continued combustion and flaring of landfill gas would minimise odour impacts.

The air quality assessment concluded that the Project would not result in significant air quality impacts.

Noise and vibration

The noise and vibration impact assessment identified that the Project would result in a change in noise level between the currently approved and proposed landfilling activity of only 1 dB(A) for any receiver. This represents a potential noise exceedance of SUEZ' Environment Protection licence (EPL) 4068 noise limits of up to 8 dB(A).

The Noise Policy for Industry (NPfI) outlines that exceedances of less than 2 dB(A) would not be discernible by the average listener and therefore does not warrant receiver-based treatments or controls. Exceedances between 3 and 5 dB(A) are considered by the NPfI to be marginal and are acceptable based upon the application of architectural treatments at affected receivers. Noise reduction berms were modelled to reduce noise impacts under both the interim and final landform scenarios. For the interim scenario, EPL noise limits were shown to be exceeded by 2 dB(A) at two receivers, and by 3 dB(A) at one receiver when winds are blowing towards the receiver and landfilling activities are taking place at the nearest edge of the Project Area. There are no exceedances during standard (calm) meteorological conditions.

Noise modelling of the final landform scenario indicated one exceedance of the EPL 4068 noise limits of 1 dB(A) under noise-enhancing meteorological conditions only. As outlined above, this exceedance is considered to be negligible and does not warrant further measures.

The forecast change in heavy vehicle trip volumes is minimal and would not cause any noticeable increase in existing road traffic noise in the vicinity of the Site.

Traffic and transport

The traffic and transport modelled the performance of Elizabeth Drive and the Site Access Road under existing conditions (2019), with and without the Project in 2025 and with the project in 2031. The number of additional trips predicted to be generated by the Project under the 'with project' scenarios was four two-way trips in the AM peak hour and twelve two-way trips in the PM peak hour.

The performance of intersections is typically measured in level of service (LoS), rated from A to F. LoS A indicates a well-functioning intersection within minimal delays, while LoS F indicates intersection failures.

The intersection modelling undertaken for the Project shows that the level of service (LoS) for vehicles exiting the Site Access Road is currently LoS F, with an average delay of between 2 and 5 minutes during the AM peak (worst case scenario conditions). This remains LoS F in 2025 with and without the project, with the 'with project' scenario resulting in an additional delay of approximately four to five minutes for vehicles exiting the Site Access Road. Under the 2031 'with project' scenario the intersection remains LoS F, with increased delays. Through traffic on Elizabeth Drive is unaffected under all scenarios and remains LoS A.

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Although the traffic modelling presents failures at the intersection, the impact that the Project would have on intersection performance is nominal. The modelling shows an increase in delay for a nominal increase in the number of trips generated by the Project. This is primarily largely due to forecast organic increases in background traffic growth to occur along Elizabeth Drive.

It is recognised that Elizabeth Drive is proposed to be upgraded by Roads and Maritime Services. This includes a new signalised intersection at Martin Road, 140 m east of the Site Access Road/ Elizabeth Drive intersection. This may present benefits for vehicles turning right out of the Site Access Road in that it will provide gaps when traffic stops for red lights.

Social and economic

The Project has the potential to result in a number of minor impacts to local amenity. These include very low level exceedances of noise and air quality thresholds for a small number of receptors, as well as broader landscape character and visual impacts to a large number of different receptors. Traffic impacts would be limited to the Site Access Road, with through traffic on Elizabeth Drive unaffected. Given the nature of the surrounding area and the scale of the impacts, amenity impacts were not expected to result in significant socio-economic impacts.

Similarly, the Project would not result in any substantial change in the nature of surrounding land use. As such, the socio-economic impact of changes to land use were deemed to be low.

Given the footprint would not change and its offsite impacts would be minimal, the Project would not be expected to alter the existing degree of community cohesion or change community values.

The Project would provide socio-economic benefit though the continuation of an important service to the broader Sydney region – a facility for the responsible and safe disposal of non-putrescible waste. The Project would not result in any distinct disadvantages or changes to local businesses and as such the Project is considered to result in a medium positive economic outcome.

Greenhouse gas

The Project would generate around 2,300,000 tonnes of CO2 equivalent (t CO2-e) of additional greenhouse gas (GHG) emissions compared with the baseline scenario due to the proposed extended life of the landfill. The annual landfill gas emissions (primarily comprised of methane) contribute the highest source of GHG emissions in both the baseline and Project scenarios (90% and 92% of the total emissions respectively). As a percentage of NSW greenhouse gas inventory for 2016, the Project would contribute 0.07%.

Although the total emissions and average annual emissions increase with the Project due to the proposed increase in waste disposal rate and the additional duration of landfilling, the emissions intensity of the Project scenario is lower than the Baseline scenario due to the proposed increase in total waste disposal quantity (approximately 4.8 million m3). Under this scenario landfill gas would continue to be captured and combusted for electricity generation, or flared. This scenario is considered more beneficial compared to the potential alternative of this waste being disposed of at a landfill facility that does not combust or flare landfill gas.

Hazards and risk

The main hazards presented by the Project are increased bush fire risk and the potential for impacts to future aircraft operations at Western Sydney Airport. A bush fire assessment undertaken for the Project indicated that existing bush fire protection measures including asset protection zones (APZs), access arrangements and firefighting equipment, would be sufficient for the minimisation of bush fire risk and enable ongoing protection of the facility.

Key potential hazards to aircraft overflying the site during operation of Western Sydney Airport would primarily relate to convection currents associated with the continued flaring of landfill gas and the possibility of bird strikes. The Project would not however alter the nature of landfill gas flaring or the location of stormwater dams, where most birds congregate on the site.

Landfill gas is currently combusted and flared on-site. This would continue during the prolonged filling operations at the landfill, and for several decades beyond final capping. Whilst no plume rise assessment has been undertaken, the potential for interference with aircraft operations is expected to be minimal.

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At present birds are generally restricted to the stormwater ponds located around the periphery of the Site. Upon capping, the Site would be managed in such a way as to discourage congregation of birds. This would include a specific grass mix, regular slashing to discourage groundcover and shrub layer vegetation and maintenance of on-site drainage. These measures would reduce the overall bird strike risk.

SUEZ has engaged with Western Sydney Airport on these topics and would continue to do so prior to the commencement of the airport's operation.

A preliminary risk screening undertaken for the Project indicated that the Project is not considered potentially hazardous. As such a preliminary hazard assessment was not required, as the potentially hazardous materials stored on site (diesel fuel) do not exceed the respective thresholds.

Other issues

Aboriginal and non-Aboriginal heritage

There are no recorded Aboriginal sites within the Project Area. It is therefore anticipated that the Project would present no additional impacts to items of Aboriginal heritage significance. Two items of local non-Aboriginal heritage significance were identified within one kilometre of the Site, however, it is not anticipated that the Project would result in any additional or new significant impacts upon the heritage value of either listed item.

Biodiversity

The Project does not include any changes to the existing footprint of landfilling activities within the Site and as such no additional vegetation is proposed to be cleared. Off-site ecological impacts associated with the extended duration of operation, increased rate of filling and increased cap height are expected to be minimal.

The nature of the grass mix on the final cap would be subject to consultation with Western Sydney Airport with a view to discouraging congregation of birds. This would not substantially alter the long term habitat value of the cap which would be low regardless of the grass mix.

Weeds within the Site would continue to be managed as per existing site management arrangements. Upon final capping regular slashing and targeted weed eradication would be undertaken as necessary to manage weeds in the long term.

Surface water, flooding and groundwater

Existing cell linings would remaining operational and the overall footprint of the landfill would remain as per the approved design, retaining the same overall rainwater catchment as present. As such the rate of leachate generated within the Project Area is expected to remain broadly consistent with current operations. The Project does not alter the operation of the existing leachate management controls in place to avoid groundwater interaction.

Appropriate erosion and sediment control measures would continue to be used throughout the extended life of the landfill, including diversional drains around operational landfill cells and ongoing maintenance and monitoring of all surface water basins. The final cap has been designed to drain to existing surface water dams which would continue to be managed to reduce off-site discharges. Overall, the Project is not expected to result in substantial changes to the existing water quality of surface water runoff during either operation or post closure.

The Updated South Creek Flood Study (Worley Parsons, 2015) indicates that no flood event of Badgerys Creek, up to and including the probable maximum flood (PMF), would be expected to reach any areas where landfilling has historically occurred. As such the Project would be carried out at a level above the PMF and would not contribute to potential flooding impacts in the wider area.

Soils, geology and contamination

The Site contains no natural surface soils due its extended history of quarrying and landfilling. Existing on-site management measures would continue to be applied to manage off-site soils impacts.

The Project would allow for an additional volume of waste material to be placed within the Project Area, having the potential to increase contamination impacts. Existing management measures would

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continue to be implemented to ensure that potential contamination is managed and offsite contamination is avoided.

Litter and illegal dumping

The Project would result in an increase in the duration of potential litter impacts occurring as part of the standard operation of the Site including from transportation of waste to the Site and from litter moved by wind or stormwater. This would continue to be managed by daily covering of waste, use of litter screens, moving the tipping area and suspension of operations in windy conditions.

Landfill Management

The Project would not affect existing waste operations at the landfill, other than prolonging them beyond the currently planned closure date of 2025.

Landfill gas and leachate have been considered with reference to the Project. Based on landfill gas modelling undertaken as part of the concept design the Project would increase landfill gas generation by an average of 40%. This would continue to be managed in accordance with the existing landfill gas management system.

The results of Hydrologic Evaluation of Landfill Performance (HELP) modelling undertaken for the Project demonstrate that the Project would not significantly affect the total leachate generation from the capped landfill. This would result in leachate generation consistent with the current scenario.

Justification and conclusion

The Site plays an important strategic role in Sydney's waste disposal network, removing the requirement to transport significant quantities of waste elsewhere within the State, involving considerable logistical effort and costs.

The Project has been designed to meet landfill industry practice and in a manner that suitably manages impacts on the surrounding environment. This includes consideration of both on site and off site impacts, such as visual impact, stormwater management, noise, air quality and traffic. The project has also considered the nature of operations throughout the extended life of the landfill including the final capping and continued management and combustion of landfill gas. The design of the final cap has been prepared in such a way as to allow for a range of (as yet undetermined) future uses.

This EIS provides a comprehensive assessment of the Project and its relevant environmental issues under both existing and future land use scenarios. Potential impacts have been assessed and strategies to avoid, minimise and mitigate those impacts form a key part of the Project. This EIS includes a number of commitments to manage environmental impacts during the Project, which are largely consistent with the measures already in place at the Site.

This EIS has concluded that the Project should proceed as it would:

- Result in no significant long term adverse impacts to the environment or local community
- Provided a range of relevant mitigation measures and commitments that would govern the responsible and appropriate implementation of Project activities
- Ensure the ongoing availability of landfill space to meet the demand driven by the ongoing development of infrastructure, housing and businesses in Sydney
- Meet the objectives of the Project
- Satisfy the principles of Ecologically Sustainable Development as described in the EP&A Regulation.

On the basis of the findings detailed within this Environmental Impact Statement, the Project is considered to be justified and is recommended to proceed subject to consent.

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Glossary and Acronyms

Acronym	Meaning
ABS	Australian Bureau of Statistics
ADC	Alternative daily cover
AEMR	Annual Environmental Monitoring Report
AHIMS	Aboriginal Heritage Information Management System
ANEC	Australian Noise Exposure Concept
ANEF	Australian Noise Exposure Forecast
ANL	Australian Native Landscapes
APZ	Asset protection zone
AQIA	Air Quality Impact Assessment
ARI	Annual Recurrence Interval
ASC	Australian Soil Classification
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity development assessment report
BoM	Bureau of Meteorology
C&D	Construction and demolition
C&I	Commercial and industrial
CBD	Central Business District
CRG	Kemps Creek Landfill Community Reference Group
CSSI	Critical State Significant Infrastructure
DA	Development Application
DCP	Development Control Plan
DoEE	Commonwealth Department of Environment and Energy
DoS	Degree of Saturation
DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
ENM	Excavated natural material
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPI	Environmental planning instrument
EPL	Environment Protection Licence
ERA	Environmental risk assessment
ESD	Ecologically Sustainable Development
GHG	Greenhouse gas

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Acronym	Meaning
GSW	General solid waste
GLVIA 3	*Guidelines for Landscape and Visual Impact Assessment 2013*
HDPE	High density polyethylene
HELP	Hydrologic Evaluation of Landfill Performance
HIPAP 6	*Hazardous Industry Planning Advisory Paper No. 6 Guidelines for Hazard Analysis*
ISEPP	*State Environmental Planning Policy (Infrastructure) 2007*
LCZ	Landscape character zones
LEMP	Landfill Environmental Management Plan
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
LUIIP	Land use and infrastructure implementation plan
LVIA	Landscape and Visual Impact Assessment
MW	Megawatt
MNES	Matters of Natural Environmental Significance
NCA	Noise Catchment Area
NGER	National Greenhouse and Energy Reporting
Non-putrescible	Waste that does not contain organic matter
NPfI	Noise Policy for Industry
NVIA	Noise and Vibration Impact Assessment
OEH	NSW Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OLS	Obstacle Limitation Surface
PCC	Penrith City Council
PCEMP	Post-Closure Environmental Management Plan
Penrith DCP 2014	*Penrith Development Control Plan 2014*
Penrith LEP 2010	*Penrith Local Environmental Plan 2010*
PHA	Preliminary hazard analysis
PMF	Probable Maximum Flood
PMST	Protected Matters Search Tool
POEO Act	*Protection of the Environment Operation Act 1997*
Project Area	The active landfill area at the Elizabeth Drive Landfill and the area subject to increased capping height.
Project	Increase the capacity of the existing landfill by raising the currently approved finished height by 15 metres, from RL80 to RL95
Putrescible	Solid waste that contains organic matter capable of being decomposed by microorganisms

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Acronym	Meaning
RBL	Rating Background Noise Level
RID	Regional illegal dumping
RSW	Restricted solid waste
RL	Reduced Level
Roads and Maritime	NSW Roads and Maritime Services
SAWT	Suez Advanced Waste Treatment
SEARs	Secretary's Environmental Assessment Requirements
SEPP 33	*State Environmental Planning Policy No. 33 - Offensive and Hazardous Development*
SEPP 55	*State Environmental Planning Policy No. 55 - Remediation of Land*
Site	Existing Elizabeth Drive Landfill at Badgerys Creek
Site Access Road	The road connecting the Site to Elizabeth Drive
SMA	Sydney Metropolitan Area
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
SSD	State Significant Development
SSI	State Significant Infrastructure
SUEZ	SUEZ Recycling and Recovery Pty Ltd
TDS	Total Dissolved Solids
TfNSW	Transport for NSW
the Community Plan	*Penrith Council Community Plan 2017*
the District Plan	*Western City District Plan 2018*
the existing landfill	Elizabeth Drive Landfill
the Region Plan	Greater Sydney Region Plan 2018
the Strategy	*Penrith City Strategy 2017*
the Quarry	Badgerys Creek Quarry
TSP	Total suspended particles
TSS	Total suspended solids
TTIA	Traffic and Transport Impact Assessment
tpa	tonnes per annum
VENM	Virgin excavated natural material
WARR Act	*Waste Avoidance and Resource Recovery Act 2007*
WARR Strategy	*Waste Avoidance and Resource Recovery Strategy 2014-2021*
WM Act	*Water Management Act 2000*
WSA	Western Sydney Airport
WSEA SEPP	*State Environmental Planning Policy (Western Sydney Employment Area) 2009*
ZTV	Zone of theoretical visibility

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Chapter 1

Introduction

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1.0 Introduction

1.1 Project overview

SUEZ Recycling and Recovery Pty Ltd (SUEZ) owns and operates the Kemps Creek Resource Recovery Park at Badgerys Creek, NSW (the Site). The Site includes both the active landfill operation, the SUEZ Advanced Waste Treatment (SAWT) facility and a landfill gas to energy system, which operate concurrently and independently of the landfill.

SUEZ projects that future demand for waste disposal within the Sydney area will continue for several years, at a minimum. This will be driven by rapid growth of both the immediate area of Badgerys Creek (with the construction of major transport and employment infrastructure), as well as across greater Sydney more generally. As such SUEZ proposes to increase the capacity of the existing Elizabeth Drive Landfill by raising the currently approved finished cap height by 15 metres, from RL 80 to RL 95 (the Project).

The Project would provide an additional landfill airspace capacity of approximately 4.8 million cubic metres and extend the life of the landfill by at least five and a half years at the disposal rate of 950,000 tonnes per annum (tpa). The existing landfill currently receives non-putrescible general solid waste and restricted solid waste, which is not proposed to change under the Project. The Project would apply to the landfill only (the Project Area).

The Project does not include any alteration to the continued operation of the existing SAWT facility within the Site. The landfill gas to energy system would not be expanded, though would operate for a greater duration based on the increased volume of waste deposited.

AECOM Australia Pty Ltd has prepared this Environmental Impact Statement (EIS) for the Project on behalf of SUEZ. This EIS is intended to support a development application (DA) to be lodged with, and assessed by, Penrith City Council (PCC) prior to determination by the Sydney Western City Planning Panel under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This EIS has been prepared in accordance with the provisions of the EP&A Act and addresses the Secretary's Environmental Assessment Requirements (SEARs) for the Project, dated 20 July 2018.

1.2 The proponent

The proponent of the Project is SUEZ Recycling and Recovery Pty Ltd. SUEZ, founded in 1858, is an international water and waste resource management company and a leader in resource recovery, providing integrated waste management and resource recovery solutions throughout Australia.

Headquartered in France, with over 80,000 employees and activities across five continents and 70 countries SUEZ recover over 14 million tonnes of waste to create secondary raw materials and energy. Globally SUEZ supplies:

- 92 million people with drinking water
- 65 million with sanitation services
- 52 million people with waste collection services

SUEZ' Australian operations commenced in 1984 as Pacific Waste Management, prior to being rebranded as SITA in 2001 and unified under one global brand, SUEZ, in 2015. SUEZ employs over 2,600 employees in Australia specialising in recycling and recovery, water and treatment solutions and oil and gas systems. SUEZ in Australia:

- Supplies 7 million people with drinking water
- Diverts 880,000 tonnes of waste from landfill annually
- Operates over 850 collection vehicles
- Manages 100 waste management facilities nationally

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- Provide reliable waste services to more than 56,000 commercial customers and 3.7 million households weekly

SUEZ' key areas of expertise include:

- Recycling and recovery:
  - Waste collection: residential kerbside and business collection
  - Resource recovery and materials recycling: recycling and recovering valuable resources back into the economy
  - Organics: conversion of green organic waste into a range of composts, mulches and soil blends
  - Alternative fuels: SUEZ was the first company in Australia to convert commercial, industrial and construction waste into alternative fuel
  - Energy from waste: producing electricity and heat from waste facilities
  - Engineered landfills: disposal of waste that cannot be recycled or reused, is disposed safely and securely within engineered landfills.
- Water and treatment solutions:
  - Drinking water: operation of 26 water plants supplying 7 million Australians with drinking water
  - Desalination: operation of two desalination plants in Australia
  - Wastewater treatment and re-use: from residential sewage through to polluted groundwater from heavy industry
  - Biosolids management: assisting customers to reduce, eliminate or recycle biosolids using various 'sludge' treatment methods
  - Water networks: complete water network management services for water authorities and communities through to remote mining operations.
- Oil and gas systems:
  - Process solutions: providing solutions for the oil and gas sector to process resource in a sustainable and efficient manner.

1.3 Existing consents

Several concurrent consents operate within the Site as discussed in **Chapter 2**. Of direct relevance to the Project is Development Application 451/89 (DA 451/89), and subsequent modifications for the operation of a non-putrescible waste landfill.

If approved, the consent would provide for ongoing landfilling activities and would replace or modify the operation of elements of DA 451/89 (as modified). A review of existing conditions of consent for DA 451/89 (as modified) was undertaken in order to determine relevant conditions for the Project and propose potential changes to conditions to include in the new conditions of consent for this DA. The result of this review is provided in **Chapter 20**.

The SAWT facility and landfill gas to energy system in the northwest of the Site are the subject of separate consents as discussed in **Chapter 2**. These facilities would continue operating under their existing consents and would not be affected by the Project.

A cumulative impact assessment has been undertaken (**Chapter 18**) to assess the potential cumulative impacts the Project may have on other approvals on the Site including the SAWT facility and the landfill gas to energy system. It is anticipated that these facilities would continue to operate in accordance with existing consent and licence conditions throughout the Project.

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1.4 Environmental Impact Assessment Process

1.4.1 Scope of this EIS

This EIS has been prepared to support a DA for the Project. The EIS document provides a detailed outline of the environmental constraints, opportunities subsequent impacts and mitigation measures associated with the Site and the Project respectively.

In June 2018 the proponent provided a request for SEARs to the NSW Department of Planning and Environment (DPE). SEARs were issued on 20 July 2018 in accordance with Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). The SEARs are outlined in **Table 1.1** below, with relevant cross references included indicating where each requirement has been addressed within this EIS.

The SEARs identified both general requirements and key issues which must be addressed in the EIS. These key issues include:

- Strategic context
- Suitability of the Site
- Waste management
- Hazards and risk
- Air quality
- Noise and vibration
- Soil and water
- Traffic and transport
- Biodiversity
- Fire and incident management
- Visual
- Heritage.

The SEARs also outlined requirements for consultation with relevant NSW Government agencies, other stakeholders and the community.

In addition to the SEARs, further requirements for consideration within the EIS were identified through the consultation process undertaken for the Project. These are summarised in **Chapter 6**.

The key issues identified in the SEARs and during the consultation process were investigated through targeted assessments undertaken by specialists in their fields, in line with relevant guidelines and assessment requirements. The range of assessments undertaken on behalf of the Project have been used to identify relevant management and mitigations measures, and to inform the justifications and conclusions of this EIS.

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Table 1.1 SEARs

SEARs	Where addressed in this EIS
General Requirements	
The Environmental Impact Statement (EIS) must meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.	**Chapters 7 - 18**
Key Issues	
• **strategic context** – including: - a detailed justification for the proposal and suitability of the site for the development; - a demonstration that the proposal is consistent with all relevant planning strategies (including the Western City District Plan), environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies; and - a list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out. - a description of how the proposed expansion integrates with existing on-site operations; and - a description of any additional licence(s) or approval(s) required to carry out the proposed development.	**Chapters 2 - 5**
• **suitability of the site** – including: - details of all development consents and approved plans for the existing facility, including for all structures, plant and equipment; and - a detailed justification that the site can accommodate the proposed landfill, having regard to the scope of the operations of the existing facility and its environmental impacts and relevant mitigation measures.	**Section 1.3, Chapter 2**
• **waste management** – including: - details of the type, quantity and classification of waste to be received at the site; - details of waste handling including, transport, identification, receipt, stockpiling and quality control; and - the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*.	**Chapter 3**
• **hazards and risk** – including: - a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33* (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis* (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011); and - an assessment of the risk of bushfire, including addressing the requirements of *Planning for Bush Fire Protection 2006* (RFS). Any proposed Asset Protection Zones must not adversely affect environmental objectives (e.g. buffers). Provision is to be made for their appropriate management into the future.	**Chapter 15**

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SEARs	Where addressed in this EIS
• **air quality** – including: - a description of all potential sources of air and odour emissions; - an air quality impact assessment in accordance with relevant Environment Protection Authority guidelines; and - a description and appraisal of air quality impact mitigation, management and monitoring measures.	**Chapter 10**
• **noise and vibration** – including: - a description of all potential noise and vibration sources during construction and operation, including road traffic noise; - a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines; and - a description and appraisal of noise and vibration mitigation, management and monitoring measures.	**Chapter 11**
• **soil and water** – including: - a description of local soils, topography, drainage and landscapes; - details of water usage for the proposal including existing and proposed water licencing requirements in accordance with the *Water Act 1912* and/or the *Water Management Act 2000*; - details of sediment and erosion controls; - a detailed site water balance; - an assessment of potential impacts on the quality and quantity of surface and groundwater resources; - details of the proposed stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts; and - a description and appraisal of impact mitigation, management and monitoring measures.	**Chapter 3, Sections 16.3 and 16.4**
• **traffic and transport** – including: - details of road transport routes and access to the site; - road traffic predictions for the development during construction and operation; and - an assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development	**Chapter 12**
• **biodiversity** – including: - accurate predictions of any vegetation clearing on site or for any road upgrades; - a detailed assessment of the potential impacts on any threatened species, populations, endangered ecological communities or their habitats, groundwater dependent ecosystems and any potential for offset requirements; - details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies; and - a detailed description of the measures to avoid, minimise, mitigate and offset biodiversity impacts.	**Section 16.2**
• **fire and incident management** – including: - an assessment of bushfire risks and asset protection zones (APZ) in accordance with NSW Rural Fire Service guidelines; and - technical information on the environmental protection equipment to be installed on the premises such as air, water and noise controls, spill clean-up equipment and fire (including location of fire hydrants and water flow rates at the hydrant) management and containment measures.	**Chapter 15**

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SEARs	Where addressed in this EIS
• **visual** – including an impact assessment at private receptors and public vantage points.	**Chapter 9**
• **heritage** – including Aboriginal and non-Aboriginal cultural heritage.	**Section 16.1**
Environmental Planning Instruments and other policies	
The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to: • *State Environmental Planning Policy (Infrastructure) 2007*; • *State Environmental Planning Policy No 33–Hazardous and Offensive Development*; • *State Environmental Planning Policy No 55–Remediation of Land*; • *Penrith Local Environmental Plan 2010*; and • relevant development control plans and section 94 plans.	**Chapter 5**
Guidelines	
During the preparation of the EIS you should consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at planning.nsw.gov.au under Development Proposals/Register of Development Assessment Guidelines. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development.	**Noted**
Consultation	
During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the: • Environment Protection Authority; • Office of Environment and Heritage; • Department of Primary Industries; • Roads and Maritime Services; • Rural Fire Service; • Penrith City Council; and • the surrounding landowners and occupiers that are likely to be impacted by the proposal. Details of the consultation carried out and issues raised must be included in the EIS.	**Chapter 6**

1.4.2 Preparation and exhibition

The objectives of this EIS are to:

- Comply with the requirements of the EP&A Act and EP&A Regulation as formalised in the SEARs
- Address the requirements of key stakeholders as identified in the SEARs and during the consultation process for the Project
- Provide PCC and the Sydney Western City Planning Panel with sufficient information to assess the potential environmental impacts, confirm the management and mitigation measures proposed and understand the benefits of the Project
- Inform the community about the Project. A full account of the community and stakeholder consultation process undertaken up to lodgement of this DA is included in **Chapter 6**.

This EIS has been prepared in accordance with the requirements outlined in clauses 6 and 7 of Schedule 2 of the EP&A regulations, which describe the form and content required of an EIS.

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It is expected that this EIS will be placed on exhibition for public review for a minimum period of 28 days, in accordance with clause 8 of Schedule 1 of the EP&A Act.

1.4.3 Assessment and determination

Following exhibition of the EIS, PCC will provide SUEZ with any submissions, or a summary of the submissions, received from the community or other government agencies during the exhibition period. SUEZ may then be required to provide a written response to the submissions that have been received, including detail on how issues raised have been addressed.

1.5 Structure of this EIS

The EIS is structured as follows:

- Chapter 1: Introduction to the EIS
- Chapter 2: A description of the Site and Project Area including location, land ownership, existing land use, surrounding land use and information on the existing operations of the existing landfill facilities and approvals
- Chapter 3: A description of the Project
- Chapter 4: A strategic justification for the Project
- Chapter 5: Information on the statutory framework
- Chapter 6: A summary of the community and stakeholder consultation that has occurred during the preparation of the EIS
- Chapter 7: Identification and prioritisation of environmental issues and format of assessment chapters
- Chapters 8 to 16: Assessment of specific environmental issues. These include:
  - Land use
  - Landscape and visual
  - Air quality
  - Noise
  - Traffic and transport
  - Social and economic
  - Greenhouse gas
  - Hazard and risk
  - Other issues.
- Chapter 17: A description of landfill management practices to be undertaken during the Project
- Chapter 18: Cumulative impact assessment
- Chapter 19: Proposed environmental management and monitoring for the Project, and a compilation of proposed management and mitigation measures
- Chapter 20: Revised conditions of consent, including proposed modifications and additions to the conditions of consent for DA 451/89
- Chapter 21: Conclusion and justification for the Project, including an overall evaluation of the Project with regard to social, economic and environmental considerations and the results of the environmental impact assessment
- Chapter 22: References.

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Chapter 2

Site context and background

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2.0 Site context and background

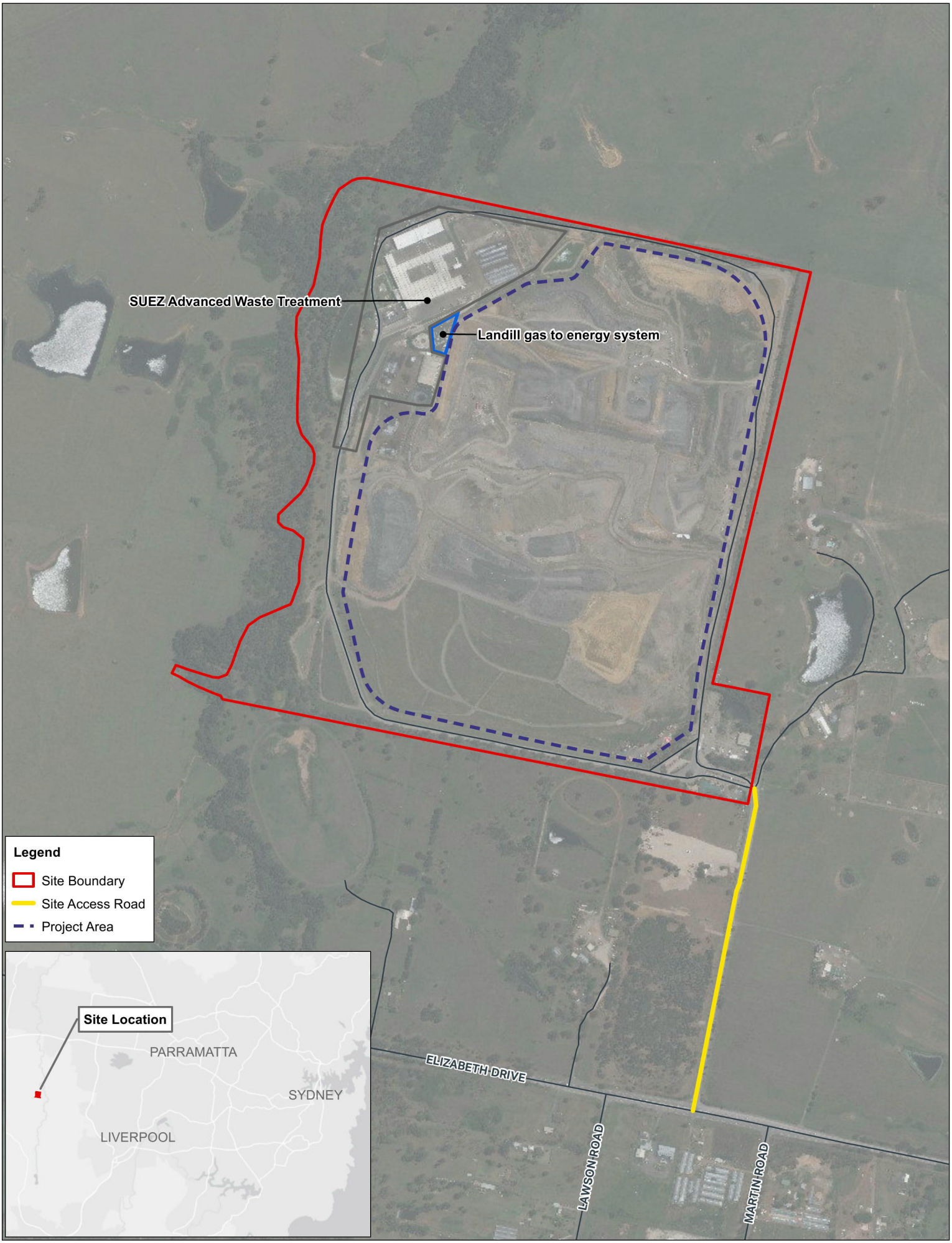
2.1 Project location and ownership

The Site is located in the suburb of Badgerys Cree, approximately 41 kilometres west of the Sydney Central Business District (CBD). The Site is within the Penrith Local Government Area (LGA) to which the *Penrith Local Environmental Plan 2010* (Penrith LEP 2010) applies. The Site is accessed via the Site Access Road from Elizabeth Drive, and is shown in **Figure 2.1**.

The Site is located on approximately 85 hectares of land owned by SUEZ, and is described as Lot 740 of DP810111 and Lot 1 of DP542395. Of the 85 hectares, the Project Area covers an area of approximately 60 hectares, the SUEZ Advanced Waste Treatment (SAWT) facility covers an area of approximately seven hectares, and the remainder of the Site is reserved for buffers and other facilities (such as the landfill gas to energy system, administration offices, staff amenities, car parking, equipment maintenance workshop and weighbridge). The Project is proposed to be contained wholly within the boundary of the existing landfill (i.e. within the Project Area). The existing consent and continued operation of the SAWT and landfill gas to energy system would not be affected by the Project.

Under the Penrith LEP 2010, the Site is primarily zoned as RU2 Rural Landscape. An area along the western boundary of the Site, adjacent to Badgerys Creek, is zoned as E2 Environmental Conservation. An overview of the Site layout and land zoning is provided in **Figure 2.2** and **Chapter 5** of this EIS.

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SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 2.1: SITE LOCATION

AECOM

suez

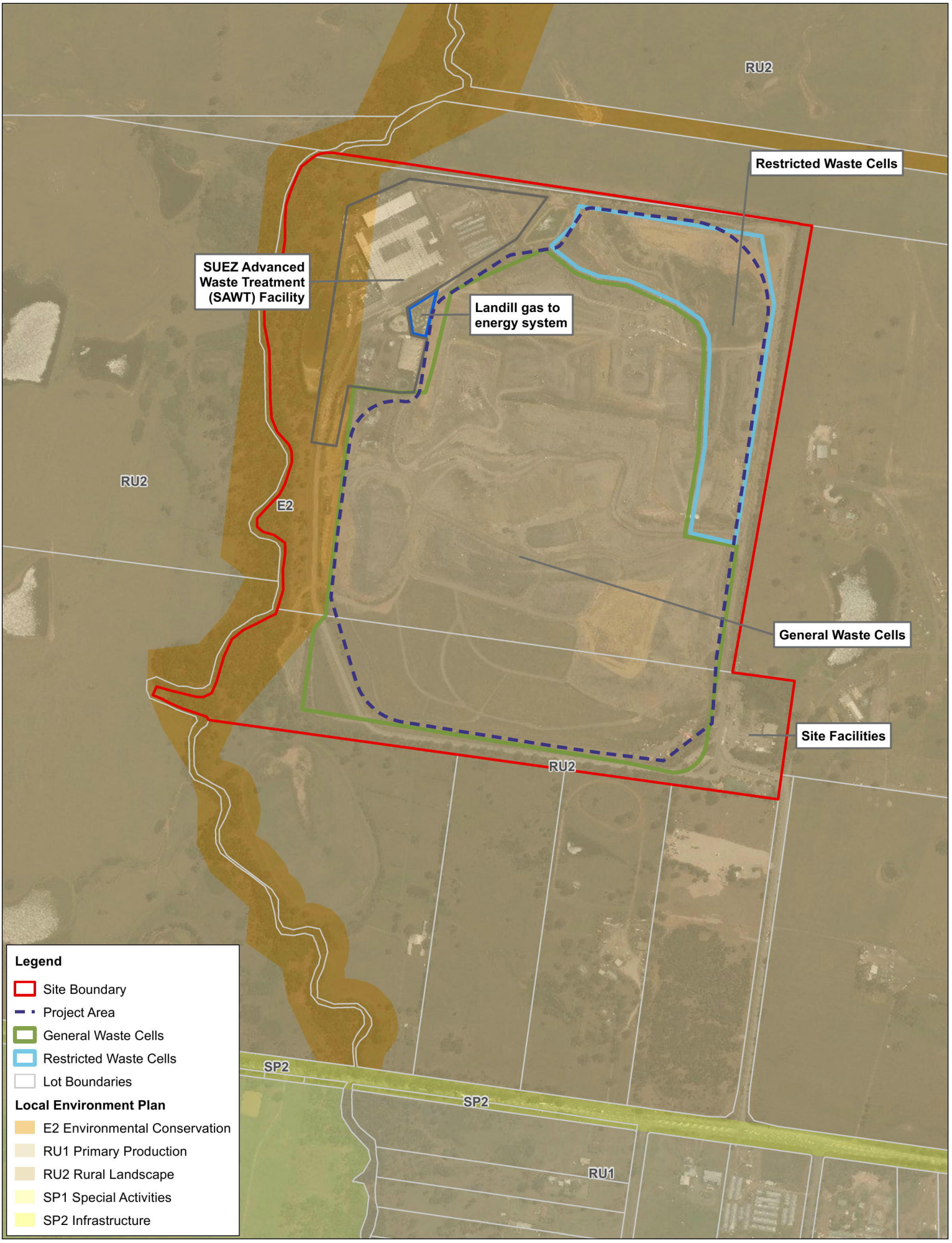
0 50 100 200 m

N

Disclaimer Spatial data used under licence from Land and Property Management Authority, NSW © 2018. Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
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DATE	10/07/2019
SCALE	1:8,604
PROJECT	60571292
DRAWN	CP

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SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 2.2: SITE LAYOUT AND ZONING

0 50 100 200 m

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DATE	10/07/2019
SCALE	1:8,000
PROJECT	60571292
DRAWN	CP

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2.2 Surrounding land uses

2.2.1 Existing land uses

The Site is located in the suburb of Badgerys Creek in western Sydney. The area is comprised of primarily rural and industrial land uses with smaller areas of residential and commercial development. This includes a variety of agricultural production including the growing of fruits and vegetables and grazing activity, as well as intensive poultry farming. Industrial activities include metal fabrication, landfilling and quarrying, particularly for brick manufacture.

The Site is accessed via Elizabeth Drive which provides a direct connection east to the M7 Motorway and the greater Sydney region, and west to The Northern Road.

Immediately north of the Site is a 300 metre wide preferred corridor for the proposed M12 Motorway (to be reduced to 150 metres following detailed design). The M12 Motorway is proposed to connect the M7 Motorway to the future Western Sydney Airport, and onwards to The Northern Road (refer to **Figure 2.3** and **section 2.2.2**).

The following section provides an outline of the dominant land uses surrounding the Site.

North of the Site

- Immediately adjacent to the Site is “Fleurs”, rural land owned by the University of Sydney. This land includes the preferred corridor alignment for the proposed M12 Motorway
- Further to the north is the Twin Creeks residential estate, located approximately 650 metres from the boundary of the Site. Within the estate is the Twin Creeks Golf and Country Club, the clubhouse of which is located approximately 2.6 kilometres from the Site boundary
- The twin Warragamba Pipelines are located approximately 3.4 kilometres from the Site. These pipelines connect Warragamba dam to the Prospect water filtration plant, supplying around 80% of Sydney’s water supply.

West of the Site

- The waterway of Badgerys Creek forms the western boundary of the Site. This waterway forms part of the Hawkesbury-Nepean River System. A vegetated buffer is maintained along much of the length of Badgerys Creek
- McGarvie-Smith Farm, owned by the University of Sydney is located beyond Badgerys Creek. The property consists predominantly of cleared open agricultural land with a number of existing farm dams
- Further west is Luddenham Road which joins Elizabeth Drive. Continuing west, Elizabeth Drive terminates at The Northern Road.

South of the Site

- Several rural residential properties are located immediately south of the Site, which consist of vegetated and cleared lands. These properties consist of rural residences, livestock grazing, horse training and other waste management facilities
- The above properties front Elizabeth Drive, which runs in an east-west direction, approximately 500 metres south of the Site boundary
- Beyond Elizabeth Drive are numerous small to medium agricultural properties, including activities such as grazing, arable farming, intensive poultry farming and plant nurseries. The Australian Native Landscapes (ANL) composting facility and Boral Brickworks are located further to the south along Martin Road

East of the Site

- Located along the immediate eastern boundary of the Site is Kingsfield Stud and the waterway of South Creek
- Further east are agricultural and residential properties within the suburbs of Kemps Creek, Mount Vernon and Cecil Park, approximately 2.5, 4.5 and seven kilometres away respectively

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- Elizabeth Drive intersects with Mamre Road to the east, with Elizabeth Drive continuing east and providing access to the Westlink M7 Motorway and beyond to Liverpool.

2.2.2 Future land uses

The surrounding area is the subject of a number of significant proposed future infrastructure items and broad land use changes. Primary amongst these is the approved Western Sydney Airport, whose closest boundary is located approximately 600 metres to the south west of the Site (**Figure 2.3**). Stage 1 of the Western Sydney Airport was approved in December 2016, with construction commenced in late 2018. The airport is expected to open in December 2026.

Surrounding the airport, as well as the Site, is the Western Sydney Aerotropolis. This area extends to the north and south of the site and is earmarked for commercial and industrial development to support and complement the proposed 'aerotropolis[1]'.

Immediately to the north and west of the site is the proposed M12 motorway corridor. This motorway is proposed to connect the Westlink M7 Motorway to Western Sydney Airport and The Northern Road. The environmental assessment of the M12 Motorway is currently being prepared. If approved, the project is proposed to commence construction in the early 2020s.

Connecting to the M12 Motorway, and extending further north and south, is the proposed M9, Outer Sydney Orbital Motorway. This would connect to the M31 Hume Motorway south of Sydney and extend to Box Hill in the north. The development of this road is in the very early stages, with the alignment of the corridor currently subject to extensive community consultation. There is potential that the corridor may be substantially altered before the final project is subject to environmental assessment.

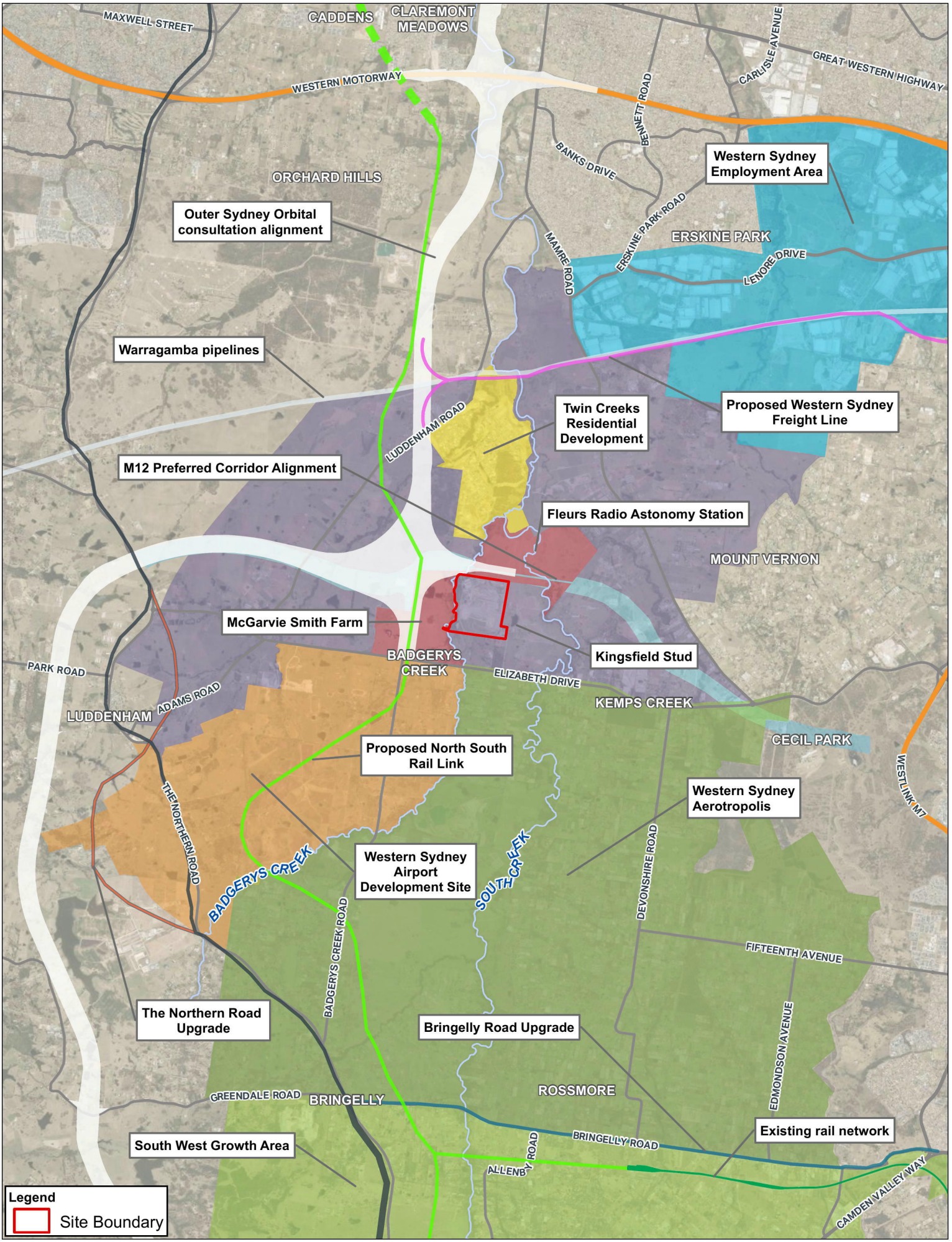
Also to the west is the proposed North-South Rail Link. This line would link the North West Growth Area, Western Sydney Airport, and the South West and Greater Macarthur Growth Areas. It would also support future town centres proposed in the region.

Further north is the Western Sydney Employment Area. This area has been established by the NSW Government to provide businesses in the region with land for industry and employment, including transport and logistics, warehousing and office space. The Western Sydney Employment Area is located approximately 50 kilometres from the Sydney CBD and aims to give these businesses access to roads and utility services in proximity to the Western Sydney Airport. Development in the Western Sydney Employment Area is governed by the *State Environmental Planning Policy (Western Sydney Employment Area) 2009* (refer to **Chapter 5**).

It is expected that Elizabeth Drive will be subject to an upgrade prior to the opening of Western Sydney Airport. This is expected to result in two lanes in each direction on this road, with capacity for later widening to three lanes in each direction. The precise timing of this project is not known, however Roads and Maritime Services have commenced consultation on the early design.

[1] Western Sydney Airport Community Update - Issue 2, 2018, Department of Infrastructure Regional Development and Cities

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SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 2.3: SURROUNDING LAND USES

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2.3 Existing facilities and approvals

The Site has a history of quarrying and landfilling of voids with waste materials. A summary history of the Site is provided in **Table 2.1**.

Table 2.1 History of the Site

Date	History
Pre 1990	A quarry known as the Badgerys Creek Quarry was operated for extracting clay, shale, sandstone and laminate
1990 – 2001	In 1990 PCC issued approval for a landfill. This allowed for backfilling of the voids with general solid waste (non-putrescible), restricted waste, asbestos waste and waste tyres Operation of the quarry continued within the landfill footprint
2001 – 2008	The landfill was issued with an Environment Protection Licence (EPL) with respect to managing all landfill environmental operations. Infilling of voids continued with general solid waste (non-putrescible), restricted waste, asbestos waste and waste tyres Quarrying operations continued within the landfill site Re-zoning of the landfill occurred in 2007 to allow waste treatment as a permissible use
2008 – Present	The SAWT facility was constructed and commenced operations under a separate consent to the landfill. The SAWT was designed to separate and treat putrescible waste materials for production of saleable compost materials. Subsequent consent modifications have been issued to allow for increased capacity and upgrades to the SAWT over time A landfill gas to energy system was approved and installed. This was constructed and is operated under a separate consent to the main landfill Landfill operations continue consistent with the requirements of the original consent (as modified) and EPL Quarrying operations continue however material is no longer being exported from the Site

2.3.1 Existing activities

Current consented activities and facilities within the Project Area include:

- Landfill: accepting an average of approximately 750,000 tpa of non-putrescible waste per year into the existing general solid waste and restricted solid waste cells
- Excavation: approximately two million cubic metres of shale and clay of which 0.8 million cubic metres is stockpiled on site for future use
- Gas management infrastructure to capture and destroy landfill gas
- Stormwater dams and leachate tanks
- Ancillary buildings including administration, maintenance workshops, car and truck parking areas and weighbridge.

Other activities and facilities at the Site not relating to the Project Area include:

- SAWT facility: processing approximately 134,000 tpa including green and food waste for recycling and composting

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- Landfill gas to energy system: two 1.4 megawatt (MW) generators powered by landfill gas

The Site operates in accordance with the consented hours of operation detailed in **Table 2.2**.

Table 2.2 Existing operational hours

Activity	Day	Hours
Landfill receipt of waste	Monday - Friday	6am - 6pm
	Saturday	7am - 5pm
	Sunday and Public Holidays	8am - 5pm
Landfill quarrying and compaction	Monday - Friday	7am - 6pm
	Saturday	7am - 5pm
	Sunday and Public Holidays	8am - 5pm
SAWT waste receipt, outdoor operations and product dispatch	Monday - Friday	6am - 6pm
	Saturday	8am - 5pm
	Sunday	8am - 4pm
	Public Holidays	7am - 4pm
SAWT indoor operations	Monday - Saturday	7am - 11pm

Landfilling

Landfilling activities currently comprise two landfilling methods to contain different classes of waste. General waste cells are located approximately in the centre and west of the Project Area and receive general solid waste (non-putrescible). Waste cells located along the northern and eastern boundaries of the Project Area receive restricted solid waste.

General solid waste (non-putrescible) includes:

- Glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal
- Paper or cardboard
- Household waste from municipal clean-up that does not contain food waste
- Waste collected by, or on behalf of, local councils from street sweepings
- Grit, sediment, litter and gross pollutants collected in, and removed from, stormwater treatment devices and/or stormwater management systems, that has been dewatered so that they do not contain free liquids
- Grit and screenings from potable water and water reticulation plants that has been dewatered so that it does not contain free liquids
- Garden waste
- Wood waste
- Waste contaminated with lead (including lead paint waste) from residential premises or educational or child care institutions
- Containers, previously containing dangerous goods, from which residues have been removed by washing or vacuuming
- Drained oil filters (mechanically crushed), rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and do not contain free liquids
- Drained motor oil containers that do not contain free liquids
- Non-putrescible vegetative waste from agriculture, silviculture or horticulture

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- Building cavity dust waste removed from residential premises or educational or child care institutions, being waste that is packaged securely to prevent dust emissions and direct contact
- Synthetic fibre waste (from materials such as fibreglass, polyesters and other plastics) being waste that is packaged securely to prevent dust emissions, but excluding asbestos waste
- Virgin excavated natural material
- Building and demolition waste
- Asphalt waste (including asphalt resulting from road construction and waterproofing works)
- Cured concrete waste from a batch plant
- Fully cured and set thermosetting polymers and fibre-reinforcing resins
- Fully cured and dried residues of resins, glues, paints, coatings and inks and
- Any mixture of the wastes referred to above.

Restricted waste includes wastes assessed and classified as such according to Part 1 of the NSW Environmental Protection Agency's (EPA) Waste Classification Guidelines (EPA 2014). These guidelines specify certain tests for contaminants, including their potential to leach out into the surrounding environment. Wastes often classified as restricted solid waste include contaminated soils and sediments.

It should be noted that the landfill does not, and has no plans to, accept waste classified as putrescible or hazardous.

2.3.2 Development Application DA 451/89 – operation of a non-putrescible waste landfill

In 1990, PCC approved a DA for the "continued operation and backfilling of Badgerys Creek Quarry" (the Quarry). The date that the quarry commenced operation is not known, though is likely to have been a decade or more prior to 1990. Backfilling of the void created by the quarrying activity with solid, non-putrescible waste was, at the time, deemed to be the most effective method of rehabilitation of the site.

The Quarry was approved subject to a range of compliance conditions, and continued to operate in accordance with the consent and its conditions. The consent allowed for continued extraction of clay, shale, sandstone and laminate, with progressive rehabilitation through backfilling quarried areas with solid, non-putrescible waste. The intention was for the Quarry to be rehabilitated to a vegetated landscape consistent with the surrounding environment after quarrying had ceased and rehabilitation was completed.

Since its original approval in 1990, DA 451/89 has been modified five times in accordance with Section 4.55 (previously section 96) of the EP&A Act. Details of these applications and consents are provided in **Chapter 7**.

This EIS seeks to obtain additional development consent for the Site to allow for expanded landfilling activities. While previous development consents obtained under DA 451/89 and subsequent modifications would not be surrendered, it is intended that the development consent, if approved, for the Project would outline conditions to regulate the ongoing operation of this Site as a landfill. A review of existing conditions of consent for DA 451/89 (as modified) is provided in **Chapter 20**. This review analyses the existing conditions including their intent and scope, and provides suggested updates to regulate the existing operation whilst allowing for the implementation of the Project, in a manner that is compatible with other active consents within the Site.

2.3.3 Major Project Approval MP 06-0185 – SAWT facility

In 2007, the Site was rezoned to permit a waste treatment facility as a permissible use on the Site. The rezoning was approved by the then Minister for Planning and gazetted on 16 February 2007.

Major Project Approval (MP 06-0185) under Part 3A of the EP&A Act was granted in April 2008 for the construction of the SAWT facility. At full capacity, the SAWT facility is capable of treating up to 134,400 tpa of waste, comprising up to 120,000 tpa of municipal solid, commercial, industrial and green waste plus up to 14,400 tpa of biosolids from sewage treatment plants.

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The SAWT facility has been in operation since 2009. Approximately 55% of incoming material delivered to the SAWT is diverted from putrescible landfill.

2.3.4 Development Application DA 12/0515 for Gas to Energy Platform and Gas Collection System

SUEZ (then SITA) submitted a DA to PCC for two 1.4 MW generators within the Site, which was approved in May 2013. The generator operates on a supply of landfill gas from the landfill at a rate of 750 cubic metres per hour. A minor modification was approved in August 2016 under section 4.55 (previously section 96) of the EP&A Act for minor upgrades to the facility. Power generated by the landfill gas to energy system is used to power the SAWT facility, with excess power being delivered to the electricity network.

2.4 Environmental management and monitoring

2.4.1 Landfilling

Management of activities at the existing landfill is currently undertaken in accordance with the Landfill Environmental Management Plan (LEMP). The LEMP specifies goals and principles, management strategies, management and monitoring activities and frequencies, performance indicators and targets, responsibilities and reporting and review requirements for:

- Surface water management
- Leachate management
- Landfill gas management
- Odour control
- Dust control
- Litter control
- Noise control
- Pest, vermin and noxious weed control
- Emergency preparedness.

Monitoring activities incorporating surface water, groundwater, subsurface gas migration, dust, noise, leachate, and weather conditions are undertaken in accordance with the EPL (4068) for the Site.

2.4.2 Other activities

The SAWT facility operates separately from the landfill under its own Operational Environmental Management Plan (OEMP) and EPL (12889). The Project would not require modification to the OEMP or EPL conditions for the SAWT facility.

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Chapter 3

Project description

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3.0 Project description

The Project involves raising the currently approved finished height of the landfill from Reduced Level (RL) 80 to RL 95. The raising would occur fully within the existing landfill footprint. Specific aspects of the Project are described further below.

If approved, the new DA would replace parts of DA 451/89 (as modified). SUEZ does not propose to surrender the consent for DA 451/89. It is SUEZ's intention that the consent for the Project would regulate the ongoing use of the Site for landfilling activities whilst the existing consent continues to operate for parts of the Site not subject to this DA. A review of the consolidated conditions of consent from DA 451/89 has been undertaken to determine the conditions considered relevant to the proposed expansion and ongoing operation of the Project (refer to **Chapter 20**).

The Project would not alter or affect the continuing operation of the separate consents that apply to the Site for the landfill gas to energy system (DA 12/0515); or the consent for the SAWT (MP 06_0185).

The approximate capital value of the Project is $2 million. This relates only to the additional value of activities specifically supporting the increased final cap height of the landfill and extended operation for approximately five and a half years.

3.1 Landfill re-profiling

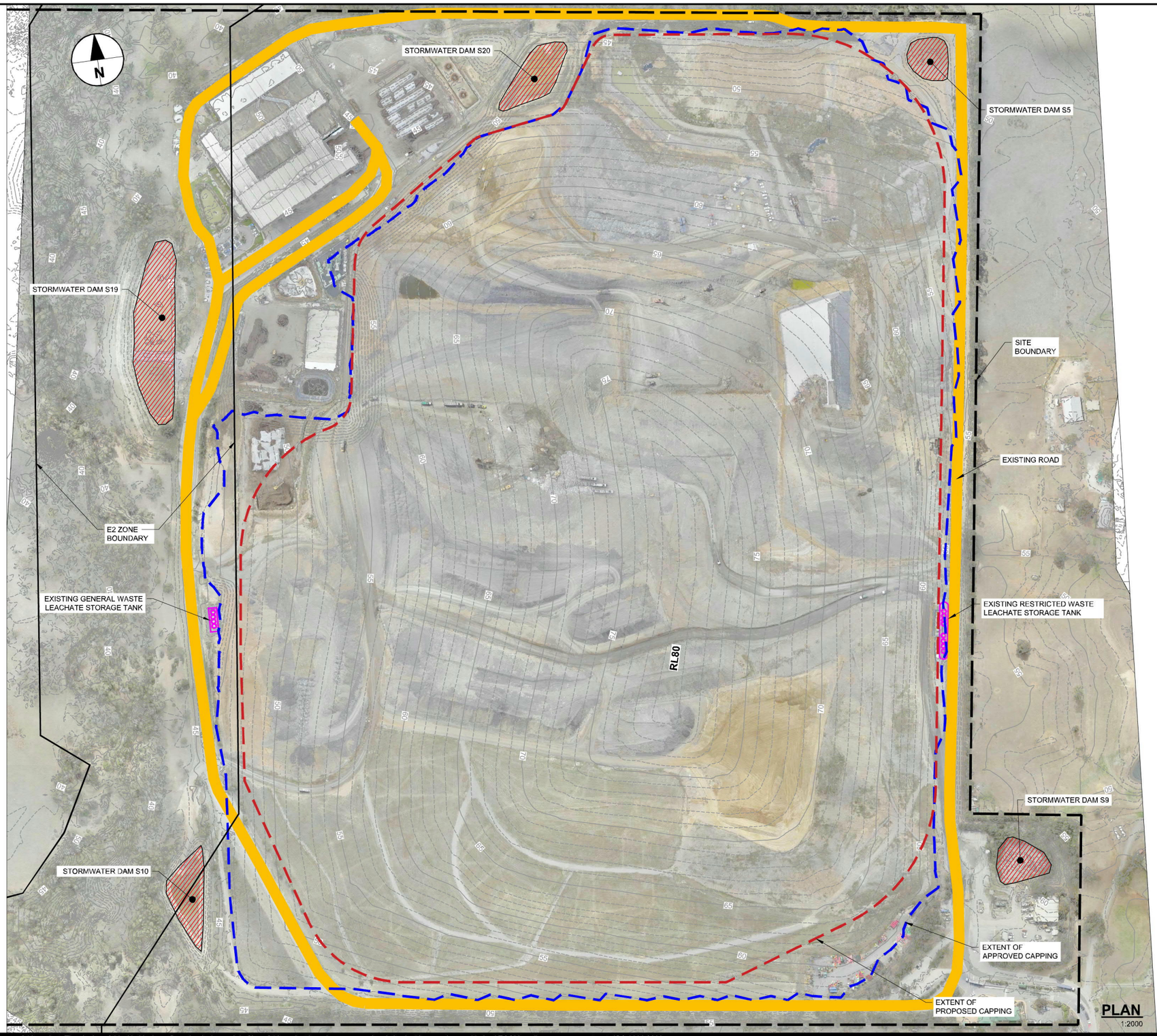
The existing landfill currently operates as a regional landfill accepting non-putrescible general solid waste and restricted solid waste. These activities operate under consent DA 451/1989, as modified. This consent allows SUEZ to landfill to an approved final landform with a maximum final cap height of RL 80.

The Project involves raising the final cap height of the landfill from RL 80 to RL 95, wholly within the current footprint of the active landfill. The revised landform would include increased gradients on batter slopes, interspersed with horizontal benches for the management of drainage. The batter slopes between the benches would be design at a pre-settlement vertical to horizontal gradient of 1:3.5, allowing for post-settlement slopes of 1:4. The gradient of the upper portion of the cap would be approximately 1:20 (5%).

Figure 3.1 and **Figure 3.2** illustrate the nexus between the approved height limit and the Project height limit, the gradient of batter slopes, the location and frequency of benches and the contours of the upper cap. As indicated in the drawings, the revised landfill batter slopes have been designed to integrate with the current landform of the Site.

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ISO A1 594mm x 841mm



LEGEND:

- EXISTING GROUND CONTOURS MAJOR (5m)
- EXISTING GROUND CONTOURS MINOR (1m)
- PROPOSED DESIGN CAP CONTOURS MAJOR (5m)
- PROPOSED DESIGN CAP CONTOURS MINOR (1m)
- SITE BOUNDARY
- EXTENT OF APPROVED CAPPING
- EXISTING ROAD
- EXISTING STORMWATER POND
- EXISTING LEACHATE STORAGE TANKS
- EXTENT OF PROPOSED NEW CAPPING
- EXTENT OF FUTURE PARKING/STORAGE AREA
- EXTENT OF APPROXIMATE CATCHMENT
- EXTENT OF STAGE FILLING BOUNDARY
- PROPOSED ROAD
- DIRECTION OF SHEET FLOW
- BENCH DRAIN
- SLOPE / SWALE DRAIN

NOTE:

EXISTING GROUND SURVEY IS A COMBINED SURVEY BASED ON SEPT 2018 SURVEY AND CURRENT APPROVED CAPPING SURFACE.

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A.B.N 20 093 846 925
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PROJECT

SUEZ BADGERYS CREEK LANDFILL EXPANSION PROJECT

CLIENT

SUEZ

0 50 100 m
1:2000

PROJECT MANAGEMENT INITIALS		
QL		
DESIGNER	CHECKED	APPROVED

PROJECT DATA			
DATUM	AHD	SURVEY	MGA 56

ISSUE/REVISION		
B	04.02.2019	FINAL DRAFT REVISED
A	01.11.2018	FINAL DRAFT
I/R	DATE	DESCRIPTION

PROJECT NUMBER

60571292

SHEET TITLE

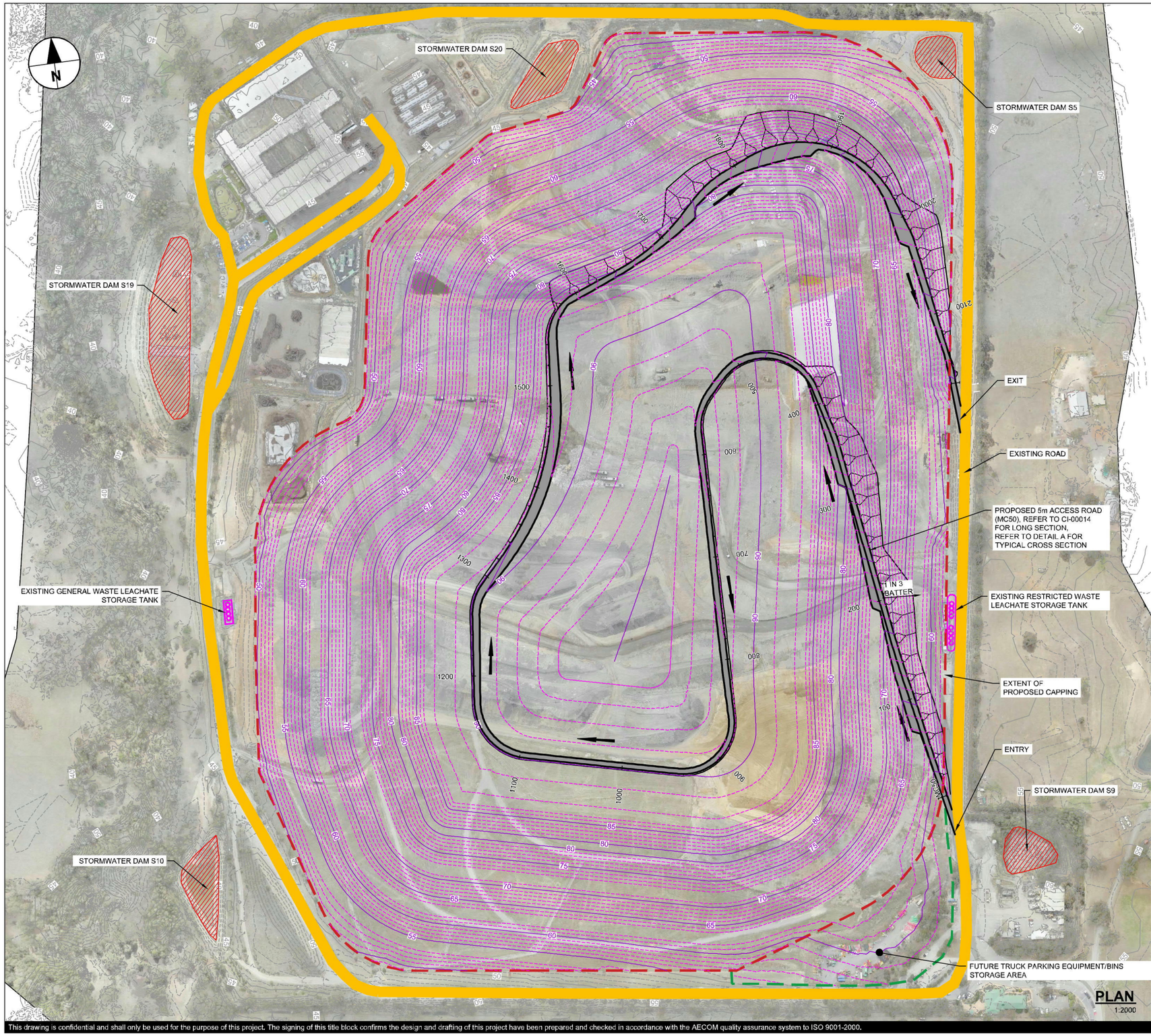
BADGERYS CREEK LANDFILL APPROVED FINAL LANDFORM

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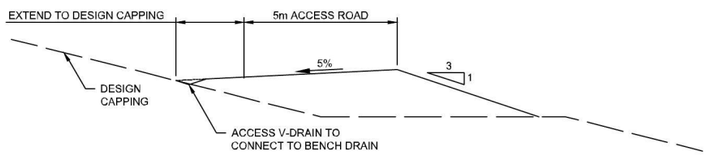
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PLAN
1:2000

LEGEND:

- EXISTING GROUND CONTOURS MAJOR (5m)
- EXISTING GROUND CONTOURS MINOR (1m)
- PROPOSED DESIGN CAP CONTOURS MAJOR (5m)
- PROPOSED DESIGN CAP CONTOURS MINOR (1m)
- SITE BOUNDARY
- EXTENT OF APPROVED CAPPING
- EXISTING ROAD
- EXISTING STORMWATER POND
- EXISTING LEACHATE STORAGE TANKS
- EXTENT OF PROPOSED NEW CAPPING
- EXTENT OF FUTURE PARKING/STORAGE AREA
- EXTENT OF APPROXIMATE CATCHMENT
- EXTENT OF STAGE FILLING BOUNDARY
- PROPOSED ROAD
- DIRECTION OF SHEET FLOW
- BENCH DRAIN
- SLOPE / SWALE DRAIN



TYPICAL ACCESS ROAD DETAILS
NTS

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PROJECT

SUEZ BADGERYS CREEK LANDFILL EXPANSION PROJECT

CLIENT

SUEZ

0 50 100 m
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PROJECT MANAGEMENT INITIALS

QL		
DESIGNER	CHECKED	APPROVED

PROJECT DATA

DATUM	AHD	SURVEY	MGA 56

ISSUE/REVISION

B	04.02.2019	FINAL DRAFT REVISED
A	01.11.2018	FINAL DRAFT
I/R	DATE	DESCRIPTION

PROJECT NUMBER

60571292

SHEET TITLE

BADGERYS CREEK LANDFILL
PROPOSED FINAL ACCESS ROAD
ON PROPOSED FINAL LANDFORM

SHEET NUMBER

60571292-SHT-CI-00013

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The 15 metre increase in final cap height would provide an additional landfill airspace capacity of approximately 4.8 million cubic metres and extend the life of the landfill by approximately five and a half years, based on a proposed filling rate of 950,000 tpa.

Within the southern part of the Project Area the landfill has already been capped and a landfill gas collection system installed. As outlined in the concept design, this part of the Project Area would also be subject to an increase in height. Works would include the removal of the existing cap, additional filling, new batter slopes and reinstallation of the gas collection infrastructure, as the Project progresses.

Landfilling would occur in a manner that ensures the ongoing integrity of the lining of existing landfill cells. Leachate would continue to be collected as per existing arrangements, with leachate from general solid waste cells to be collected separately from that of restricted waste cells.

It should be noted that the approved landfill cap partially occupies the E2 Environmental Conservation land use zone along the riparian corridor of Badgerys Creek to the west of the Site. Whilst the operation of a landfill is prohibited within the E2 zone, the approved landfill design pre-dates the establishment of this zone and as such is deemed an existing use. The proposed (raised) final cap surface within RU2-zoned land has been designed to integrate with the consented (lower) cap surface within the E2-zoned land in a manner that optimises environmental and engineering outcomes for elements such as visual amenity, surface water management and constructability, among others.

As outlined above, the proposed increased cap height would be RL 95. For operational reasons and prior to finalisation of the cap it will be necessary to temporarily place stockpiled quarried material on or near the top of the cap. These temporary stockpiles would not exceed 10 metres (or RL 105) and would be removed prior to final capping of the landfill.

It is recognised that the flight path of the future Western Sydney Airport would pass partially over the Site. As with all airports in Australia, land uses under the approach and take-off flight paths are restricted through the establishment of an Obstacle Limitation Surface (OLS). The OLS sets a maximum height for development so as to not interfere with aircraft under both typical and non-typical landing and take-off scenarios. At its lowest point over the site the OLS for Western Sydney Airport, based upon current runway design, is RL 120. The temporary stockpiles and final capping layer would be well within this limit. A preliminary hazards analysis for the operation of aircraft overflying the Site is provided in **Chapter 15**.

3.1.1 Landfill operation

Landfilling operations would generally be undertaken in a manner consistent with the current practices and as outlined in the existing LEMP for the Site.

The landfill currently accepts, on average, approximately 750,000 tpa of non-putrescible general solid waste and restricted solid waste. It is envisaged that this rate of filling would increase to take into account changes in the volume of waste being generated and disposed of in NSW and the broader industry capacity to receive the waste. Under the Project approximately 950,000 tpa of non-putrescible general solid waste and restricted solid waste is expected to be received during the remaining life of the landfill.

Waste would continue to be deposited, spread and compacted in layers. At the end of each working day, or when practicable, exposed waste surfaces would be covered with tarps and/or virgin excavated natural material (VENM) or excavated natural material (ENM) to reduce environmental impacts such as the escape of litter and dust etc, in compliance with the EPL, Daily cover material generally comprises approximately 150 millimetres of VENM, ENM or an approved alternative.

To optimise the use of landfill space and facilitate efficient leachate drainage, cover material would be removed as far as practicable prior to the placement of additional/new waste. Any cover removed in this manner would be stockpiled for reuse as required.

The existing protocols for the acceptance of restricted solid waste and asbestos contaminated special waste would remain unchanged. All restricted solid waste would continue to be disposed within the existing restricted waste cells, with asbestos contaminated special waste continuing to be deposited in general solid waste cells. As per existing practices, all current waste handling and disposal procedures

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(including for asbestos waste) would continue in accordance with the relevant guidelines and legislation.

At present the Site is accessed by vehicles transporting waste via a 700 metre long sealed access road from Elizabeth Drive. Vehicles enter the Site and are weighed on the weighbridge. Vehicles are then directed to the Project Area where waste is deposited in the relevant cell and the vehicle is weighed again when exiting. Disposal fees are levied according the net weight of the deposited material. This process would remain in place during the proposed extended life of the landfill. A second weighbridge will be commissioned in 2019.

3.1.2 Landfill construction and leachate

The approved existing design for the lining of the general solid waste cells includes a 900 millimetre compacted clay lining, protection geotextile, leachate drainage layer (including 300 millimetre gravel with leachate pipes) and a separation geotextile above the leachate drainage layer.

The approved existing design for the lining of the restricted waste cells includes an expanded 1000 millimetre compacted clay primary lining, a leakage detection drainage geocomposite and a two millimetre high density polyethylene (HDPE) geomembrane on the base. This is further augmented by a protection geotextile, a leachate drainage layer (including 300 millimetre gravel with leachate pipes), and a separation geotextile above the leachate drainage layer. The Project does not propose any changes to the existing approved landfill cell designs (general or restricted).

Leachate refers to liquid draining through the landfill cells. The source of most leachate is rainwater falling on the site, though some may originate from the deposited waste itself.

Leachate is currently separated based on the category of landfill cell in which it originates. Leachate originating from the restricted waste cells is extracted from the landfill and contained within leachate storage tanks near the eastern boundary of the Site, with a combined capacity of 200,000 litres. Leachate leakage detection sumps are installed to ensure any escape of leachate from the restricted waste cells is rapidly identified. Leachate from general waste cells is extracted from the landfill and contained within leachate storage tanks near the western boundary of the Site, with a combined storage of 100,000 litres.

The Project seeks only to alter the final cap height of the landfill. The overall footprint of the landfill would remain as per the currently approved design, and therefore the overall rainwater catchment would remain unchanged. As such the rate of leachate generated on site is expected to remain broadly consistent with current operations and no changes to the leachate collection, storage or management regime are proposed. Raised areas will be progressively capped to minimise leachate generation through rainfall.

As the overall catchment size of the Site would not change no additional surface water would be expected to be generated by the new design. As such no changes in the number, size or location of existing approved surface stormwater basins are required.

The landfill cap would be progressively constructed and stabilised as soon as practicable after reaching final landform levels.

The general waste cell cap would comprise the following layers (from top to bottom):

- 100 mm topsoil to support grass growth
- 300 mm revegetation layer
- 500 mm subsoil layer
- 600 mm low permeability clay barrier or equivalent
- 300 mm seal bearing layer.

The restricted waste cell cap would comprise the following layers (from top to bottom):

- 100 mm topsoil to support grass growth
- 1000 mm revegetation layer (which would comprise approved thickness of compost from SAWT)
- 300 mm drainage aggregate

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- Geosynthetic clay liner
- 600 mm re-compacted clay placed in layers with a maximum thickness of 300 mm
- 450 mm bearing layer consisting of intermediate and daily cover

It is anticipated that capping material would be predominantly sourced from material stockpiled during historic quarrying activities within the Site or imported from suitable external sources if required.

At a minimum the final cap would be rehabilitated with grass cover to encourage binding and stabilisation of the soil. This process has already been implemented successfully for the existing capped parts of the landfill along the southern boundary of the landfill.

Additional landfill gas collection infrastructure would be installed and connected to the existing system progressively as the cap extends across the Site. This element of the Site would continue as per the existing consent for this facility and does not form part of the Project. The Project would not lead to any increase in the amount of landfill gas currently flared or combusted at the Site, though it would increase the duration of this activity based upon at amount of additional waste deposited at the Site under the Project.

3.1.3 Plant, buildings and equipment

As the Project would not change the nature of landfilling operations, existing landfill equipment would continue to be used. This includes landfill compactors, dozers, excavators, dump trucks, graders, rollers, water carts and road sweepers.

Supporting buildings and structures such as the weighbridge, on-site utilities, administration building, workshop and leachate management systems would remain as per current operations.

The existing landfill gas collection infrastructure would remain in operation and be extended as required throughout the extended life of the landfill. Landfill gas would continue to be used by the on-site landfill gas to energy system to supply power to the SAWT facility and the electricity grid. As per existing arrangements, the landfill gas infrastructure would continue to operate after the final cap has been installed.

3.1.4 Workforce

The Project would not alter the number of people currently employed at the site. The Project would however provide for an additional five and a half years of activity (approximately) which would extend the duration of employment accordingly, guaranteeing ongoing employment in the region. Any potential increase in future workforce associated with additional tonnage and capping works would be minor and is not considered significant.

3.2 Operating hours

The Project would not alter the existing operating hours of the Site. The existing operating hours for landfilling activities are outlined in **Table 3.1**.

Table 3.1 Current operating hours

Activity	Day	Operating Hours
Landfill receipt of waste	Monday - Friday	6am - 6pm
	Saturday	7am - 5pm
	Sunday and Public Holidays	8am - 5pm
Landfill quarrying and compaction	Monday - Friday	7am - 6pm
	Saturday	7am - 5pm
	Sunday and Public Holidays	8am - 5pm

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3.3 Future use

3.3.1 Site closure and post-landfill use

Following the completion of capping the site would be closed and the aftercare phase would commence. SUEZ is committed to this aftercare period for a minimum of 30 years, during which time it is expected that vast majority of settlement would have taken place.

Key elements of the aftercare period would be:

- Maintenance of the integrity of the cap, including vegetation cover and drainage. This activity will be important for managing leachate generation and landfill gas collection in the long term, as well as for maintaining the landscape and visual character of the Site
- Ongoing collection and management of leachate
- Ongoing maintenance of stormwater infrastructure, including drains, basins, pipes and pumps
- Maintenance of roads and access tracks
- Regular inspection and reporting on the integrity of the cap and any emerging issues within the capped landfill.

As outlined above, the landfill gas to energy system would continue to remain in operation during and beyond the proposed extended life of the landfill. The ongoing operation of this element is largely dependent on the rate of gas production from the landfill which would continue for several decades after capping.

The Project does not propose any change to the future land use of the capped site. There is the potential however that alternative land uses may be proposed at some point in the future, particularly once the landfill has settled. Any specific proposal in this regard would be the subject of a separate environmental assessment and approval at the time, as necessary. At a minimum, any future use would be planned around the continuation of maintenance and safety management relating to the integrity of the landfill cap and leachate/gas infrastructure.

A range of potential future land uses are considered in **Chapter 8**. This EIS does not commit to any of these as part of the Project and provides these only as an indication of the potential for the adaptive reuse of the land – the economic and community value of which is expected to rise significantly in line with surrounding future development.

3.3.2 Responsibilities

SUEZ would maintain responsibility for the Site following closure. In line with the closure plan requirement of the EPL, SUEZ must prepare and submit to the EPA a closure plan within twelve months prior to the last load of waste being deposited. Closure responsibilities would likely include monitoring and management of landfill gas and leachate.

The responsibility for management of any alternative beneficial use of the final cap would be the subject of separate negotiations between SUEZ and any other relevant party.

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Chapter 4

Strategic project justification

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4.0 Strategic project justification

This chapter describes the strategic need and justification for the Project. It also describes the alternatives that were considered and assessed during the Project development process.

4.1 Project need

The Elizabeth Drive Landfill currently accepts an average of 750,000 tpa of non-putrescible general solid waste and restricted solid waste and is anticipated to be operational until 2025. The proposed increase in the total landfill capacity and subsequent extension of the landfill life is required to:

- meet future demand for disposal of non-putrescible waste from the commercial and industrial (C&I) and construction and demolition (C&D) sectors across the Sydney Metropolitan Area (SMA)
- provide a reliable disposal option for non-putrescible, restricted and special waste not able to be diverted for resource recovery
- provide emergency waste disposal capacity for Sydney after 2025.

4.1.1 Non-putrescible waste disposal options in Sydney and NSW

General Solid Waste (non-putrescible)

The *Australian National Waste Report 2016* (REC and Blue Environment, 2017) stated that in 2014-15 NSW generated approximately 11,609,000 tonnes of waste from the C&I and C&D sectors[1]. Of this volume 3,999,000 tonnes or 35% was disposed of to landfill.

Elizabeth Drive Landfill currently accepts on average 750,000 tpa of non-putrescible general solid waste and restricted solid waste, which represents a significant portion (approximately 20%) of the waste disposed to landfill in 2016 by the C&I and C&D sectors.

Within the SMA, Elizabeth Drive Landfill is one of six operational non-putrescible landfill sites which accept waste from the C&I and C&D sectors. There are a number of other landfills within the SMA which accept non-putrescible waste however these are restricted primarily to council-managed wastes.

The five other landfills in the Sydney Basin include:

1. Veolia landfill at Horsley Park, which is licensed to receive up to 430,000 tonnes of general solid non-putrescible waste
2. Bingo Industries landfill at Eastern Creek, which is licensed to accept two million tonnes of non-putrescible general solid waste, with 750,000 tpa going to landfill
3. Breen Resources landfill at Kurnell, which accepts construction and demolition (non-putrescible) waste
4. Kimbriki Resource Recovery Centre at Terrey Hills, which is approved to receive approximately 232,000 tpa of non-putrescible general solid waste for landfilling and resource recovery activities
5. Bingo Industries Patons Lane facility at Orchard Hills, which includes the capacity to landfill approximately 205,000 tpa of general solid non-putrescible waste (soils).

Outside of the SMA there are a number of council-operated landfills as well as the Veolia Woodlawn Waste Management Facility (putrescible landfill) and the SUEZ Lucas Heights (putrescible landfill), none of which would be suitable alternative locations for waste currently disposed of at the Elizabeth Drive Landfill.

If the rate of non-putrescible waste generation were to remain at the levels recorded in 2014-15 and Elizabeth Drive Landfill were to close in 2025, non-putrescible waste would require transport to other

[1] Randell Environmental Consulting, Blue Environment (2017), *Australian National Waste Report 2016*, prepared for Commonwealth Department of the Environment and Energy - figures exclude fly ash.

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facilities in the SMA, within NSW or interstate. Such transport would place an additional strain on the State's transport infrastructure, particularly road and rail.

It is understood that during 2016/17 approximately 830,000 tonnes of waste was transported from NSW to Queensland. With Queensland introducing a $75 per tonne waste levy, commencing in mid-2019, there may be a significant increase in the volume of waste required to be managed and disposed of within NSW and the SMA more specifically. The Elizabeth Drive Landfill is expected to play a critical role in accommodating this additional waste, particularly in relation to restricted waste, given it is the only approved and publicly accessible restricted waste landfill in NSW.

The diversion of waste currently being transported interstate, and the general growth of Sydney, are the key factors supporting the proposed increase in the filling rate and final cap height of the landfill.

4.1.2 Planning for future non-putrescible waste disposal

Population growth in Sydney

Waste generation is closely linked to population. The population of Sydney is anticipated to grow by approximately 850,000 residents between 2016 and 2026 and a further 440,000 between 2026 and 2031 (DPE, 2016) (i.e. near the end of the Projects proposed operational life in 2032). For the C&I and C&D sectors, economic growth is also linked to a growth in waste generation[1].

With the projected increase in population and associated economic growth of Sydney, and in particular Western Sydney, it is anticipated that there will be a significant increase in volumes of non-putrescible waste requiring disposal. In 2014-15 Australia produced equivalent of 831 kg per capita of C&D waste and 849 kg per capita of C&I waste[1]. Based on population increasing by 1,290,000 by 2031, this would equate to approximately 2.2 million tonnes of additional C&D and C&I waste being generated in Sydney.

In addition to this, numerous large infrastructure projects are proposed or planned to commence construction in the near future which may result in a further increase in non-putrescible waste generation in Sydney. These projects include WestConnex M4-M5 Link, Western Harbour Tunnel, Beaches Link, the North-South Rail Link and West Metro, as well as projects closer to the site such as Western Sydney Airport, the M12 Motorway and a number of other RMS road upgrade projects. Waste produced from these developments would typically consist of general construction waste, asbestos contaminated waste and contaminated soil material, consistent with waste currently disposed of at the Site.

There is also an ongoing need for the disposal of contaminated soils and sediments from the clean-up of numerous contaminated sites across Sydney. These sites, which contain contaminated material from historical uses, require a regionally local and safe disposal options such as the Elizabeth Drive landfill.

More importantly, Elizabeth Drive Landfill is located in an area earmarked for major growth as a "Western Parkland City" within the Greater Sydney Region. The Western Sydney Growth and Employment Areas, forming part of the Western Parkland City are key growth areas, with new houses, 200,000 jobs and other major transport projects planned. In addition, the Western Sydney Aerotropolis will be developed around Western Sydney Airport, supporting new high-skilled job hubs across aerospace and defence, manufacturing, healthcare, freight and logistics, agribusiness, education and research industries.

As stated in the NSW Infrastructure Strategy, it is preferable for waste to be treated within the area it is generated. Expansion of the Elizabeth Drive Landfill provides the Western Sydney Growth Area with waste infrastructure for both C&D waste generated during construction (including from activities such as Western Sydney Airport, M12 and M9 Motorways, the North-South Rail Link, various urban release areas and utility upgrades), as well as C&I waste generated by new businesses. The proximity of the Elizabeth Drive Landfill provides a positive outcome for both developers and the community through reduced transport requirements and associated community and monetary costs.

Government policy and infrastructure

The NSW Government's *Waste Avoidance and Resource Recovery Strategy 2007* ('2007 WARR Strategy') (EPA, 2014a) provided a strategic direction for waste management and resource recovery in NSW. The 2007 WARR Strategy set the following targets:

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- By 2014, increase recovery and reuse of materials from:
  - the C&I sector to 63%; and
  - the C&D sector to 76%.

The NSW WARR Strategy Progress Report 2014-15, prepared by the EPA identified that although the State made good progress towards meeting the 2014 targets, ultimately it fell short. The C&I sector achieved 58% in 2014/15 and the C&D sector achieved 71%.

In 2014 the NSW Government released the NSW Government's *Waste Avoidance and Resource Recovery Strategy* ('2014 WARR Strategy'). The priorities for waste reform were determined by the NSW Government in the *NSW 2021: A plan to make NSW number one* and the findings of the NSW WARR Strategy Progress Report 2014-15. The 2014 WARR Strategy set the following targets for 2021–22 applicable to the Project:

- Increase recycling rates to:
  - 70% of C&I waste
  - 80% for C&D waste; and
  - 75% diversion of waste from landfill.

To understand the State's capacity to meet the resource recovery targets the government commissioned an infrastructure needs analysis, the findings of which have been used to inform the government's draft NSW Waste and Resource Recovery Infrastructure Strategy 2017-2021 (the 'NSW Infrastructure Strategy'). The NSW Infrastructure Strategy found that:

- Assuming the 2021 resource recovery diversion target is met, NSW will have sufficient existing (or planned and approved) landfill capacity. Should the 75% target for resource recovery diversion not be met demand for landfill will increase
- Overall the state has sufficient capacity of non-putrescible landfills with an estimated 759,000 tonnes surplus of existing non-putrescible landfill capacity
- Overall the state has sufficient capacity to process (recycle) projected volumes of C&D waste
- Most of the existing C&D processing (recycling) capacity is in Sydney. It is preferable to encourage the treatment of waste within the area it is generated
- The Strategy outlines that a significant number (22) of new C&D processing (recycling) facilities in regional areas are required to meet the resource recovery targets for C&D.

Although the current scenario for waste management within NSW appears to be suitable, it is evident that by 2021 the surplus of landfill capacity will be equal to the current average annual throughput of the Elizabeth Drive Landfill (i.e. 750,000 tpa). It can therefore be assumed that by 2025 when the total volume of waste generated has increased beyond 2021 volumes with population growth and the Elizabeth Drive Landfill has reached capacity, NSW will be left with a significant shortfall of availability capacity for non-putrescible landfills.

In addition, it is noted that should NSW not meet the 2014 WARR Strategy targets for diversion from landfill the shortfall of available capacity for non-putrescible landfills would increase further. The Project provides a well-maintained option for the disposal of C&I and C&D waste for an additional five and a half years, during which time it is likely that alternative arrangements would be in place to continue to manage Sydney's waste.

4.1.3 Providing emergency waste disposal capacity for Sydney

During emergency events, including storms, bushfires and flooding, there is the potential that significant additional landfill space may be required at short notice to provide capacity for the disposal of additional waste. This waste would likely be a mix of general solid (including special waste i.e. asbestos) and restricted waste. This waste would require rapid disposal in order to assist clean-up and recovery efforts and avoid the requirement for time consuming transport elsewhere around NSW or interstate. The Site has successfully accommodated this type of waste at short notice several times in the past.

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4.2 Project benefits

In light of the increasing demand for landfill space within Sydney and the wider region the expansion of Elizabeth Drive Landfill by approximately 4.8 million cubic metres would provide a clear strategic economic and community benefit. This increase in capacity would provide the continued operation of the Site for an additional five and a half years until 2031, providing for the disposal needs of many of the above major projects, including nearby urban releases.

The existing facility is already readily accessible through the existing arterial road network and has the requisite environmental controls in place to manage and monitor the receipt and ultimate landfilling of non-putrescible waste. The existing landfill operates with minimal impact on the surrounding environment and within the confines of the relevant EPL requirements.

It is noted that the site selection, planning and commissioning process for a suitable replacement landfill site within the Sydney region could take up to 10 years. In order to provide for the ongoing disposal of waste beyond the Site's existing closure date of 2025 would have required the above site selection and planning process would have needed to commence in 2015. In the absence of this process (to the best of the proponent's knowledge), the expansion of this existing facility is clearly beneficial to ongoing accommodation of Sydney's economic and population growth.

Approval for the expansion of the existing Elizabeth Drive Landfill would provide the necessary buffer to enable planning to commence for a future alternative landfill site to accommodate Sydney's future demand for non-putrescible waste disposal.

Generally, the Project would provide for the following key benefits:

- Support the ongoing waste disposal needs of Sydney generated through rapid increase in population and associated development
- Delaying the need for a new non-putrescible landfill to be commissioned within the greater Sydney area
- Provide a suitable disposal location for non-putrescible waste diverted away from export to other states
- Support the construction of the nearby major infrastructure projects, reducing transport needs and associated community and economic costs
- Provide a final landform suitable for potential beneficial future economic and/or recreational uses (subject to separate planning approval)
- Continue to support the operation of the landfill gas to energy system, contributing renewable energy to the National Electricity Market
- Provide a continuation of local employment for existing staff for approximately five and half years.

4.3 Alternative options considered

SUEZ considered alterative options for the Project which are described below.

4.3.1 'Do nothing' option

A 'Do nothing' option was considered by SUEZ as a starting point in response to assessing the ability of the landfill to meet current and future demand. This option would involve operating the existing landfill according to the current development consent, which allows for a final height of RL 80 to be reached within the boundary of the Site. Given the RL 80 final height, at current projected waste volumes, the landfill is anticipated to reach its end of life by approximately 2025.

This option would meet the immediate current demand for disposing of non-putrescible general solid waste and restricted solid waste in the region, however would not fulfil the future demand beyond 2026 or accommodate increased demand for filling in the interim. To sustain the ongoing disposal of waste, a replacement landfill would need to be commissioned prior to 2025 which would result in the requirement to obtain and develop a large parcel of land for landfilling operations.

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Without additional capacity, non-putrescible waste would likely finish up in putrescible landfill sites, placing a strain on these facilities which are required for the ongoing disposal of Sydney's domestic household waste. Additionally, the existing landfill is the only approved and operational site available for the receipt of restricted waste in NSW. Without additional capacity, restricted waste would be required to be transported significant distances (to other states), resulting in increased disposal costs and an increased risk of environmental incidents during transport.

4.3.2 New landfill facility

The option for SUEZ to construct a new landfill to replace the Elizabeth Drive Landfill facility to accommodate anticipated future capacity was considered. It is assumed that with the rapid rate of development within the Sydney Basin, any new landfill facility would be required to be located a significant distance from Sydney and would therefore not adequately support the ongoing waste disposal requirements of Sydney.

The likely timeframe for the approval of a new major landfill to replace the existing landfill could potentially take many years. There is considered to be insufficient time (prior to 2025) to identify a suitable site, purchase suitable land for the landfill, obtain the environmental approvals and construct the facility. It is generally understood that very few (if any) potentially available landfilling sites exist in close proximity to Sydney with suitable geology, transport links and void or potential void size.

4.3.3 Landfill expansion design

An expansion of the existing landfill was considered. This option took into account the current and projected annual filling rates, in conjunction with quarrying rates. To accommodate the additional waste capacity, initial design indicated the requirement to increase the currently approved finished height of the landfill from RL 80 to RL 95. This increase in final height would result in an additional landfill airspace capacity of approximately 4.8 million cubic metres and extension of the operational life of the landfill by an estimated five and a half years, based on the disposal rate of 950,000 tpa.

This option allows additional time for the determination of a new solution to waste management, whether a new landfill or otherwise.

4.3.4 Alternative options to landfilling

SUEZ continues to invest in upstream recovery options including material recycling facilities and advanced resource recovery technologies. The existing SAWT facility on the Site demonstrates SUEZ' commitment to the reduction of waste disposed of to landfill and the efficient reuse of waste for beneficial purposes. However, until waste to energy or other suitable technologies are suitably advanced, there remains an ongoing residual need for the disposal of general solid waste that can't be met by other means.

4.3.5 Preferred option

In order to best meet the waste disposal demands of Sydney into the future the landfill expansion option was selected. This option reduces the risk of not having appropriate waste disposal capacity required for ongoing development activities being undertaken to support population growth in Sydney. The expanded landfill would allow additional time for a suitable and sustainable solution for non-putrescible waste disposal to be developed to support the future growth of Sydney and would continue to provide the only publicly-accessible restricted waste disposal facility in NSW.

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Chapter 5

Legislation, planning policy and approvals

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5.0 Legislation, planning policy and approvals

5.1 Introduction

This chapter reviews the key Commonwealth and State legislation that applies to the Project, as well as applicable State and local planning policies, in order to determine the approvals and other requirements that would be required to allow the Project to proceed.

This section presents the assessment and approval framework for the Project.

5.2 Commonwealth legislation

5.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires approval from the Commonwealth Minister for Environment and Energy, where an action has, would have or is likely to have a significant impact on a matter of natural environmental significance (MNES).

A search of the online EPBC Protected Matters search tool has been conducted for a one kilometre buffer of the Site to identify potential MNES that may trigger the need for a referral of the action to the Minster for the Environment. The results of the database search are presented below in **Table 5.1**.

Although a number of MNES have previously been recorded within the search area, it is unlikely that any of these matters would be significantly affected, as the Project would be contained within the existing footprint of the Site and would not change the nature of the existing operations. As such, a referral under the EPBC Act has not been made for the Project.

Table 5.1 Matters of National Environmental Significance surrounding the Site

Matters of NES	Matters surrounding the Site
World heritage properties	There are no world heritage properties in the immediate vicinity of the Project. The closest world heritage properties to the Site are the Greater Blue Mountains, located approximately 15 kilometres west, and the Australian Convict Sites, which is a series of properties made up of 11 sites across Sydney. The closest Australian Convict Site to the Project is the Old Government House and Domain located at Parramatta at a distance of more than 20 kilometres north east of the Site.
National heritage places	There are no national heritage places in the immediate vicinity of the Project. The closest national heritage place to the Project is the Old Government House and Government Domain at Parramatta, which is located more than 20 kilometres north east of the Site.
Wetlands of international importance	There are no wetlands of international importance in the immediate vicinity of the Project. The closest wetland of international importance to the Project is Towra Point Nature Reserve, which adjoins Kurnell Peninsula and is located more than 20 kilometres to the south east of the Site.
Commonwealth listed threatened species and ecological communities	Five listed threatened ecological communities along with 31 listed threatened species have been recorded, or their potential habitat has been reported, in the area surrounding the Project. The Site itself has low ecological value and substantial changes to indirect impacts upon adjoining riparian areas are unlikely. On this basis the Project would not result in a significant impact on threatened species or ecological communities listed under the EPBC Act.

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Matters of NES	Matters surrounding the Site
Commonwealth listed migratory species	Fifteen listed migratory species have either been recorded, or their potential habitat has been recorded, within the area surrounding the Project. The Site itself has low ecological value and the Project's direct and indirect impacts on the adjoining riparian areas would be limited. On this basis, the Project would not have a significant impact upon Commonwealth listed migratory species and a referral is not warranted.
Nuclear action	The Project would not result in a nuclear action nor would any nuclear activity need to be undertaken.
Great Barrier Reef	The Project would not result in any impact on the Great Barrier Reef Marine Park.
Commonwealth marine areas	The Project is located approximately 40 kilometres from the coastline and there are no Commonwealth marine areas in the immediate vicinity of the Project.

5.3 NSW legislation

5.3.1 Environmental Planning and Assessment Act 1979

The EP&A Act and associated EP&A Regulation provide the framework for environmental planning in NSW. The act and associated regulation include provisions to ensure that all development proposals that have the potential to have an impact on the environment are subject to an appropriate level of assessment, while also providing opportunity for public involvement.

The EP&A Act provides for environmental planning instruments (EPIs) which supplement the Act to govern development at a range of scales.

The Project is considered 'development' under the EP&A Act and as such is subject to the provisions of Part 4. Within this Part, Division 4.1 outlines the circumstances under which a proposal needs consent from a consent authority. The need for consent from a consent authority is governed by one or more EPIs, as made under the Act.

Project approval pathway

For a Project to be assessed and approved under the EP&A Act, it must first be deemed to be permissible. The Project's permissibility is based on the land use zoning of the Site and the stipulations of certain EPIs (see **section 5.3.2** below). As the Site is located within the PCC local government area (LGA), the primary EPI governing the Site is the Penrith LEP 2010. Under clause 2.1 of the LEP the Site is zoned as part 'RU2 Rural Landscape' and part 'E2 Environmental Conservation'. The E2 zoning occupies a narrow band along the western boundary of the Site and includes the waterway and part of the riparian area of Badgerys Creek.

The proposed development for a waste disposal facility is prohibited within both the RU2 and E2 zones under Penrith LEP 2010. Despite this, Division 23 of the Infrastructure SEPP provides for a waste disposal facility to be permitted with development consent within the RU2 zone. Neither the ISEPP or any other EPI permits the development of a waste disposal facility within the E2 zone. However, the existing approval and operation of the Elizabeth Drive Landfill pre-dates the establishment of this E2 zone.

The Project would be limited to land zoned RU2 only. Previous development consents relating to the Site over the land that is now zoned E2 would remain in place and would not be affected by this Project. These existing consents would continue to allow final capping and ongoing management and maintenance of parts of the existing landfill within the E2-zoned land as an existing use. The proposed (raised) final cap surface RU2-zoned land has been designed to integrate with the previously consented (lower) cap surface within the E2-zoned land in a manner that optimises environmental and engineering outcomes for elements such as visual amenity, surface water management and constructability, among others.

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Section 4.55(1A) of the EP&A Act, allows for the consent authority to modify an existing consent, if the consent authority is:

a. Satisfied that the proposed modification is of minimal environmental impact; and

b. It is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified.

The original consent for the Site was awarded in October 1990 (DA 451/1989) for the 'continued operation and backfilling of the Badgerys's Creek Quarry'. This DA was originally assessed under *Sydney Regional Environmental Plan No.9 – Extractive Industry*. This consent has undergone five approved modification in accordance with Section 4.55 (previously Section 96) of the EP&A Act. These included alterations to increase fill levels across the Site, the most recent of which occurred in 2012 (refer **section 2.3**, in particular **Table 2.3**, for further details).

The Project however is not considered to be able to satisfy the test for 'substantially the same development' pursuant to Section 4.55 of the EP&A Act. This view is based upon the scale of the potential modification beyond that originally consented, particularly in terms of increased quantum of fill, increased finished surface levels and extended duration of the activity. SUEZ has therefore elected to prepare a new DA under Part 4 of the EP&A Act for the Project.

The Project is considered to be 'designated development' as prescribed in clause 32 of Schedule 3 of the EP&A Regulation on the basis that it can be classified as 'waste management facilities or works' and the following provisions apply (emphasis added):

Schedule 3 - Clause 32 - Waste management facilities or works

(1) Waste management facilities or works that store, treat, purify or dispose of waste or sort, process, recycle, recover, use or reuse material from waste and:

(a) that dispose (by landfilling, incinerating, storing, placing or other means) of solid or liquid waste:

(i) that includes any substance classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste, or

(ii) that comprises more than 100,000 tonnes of "clean fill" (such as soil, sand, gravel, bricks or other excavated or hard material) in a manner that, in the opinion of the consent authority, is likely to cause significant impacts on drainage or flooding, or

(iii) that comprises more than 1,000 tonnes per year of sludge or effluent, or

(iv) that comprises more than 200 tonnes per year of other waste material, or

(b) that sort, consolidate or temporarily store waste at transfer stations or materials recycling facilities for transfer to another site for final disposal, permanent storage, reprocessing, recycling, use or reuse and:

(i) that handle substances classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste, or

(ii) that have an intended handling capacity of more than 10,000 tonnes per year of waste containing food or livestock, agricultural or food processing industries waste or similar substances, or

(iii) that have an intended handling capacity of more than 30,000 tonnes per year of waste such as glass, plastic, paper, wood, metal, rubber or building demolition material, or

(c) that purify, recover, reprocess or process more than 5,000 tonnes per year of solid or liquid organic materials, or

(d) that are located:

(i) in or within 100 metres of a natural waterbody, wetland, coastal dune field or environmentally sensitive area, or

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(ii) in an area of high watertable, highly permeable soils, acid sulphate, sodic or saline soils, or

(iii) within a drinking water catchment, or

(iv) within a catchment of an estuary where the entrance to the sea is intermittently open, or

(v) on a floodplain, or

(vi) within 500 metres of a residential zone or 250 metres of a dwelling not associated with the development and, in the opinion of the consent authority, having regard to topography and local meteorological conditions, are likely to significantly affect the amenity of the neighbourhood by reason of noise, visual impacts, air pollution (including odour, smoke, fumes or dust), vermin or traffic.

This EIS has been prepared to accompany a DA for the Project in accordance with clause 4.12 of the EP&A Act. This requires that the proponent request SEARs from the NSW DPE. SEARs were issued for the Project and eventually received on 20 July 2018.

Section 4.5 of the EP&A Act outlines the consent authority for certain types of development. Subsection (b) of this section outlines the consent authority to be:

b. in the case of development of a kind that is declared by an environmental planning instrument as regionally significant development—the Sydney district or regional planning panel for the area in which the development is to be carried out,

The Project is considered regionally significant development under the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) (refer **section 5.3.2** of this report) and as such the consent authority is the Sydney Western City Planning Panel.

5.3.2 Environmental planning instruments

EPIs are legal documents that are prepared under the EP&A Act to regulate land use and development. EPIs can determine the relevant part of the EP&A Act under which a development proposal must be assessed and therefore determines the need or otherwise for development consent. EPIs consist of State and local environmental planning policies and plans. Relevant EPIs for the Project are addressed below.

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011(SRD SEPP) specifies whether development is:

- Regionally significant development
- State Significant Development (SSD), or
- State Significant Infrastructure (SSI) or Critical State Significant Infrastructure (CSSI).

Clause 23 of Schedule 1 in the SRD SEPP specifies the circumstance under which development is considered to fall into any of the above categories. The Project is not SSI or CSSI as the proponent is not a public authority for the purposes of the EP&A Act. The Project is also not deemed to be SSD as the proposed development is not for the purpose of a regional putrescible landfill, a waste or resource transfer station, resource recovery or recycling facility, waste incineration, a hazardous waste facility or a liquid waste depot.

The Project is however considered to be regionally significant development on the basis of clause 7(c) of Schedule 7 of the SRD SEPP as it is for:

c. waste management facilities or works, which meet the requirements for designated development under clause 32 of Schedule 3 to the Environmental Planning and Assessment Regulation 2000.

As indicated in **section 5.3.1** above, the Project meets the requirements for designated development under the relevant schedule of the EP&A Regulation. On this basis the Project is considered regionally significant and the relevant consent authority would be the Sydney Western City Planning Panel.

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State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the State through increased regulatory certainty and improved efficiency and flexibility in the location of infrastructure service facilities, while also providing for adequate stakeholder consultation.

Clause 121(1) of the Infrastructure SEPP sets out that:

1. *Development for the purpose of waste or resource management facilities, other than development referred to in subclause (2), may be carried out by any person with consent on land in a prescribed zone.*

The Project is located on land zoned as 'RU2 Rural Landscape' under the Penrith LEP 2010. The RU2 zone is specified as a *prescribed zone* within the Infrastructure SEPP, and the Project is therefore permissible with consent.

Clause 123 of the Infrastructure SEPP outlines the matters a consent authority must take into consideration when determining a development for the purpose of the construction, operation or maintenance of a landfill for the disposal of waste. **Table 5.2** addresses these matters.

Table 5.2 Infrastructure SEPP Clause 123 matters for consideration

Matter for consideration	Response
a. whether there is a suitable level of recovery of waste, such as by using alternative waste treatment or the composting of food and garden waste, so that the amount of waste is minimised before it is placed in the landfill	The Project would not result in a change in wastes currently accepted by the landfill which includes non-putrescible general solid waste and restricted solid waste, Opportunities for alternative treatment or recovery of these waste streams are considered limited.
b. (i) whether the development adopts best practice landfill design and operation	The design of the landfill would adopt best practice for landfill design and operation and be consistent with the *Environmental Guidelines, Solid Waste Landfills* (EPA, 2016). The landfill would operate under the existing LEMP and in accordance with EPL 4068.
b. (ii) whether the development reduces the long term impacts of the disposal of waste, such as greenhouse gas emissions or the offsite impact of odours, by maximising landfill gas capture and energy recovery	The existing landfill has a landfill gas to energy system already in place, which would continue to operate. As the existing landfill accepts only dry non-putrescible wastes, ongoing odour impacts are not considered likely.
c. (i) if the development relates to a new or expanded landfill whether the land on which the development is located is degraded land such as a disused mine site	The Project would be conducted on disturbed land within the existing landfill footprint (initially developed as a quarry) and is therefore considered to be on degraded land.
c. (ii) if the development relates to a new or expanded landfill whether the development is located so as to avoid land use conflicts, including whether it is consistent with any regional planning strategies or locational principles included in the publication *EIS Guideline: Landfilling* (Department of Planning, 1996), as in force from time to time	The Project would occur within the boundaries of the existing landfill site. The Project would result in an increase or extension to some impacts though these would not result in the development becoming incompatible with existing surrounding land uses. Land use and planning is addressed further in **Chapter 8** of this EIS.

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Matter for consideration	Response
d. whether transport links to the landfill are optimised to reduce the environmental and social impacts associated with transporting waste to the landfill	The Project would not alter transport links to the landfill, which have already been subject to optimisation.

State Environmental Planning Policy (Western Sydney Employment Area) 2009

State Environmental Planning Policy (Western Sydney Employment Area) 2009 (WSEA SEPP) aims to protect and enhance the land in the Western Sydney Employment Area for employment purposes. The specific aims of this SEPP are as follows:

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

The Site is located within the Western Sydney Employment Area, and is currently unzoned under this SEPP. Clause 12 of the WSEA SEPP states that development may be carried out on unzoned land only with consent. Consent is currently being sought for the Project through this DA.

In accordance with Clause 18 of the WSEA SEPP, a Development Control Plan (DCP) is required to be prepared before the consent authority can grant consent to development on land to which the SEPP applies, unless the Director-General (now Secretary of the Department of Planning) determines otherwise, by notice in writing to the consent authority. There is no specific DCP prepared under the WSEA SEPP that applies to the site, however the Penrith DCP applies to the Site and is addressed below.

State Environmental Planning Policy No. 33 - Offensive and Hazardous Development

State Environmental Planning Policy No. 33 - Offensive and Hazardous Development (SEPP 33) ensures that in assessing an application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise potential impacts.

Under SEPP 33, a potentially hazardous industry is defined as a development for any industry, that without appropriate measures, presents a significant risk to human health, life or property, or to the biophysical environment. SEPP 33 requires developments that undergo screening and, if shown to be potentially hazardous, have a preliminary hazard analysis (PHA) prepared to determine the risk to people, property and the biophysical environment at the proposed location and in the presence of controls.

A potentially offensive development, means a development for an industry, that without appropriate measures, would emit a polluting discharge in a manner that may have a significant adverse impact. Developments which are required to obtain an EPL under the *Protection of the Environment Operations Act 1997* (POEO Act) are considered to be potentially offensive. However, the level of offense is generally not deemed to be significant if the relevant EPLs can be obtained. Two EPLs apply to the existing Site, only one of which relates to landfilling activities (the other relates to the SAWT only). As such the proposed expansion is considered to be a 'potentially offensive' development. However, the existing EPLs would adequately cover the Project without resulting in an

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increase in offence to the surrounding environment. As such the Project would not be considered 'offensive'. On this basis no specific assessment is required under SEPP 33.

State Environmental Planning Policy No. 55 - Remediation of Land

The objects of *State Environmental Planning Policy No. 55 - Remediation of Land* (SEPP 55) are to provide a State-wide planning approach to the remediation of contaminated land and to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

SEPP 55 restricts consent authorities from issuing development consent on land that may be contaminated, unless the consent authority is satisfied that the land in question is suitable for the development proposed to be carried out, or would be suitable if appropriate remediation is undertaken.

The Elizabeth Drive Landfill currently operates as a waste management facility, and has for several decades. On this basis the Site is deemed to be suitable for the Project.

Once landfilling is complete capping of all disturbed areas in line with EPA (Closure Plan) requirements would provide a robust barrier to prevent future exposure of buried waste. Revegetation of the final cap with groundcover (mainly grasses) would stabilise the surface and enable these areas to be potentially used for public benefit (pending separate development assessment and approval) with minimal risk.

Penrith Local Environment Plan 2010

The Site is zoned as part 'RU2 Rural Landscape' and part 'E2 Environmental Conservation' under clause 2.1 of Penrith LEP 2010. The Project (a waste disposal facility) is prohibited within both the RU2 and E2 zones under the Penrith LEP 2010. Despite this, Division 23 of the Infrastructure SEPP provides for a waste disposal facility to be permitted with development consent within the RU2 zone. The Infrastructure SEPP does not however permit the development of a waste disposal facility within the E2 zone.

On this basis the Project would be limited to land zoned RU2 only. Previous development consents relating to the Site over the land that is now zoned E2 would remain in place and would not be affected by the Project. These existing consents would continue to allow final capping and ongoing management and maintenance of parts of the existing landfill within the E2-zoned land as an existing use. The proposed (raised) final cap surface within RU2-zoned land has been designed to integrate with the previously consented cap surface within the E2-zoned land in a manner that optimises environmental and engineering outcomes for elements such as visual amenity, surface water management and constructability, among others.

Relevant Development Control Plans

The *Penrith Development Control Plan 2014* (Penrith DCP) has been prepared to support all planning instruments applying to the Penrith LGA, including the Penrith LEP 2010. A detailed assessment of the compliance of the Project against relevant controls outlined in the Penrith DCP is provided in **Appendix E**.

"Section 94" Development Contributions

It is not expected that any development contributions would be required to Penrith City Council under section 7.11 (previously section 94) of the EP&A Act.

5.3.3 Protection of the Environment Operation Act 1997

The POEO Act establishes, amongst other things, the procedures for issuing of licences for environmental protection of aspects such as waste, air, water and noise pollution. The owner or occupier of a premises engaged in a scheduled activity is required to hold an Environmental Protection Licence (EPL) and comply with the conditions of that licence.

The Site is currently subject to two EPLs; 4068 and 12889 as outlined in **Table 5.3**.

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Table 5.3 Existing EPLs

EPL	Component	Activities
4068	Landfilling	Generation of electrical power from gas
		Waste storage - other types of waste
		Waste disposal by application to land
12889	SAWT	Recovery of general waste
		Waste storage - other types of waste
		Composting

Although the final volume of waste stored at the Site would increase under the Project, EPL 4068 provides for the disposal of any capacity of waste. On this basis the existing EPL is likely to remain relevant to the expanded landfill.

5.3.4 Waste Avoidance and Resource Recovery Act 2007

The *Waste Avoidance and Resource Recovery Act 2007* (WARR Act) outlines a number of over-arching objectives and guiding principles to encourage avoidance of generation of waste, the beneficial the re-use of waste and resource recovery generally.

The WARR Act promotes waste avoidance and resource recovery by providing a framework for the development of strategies and programs. It also defines the waste hierarchy, requiring that resource management options are considered against the following priorities in declining order of preference:

1. **Avoidance** - including action taken to reduce the amount of waste generated, to maximise efficiency and avoid unnecessary consumption
2. **Resource recovery** - including reuse, recycling, reprocessing and energy recovery, where avoidance and reduction are not possible.
3. **Disposal -** including management of all disposal options in an environmentally sensitive manner. This provides for disposal of materials such as asbestos that cannot be safely reused or recycled.

The existing Site operates in accordance with the principles of the WARR and would continue to do so under the Project. The Site implements resource recovery principles (via the SAWT and landfill gas to energy system) and otherwise disposes of waste via landfilling, including special waste such as asbestos, for which no other disposal methods are available.

5.3.5 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (the BC Act) identifies threatened species and ecological communities, areas of outstanding biodiversity value and key threatening processes. The BC Act establishes a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity.

Under the BC Act a development application under Part 4 of the EP&A Act (other than SSD or complying development) must be accompanied by a biodiversity development assessment report (BDAR) if it meets or is above the biodiversity offsets scheme threshold, or if the proposed development is likely to significantly affect threatened species. Given that the Project would be fully developed within the existing footprint of the operational landfill it would not require any vegetation clearing and would therefore not affect any native vegetation or threatened species. On this basis the project would not exceed the biodiversity offsets scheme threshold and as such a BDAR is not required.

5.3.6 Water Management Act 2000

The *Water Management Act 2000* (WM Act) sets out provisions to regulate the use of water, water management works, drainage and flood works. These are partially implemented via approvals for controlled activities and aquifer interference.

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Section 91 of the WM Act requires that a controlled activity approval be obtained for activities undertaken in, on, or under waterfront land. On the basis that the landfill is located more than 40 metres from the top of the nearest bank of Badgerys Creek the development is not on waterfront land and hence a controlled activity approval is not required.

An aquifer interference approval is required under section 91 of the WM Act for activities that penetrate an aquifer, interfere or obstruct with water in an aquifer, take water from an aquifer in the course of carrying out mining or other prescribed activities, or dispose of water taken from an aquifer during mining or other prescribed activities.

The Project relates to the increase in height of the landfill, which would occur at a level already much greater than the natural ground surface. The Project does not include any modification of existing capping or currently proposed subsurface elements of the landfill such as cell linings or leachate collection systems. All water infiltrating through the proposed raised landfill would be continue to be collected by the existing cell linings and leachate collection systems, as per current practice. On this basis the potential for the Project to interact with any aquifer is negligible and as such an aquifer interference approval is not required.

5.3.7 Roads Act 1993

The *Roads Act 1993* sets out the rights of road users, declaration and functions of road authorities, classification of roads, and regulation of certain activities on public roads.

The Project is contained wholly within the existing landfill site and accessed by Elizabeth Drive, which is classified as a State road. It is not expected that any permits (e.g. road occupancy licences) would be required for temporary road lane closures or floating plant/machinery to site along surrounding roads.

5.4 Key NSW State Government policies

This section gives an overview of key NSW State Government policies that are applicable to the Project. Other relevant government policies are considered in the individual assessments for each environmental matter.

5.4.1 Waste Avoidance and Resource Recovery Strategy 2014-2021

The *Waste Avoidance and Resource Recovery Strategy 2014-2021* (WARR Strategy) provides the strategic direction for future waste management and resource recovery activities in NSW. The priorities for waste reform were determined by the NSW Government in the *NSW 2021: A plan to make NSW number one*.

The WARR Strategy aims to drive the efficient use of resources, reduce the environmental impact of waste and improve the well-being of the NSW environment, community and economy. The WARR Strategy sets out long-term targets and provides a framework for the development of various implementation plans. The WARR Strategy sets the following targets for 2021–22 which are applicable to the Project:

- Avoiding and reducing the amount of waste generated per person in NSW
- Increasing recycling rates to:
  - 70% for municipal solid waste
  - 70% for commercial and industrial waste, and
  - 80% for construction and demolition waste.
- Increasing waste diverted from landfill to 75%.

The WARR Strategy provides a clear framework for waste management to 2021-22 and provides an opportunity for NSW to continue to improve recycling rates across all waste streams.

The Project would produce little waste in its own right.

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SUEZ fully supports the objectives of the WARR Strategy and assists individuals, Councils and business owners to do likewise by providing environmental education regarding waste avoidance and minimisation and resource recovery.

The Project itself represents the final stage of the waste hierarchy, disposal. While it is recognised that more waste is being avoided, reused or recycled every year, the generation of non-recyclable waste is likely to continue for some years to come (e.g. asbestos contaminated waste). The Project aims to accommodate this waste in a manner that reduces the impact upon the environment and defers the requirement for new landfill sites to be developed for several years.

5.4.2 NSW Waste Classification Guidelines

The *Waste Classification Guidelines* (EPA, 2014) provides advice and direction on classifying waste so that appropriate management of all waste types is achieved. Waste classification helps those involved in the generation, treatment and disposal of waste, ensure the environmental and human health risks associated with their waste is appropriately managed in accordance with the POEO Act and its associated regulations.

The Elizabeth Drive Landfill is currently the only publicly-accessible landfill in NSW that accepts restricted solid waste. As such it plays an important role in the management of this material. The Project would support this by extending this availability for several years.

Waste generated by the Project is expected to be minimal, including that from ongoing activities within the administration and workshop areas of the site. Within the landfill itself, waste would be expected to be negligible, with all stockpiled excavated material being reused as cover or capping material. Despite this, any waste generated during the continued operation of the Project would be classified in accordance with NSW Waste Classification Guidelines.

5.4.3 Other strategic plans

Several government strategic plans have been implemented to guide the sustainable growth of Western Sydney. With unprecedented growth levels anticipated, it is paramount that waste management infrastructure and capacity be provided in the area to ensure the ongoing growth and development of Western Sydney does not result in negative environmental, economic and social impacts. Relevant strategic plans include:

- Western Sydney Infrastructure Plan
  - The Australian and NSW Governments are funding a 10 year, $3.6 billion infrastructure investment program. This will deliver new and upgraded roads to support integrated transport in the region and capitalise on the economic benefits from developing the Western Sydney Airport at Badgerys Creek. The program includes:
    - upgrade of The Northern Road to a minimum of four lanes from Narellan to Jamison Road, Penrith
    - construction of a new east-west motorway to the airport between the M7 Motorway and The Northern Road (to be known as the M12 Motorway)
    - upgrade of Bringelly Road to a minimum of four lanes between The Northern Road and Camden Valley Way
    - construction of the Werrington Arterial Road by upgrading Kent Road and Gipps Street to four lanes between the Great Western Highway and the M4 Motorway
    - upgrade of the intersection of Ross Street and the Great Western Highway
    - a $200 million package for local roads upgrades, to be delivered across four rounds over ten years
- Western Sydney Employment Area
  - The NSW government has established the Western Sydney Employment Area to provide businesses, including transport, logistics and warehousing, with land for industry and employment. The Western Sydney Employment Area will provide people living in Western

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Sydney the chance to work locally, spend less time commuting and improve liveability for residents.

- Western Sydney Aerotropolis
  - The Western Sydney Aerotropolis aims to become a thriving economic hub delivering new jobs, homes, infrastructure and services in the heart of Western Sydney. The Aerotropolis will make a significant contribution to 200,000 new jobs for Western Sydney by establishing a new high-skill jobs hub across aerospace and defence, manufacturing, healthcare, freight and logistics, agribusiness, education and research industries.

    DPE has been working with all levels of government through the Planning Partnership to draft the Stage 1 Land Use and Infrastructure Implementation Plan (Stage 1 Plan) for the Aerotropolis. The Stage 1 Plan, currently on public exhibition, provides an overview of proposed land uses and the sequence of development that will deliver Sydney's newest economic hub.
- Greater Sydney Commission
  - The Greater Sydney Commission is leading metropolitan planning to make Greater Sydney more productive, sustainable and liveable. The role of the Greater Sydney Commission is to coordinate and align the planning that will shape the future of Greater Sydney through a collaborative “one government” approach.

Other government strategic plans apply to the Site, including the following:

- Greater Sydney Region Plan 2018 (GSC 2018a)
- Western City District Plan 2018 (GSC 2018b)
- Western Sydney Airport Growth Area (DPE 2018)
- Penrith Council Community Plan 2017 (PCC 2017a)
- Penrith Council City Strategy 2017 (PCC 2017b).

These strategic plans and policies are discussed in detail in **Chapter 8**.

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Chapter 6

Consultation

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6.0 Consultation

6.1 Introduction

This chapter documents the consultation undertaken to date for the Project, as well as that proposed throughout the public exhibition period.

Consultation requirements are outlined in the SEARs, which require SUEZ to:

> *Consult with the relevant local, State and Commonwealth Government authorities, service providers and community groups during the preparation of the EIS, and address any issues they may raise in the EIS. In particular, consult with the:*
>
> - *Environment Protection Authority*
> - *Office of Environment and Heritage*
> - *Department of Primary Industries*
> - *Roads and Maritime Services*
> - *Rural Fire Service*
> - *Penrith City Council, and*
> - *The surrounding landowners and occupiers that are likely to be impacted by the Project.*

Details of the consultation carried out and issues raised are discussed below.

6.2 Consultation objectives

The main objective of consultation during the environmental approvals process is to provide opportunity for people to meaningfully participate in the development and direction of the Project. With this in mind, the supporting objectives in relation to stakeholder and community consultation for the Project are to:

- Raise awareness of the Project, its likely impacts and its local and broader community benefits
- Gather feedback from the community and stakeholders to ensure concerns are considered and addressed in the EIS
- Increase awareness of SUEZ' best practice waste and recycling operations
- Minimise risks to the Project arising from consultation.

6.3 Approach

The consultation approach for the Project aims to align with SUEZ' community commitments. SUEZ believes community consultation, open dialogue with stakeholders, and supporting the communities in which we operate is imperative. On this basis the following key guidelines underpin the consultation approach:

- International Association for Public Participation Spectrum (IAP2 Spectrum)
- The project SEARs (outlined above).

The IAP2 Spectrum identifies the level of influence stakeholders have on a project, from Inform through to Empower (Refer **Table 6.1** 2014). For the environmental approvals process of the Project SUEZ has undertaken, and proposes, consultation activities built around these principles. SUEZ would keep stakeholders informed, listen to and acknowledge concerns and aspirations, and provide feedback on how input received has influenced Project direction and decisions.

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Table 6.1 IAP2 Spectrum (IAP2 International Federation, 2014)

	Inform	Consult	Involve	Collaborate	Empower
Public Participation Goal	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions	To obtain public feedback on analysis alternatives and/or decisions	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered	To partner with the public in each aspect of the decision including the development of alternatives and identification of the preferred solution	To place final decision making in the hands of the public
Promise to the Public	We will keep you informed	We will keep you informed, listen to and acknowledge concerns and aspirations and provide feedback on how public input influenced the decision. We will seek your feedback on drafts and proposals	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision	We will work together with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible	We will implement what you decide

During the development of this EIS SUEZ have aimed to consultation activities at the 'consult' level with stakeholders and the community. This means that SUEZ have aimed to keep them informed, listen to and acknowledge concerns and aspirations, and provide feedback on how their input influenced the decision.

6.4 Stakeholder identification

During the development of the Community Consultation Plan for the Project an assessment was undertaken of the likely interest and risk areas for relevant groups of stakeholders. This initial scoping of consultation interest formed the basis of the identification of stakeholders and implementation of the plan (**Table 6.2**).

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Table 6.2 Potential government and community issues

Issue	Government authorities	Local government	Service providers	Community groups	Surrounding landowners and occupiers
Waste management	✓	✓		✓	✓
Soil and water		✓	✓	✓	
Air quality and odour		✓		✓	✓
Traffic and transport	✓	✓	✓	✓	✓
Noise and vibration		✓		✓	✓
Hazards and risk	✓	✓	✓	✓	✓
Biodiversity		✓		✓	
Heritage		✓		✓	
Bushfire		✓		✓	✓

Following the initial scoping of potential stakeholder involvement an exercise was undertaken to outline specific stakeholders with an interest in the Project and the goal of consultation with each. **Table 6.3** identifies each of these stakeholders and/or stakeholder groups. Detail of the specific consultation activities undertaken with each stakeholder is included in the following sections.

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Table 6.3 Stakeholder analysis

Stakeholder category	Specific stakeholders	Risk	Consultation goal
Government authorities	• NSW Dept of Planning and Environment • NSW Office of Environment and Heritage • NSW Environmental Protection Agency • NSW Department of Primary Industries	Lack of consultation, and irregular and unreliable information provided to government agencies could lead to project delay	Record and follow up on agreements and issues raised by agencies so feedback can be incorporated into EIS
Local government	• Penrith City Council • Liverpool Council	Lack of consultation, and irregular and unreliable information provided to local government could lead to project delay	Record and follow up on agreements and issues raised by local government so feedback can be incorporated into EIS
Federal and State government and elected local government	• Federal Member for McMahon • State Member for Mulgoa • Penrith City councillors and mayor • Liverpool councillors and mayor • Western Sydney Airport Corporation	Lack of consultation, and irregular and unreliable information provided to politicians could lead to project delay	Record and follow up on agreements and issues raised by politicians so feedback can be incorporated into EIS
Service providers: Roads and emergency services	• Roads and Maritime Services • Rural Fire Service • Ambulance Service of NSW	Lack of consultation, and irregular and unreliable information provided to service providers could lead to project delay	Record and follow up on agreements and issues raised by service providers so feedback can be incorporated into EIS
Community groups: clubs, environmental interest groups and community and resident associations	• Protect Penrith Action Group • Western Sydney Community Forum	Lack of consultation could lead to community and stakeholders not supporting the proposal	Provide information on the Project and EIS to community groups. Gather feedback around issues and concerns for incorporation into EIS
Kemps Creek Landfill Community Reference Group (CRG)	• Local residents, neighbouring businesses and landowners, Council representatives, local politicians, and officers from the NSW EPA	Lack of consultation could lead to CRG, and by extension, the wider community, not supporting the proposal	Provide information on the Project and EIS to the CRG. Gather feedback around issues and concerns for incorporation into EIS

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Stakeholder category	Specific stakeholders	Risk	Consultation goal
Surrounding landowners and occupiers that are likely to be affected by the proposal: Residents, businesses and landowners	• Residents and businesses within 2-4 km of the project • Twin Creeks Community Association	Lack of consultation could lead to community and stakeholders not supporting the proposal	Provide information on the Project and EIS to surrounding landowners and occupiers. Gather feedback around issues and concerns for incorporation into EIS

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6.5 Government agency consultation

During the preparation of the SEARs, DPE sought input from the following government agencies:

- NSW EPA
- Office of Environment and Heritage
- Department of Primary Industries
- Roads and Maritime Services
- Rural Fire Service
- Penrith City Council.

As described above, the SEARs require SUEZ to engage in consultation with several government agencies. To meet these, letters were sent to the agencies listed above to provide information on the Project and to invite each agency to provide feedback during compilation of the EIS. SUEZ also consulted with a number of other agencies considered of relevance to the project including emergency services, the subject and adjoining council and State members of parliament representing the local and wider area. Certain stakeholders were also offered specific face to face briefings to further outline the nature of the project.

The consultation undertaken with government stakeholders is outlined in **Table 6.4**. A summary of these issues raised is provided in **section 6.7**.

Table 6.4 Government stakeholder consultation and outcomes

Department	Consultation method	Response provided
NSW Environment Protection Authority (EPA)	• Stakeholder letter sent 2 November 2018 • Notification during meeting at Lucas Heights Resource Recovery Park	No response provided
NSW Office of Environment and Heritage	• Stakeholder letter sent 2 November 2018	No response provided
NSW Department of Primary Industries	• Stakeholder letter sent 2 November 2018	No response provided
Roads and Maritime Services	• Stakeholder letter sent 2 November 2018	No response provided
Rural Fire Service	• Stakeholder letter sent 2 November 2018 • Phone call 25 September 2018	No response provided to letter. Response to phone call outlined in **Table 6.5**
Ambulance Service of NSW	• Stakeholder letter sent 2 November 2018	No response provided
Penrith City Council	• Face to face meeting 7 June 2018 to introduce project prior to request for SEARs • Letter sent 13 June 2018 outlining the Project and planning pathway • Briefing letter sent 2 November 2018 offering briefing to Councillors. Follow up email sent 11 December 2018	• Meeting summary provided in **Table 6.5** • 3 July 2018 - email response outlining Council's main planning concerns • 3 January 2018 – email response declining briefing of Councillors

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Department	Consultation method	Response provided
Liverpool City Council	• Briefing letter sent 2 November 2018 offering briefing to Councillors • Face to face briefing of Mayor and head of City Presentation by SUEZ and AECOM – 27 November 2018	No response provided
Hon Chris Bowen MP, Federal Member for McMahon	• Briefing letter sent 2 November 2018	No response provided
Tanya Davies MP, State Member for Mulgoa	• Briefing letter sent 2 November 2018 • Face to face briefing provided by SUEZ and AECOM	No response provided

6.6 Community consultation

SUEZ has undertaken consultation with the surrounding landowners and occupiers that are likely to be affected by the Project. Consultation with these parties has been undertaken by direct letterbox drops of information flyers and notification in local newspapers. The letterbox drop consisted of 1,000 printed A4 flyers outlining specific detail of the Project and providing various avenues for finding out more, including detail on the SUEZ website, a contact phone number and email address. Information flyers were distributed to nearby residents in Twin Creeks, Luddenham, Kemps Creek, Badgerys Creek and Mount Vernon, including residents within Liverpool LGA (south of Elizabeth Drive).

SUEZ hosted a community information session at the Elizabeth Drive Landfill on 14 November 2018 to provide further detail of the Project and answer any specific community questions. This information session was advertised within the community information flyer and local newspaper advertisements. The session was staffed by SUEZ and AECOM project managers, as well as a number of other staff from both organisations.

A further specific community briefing was provided to the Twin Creeks Community Association on 21 January 2019 at the Twin Creeks Golf and Country Club. The meeting was attended by SUEZ and AECOM project managers and other SUEZ staff.

In addition to the above, a stakeholder letter and newsletter were sent to the Western Sydney Community Forum on 2 November 2018. No response was received.

Community consultation responses arising from the above activities are documented in **Table 6.5** below.

6.7 Summary of issues and responses

Table 6.5 below presents a summary of key issues raised during the government and community consultation activities and where these issues have been responded to in the EIS.

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Table 6.5 Government and community stakeholder consultation

Issue	Response
Government agency issues raised	
Penrith City Council meeting - 7 June 2018 (PCC offices)	
Discussed the nature of the proposal and specific elements relating to hydrology, traffic and the site context. SUEZ and AECOM indicated that these issues would be fully explored and outlined in the EIS.	PCC committed to provide latest flood modelling info to AECOM. PCC also indicated that SUEZ/AECOM may need to get sign-off from RMS to use Elizabeth Drive as the main access to landfill
The surrounding area and its ongoing transformation into a generally industrial nature was specifically discussed. It was noted that proposals such as Western Sydney Airport, growth and employment areas and other major transport infrastructure would radically alter the locality.	Noted by SUEZ and addressed in EIS
PCC requested additional detail regarding the proposed planning pathway. AECOM to provide brief outline of the pathway to PCC. AECOM's view is that the proposal would be designated development and the Sydney West Regional Planning Panel would be the consent authority.	Further detail of the planning pathway was provided as part of the SEARs request letter, which was forwarded to PCC
PCC indicated that they were broadly satisfied with the issues categorised as key or secondary.	Noted by SUEZ
AECOM/SUEZ requested that PCC provide comment on the request for SEARs.	SEARs request letter was forwarded to PCC. PCC provided comment to SUEZ by email on 3 July 2018 outlining Council's key issues for consideration. These issues are outlined below
Penrith City Council - email response to draft request for SEARs 3 July 2018	
Requests the following key issues are addressed in the EIS: • Suitability of the site for the proposed expanded operations (considering the approved and proposed activities in combination).	Addressed in **Chapter 4** Strategic Project Justification
• Suitability of the revised land form as a result of the proposed expansion	Addressed in **Chapter 4** Strategic Project Justification**, Chapter 8** Land Use**, Chapter 9** Landscape and Visual Impact Assessment

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Issue	Response
• Demonstration that the intended finished condition of the site does not provide a resulting topography or landscape that is out of character with the existing and planned future character of the area (by way of finished ground levels, batter gradients, landscape design treatments, etc.)	Addressed in **Chapter 9** Landscape and Visual Impact Assessment
• Consideration of any flooding or overland flow implications as well as associated drainage implications resulting from proposed works.	Addressed in **Chapter 16** Other Issues**:** Surface water, flooding and groundwater
• Consideration of PCC's 'scenic and landscape values' mapping which is designated in the vicinity of the site. The final landscape treatment should ensure that the finished landform positively contributes to this mapped character and does not detract from it.	Addressed in **Chapter 9** Landscape and Visual Impact Assessment
• The site is adjacent to mapped endangered vegetation and as such the application should address this and management measures will need to be suitably considered to protect this vegetation and the adjacent water course.	Addressed in **Chapter 16** Other Issues: Biodiversity
• The site is adjacent to a watercourse and proposed works within 40 metres of the bank of the watercourse would be nominated integrated development requiring concurrence from Water NSW.	Addressed in **Chapter 5** Legislation, planning policy and approvals
• The site is immediately adjacent to the planned M12 Motorway corridor and as such, the proposed finished ground levels will need to address/consider implications of the proposed works on the corridor. It is recommended that the Roads and Maritime be engaged early to ascertain implications of the corridor alignment.	The footprint of the existing landfill would not be expanded as part of the Project. As such there would be no impact upon the proposed alignment of the proposed M12 Motorway
• Environmental management measures addressing key considerations such dust, noise, pollution control, etc. Given the increased land form, existing acoustic management measures will need to be revisited.	A consolidated list of proposed mitigation measures are provided in **Chapter 19** Environmental management

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Issue	Response
• Consideration of significant views/vistas from east (such as Mt Vernon) to the west (Blue Mountains). The altered/increased land form height must demonstrate that its visual prominence does not detract from these views.	Addressed in **Chapter 9** Landscape and Visual Impact Assessment
Rural Fire Service – stakeholder letter (2 November 2018) and phone call (25 September 2018)	
Discussed the project in terms of bushfire protection with reference to fire fighter access, emergency management planning, electricity and services supply (water).	RFS advised that the development should meet the aims and objectives of Planning for Bush Fire Protection 2006 and be assessed as "PBP and other development
Liverpool City Council briefing - 27 November 2018 (LCC offices)	
Discussed the Project and Site and its context in relation to Western Sydney Airport	SUEZ agreed with the importance of the area and outlined the context of the EDL site and its relationship to WSA. SUEZ outlined consultation activities to date with WSA
Requested information regarding formal consultation of the EIS	SUEZ noted a DA was proposed to be lodged in 2018 (since extended to 2019). SUEZ discussed the fact that the consent authority is the Sydney Western City Planning Panel. SUEZ noted that if the DA was put on exhibition over the school holidays it would be extended to allow people to provide comment
Requested detail of consultation carried out to date	SUEZ outlined that 1000 community information flyers had been distributed to nearby residents in Twin Creeks, Luddenham, Kemps Creek, Badgerys Creek and Mount Vernon, including residents within Liverpool LGA (south of Elizabeth Drive). SUEZ outlined consultation with Twin Creeks Community Group to date, as well as proposed consultation with this group of residents. Mayor Waller acknowledged her familiarity with the Twin Creeks Community Association
Tanya Davies MP briefing - 16 November 2018 (Tanya Davies' office, St Clair Shopping Ctr)	
Requested clarification on the detail of the Project including whether the footprint would increase as part of the development	SUEZ outlined the nature of the Project, including the increase in height of 15 metres. SUEZ clarified that the existing footprint of the landfill would not change
Requested detail of consultation carried out to date	SUEZ outlined that approximately 1000 community information flyers had been distributed to nearby residents in Twin Creeks, Luddenham, Kemps Creek, Badgerys Creek and Mount Vernon

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Issue	Response
Requested clarification on the current operations.	SUEZ outlined the nature of the current operation including that the main landfill only accepts dry commercial waste. SUEZ clarified the separate activities undertaken at the SAWT and that this was not part of the current Project
Requested clarification regarding the history of the site's ownership	Clarified that the site was managed under SUEZ's previous name, SITA. Prior to that the site was managed by Pacific Waste Management
Discussed historic complaints received regarding odour	SUEZ accepted that there had been odour issues in the past and discussed the recent odour management at the site, which has been very good. Ms Davies acknowledged that she had not received any recent odour complaints
Requested further detail on what SUEZ is doing as an international company to improve waste management, particularly in terms of alternative waste management methods	SUEZ outlined that the best solution to waste was to avoid its generation. SUEZ outlined approaches to waste that the company are involved in worldwide, including waste to energy in parts of Europe and elsewhere. Ms Davies stated an opposition to any energy to waste in this region
Asked about SUEZ' involvement with the circular economy	SUEZ outlined its active participation in recycling programs and general support for initiatives to avoid, reduce, reuse and recycle waste. SUEZ highlighted the recent decision by the NSW EPA to remove all exemptions and orders on organic material recovered from advanced waste treatment facilities across the state. This material was previously able to be utilised for activities such as mine site rehabilitation but now has to go directly to landfill. This has resulted in a substantial disruption to the waste industry
Community issues raised	
SUEZ Community Information Session – 14 November 2018 (Elizabeth Drive Landfill Administration Offices)	
A community member from Twin Creeks recommended consultation with the Twin Creeks Community Association	SUEZ committed to meet with the Twin Creeks Community Association
Complaint about odour generated from the site and question about what type of waste is treated at the facility	The landfill accepts non-putrescible general solid waste and restricted waste. This is the section to be expanded as part of the Project . The SAWT facility receives two different waste streams - food and garden organics and municipal solid waste from various councils around Sydney, and is not part of the Project
What is the stockpile of soil used for?	Soil stockpiles consist of the material that has been excavated in the process of constructing the landfill. The spoil is used as day cover during operations to cover the waste daily and stockpiled to be used as part of the final capping. Stockpile locations may move throughout the operations depending on where it is needed around the site

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Issue	Response
How do you keep dust levels down?	A variety of mitigation measures are used. The stockpiles aren't driven over by vehicles and the roads are regularly watered using two water carts to reduce dust
What will the final site look like once covered?	The final site will be covered over with grass and sides will be battered
Is SUEZ expanding the site area outwards?	No. SUEZ is proposing to increase the height of the existing landfill by 15 metres. The project does not involve any changes to the existing cell design, final cap design or waste disposal methods including operations and environmental management of the site. This proposed increase would provide an additional landfill airspace capacity of approximately 4.8 million cubic metres and extend the life of the landfill by approximately five and a half years
There is a development along to the access road with earthworks and temporary fencing covered with hessian. Is this part of SUEZ's operations?	No. SUEZ is only responsible for the Elizabeth Drive Landfill site which begins at the entrance gates at the end of the access road. The development along the access road is not connected to SUEZ
Who will make the decision/who will give final approval?	The development application will be lodged with Penrith City Council who will place the EIS on exhibition and prepare an assessment report. The EIS and the accompanying assessment report is then forwarded to the Sydney Western City Planning Panel for a final decision on the Project
How are environmental regulations enforced?	SUEZ has two environment protection licenses over the site, which are administered by the EPA. The Elizabeth Drive Landfill site is subject to random compliance inspections from the EPA
What can the land be used for after the landfill is covered?	After the landfill is capped, the land may be used for a variety of purposes, such as open space recreational, car parks and storage facilities. Any future use does not however form part of this development application. SUEZ is responsible for monitoring the site for 30 years after the site is capped
Twin Creeks Community Association Briefing – 21 January 2019 (Twin Creeks Golf and Country Club)	
Will the landfill be deeper than currently?	No, the footprint and depth will not change, only the height
When will the SAWT finish operations?	Currently 2029, but this may be extended
So you will be literally piling up rubbish?	Yes, though much of it is excavated material or imported dirt
Will you build walls before placing rubbish?	In same case earth bunds or walls will be present but not all the time

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Issue	Response
Would you see a pile of rubbish?	Waste accepted at the site is not typical household waste and is covered each day so visual impact will be similar to a quarry
How much gas is produced?	Gas generation is ~2500 m^3/hr across 120 wells
Does the landfill settle to a crater?	No crater would occur as the landfill would settle fairly evenly
Are you seeking our support?	We would welcome any support, but this meeting is simply about directly introducing the Community Association to the project
The issue of odour was raised	This arises from the SAWT only. SUEZ is constantly trialling new techniques and technology to manage this. The SAWT is not subject to this development application
What's the support from other stakeholders?	No distinct support or otherwise has yet been indicated by PCC or other government agencies. These agencies will be part of the formal consultation on the EIS
Mentioned that the landfill might not be optimal visually for incoming/outgoing air passengers	Noted by SUEZ
Asked about SAWT separation process	Process outlined by SUEZ operational staff
Asked if SAWT would be visible	Outlined this is not part of expansion and SAWT would remain visible to those that can see it currently. No change to SAWT operations
What is the intention beyond 2020? Will it become recreation?	No current plans for land use beyond final capping other than it will be grassed over. Some potential ideas are mentioned in the EIS but any change of use would be subject to a separate DA
Will you raise the height of the restricted waste area?	This may occur by a small amount but is limited by its location at the side of the landfill
Do you currently accept asbestos at the Site?	Yes, though this is double bagged and covered following delivery
Do you have any environmental obligation to Badgerys Creek?	Outlined that the site has discharge limits as part of the EPL. All stormwater basins were recently deepened and are linked by pumps and 10 inch pipes to distribute stormwater to basins with less water if needed and to minimise offsite discharge
Western Sydney Airport Briefing – 13 February 2019 (SUEZ offices, Chullora)	
SUEZ presented the Project, outlined previous consultation activities and the nature of current operations.	Notde by WSA

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Issue	Response
WSA asked about previous EPA interactions and proposals for landfill gas collection and flaring/combustion	Outlined discussions with the EPA about dirt on the Site Access Road and that this was from vehicles entering/exiting neighbouring properties. SUEZ outlined that gas collection and flaring would continue for several decades post-capping
WSA asked about the Project's planning pathway	Indicated that the project is designated development and therefore requires an EIS. The project is also regionally significant and will be assessed by the Sydney City West Planning Panel, as consent authority
WSA indicated that the obstacle limitation surface (OLS) is not likely to be an issues for the Project. WSA discussed PANS-OPS and that this was being modelled separately.	Acknowledged ongoing work at airport on navigation procedures. SUEZ indicated the OLS had been considered in the EIS
WSA asked if SUEZ is proposing any buildings on the final cap?	No buildings are proposed due to settlement of the landfill and the effect on footings
WSA: is there any proposal to commercialise the use of the final cap?	No, not currently
WSA indicated that their main issues in relation to the landfill expansion would be landfill gas flaring and wildlife management	Indicated that these issues would be assessed within the EIS
WSA asked what type of grass species SUEZ proposed to use on the cap. Also asked how the grass would be managed e.g. what height?	No specific plans for grass species. Grass would be managed to a suitable level according to rainfall etc. This may be as little as slashing twice a year
WSA asked about waterbodies on site – are birds expected to disperse or stay nearby when the landfill expansion occurs? Request to mention consultation in hazards chapter of EIS	Indicated that this would be included in the hazards discussion in the EIS. SUEZ also indicated that: • 100 to 150 ibis are present on site • The presence of birds on site will also not change with the expansion • The EIS does not include a plume rise assessment as there is no change to the current gas management as part of the landfill expansion
WSA request SUEZ mention gas management in EIS i.e. no increase in rate of gas flaring only overall duration	SUEZ committed to include this statement
WSA indicated that navaids for aircraft approach would not immediately be an issue in relation to the landfill expansion. WSA asked if there was any new lighting proposed as part of the landfill expansion	No new lighting as part of the expansion

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6.8 Exhibition

The EIS is expected to be placed on public exhibition by PCC. This process provides further opportunity for public and government agency involvement and input into the environmental planning and assessment process. Following exhibition, PCC or the Sydney Western City Planning Panel may seek further clarifications on the EIS and other aspects of the Project, based on other stakeholder review and submissions from the community.

The community around the Site would be advised of the exhibition period via a notice in the local paper, with immediately neighbouring landowners provided a specific notification letter indicating that the EIS is on exhibition. In addition to this, SUEZ plans to host another community information session during the exhibition period to discuss the outcomes of the EIS with interested stakeholders.

6.9 During operation

During operation of the Project, public and stakeholder consultation activities would be carried out by SUEZ, as required by the consent. SUEZ may invite the public to raise any comments and issues via the publicly available telephone and email contacts featured on its website. As per existing practice, all comments and concerns would be logged, tracked and promptly responded to.

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Chapter 7

Environmental scoping assessment

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7.0 Environmental scoping assessment

7.1 Environmental scoping for the Project

This EIS documents a range of environmental assessments. These assessments identify environmental impacts that may result from the Project and identify measures to manage or mitigate as appropriate.

The identification of potential impacts, and confirmation of appropriate assessment methodologies, is determined through a scoping process. The scoping process for this EIS was based upon:

- Review of available information and documents relating to the existing environment
- Site visits
- Consultation with government agencies, community groups and other stakeholders (refer **Chapter 6**)
- A review of relevant legislation and planning policy (refer **Chapter 5**)
- Identifying the sensitivities of the local environment
- Understanding the characteristics of the Project, and
- Identification of other projects or actions that may cumulatively add to the residual impacts from the Project, including those currently present at the Site.

7.2 Summary of potential issues identified

Following the scoping process, potential impacts were considered for the following environmental issues, as relevant to the Project:

- Land use
- Visual
- Air quality and odour
- Noise and vibration
- Traffic and transport
- Ecology
- Hazard and risk, including bush fire hazard
- Soil and water
- Social and economic
- Greenhouse gas
- Heritage
- Landfill management issues.

7.3 Prioritisation of potential issues

The potential environmental issues and impacts associated with the Project were considered at the request for SEARs stage. The breadth of environmental aspects to be considered has been based on previous projects of a similar nature, previous environmental studies undertaken at the Site, consultation with SUEZ, AECOM's professional judgement and Site-specific influences. Relevant environmental aspects for further investigation are outlined in **Table 7.1**.

The issues outlined below have been broadly categorised into 'key' and 'other' issues. This reflects the degree of importance of the issue with respect to:

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- The specific nature of the Project
- The interests of the surrounding community, including consultation feedback to date
- The interests of relevant state government stakeholders, including consultation feedback to date
- The interests of PCC, including consultation feedback to date
- The SEARs
- SUEZ's plans for ongoing operations at the Site and Project Area.

Table 7.1 Prioritisation of environment issues

Key issues	Other issues
• Land use (**Chapter 8**) • Landscape and visual impacts (**Chapter 9**) • Air quality and odour (**Chapter 10**) • Noise and vibration (**Chapter 11**) • Traffic and transport (**Chapter 12**) • Social and economic impacts (**Chapter 13**) • Greenhouse gas (**Chapter 14**) • Hazard and risk (**Chapter 15**) • Cumulative impacts (**Chapter 18**)	• Ecology (**Chapter 16**) • Aboriginal and Non-Aboriginal Heritage (**Chapter 16**) • Flooding, hydrology and groundwater (**Chapter 16**) • Soils, geology and contamination (**Chapter 16**) • Landfill management (**Chapter 17**)

7.4 Format of assessment chapters

Where possible, a common format has been adopted for each of the assessment chapters of the EIS. This format is outlined below.

Executive Summary

Each topic chapter includes an executive summary. This outlines the main points of the chapter including notable results of the assessment and proposed mitigation measures. It also discusses residual impacts and other relevant permits or licences that are required.

Introduction

This section provides an overview of the environmental aspect under consideration. It also provides cross-reference to other technical assessments or relevant appendices that have been used to inform the assessment chapter.

The introduction outlines the relevant SEARs for the particular environmental aspect and outline where within the chapter (or elsewhere) they are addressed. In certain cases a particular requirement may be excluded. If so this is indicated and a justification provided.

Where relevant, legislation, policies and plans relevant to the specific environmental aspect may also be included in this section. A review of legislation and policy relevant to the Project as a whole is provided in **Chapter 4**.

Method of assessment

This section summarises the methodology for:

- Determining the existing environment as relevant to the particular environmental aspect
- Determining criteria or thresholds for the assessment of the significance of impacts
- Conducting an assessment of the potential impacts of the proposed expansion in relation to the relevant environmental aspect
- Determining and justifying whether these impacts are significant
- Providing a suite of measures to avoid, minimise and/or manage these impacts.

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For each environmental aspect an explanation is provided outlining the approach to identifying impacts and assessing whether a potential impact is likely to be significant. Assessments can be either quantitative (relying on calculation, modelling, criteria, standards and thresholds) or qualitative (using certain scientific material, but ultimately making decisions based on professional judgement).

Existing environment

This section describes the key components, characteristics and status of the existing environment relevant to the environmental aspect. This includes detail on historic and ongoing operations at the Site, as relevant to the issue under consideration.

Impact assessment

This section identifies potential impacts of the Project on relevant receptors for particular environmental aspects assessed. It includes aspect-specific methodologies for evaluating the significance of the impact in accordance with the criteria detailed in the method of assessment.

In general, impacts may be referred to as either prior to (potential impact) or following mitigation (residual impact). For this section of each chapter all impacts are potential impacts.

Impacts can be considered as:

- Direct or indirect
- Adverse or beneficial, or
- Significant, non-significant or neutral.

Where existing criteria, guidance, environmental standards or assessment methodologies exist, the significance of an impact is based on that information. Where possible and/or necessary quantitative assessments about the significance of an impact are made using this information. Where no explicit guidance or Site-specific quantitative information exists, a qualitative assessment of the significance of an impact are made. Where qualitative judgements are required, some or all of the following characteristics are considered to understand the potential magnitude of impact:

- Extent - the area potentially affected by the impact
- Magnitude - the size or amount of the impact
- Duration - how long the impact is likely to last
- Frequency - whether the impact is continuous, brief or intermittent
- Timing - if the impact occurs at a particularly sensitive time, and
- Permanence - whether the impact is permanent or temporary.

Consideration of whether an impact is significant will depend on the importance or sensitivity of the receptor (e.g. as defined by legislation, policy, standards, guidance or professional judgement) and the magnitude of the impact (as determined by quantitative or qualitative means). For the purposes of the 'Impact assessment' section of each technical assessment chapter all impacts are considered 'alone' and not cumulatively.

Management and mitigation measures

This section describes the measures that have been identified to avoid, reduce and compensate for the relevant impacts on the environment arising from the Project.

The mitigation hierarchy has been used to help identify management and mitigation measures for each of the technical assessments. Wherever possible, impacts have firstly been avoided where possible, then either reduced at the source or at the receptor where avoidance cannot be achieved and finally either compensated or offset where avoidance or reduction is not possible or would not achieve practicable or acceptable levels of mitigation.

If management and mitigation measures are to be implemented through particular environmental management plans, these are also discussed in this section.

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Once all of the mitigation measures are identified and described, the section also considers any residual impacts that would remain following the application of management and mitigation measures.

The mitigation and management measures from all technical assessments chapters are collated into a single table within **Chapter 19**.

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Chapter 8

Land use

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8.0 Land use

Executive summary

The surrounding area is currently comprised of primarily rural-residential and industrial land uses with smaller areas of residential and commercial development. The Site itself is industrial in nature, having been historically quarried and is now utilised solely for landfilling. Whilst the Project would prolong the life of the landfilling operation at the Site and alter the physical design of the final landform, the potential for the Project to alter the nature of the land use within the Site or its surrounds would be negligible.

The Site is located within an area subject to rapid land use change, driven primarily by the construction of Western Sydney Airport. This is expected to change the surrounding land use from rural land uses towards commercial and industrial land uses throughout the existing approved, and proposed extended, life of the landfill. The presence of the Project is not expected to influence or hinder this development due to the Project's low level of off-site impacts.

Overall the impact of the Project upon the existing and future use of surrounding land is considered to be negligible.

This chapter considers the consistency of the Project with relevant land use controls and strategies, and existing and planning land use activities on the Site and surrounding land, to demonstrate that the Site is suitable for the proposed Project.

Table 8.1 sets out the SEARs relevant to land use planning considerations and where these are discussed in this chapter.

Table 8.1 SEARs - Project description

SEARs	Where addressed in this EIS
strategic context – including: • demonstration that the proposal is consistent with all relevant planning strategies (including the Western City District Plan), environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies.	**Section 8.4**
suitability of the Site – including: • a detailed justification that the Site can accommodate the proposed landfill, having regard to the scope of the operations of the existing facility and its environmental impacts and relevant mitigation measures.	**Section 8.6**

8.1 Assessment Approach

8.1.1 Overview

The methodology adopted for the preparation of the land use planning assessment comprises:

- Analysis of the key existing land use characteristics of the Site and surrounding land
- Review of relevant planning controls including Commonwealth and NSW legislation, relevant EPIs and DCPs
- Review of relevant planning strategies and how this Project is consistent with these
- Analysis of the likely future land use character of the Site and surrounding land based on currently proposed and approved planning proposals, development applications, and State significant infrastructure projects, and assessment of the likely impacts of the Project on the Site and surrounding land uses, and

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- A justification that the Site can accommodate the proposed expansion of the existing landfill.

8.2 Existing Environment

8.2.1 Existing land use within the Site

The Site is located at Badgerys Creek, NSW. The Site is currently approved and operating as a non-putrescible landfill, accepting non-putrescible general solid waste and restricted solid waste in accordance with the Site's existing EPL. Landfilling activities currently involve the use of two different landfilling methods to contain different classes of waste. General solid waste cells are located approximately in the centre and west of the Project Area and receive general solid waste (non-putrescible). Waste cells located along the northern and eastern boundaries of the Project Area receive restricted solid waste.

The Site contains waste cells for the waste types outlined above, as well as workshops and administration buildings, roads, car parking, weighbridges, stormwater basins, leachate storage infrastructure and other ancillary infrastructure.

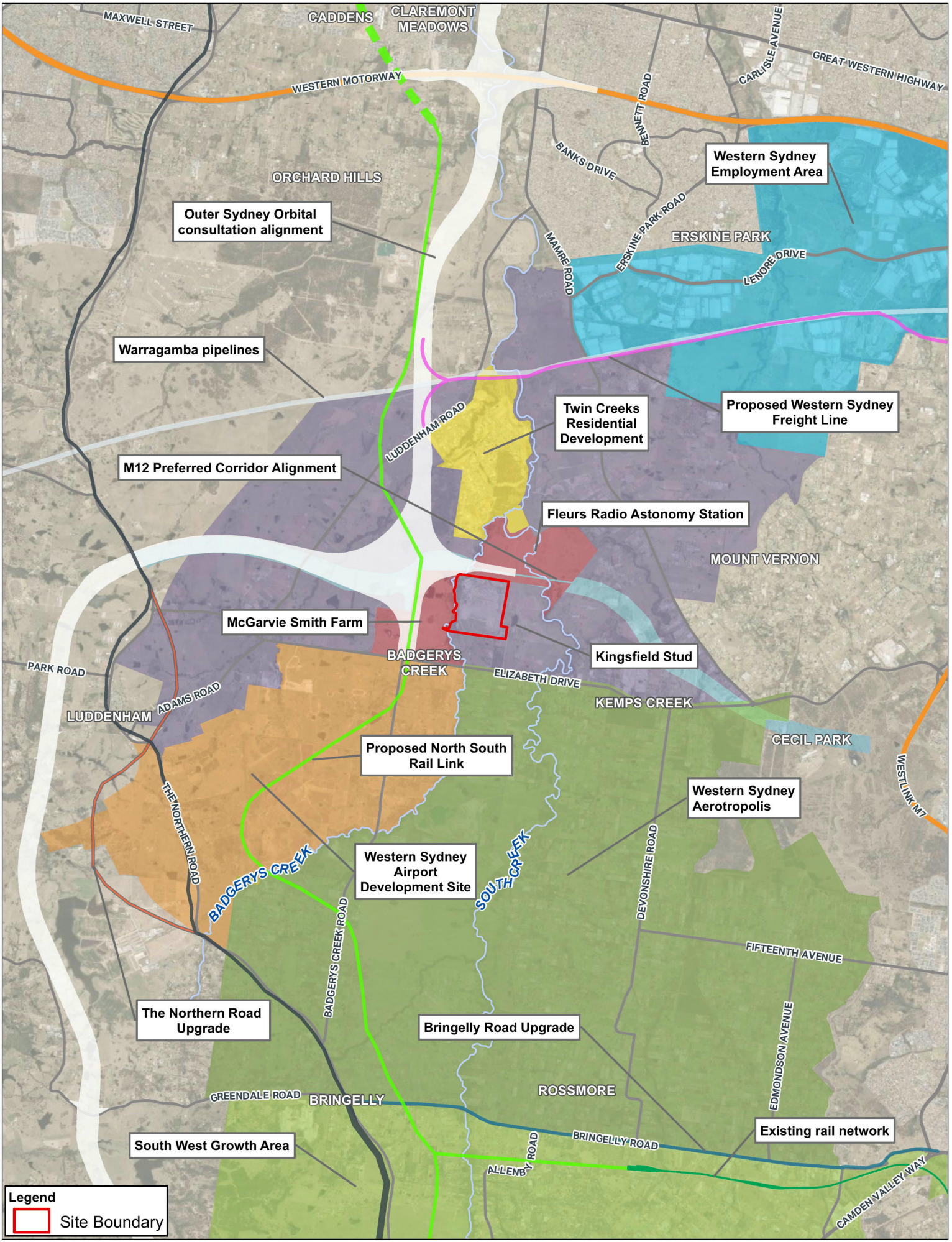
The Site also contains the SAWT and landfill gas powered electricity generation facility, occupying approximately seven hectares of the Site. These facilities are consented and operate separately to the main landfill operations.

8.2.2 Surrounding development

Land uses surrounding the Site are generally rural and industrial in nature with smaller areas of residential and commercial development. This includes a variety of agricultural production including the growing of fruits and vegetables and grazing activity, as well as intensive poultry farming. Industrial activities include metal fabrication, landfilling and quarrying, particularly for brick manufacture.

Figure 8.1 illustrates the relationship of surrounding land uses to the Site and **section 2.2.1** provides a detailed description of these surrounding land uses.

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SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 8.1: SURROUNDING LAND USES

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8.2.3 Current approvals for the Site

Various development approvals have been granted for the Site since at least 1990, some of which have been modified a number of times. These approvals permit the use of the Site for quarrying, filling the Site, and for processing of various types of waste.

The approvals fall into two categories – quarrying and landfilling, or waste management operations. The original approvals and associated development applications (DAs) were generally granted for quarrying and landfilling, with later approvals granted for waste management operations and energy generation (**Table 8.2**).

Table 8.2 Existing consents

Approval/Modification	Date Approved	Development
DA 451/89	22 October 1990	'Continued operation and backfilling of the Badgerys's Creek Quarry'
Mod 1	3 March 1992	Amended the approval for the existing quarry and waste disposal depot to provide a mini-transfer area with a tipping and collection area
Mod 2	27 October 1993	Amended to include "and blasting in accordance with details submitted to Council on 16 July 1993"
Mod 3	19 October 1999	Deletion of conditions 27 and 28 for contributions to Council
Mod 4	16 November 2001	Alteration to increase finished fill levels
Mod 5 Ref DA08/0958	8 February 2012	Alteration to increase finished fill levels and extend hours of operation (SITA)
Mod 6 Ref DA08/0958	Refused 8 February 2012	Modification to extend operating hours
DA07/0678	14 September 2007	Trial program for recycling of aluminium salt slag
DA07/1087	31 March 2008	Widening of landfill Site access road
DA08/1278	15 April 2009	Septic Tank
DA 12/0515	21 May 2013	Gas to energy platform and gas collection system for SITA Kemps Creek Landfill Site
DA12/0515.01	11 August 2016	Minor alterations to the approved gas to energy platform and gas collection system
Advanced Waste Treatment – General Sold Waste (putrescible) MP(06-0185)	15 April 2008	To operate on approx. 6ha in the northwest corner of the Site.
Mod 1	20 September 2010	Extension of operating hours
Mod 2	N/A - Withdrawn	Increase annual input
Mod 3	24 January 2014	Maturation pad upgrades

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Approval/Modification	Date Approved	Development
Waste Management Facility – General Solid Waste (putrescible)	Under assessment Exhibition ended 3 June 2016.	Expansion of existing SITA AWT including: Increase capacity to 220,000 tonnes per annum of waste Modify current layout at Site Increase operation hours for indoor from 7am to 11pm Monday to Friday to 24 hours per day, seven days per week.

8.3 Planning Controls

8.3.1 The Site

The Site is located wholly within the Penrith LGA. The Penrith LEP 2010 and the Penrith DCP 2014 apply to the Site.

Penrith LEP 2010

The Site is zoned as part RU2 Rural Landscape and part E2 Environmental Conservation under clause 2.1 of the Penrith LEP 2010. The E2 zoning occupies a narrow band along the western boundary of the Site and includes the waterway of Badgerys Creek.

The current approval for the Site relating to its use as a landfill Site (DA 451/1989) was granted on 22 October 1990 and relates to the whole of the Site, including land that is now zoned E2. At the time this approval was granted the entire Site was zoned '1(a1) Rural A1', within which the activities of 'extractive industry' and 'waste disposal' were permissible. Subsequent approved modifications to this approval relate only to the land that is now zoned RU2.

The proposed development for a waste disposal facility is prohibited within both the RU2 and E2 zones under Penrith LEP 2010. Despite this, Division 23 of the Infrastructure SEPP provides for a waste disposal facility to be permitted with development consent within the RU2 zone. The Infrastructure SEPP does not however permit the development of a waste disposal facility within the E2 zone. However, the Project only applies to land in the RU2 zone.

Penrith DCP 2014

The Penrith DCP 2014 sets out detailed planning and design guidelines that support/supplement the provisions of the Penrith LEP 2010.

A review of the consistency of the Project with the Penrith DCP 2014 is provided in **Appendix E**. This demonstrates that the Project would effectively comply with the requirements of the Penrith DCP 2014.

8.3.2 Surrounding Land

The areas immediately surrounding the Site are located within the Penrith LGA and are zoned under the Penrith LEP 2010 as follows:

- Land to the immediate north, east and south is zoned RU2 Rural Landscape
- Land immediately to the west along Badgerys Creek is zoned E2 Environmental Conservation. This zoning is also present alongside both South Creek and Kemps Creek to the east of the Site, as well as a narrow corridor of land to the north of the Site
- An area of land approximately 600 m to the north of the Site, as well as land to the west of Badgerys Creek, is zoned for 'E4 Environmental Living' proposes.

While the Site and its immediate surrounds are located within the Penrith LGA it is acknowledged that the boundary with the Liverpool LGA lies along Elizabeth Drive, approximately 500 m to the south. The following is a summary of the land use zones in proximity to the Site located within the Liverpool LGA:

- Land to the south along Elizabeth Drive is zoned SP2 Infrastructure
- Further south of Elizabeth Drive, land between Badgerys Creek and Kemps Creek is zoned RU1 Primary Production

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- Land to the south of Elizabeth Drive and the east of Kemps Creek is zoned RU4 Primary Production Small Lots
- Land to the south of Elizabeth Drive and the west of Badgerys Creek is zoned SP1 Special Activities (land reserved for the Western Sydney Airport).

The Project is compatible and would not conflict with the objectives of the zoning and land uses on surrounding land, as per existing operations on the Site.

8.4 Relevant Planning Strategies

8.4.1 Greater Sydney Region Plan 2018

The Greater Sydney Region Plan (the Region Plan), developed by the Greater Sydney Commission (GSC) and released in March 2018, sets the vision and strategy for the Greater Sydney Region. This vision is based on the concept of 'a metropolis of three cities' comprising the current Sydney CBD, the emerging CBD of Parramatta, and a new Western Sydney CBD (the 'Western Sydney Parkland City') to be planned as part of the future Western Sydney Airport.

The Site is located within the Western Parkland City, and approximately 500 m northwest of the Western Sydney Airport site.

One of the 40 objectives set out in the Region Plan (Objective 20) is to leverage the development of the new Western Sydney Airport and Badgerys Creek Aerotropolis as an economic catalyst for the Western Sydney Parkland City. One of the strategies identified under this objective (Strategy 20.2) involves developing and implementing a land use and infrastructure plan for the Western Sydney Airport area (within which the Site is located) that:

- Supports commercial development, aerospace and defence industries and the innovation economy
- Supports internationally competitive freight and logistics sectors
- Plans vibrant strategic centres and attracting health and education facilities, cultural, entertainment, arts and leisure activities
- Creates high quality places with a focus on walking and cycling
- Improves transport connections across the Western Parkland City.

In line with this strategy, a land use and infrastructure implementation plan for the Western Sydney Aerotropolis was released in August 2018 (refer **section 8.4.3**)

A central organising principle set out in the Region Plan for guiding development of the Western Parkland City are two key north-south corridors - the South Creek 'green' corridor and a new rail corridor (refer **Figure 8.2**). The Site is in the vicinity of these two corridors, and these are therefore considerations relevant to the Project.

The Region Plan envisages a green spine for the Western Parkland City along South Creek. Planning for the South Creek precinct will incorporate the following urban design principles:

- Orientate development to face towards the creek corridor
- Create a transect of creek-oriented place types and things to do
- Build a network of everyday uses within a walkable creek catchment
- Provide creek connections and encourage waterfront activities.

The Region Plan also considers a connected active transport network along Badgerys Creek with a specific objective around maximising the use of existing open space and protecting, enhancing and expanding public open space. Further, it promotes the management of urban bushland and remnant vegetation as green infrastructure.

Objective 29 of the Region Plan relates to ensuring that environmental, social and economic values in rural areas are protected and enhanced. The Region Plan states that urban development should be

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limited to land within the designated Urban Area, except for the investigation areas at Horsley Park, Orchard Hills, and east of The Northern Road, Luddenham **Figure 8.2**.

Planning for these uses has been undertaken accounting for the existing and operational Elizabeth Drive Landfill.

Based on the above objectives and strategies, the wider area within which the Site is located is expected to transition towards a mix of primarily commercial and open space land uses over time.

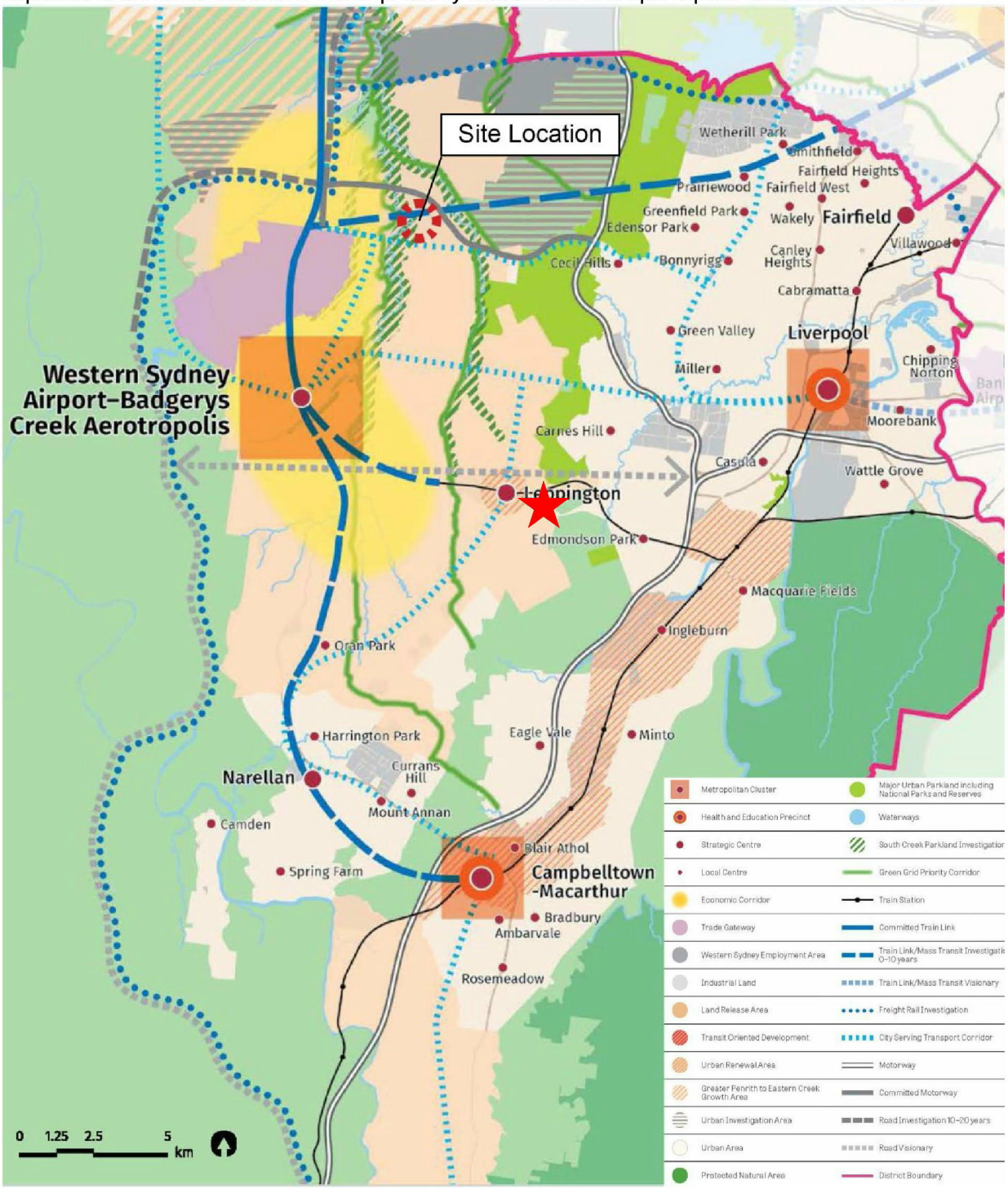


Figure 8.2 Western City District Plan (Source: GSC 2018)

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8.4.2 Western City District Plan 2018

The Site is located within the Western City District of Greater Sydney (see **Figure 8.2**). The Western City District Plan (the District Plan), developed by the GSC and released in March 2018, sets out aspirations and proposals for Greater Sydney's Western District. It is a guide for implementing the Region Plan at a District level and is a bridge between regional and local planning.

The District Plan reiterates the objectives set out in the Region Plan with regard to the Western Sydney Airport and Aerotropolis and specifies a planning priority (Planning Priority W8) around leveraging commercial/economic opportunities from the Western Sydney Airport and Aerotropolis.

8.4.3 Western Sydney Aerotropolis

The Site is located within the Western Sydney Aerotropolis (previously the Western Sydney Growth Area). This area has been identified by the NSW Government as a location for future employment focused uses, with some residential development, to support the future Western Sydney Airport (see **Figure 8.3**). The Aerotropolis is a 11,200 hectare site consisting of nine 'precincts', which combined will deliver an 'economic hub' as part of the vision for the Western Parkland City.

The Federal and New South Wales Governments are working together on land use planning around the airport to maximise opportunities for new jobs and industry and to ensure future land uses are compatible with the airport's growth. The *Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan Stage 1: Initial Precincts* (DPE, 2018) provides a structure plan, describing how future development within the Aerotropolis should be arranged. It considers the South Creek catchment and floodplains and future infrastructure/transport corridors to identify suitable land uses and their distribution. This plan will inform and guide future rezoning of the land in the area.

As shown in **Figure 8.3**, the Site is located in an area identified in the Land Use and Infrastructure Implementation Plan as primarily 'Flexible Employment' land, within the 'Badgerys Creek' precinct (for which detailed planning is yet to be provided). A small portion of the Site along its western edge is identified as forming part of the South Creek precinct.

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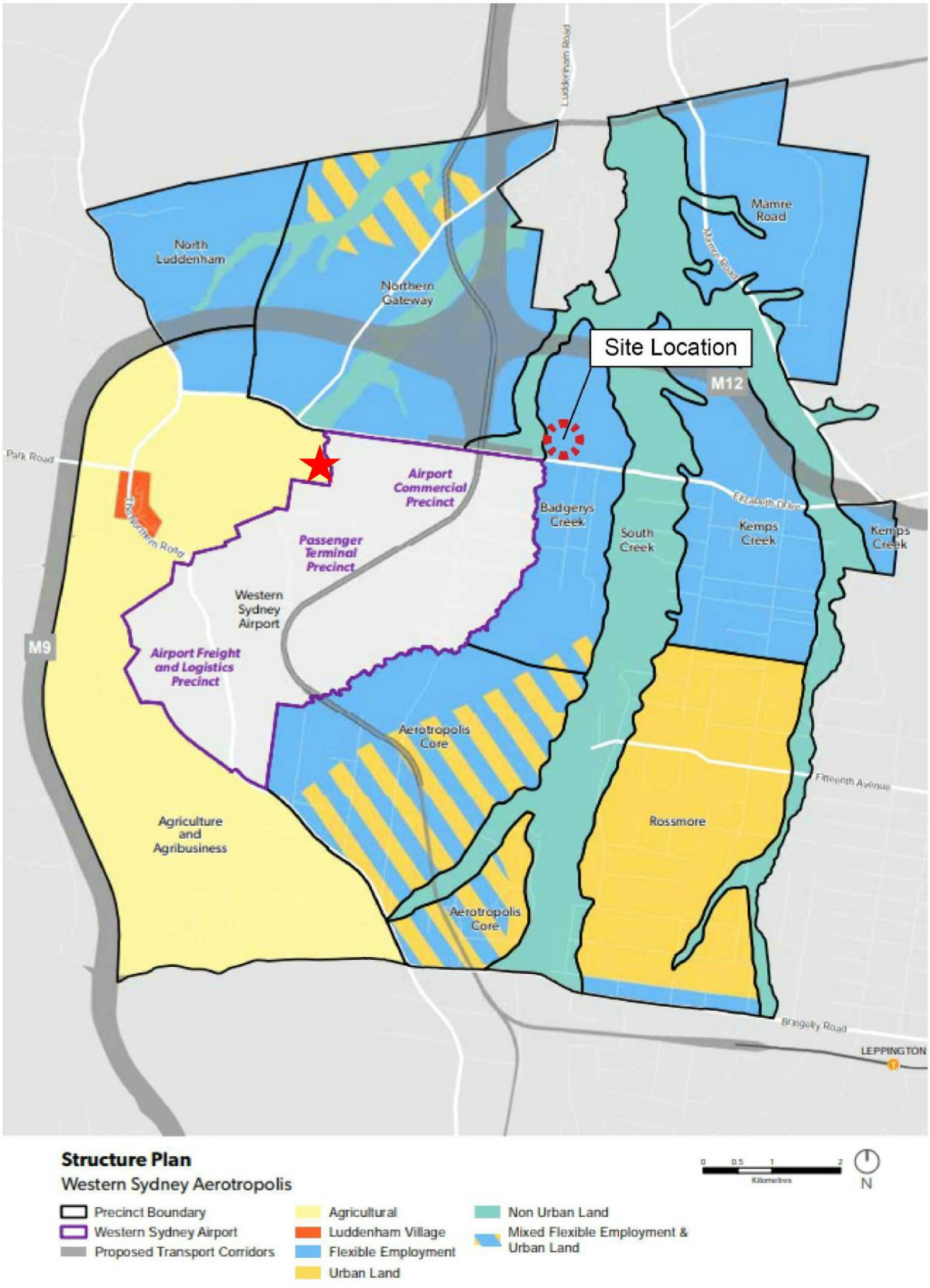


Figure 8.3 Western Sydney Aerotropolis

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8.4.4 Penrith Council Community Plan 2017

The Penrith Council Community Plan 2017 (the Community Plan) is based around seven outcomes the community has identified to improve Penrith as a place to live, work and visit the next 20 or more years. These outcomes are focussed around residents being able to work closer to home, having a city that is easy to get around, successfully planning for future growth, creating safe and vibrant places, caring for the environment, having a healthy community and ensuring there is confidence in council.

The Project would be undertaken within an active landfill site that has operated for approximately 30 years. The Project would not be detrimental to the achievement of the goals and aspirations outlined in the Community Plan.

8.4.5 Penrith Council City Strategy 2017

The Penrith City Strategy 2017 (the Strategy) identifies the key issues Council expects to face over the next 10-20 years, and provides an outline of how Council will respond. The Strategy directly informs the Community Plan.

As evidenced by the Council's Advocacy Program outlined in the Strategy, a priority for Council is the provision of north-south transport services and the reservation of land for transport corridors. A further priority is to protect the scenic and natural landscape values and the productive capacity of the City's rural lands. This includes the protection of the City's agreed urban and rural boundaries refer **Figure 8.4**.

As outlined above, the Project would be confined within the Site and as such would not affect the ability for changing land uses around the Site to be realised. The Project would result in a minor additional visual impact compared to the currently approved cap.

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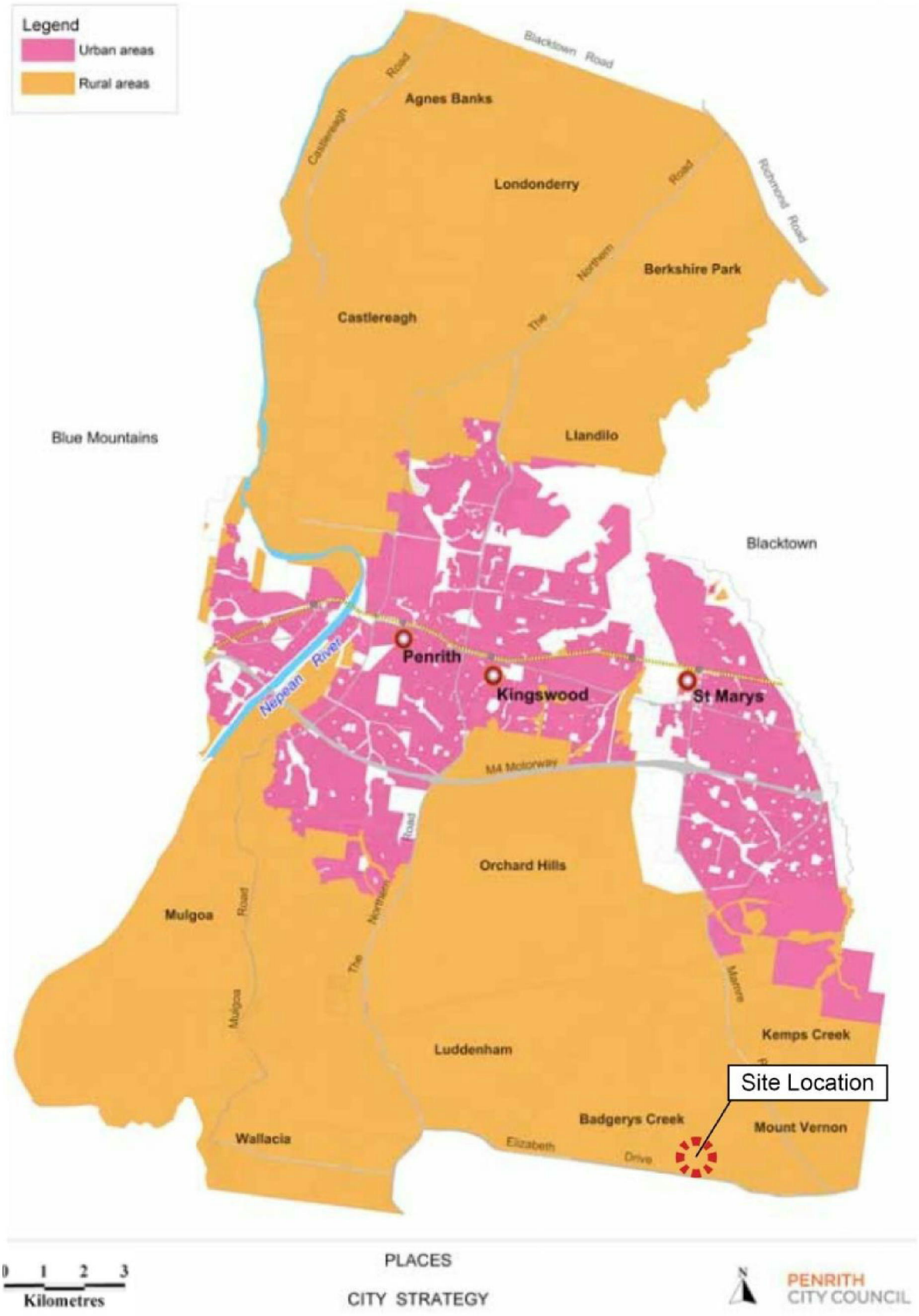


Figure 8.4 Penrith LGA urban and rural land boundaries

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8.4.6 Consistency with Relevant Strategies

The Greater Sydney Region Plan and the District Plan anticipate that the area around the Site would support the development of an Aerotropolis, focused on encouraging industry and employment. This area is also intended to support the provision of green networks and provide for essential supporting infrastructure.

The Project is consistent with these strategies as:

- The current and intended future land use of the Site would not conflict with neighbouring or nearby land uses intended for the development of an employment-focused Aerotropolis
- The Project would not result in the obstruction of any other nearby employment development
- The Project would not conflict with the development of transport corridors proposed for the District and would be a compatible land use with this type of development.

The Site would not be able to support any type of significant construction in the short term (up to 30-50 years) given ongoing ground settlement from past landfilling activities. It may however be available for other non-structural economic generating uses that would align with the strategic directions (refer to **section 8.6**).

The PCC plans and strategies prioritise transport connectivity, planning for growth, protection of the environment (including preservation of scenic and natural landscape) and supporting a safe, healthy community. The Project is consistent with these plans and strategies as it would support, and be compatible with, the development of surrounding transport corridors; would not impact on the safety or health of the community; would support community growth by providing for processing of additional waste and would provide for green and relatively natural landscapes once landfilling has ceased and the Site is capped.

8.5 Future environment/land use

The following section provides an outline of the likely future land use within and around the site. This outline is included to provide context to the subsequent assessment of compatibility between the Project and future surrounding land uses (see **section 8.6**).

8.5.1 Future environment/land uses surrounding the Site

The Kemps Creek area is undergoing significant change. To understand the likely future environment and land uses surrounding the Site, an analysis of planning proposals and development applications recently approved or under assessment was undertaken.

A search of PCC and Liverpool City Councils' development application registers, the NSW DPE major project tracking system, and the Joint Regional Planning Panels development and planning register, found a number of planning proposals relevant to land in proximity to the Project. The status of each proposal, such as whether SEARs have been issued, are provided in **Table 8.3**.

The applications outlined below primarily relate to industrial activities/land uses – either the expansion of existing uses or development of new uses. An exception to this is the expansion of the Twin Creek Development to the north of the Site to include a hotel and additional golf/country club facilities.

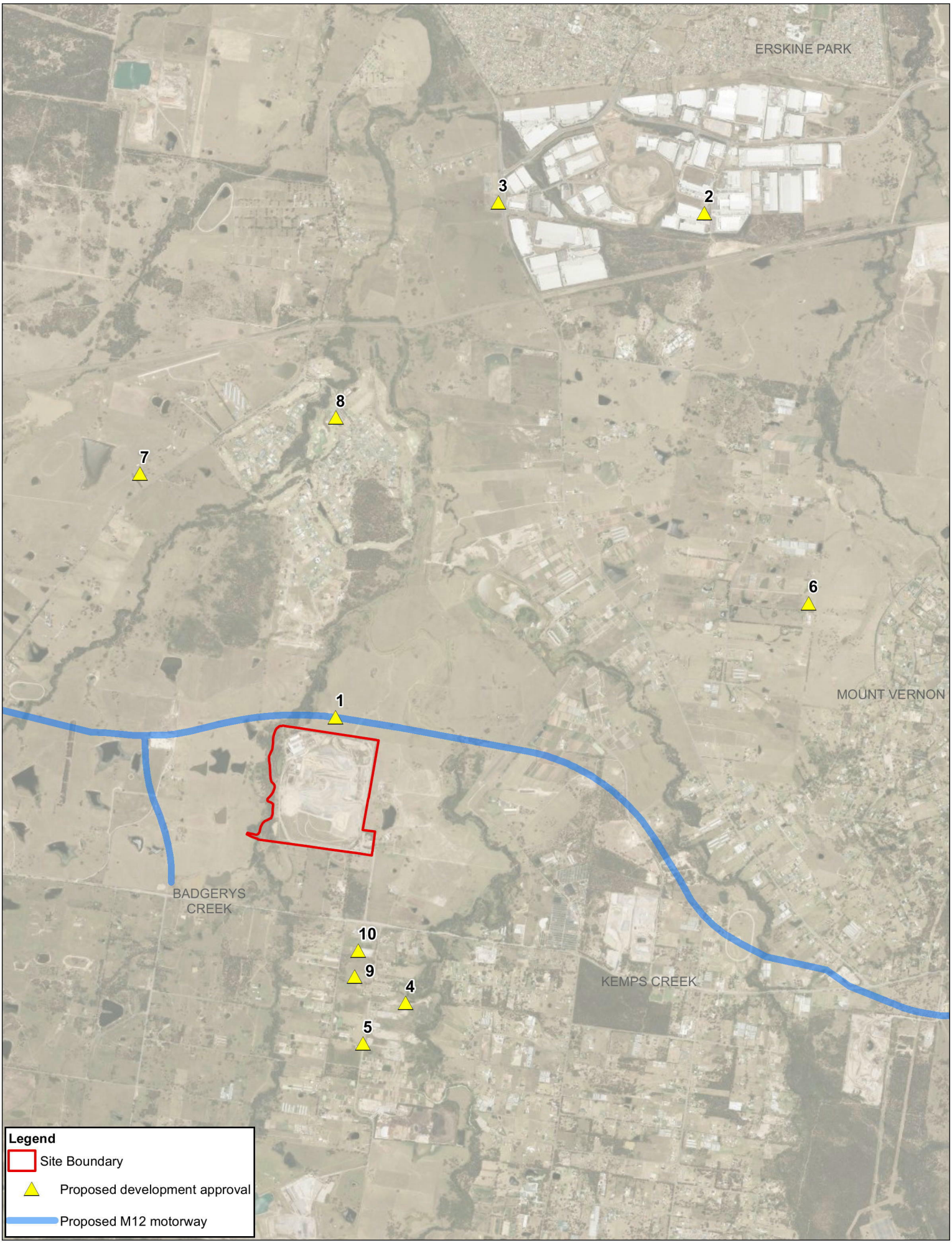
Table 8.3 Development Applications and State Significant Development Applications recently approved or under assessment

ID	Distance from Site	Planning Proposal/DA	Status	Description
1	140 m	M12 Motorway SSI	SEARs issued	Proposal to build the M12 Motorway, about 16 kilometres between the M7 Motorway, Cecil Hills and The Northern Road, Luddenham

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ID	Distance from Site	Planning Proposal/DA	Status	Description
2	5.27 km	Jacfin Horsley Park Employment Precinct, Burley Road Horsley Park	Undergoing sufficiency review with DPE	Proposed modification to Jacfin Horsley Park Employment Precinct Project (for industrial/employment uses and associated works), Stage 1: Warehouse and Subdivision
3	4.69 km	Snack Brands Warehouse and Distribution Facility, 585 Mamre Road, Orchard Hills	SEARs being prepared	Proposed Warehouse and Distribution Facility
4	1.29 km	Badgerys Creek Resource Recovery and Landscaping Facility,80 Martin Road Badgerys Creek	SEARs issued	Proposed resource recovery facility and landscape supplies facility
5	1.60 km	Badgerys Creek Quarry and Brickworks, 235 Martin Rd, Badgerys Creek	Modification Report (MR) exhibition concluded 16/05/2019. Proponent preparing RTS report	Proposed modification to Brickworks Concept Plan including a solar farm, dewatering of Pit 1 and extraction of remaining clay resource to a depth of 35 metres below the pre-existing natural surface of the ground
6	3.84 km	Community Facility - Place of Public Worship, 230-242 Aldington Road Kemps Creek	Under assessment,	Proposed Place of Public Worship
7	2.45 km	Commercial Development 565-609 Luddenham Road Luddenham	Approved March 2018	Proposed construction of a seven storey office building and associated works
8	2.67 km	Golf Club & Golf Course 2-8 Twin Creeks Drive Luddenham	Approved 30 April 2018	Staged construction of Twins Creek Resort including 165 room hotel and alterations and additions to existing golf and country club
9	1.04 km	Resource Recovery Facility, 55 Martin Road, Badgerys Creek	Approved 17/04/2019	Proposed Resource Recovery Facility for 95,000 tonnes per annum of construction and demolition waste
10	819 m	Resource Recovery Facility, 25 Martin Road Badgerys Creek,	Approved by (Former) Sydney South West Planning Panel, July 2017	Construction and operation of a resource recovery facility and ancillary structures

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FIGURE 8.5: PROPOSED DEVELOPMENT APPLICATIONS

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8.5.2 Planned infrastructure projects

There are a number of significant infrastructure projects in planning and underway in the vicinity of the Site, the most significant of which is the development of the new Western Sydney Airport (WSA).

The Australian and NSW governments are also funding a 10 year, $3.6 billion road investment program to capitalise on the economic benefits from developing the WSA. Two key relevant projects coming out of this program are the M12 Motorway for which an EIS is currently being prepared and an upgrade of Elizabeth Drive to dual carriageway.

The NSW Government has also identified future rail projects in the region. These include a potential North-South Rail Link from the around the south west growth centre north towards Penrith, and an extension of the existing South West Rail Link, extending this line from Leppington to St Marys via the Western Sydney Airport site (refer **section 8.4.1**).

The following section describes these infrastructure projects in greater detail.

Western Sydney Airport

An EIS for the Western Sydney Airport (WSA) was completed on 15 September 2016 and forwarded to the Minister for the Environment and Energy, for consideration. The Minister subsequently authorised the construction and operation of Stage 1 of the airport (a single runway facility) on 12 December 2016 in accordance with the Western Sydney Airport Plan (Airport Plan). The Airport Plan sets out the vision for the development and operation of the Airport and includes details on concept design and indicative airport layout and zoning.

The proposed airport will be designed and developed in stages to meet the needs of future passengers and freight movements, growing in line with aviation demand. Works are currently underway on Stage 1, with the Airport set to open in late 2026.

Runway modes of operation

Runway modes of operation determine how an airport's runway system is used and refer to the direction in which aircraft take off and land. Modes of operation are informed by assessing runway orientation and availability against factors such as forecast meteorological conditions (especially wind direction and strength), aircraft profile and capability, demand and traffic volumes, airspace management procedures, and potential impacts on surrounding communities, including noise. There are two main operating modes available at the airport during single runway operations: departures and arrivals in a south-west direction (referred to as operating mode 05); departures and arrivals in a north-east direction (referred to as operating mode 23).

To manage noise impacts, a third operating mode, 'head-to-head' (also known as reciprocal runway operations) will be thoroughly evaluated through further detailed assessment. Under this mode all aircraft arrivals and departures would use only one end of the runway, therefore offering a respite period for receivers under the non-active flight path.

Obstacle Limitation Surfaces (OLS)

The OLS is a series of virtual surfaces around a runway which establish the height limits for objects in and around an airport. It identifies the lower limits of an airport's airspace, which should be kept free of obstacles that may endanger aircraft during take-off, preparation to land and landing. The WSA Airport Plan sets out an OLS for the long-term layout at the airport, which will be protected under the Airspace Protection Regulations (refer **Figure 8.6**).

Being close to the north-eastern end of the proposed runways, the Site is subject to the OLS. Small sections of the south-western corner of the Site are subject to limits of 110 m AHD and 120 m AHD, with the majority of the Site being subject to a limit of 125.5 m AHD. The proposed increased final cap height of RL 95 m equates to an airspace of 30.5 m across the majority of the Site. No part of the Site, nor associated equipment, machinery or infrastructure is proposed to exceed this limit at any point during the operation of the Project.

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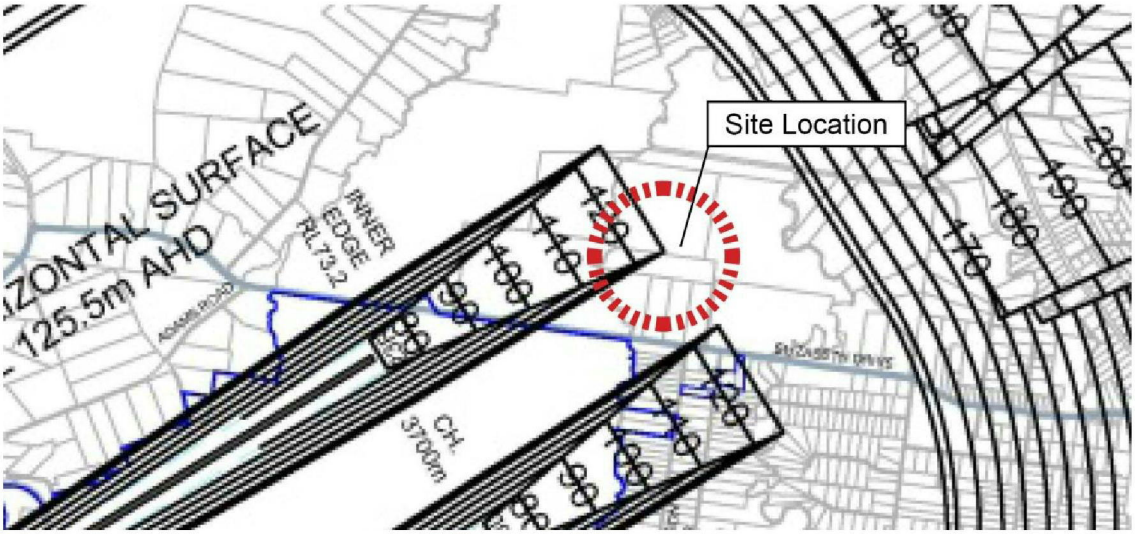


Figure 8.6 Western Sydney Airport OLS

Projected aircraft noise contours

An Australian Noise Exposure Forecast (ANEF) would be prepared for the WSA during the detailed airspace design phase, based on modelled long-term parallel runway operations. An ANEF chart endorsed by Airservices Australia would help to refine the existing land use planning controls that have been in place around the Airport Site over the past three decades, and set new standards for development.

Australian Noise Exposure Concept (ANEC) charts are used to describe the potential noise impacts of proposed airport developments. They are calculated under Australian Standard AS2021 (Acoustics - Aircraft noise intrusion - Building siting and construction) and represent a hypothetical future set of conditions at an airport. ANEC charts represent the average noise exposure from an average day, calculated over a 12-month period.

The indicative aircraft noise contours as they apply to the Site for Stage 1 operations and the long-term airport operations (approximately in the year 2063) are shown in **Figure 8.7** and **Figure 8.8** and are summarised in **Table 8.5**. Acceptable uses within varying ANEF zones (which are calculated using the same methods as ANEC) surrounding an airport are provided in **Table 8.4**. Based on this, industrial uses (with the exception of light industrial uses) are the only type of development that would be considered acceptable across all of the Site in the long term (refer **Table 8.5**). Other uses would be conditionally acceptable on parts of the Site.

As the development of substantial, permanent structures on landfill sites (such as industrial facilities) is restricted due to ground settlement, it is highly unlikely the Project would result in a restriction on future land uses further than what is currently possible.

Table 8.4 Building site acceptability based on ANEF zone (Source: AS2021)

Building Type	ANEF zone of site		
	Acceptable	Conditionally acceptable	Unacceptable
House, home, unit, flat, caravan park	Less than 20 ANEF	20 – 25 ANEF	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 – 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF	20 – 25 ANEF	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF	20 – 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF	20 – 30 ANEF	Greater than 30 ANEF

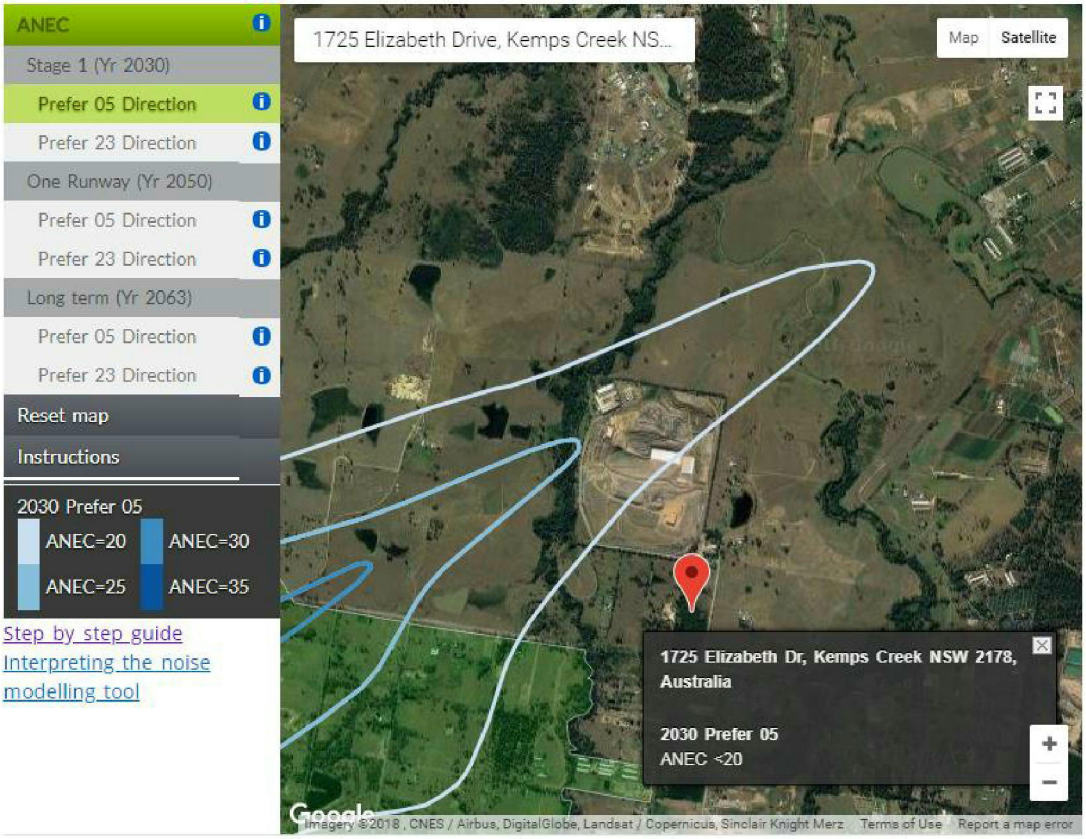
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Building Type	ANEF zone of site		
	Acceptable	Conditionally acceptable	Unacceptable
Commercial building	Less than 25 ANEF	25 – 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 – 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Table 8.5 ANEC as the apply to the Site

Airport development stage	Aircraft landing and taking off in the 05 Direction	Aircraft landing and taking off in the 23 Direction
Stage 1	• Majority of the Project Site located within ANEC <20 • Southern and eastern parts of the Site located within ANEC 20 - 35	• Majority of the Project Site located within ANEC <20 • Northern parts of the Site located within ANEC 20 - 30 and ANEC 25 – 30
Long Term	• Majority of the Project Site located within ANEC 20 – 35. • Southern and eastern parts of the Site located within ANEC 25 – 30	• Majority of the Project Site located within ANEC 20 – 25 • Southern and eastern parts of the Site located within ANEC 25 – 30 and ANEC 30 - 35

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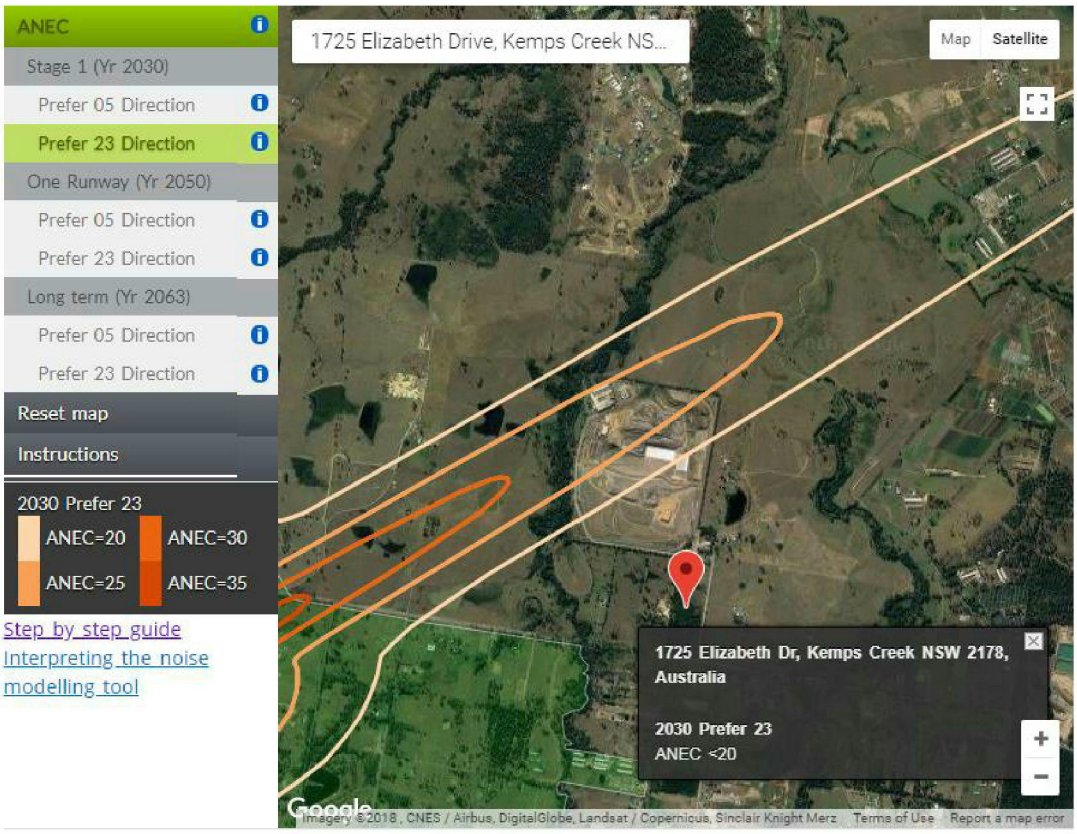
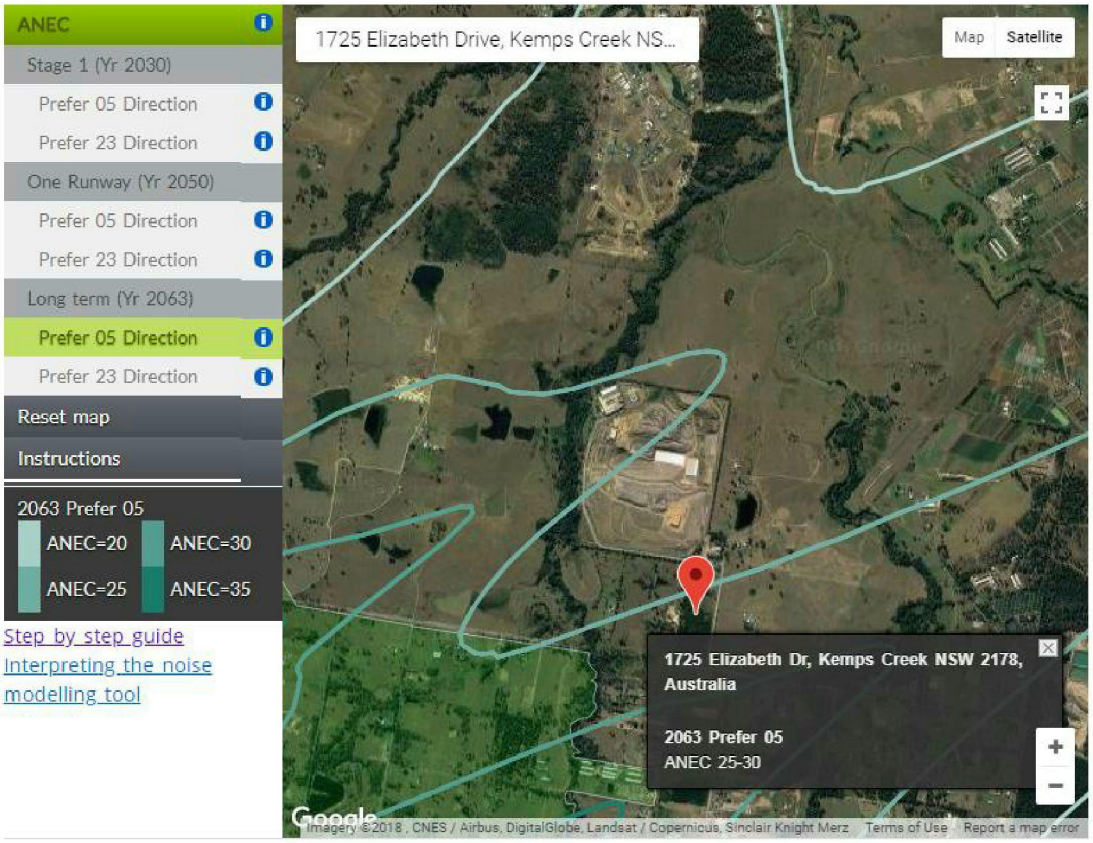


Figure 8.7 Indicative ANEC – Stage 1 (Yr 2030)

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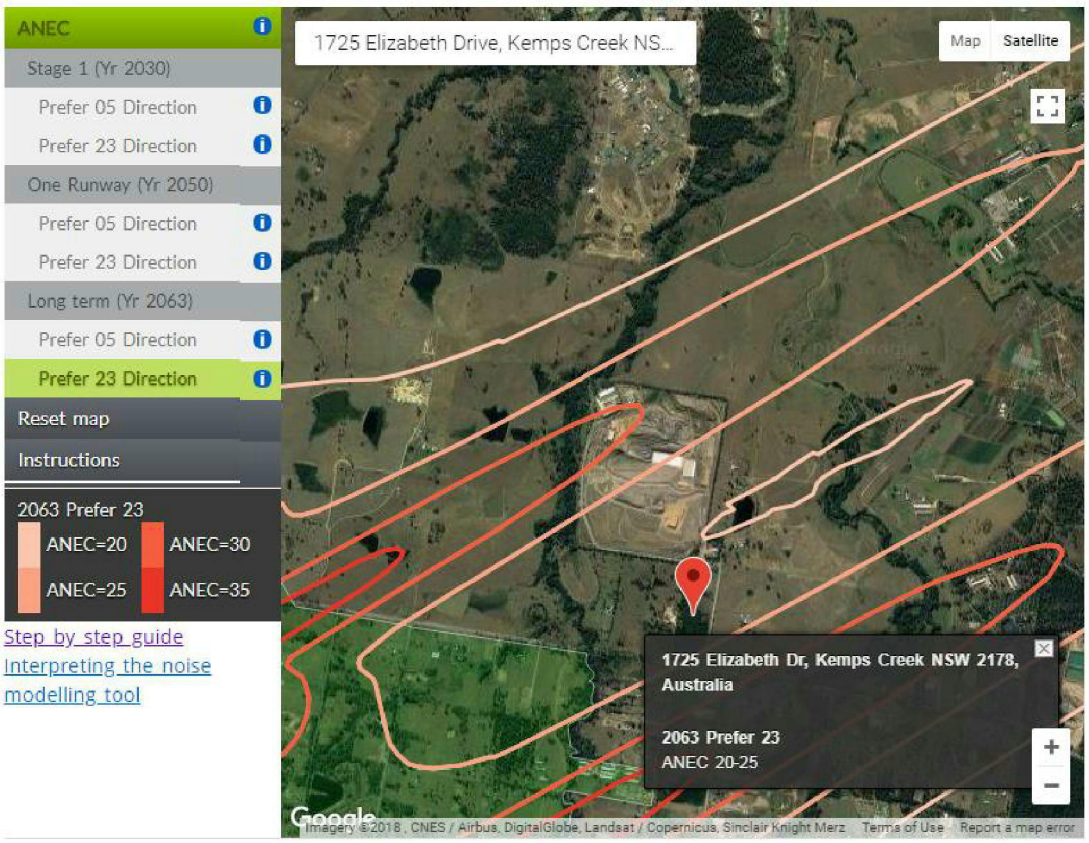


Figure 8.8 Indicative ANEC – Long Term (Yr 2063)

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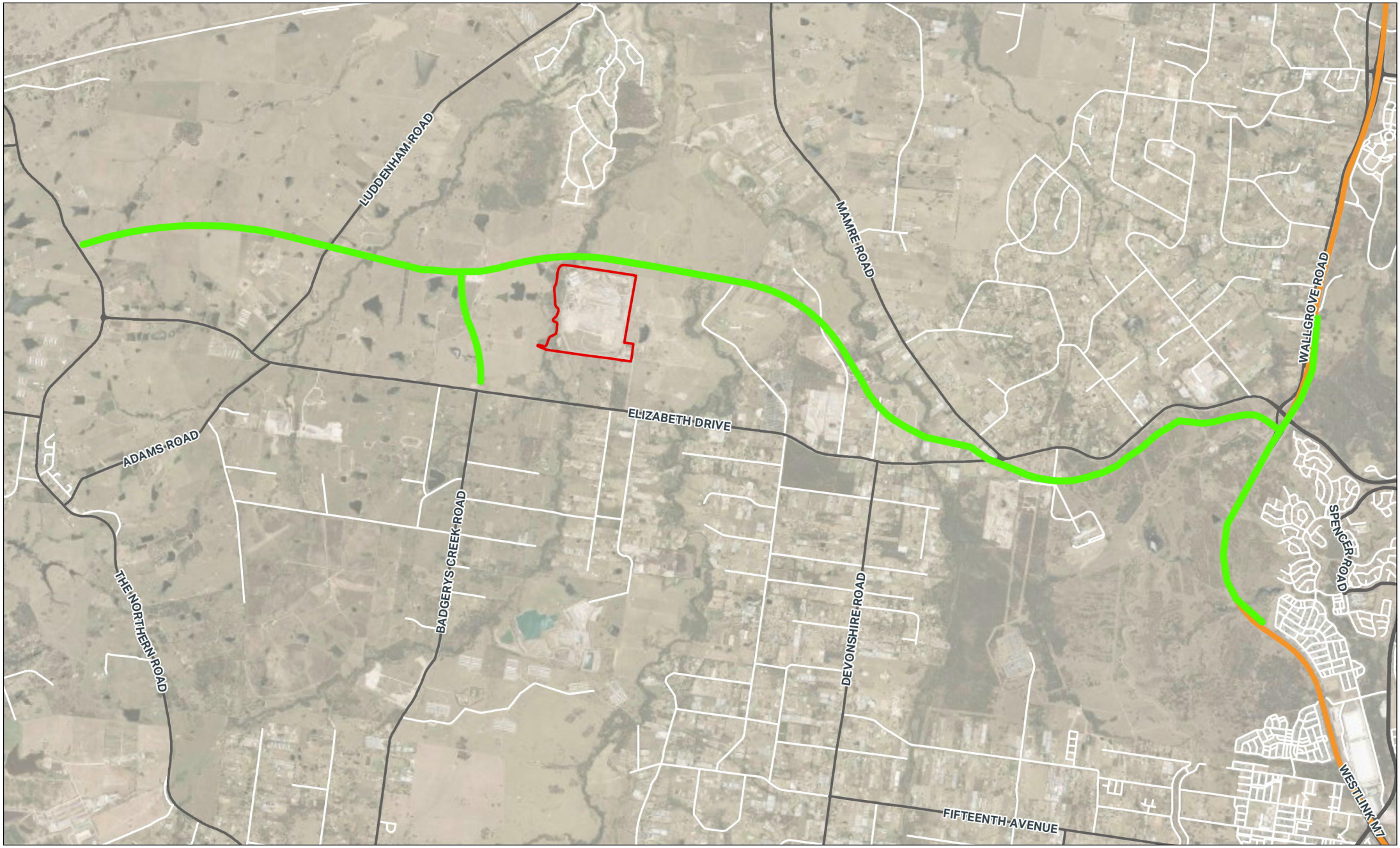
M12 Motorway

The M12 Motorway is a key element of the $3.6 billion Roads and Maritime Western Sydney Infrastructure Plan. The M12 Motorway is expected to be operational prior to the opening of Western Sydney Airport and will provide direct access to the airport and connection to Sydney's motorway network. A number of corridor routes were considered with the preferred corridor announced in November 2016. This corridor is currently subject of a SSI assessment with SEARs issues in July 2018 (and reissued in October 2018). The motorway corridor passes directly to the north of the Site (see **Figure 8.9**).

The M12 Motorway would be initially opened as two-lanes in each direction with a central median facilitating future expansion to six lanes with three strategic interchanges:

- A motorway interchange with the M7 Motorway
- A grade separated interchange with the Western Sydney Airport
- A signalised intersection with The Northern Road with the provision for grade separation in the future.

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Legend

- Site Boundary
- Proposed M12 alignment
- Motorway
- Primary road
- Local road

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FIGURE 8.9: M12 ALIGNMENT

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Elizabeth Drive Upgrade

Roads and Maritime Services (RMS) has commenced planning for the upgrade of Elizabeth Drive between the Westlink M7 Motorway and The Northern Road. This 14 km section of road is generally single lane in each direction with turning bays and no median. With the ongoing development of Western Sydney Airport and the impending intensification of nearby land uses, RMS plans to provide for additional capacity to better service predicted demand, including provision for active transport.

Whilst planning is still in the preliminary stages it is likely that the road would be upgraded to a minimum of two lanes in each direction, potentially allowing for three lanes in the future. It is expected that the upgrade would allow for the intersection with the Site access road to be maintained in at least it's current configuration (including westbound turning and acceleration lanes).

RMS plans to exhibit an access strategy for Elizabeth Drive in late 2018 though this has not yet been published.

North South Rail Line Extension

A future passenger rail connection between the Main West Line near St Marys, and the Main South Line near Macarthur, known as the North South Rail Line, is being investigated by Transport for NSW (**Figure 8.10**). This project is planned to assist in meeting the long term transport needs of Western Sydney and is currently at the corridor planning stage. The draft corridor for this line is located in close proximity to the west of the Site.

The final rail alignment north and south of the planned Western Sydney Airport will be informed by the final airport layout. The NSW Government plans to continue working with the Australian Government to identify a suitable corridor and station locations to maximise the line's service to the Western Sydney Airport, the Aerotropolis, and existing and future residential suburbs.

South West Rail Link Extension

As part of a strategic planning exercise currently being undertaken by TfNSW a corridor is being developed for the extension of the existing South West Rail Link. This line originates at Glenfield and currently terminates at Leppington. The extension of this line towards the Western Sydney Airport is currently being considered. This corridor is approximately 8 km south of the Project and therefore is unlikely to affect, or be affected by, the Project.

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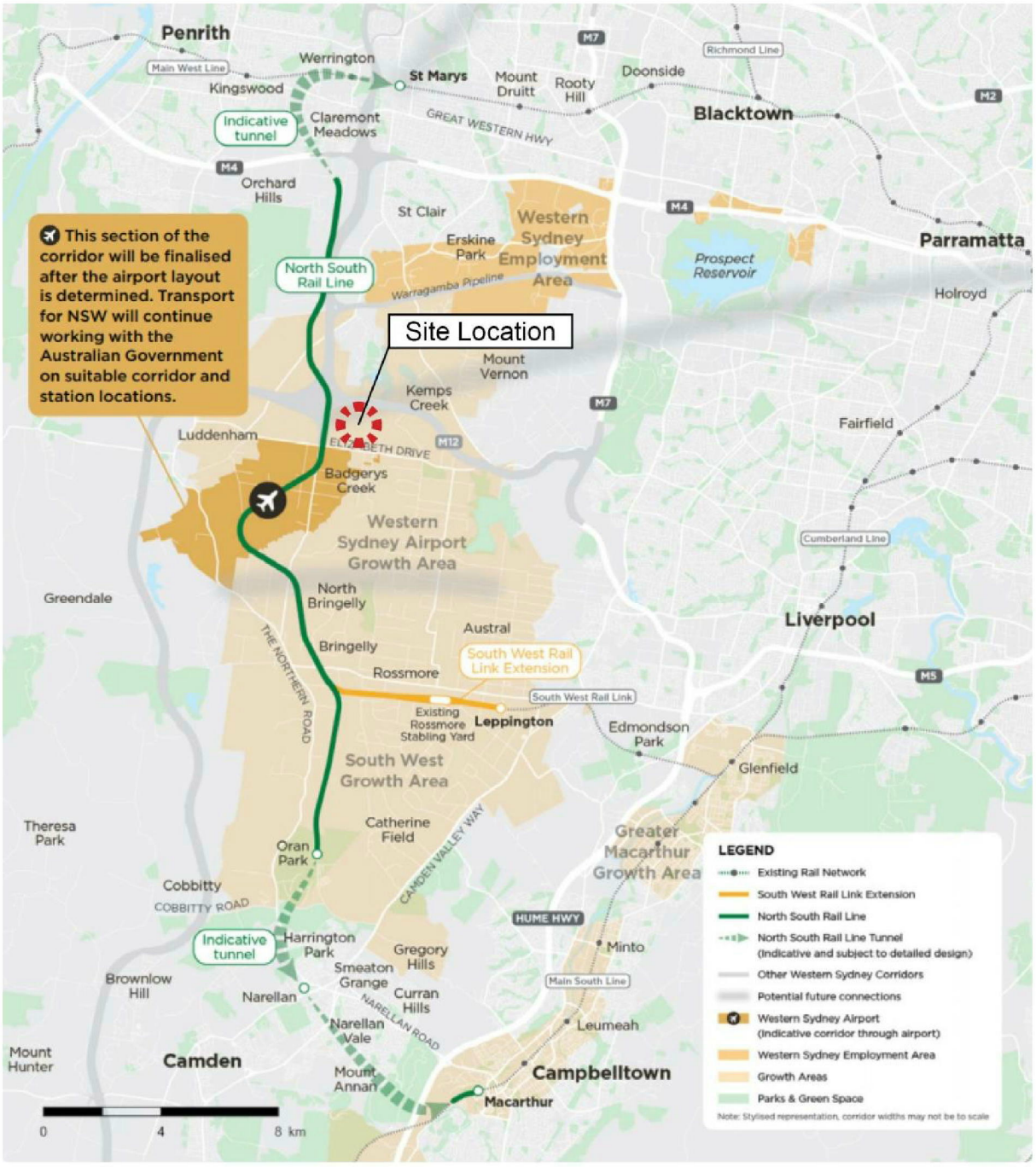


Figure 8.10North South Rail Line and South West Rail Link Extension Corridors (Source: TfNSW, 2018)

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8.5.3 Potential future uses of the Site

Once landfilling operations have ceased at the Site, a final cap would be applied and the land would be rehabilitated. The rehabilitation of the cap is currently planned as a grass covering only. Larger trees and shrubs are not proposed based on the potential for their roots to penetrate the cap, potentially leading to the unwanted escape of greenhouse gases from the body of the landfill, as well as allowing rainwater to infiltrate the waste, increasing leachate loads. The capped landfill would include landfill gas extraction infrastructure placed throughout the cap, as per current operations.

Although it is not the intent of this EIS to determine any alternative future use of the Site post-closure, a range of potential uses have been considered by SUEZ. These uses have been considered based on the strategic direction of the precinct and the Site's existing and future context. These potential land uses are provided as an indication of potential future uses only and do not form part of the Project.

SUEZ recognises the likely future importance of this land, particularly in relation to the rapidly transforming surrounding areas. The potential land uses proposed below are provided as a guide on how the land may continue to contribute to the local and regional economy and community, whilst still being mindful of the Site's limitations (**Table 8.6**).

Table 8.6 Potential future uses of the Site following landfill closure

Potential Future Land Uses	Details
Large scale storage area	Storage for items such as shipping containers, earth moving machinery, trucks/other heavy goods vehicles , cars etc
Solar farm	Potentially utilising flexible membrane technology
Recreational motorbike/all-terrain vehicle (ATV)/go-kart track	Due to the Site's location within the future WSA flight path, these types of uses would be more compatible as users would be less noise sensitive
Viewing platform for arriving/departing aircraft	A small platform area for those wishing to view aircraft at the WSA
Smaller co-existing uses	Smaller uses such as bee keeping could co-exist with other larger primary uses
Advertising	The lightweight structural requirements of advertising structures would enable this type of use on the Site

These potential future land uses have been identified based on a number of known existing and future limitations of the Site. These are discussed in more detail in **section 8.6** below.

Should SUEZ or another party wish to progress any of the above land uses, they would be subject to a separate planning approval at the time.

8.6 Suitability of the Site

The following sections outline the suitability of the development for the Site through discussion of direct potential land use implications of the Project, both within the Site and the surrounds.

Potential indirect impacts as a result of changes to land use would predominantly relate to social values. **Chapter 13** provides further detail relating to these potential impacts.

8.6.1 Land use within the Site

Existing land uses

The proposed expansion of the landfill represents a continuation of the existing land use at the Site. Whilst this would delay the final capping of the landfill by several years there would be no immediate impact upon the nature of the existing land use. As such this impact would be negligible.

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Future land uses

The following discussion presents an assessment of future potential land uses within the Site for context only. The specific future land use beyond the final cap stage does not form part of this development application and would be subject to further environmental assessment at a future date.

The Site is currently approved to be capped at RL 80 m and rehabilitated with a grass covering or similar shallow-rooted vegetation. This EIS proposes to increase the final height of the capped landfill by 15 m above the currently approved limit. The overall nature of the final site would be similar i.e. a small grassed hill.

The ability of the Site to accommodate any of the potential alternative land uses in **Table 8.6** beyond the proposed final cap stage would be affected by several factors:

Ground settlement

The landform would continue to settle over several years beyond the construction of the final cap. This would present inherent risks to structural integrity and as such the placement of any substantial permanent structures would not be possible. It should be noted that the difference in overall settlement predicted for the approved landfill versus the Project is expected to be negligible.

Cap and landform integrity

The types of activities and/or structures, equipment or vegetation would be subject to restrictions based upon the need to maintain the integrity of the cap and the broad shape of the landform for the management of stormwater and access. This would prevent, for example, deep rooted vegetation such as large trees or shrubs, as well as any other ground penetrating activity.

Obstacle Limitation Surface

The proposed expansion to the landfill would result in it being 15 metres higher than previously approved. This, in conjunction with the flight path of the nearby runways of WSA, would limit the type and height of any structures, equipment or other items placed within the Site (notwithstanding limits on building imposed settlement). Based upon the airport's proposed OLS, the height of any item placed on the cap could be no greater than 20.5 m, with slightly lower heights allowable closer to the runway in the south west corner of the Site.

Aircraft noise exposure

The type of development possible within the final capped site would also be heavily influenced by aircraft noise, as defined by the airport's ANEF. Based on this, industrial uses (though not light industrial uses) are the only type of development that would be considered acceptable across all of the Site in the long term (refer **Table 8.5**). Other uses may be conditionally acceptable on parts of the Site, though it is considered that the degree of aircraft noise would prevent usage for public open space.

On this basis, it is likely that future use of the Site post-final capping would be heavily restricted. It is likely that the Site would be suitable only for a relatively narrow band of industrial or other non-noise sensitive uses. The Site is likely to retain its current semi-industrial nature and as such the overall impact of the Project on the nature of future land use within the Site is considered to be negligible.

8.6.2 Surrounding land use impacts

Existing surrounding land uses

As outlined in **section 8.2**, the Site is currently surrounded on all boundaries by rural and rural/residential properties. These properties are already subject to impacts relating to noise, visual and air quality amenity arising from the landfill, the duration of which would be prolonged under the proposed expansion. The impact of these elements upon people living and working within the surrounding properties is assessed separately within this EIS (see **Chapter 9**, **Chapter 10**, **Chapter 11**, and **Chapter 13**).

The proposed expansion of the landfill to a height of RL 95 m would slowly increase the degree of amenity impacts over the course of several years as the Site is further filled above the previously approved RL 80 level. Noise and air quality amenity impacts would then cease altogether once the Project area is finally capped. Changes to the visual nature of the Project area would also cease, with amenity gradually improving as the Project area is revegetated.

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Whilst the above amenity impacts prolong and gradually increase these would not be expected to exceed a point where they may jeopardise the gainful economic use of adjacent properties for rural or rural/residential purposes.

With regard to properties further afield, such as those in Twin Creeks, the extension of landfilling activity would prolong impacts to visual amenity in the short term. In the long term however noise and air quality impacts would cease and the rehabilitated (grassed) final cap would become a relatively benign feature in the local landscape, particularly as landscaping vegetation within the residential estate matures and provides greater screening. The extension of the duration of landfilling at the Project area, and its final capped landform, would not be expected to jeopardise the ongoing use of the Twin Creeks estate for residential or recreational purposes.

Immediately to the west of the Site is the waterway of Badgerys Creek. The Project would not affect the existing land use of this area (environmental conservation). The Project has in fact been explicitly designed to not intrude into the any E2-zoned land, part of which overlaps Site. As such the Project would not be expected to alter the future use of this land.

On the basis of the above, the impact of the Project upon the existing use of surrounding land would be considered to be negligible.

Future surrounding land uses

As outlined throughout this chapter, the nature of the surrounding land use is expected to change dramatically throughout the existing approved, and proposed extended, life of the landfill. This would include a general move away from rural land uses towards a heavily urbanised environment, being generally rezoned for commercial, industrial and infrastructure uses (e.g. WSA, M12 Motorway). As a result it is expected that many of the existing rural residential landowners would leave the area, reducing the number of nearby sensitive residential receivers.

During this period of rapid land use change, there would be substantial construction activity. Within this environment the local amenity impacts of the ongoing operation of the active landfill would be somewhat masked. Once surrounding development is operational, it is expected that the sensitivity of many of the likely surrounding land uses would be substantially reduced, such that the presence of the active landfill would not alter the ability of the land to be gainfully occupied for industrial and infrastructure purposes.

As outlined above, the Site would be capped and rehabilitated upon the cessation of landfilling. From this point onwards the only ongoing amenity impact would be associated with visual impact, though this would be expected to be negligible and potentially even positive, in the context of the heavily developed and urbanised future surrounding landscape.

As such the proposed expansion would not be expected to impede development of surrounding land uses for the purposes outlined in relevant strategic planning documents (refer **section 8.4**) and the impact of the proposal upon future surrounding land use would be negligible.

8.7 Management of impacts

All land use impacts associated with the Project are expected to be negligible, subject to the proposed management methods proposed in other sections of this EIS, and therefore no additional mitigation measures specific to land use are proposed.

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Chapter 9

Landscape character and visual impact

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9.0 Landscape character and visual impact

Executive summary

Assessment of the Project's impact upon the landscape character and visual environment was undertaken based upon the existing nature of the surrounding environment and the raising of the final landform height by 15 m. Impacts upon the landscape character ranged between negligible to moderate based upon the additional bulk, height and shape of the final landform.

Visual impacts associated with the Project would range from low to medium-high, depending on the location of the receptor. Locations closer to the Site, such as Twin Creeks and the Badgerys Creek Road/Elizabeth Drive intersection, were would be subject to a greater degree of impact. These would be managed through maintenance of screening vegetation and appropriate vegetation management of the final cap.

Under a future land use scenario the landscape context of the Site would change dramatically. This would reduce the sensitivity of surrounding land uses, subsequently reducing the significance of both landscape character and visual impacts.

This chapter provides a summary of the findings of the Landscape and Visual Impact Assessment (LVIA) undertaken by AECOM (refer to **Appendix A**).

Table 9.1 sets out the SEARs relevant to landscape and visual impact and identifies where the requirements have been addressed in this environmental impact statement (EIS).

Table 9.1 SEARs – Visual impacts

SEARs	Where addressed in this EIS
Visual: • an impact assessment at private and public vantage points	**Section 9.3**

9.1 Assessment approach

9.1.1 Overview

This chapter assesses the visual and landscape character impact associated with the change between the currently approved final landform (RL 80) and the proposed final landform (RL 95) and considers the visual impact of extended operations.

The Landscape and Visual Impact Assessment has been undertaken with reference to the *'Guidelines for Landscape and Visual Impact Assessment'*, 2013, Third edition (GLVIA 3), Landscape Institute and Institute of Environmental Management & Assessment (UK). The method:

- Analyses existing landscape character and representative views of the Project
- Determines the nature and extent of the potential landscape and visual impacts of the Project
- Identifies measures to mitigate potential impacts.

It is recognised that the landscape within which the Project is located would be subject to a radical change in landscape character in response to the development of the Western Sydney Airport, located less than one kilometre south-west of the Site. As this land is yet to be formally rezoned, a further qualitative assessment has been undertaken against the future proposed surrounding land uses. This high level assessment has been included to provide a more representative assessment of impacts into the next decade and beyond.

A combination of desktop assessment and fieldwork was conducted to inform this assessment. It included a review of topographic maps and aerial photography of the Project Area and surrounding landscape, preparation of Zone of Theoretical Visibility (ZTV) mapping, photography of the Project from key visual receptor locations and review of landform, elevation, land cover and distribution of residential properties.

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9.1.2 Landscape character impacts

Assessment of landscape character impact deals with the impact of change and development on landscape as a resource. This assessment comprises of the combination of the following criteria:

- Sensitivity of landscape to visual change including:
  - Susceptibility to change – the ability of the landscape to accommodate the proposed change without undue consequences
  - Value of the landscape – based on the existing character designations and value of particular landscape elements or notable aesthetic, perceptual or experiential qualities of the landscape.
- Magnitude of landscape impact including:
  - Size or scale of change – the extent of existing landscape elements that would be lost and the degree to which aesthetic or perceptual aspects of the landscape are altered.
  - Geographical extent of impacts – distinct from the size or scale of change and factors in the spatial extent of impacts
  - Duration and reversibility of impacts.

Following the determination of the sensitivity of the landscape and the magnitude of the impact, a rating matrix is used to determine the overall significance of the landscape character impact as shown in **Table 9.2**.

Table 9.2 Overall significance of landscape character impacts

		Magnitude of landscape impact			
		High	**Moderate**	**Low**	**Negligible**
Sensitivity	**High**	High	High - moderate	Moderate	Negligible
	Moderate	High - moderate	Moderate	Moderate - low	Negligible
	Low	Moderate	Moderate - low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

9.1.3 Assessment of visual impacts

An assessment of visual impacts deals with the effects of change and development on the views available to people and their visual amenity. The assessment of visual impacts utilised viewpoints, visual envelope mapping and photomontages to determine both the sensitivity of visual receptors and magnitude of visual impact to identified visual receptors. This included the following factors:

- Sensitivity of visual receptors including:
  - Susceptibility of visual receptors to change – a function of the activity of people experiencing the view and the extent to which their attention or interest may therefore be focused on the view.
  - Value attached to views - can encompass a range of factors important to the community or particular receptors including views associated with heritage items, those designated in policy or design documents, those associated with tourism or those referred to in literature or art.
- Magnitude of visual impacts including:
  - Size or scale of the change – the amount of loss or addition of features in the view, the degree of contrast the integration of any new features or changes and the nature of the view of the Project (full, partial or glimpses)

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- Geographical extent of impacts - varies with different viewpoints and is likely to reflect the horizontal angle of the view, the distance of the viewpoint, and the extent of the area over which changes would be visible.
- Duration and reversibility of the impacts – short, medium or long term and based on professional judgement about the prospects of the impact being reversed.

Once the sensitivity of the visual receptor and the magnitude of the visual impact is established, a rating matrix is used to determine the overall significance of the visual impact as shown in **Table 9.3**.

Table 9.3 Overall significance of visual impacts

		Magnitude of visual impact			
		High	**Moderate**	**Low**	**Negligible**
Sensitivity	**High**	High	High - moderate	Moderate	Negligible
	Moderate	High - moderate	Moderate	Moderate - low	Negligible
	Low	Moderate	Moderate - low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Where it is determined that no view is likely to be available from a viewpoint, a rating of 'No Impact' is applied.

9.1.4 Key assumptions

The following assumptions have been made for the purposes of assessing the Project's landscape and visual impacts:

- The final landform would initially have pre-settlement batter slopes of 1:3.5 (vertical:horizontal). These are anticipated to decrease in slope towards 1:4 (vertical:horizontal) (post-settlement) as the landform settles over time. It is assumed that approximately 90% of the settlement would occur within the first three years post-completion
- The final landform would remain in perpetuity in its final post-settlement form
- The final landform would initially have a grassed cover sufficient to secure the surface material. Once sufficient settlement and reduction in batter slopes to 1:4 (vertical:horizontal) had occurred, the landform would comprise a grassed, regularly slashed and managed final landform mound with provision for 30 years of rehabilitation and maintenance
- The existing riparian corridors surrounding the Project would remain as vegetated, natural creek lines
- On completion of the final landform, the SAWT may remain operational as a waste management facility.

9.2 Existing environment

9.2.1 Landscape character

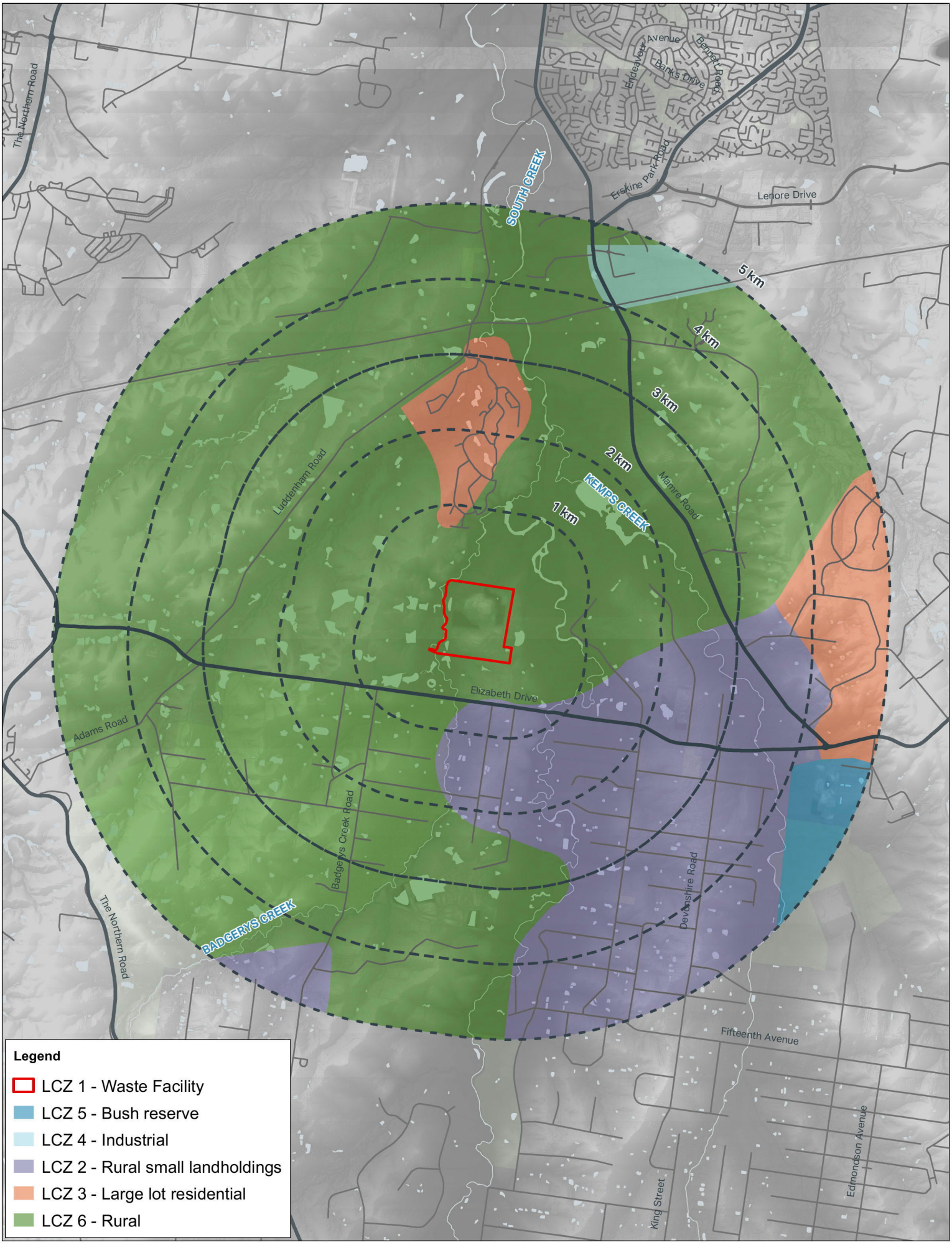
Six Landscape Character Zones (LCZ) have been identified within the vicinity of the Project (refer to **Figure 9.1**), comprising;

- LCZ 1: Waste Facility (i.e. the Site)
  - Currently identifiable by the large exposed earth stockpiles rising above the gently rolling rural landscape that immediately surrounds.

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- LCZ 2: Rural Small Landholdings
  - Characterised by a mix of rural and industrial business operations as well as residential dwellings situated on small rural lots
  - A number of quarries and small waste management facilities have 'scarred' the landscape, altered the topography and are visually prominent in some locations.
- LCZ 3: Large Lot Residential
  - Characterised by predominantly large, prestige residential dwellings situated on large suburban and small rural blocks. Two areas are present within the Study Area:
    - Capital Hill – consisting of houses set amongst remnant trees and rising above the rural flat lands, affording long distance views of the Great Dividing Range to the west
    - Twin Creeks Estate – a relatively new golf course/prestige residential development on a low, gently undulating landform.
- LCZ 4: Industrial
  - Erskine Business Park forms this LCZ. It is typical of a business park with wide roads and large commercial and industrial buildings of varying form and scale.
- LCZ 5: Bush Reserve
  - Characterised by Kemps Creek Nature Reserve which comprises a number of endangered ecological communities such as Cumberland Plain Woodland, River-Flat Eucalypt Forest, Castlereagh Swamp Woodland and Cumberland Plain Shale Woodlands.
  - This land identified as 'Priority Conservation Land' under the Cumberland Plain Recovery Plan and is closed to public access.
- LCZ 6: Rural
  - Characterised by predominantly open rural landscape with large rural lot holdings on an undulating grassed landscape
  - Future development is planned across the majority of this LCZ as part of the Western Sydney Aerotropolis and new Western Sydney Airport.

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SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 9.1: LAND USES

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9.2.2 Visual receptors

A total of nine visual receptor locations have been identified to represent viewpoints for the assessment of potential impacts on views as a result of the Project. The visual receptor locations are shown in **Figure 9.2**. Two main receptor types have been identified as follows:

Residents

Residents are interested in the outlook from their properties and have a sense of proprietary interest in views from their homes and their local environment. Residents typically have regular and prolonged viewing opportunities from living areas within the home and garden areas, and so are considered to have a high level of sensitivity to proposed changes.

Road users

Road users are generally considered to have less of an interest in the quality of their surroundings as they are passing through the landscape and are focused mainly on the road. The Project would also comprise only a small component of the landscape through which they are travelling.

A large number of vehicles use Elizabeth Drive and other nearby roads on a daily basis. Drivers in this area would typically be expected to be 'local' residents using the road regularly to commute and visit shops and social contacts elsewhere, as well as workers such as employees, tradesmen and delivery drivers travelling to, from and through the area for work purposes.

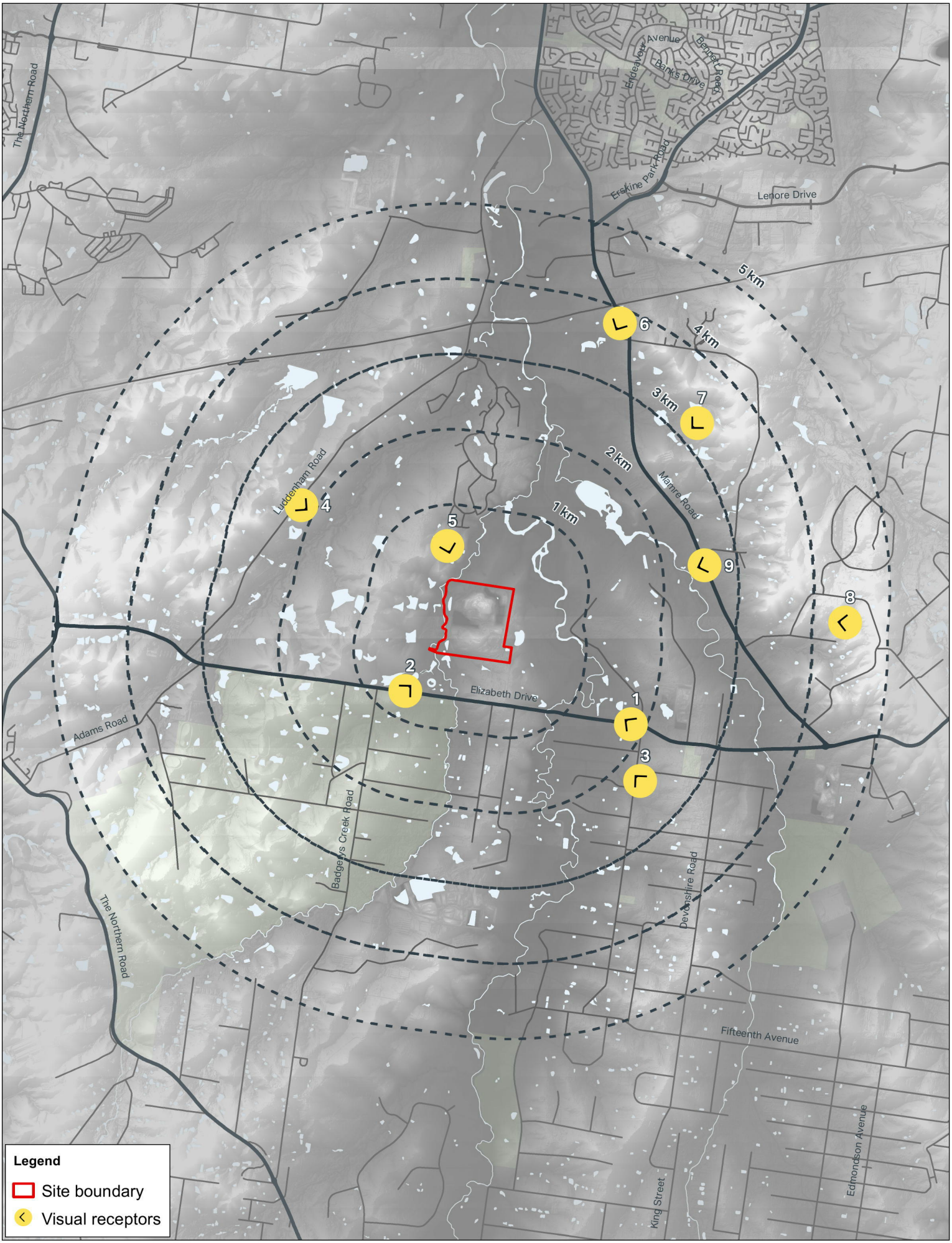
Local road users would be considered to have a moderate level of sensitivity to change, given the potential for a sense of proprietary interest in their local environment.

Workers such as employees, tradesmen and delivery drivers would be expected to have much of their attention focussed on road conditions and their work, rather than a specific interest in the landscape through which they are travelling. As such, this group are considered to have a low to moderate level of sensitivity to change.

Table 9.4 Visual receptor types

Visual receptor	Receptor type
1	Road user
2	Road user
3	Resident
4	Road user
5	Resident
6	Road user
7	Road user
8	Resident
9	Road user

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FIGURE 9.2: VISUAL RECEPTORS

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9.3 Potential impacts

9.3.1 Landscape character impacts

The significance of the Project's potential landscape character impacts on the identified landscape character zones is based on the difference between the current approved final landform and the final proposed Project landform.

The landform would increase by a further 15 metres above the current approved height of RL 80 (about 30 m above surrounding ground level), to a final height of RL 95 (about 45 m above surrounding ground level) with broadly symmetrical east/west and north/south cross-sectional forms. The final proposed height of the landfill is approximately equivalent to that of a 15 storey building, when compared to the surrounding natural ground level.

The currently approved final landform (RL 80) would be considered visually sympathetic to that of the existing rolling landscape with intermittent low hills, being a gently sloping and rounded 'hill' with batter slopes generally about 1:8.

The relationship of height, bulk and scale between the approved landform and the proposed landform would increase substantially with the Project. The new final landform would change to that of a more visibly engineered landform. This would include 1:4 (vertical:horizontal) post-settlement batters with regular horizontal benches and a large, relatively flat top. This form could be broadly described as a 'mesa-like' or 'plateau' landform.

Once completed, the new final landform mound would include a road suitable for landfill maintenance vehicles ascending the eastern batter, and then descending back along a separate alignment on the northern and eastern batters.

As per current practice, the Project proposes to continue to stockpile fill material within the Site, with some stockpiles temporarily extending above the approved elevation.

The nature of the final cap surface itself would be consistent between both the currently approved and proposed final landforms. That is, both would be secured by a grass covering and would be maintained through regular mowing. Weeds would be primarily managed by mowing, with any residual infestations being managed by selective management, ensuring an ongoing consistent visual scenario across the final landform.

Anticipated impacts for each LCZ as a result of the visual changes described above are shown in **Table 9.5** below.

Table 9.5 Landscape character impact assessment summary

LCZ	Sensitivity to change	Magnitude of change	Significance of landscape character impact
1 – Waste Facility	Moderate	Moderate	Moderate
2 – Rural Small Landholdings	Low	Low	Low
3 – Large Lot Residential	Moderate	Moderate	Moderate
4 – Industrial	Negligible	Negligible	Negligible
5 – Bush Reserve	Low	Negligible	Negligible
6 – Rural	Moderate	Moderate	Moderate

Future landscape character impacts

The Land Use and Infrastructure Implementation Plan for the proposed Western Sydney Aerotropolis includes a 'Structure Plan' has been prepared for its future development. The Aerotropolis would result in a radical change to the landscape across this area. The LCZs above would be replaced by an airport, highways, rail and a built environment of varying scales.

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The Structure Plan shows that the proposed final landform would be adjoined by riparian corridor along its western boundary and the northern part of its eastern boundary, and adjoined by the proposed M12 Motorway along its northern boundary. The remaining southern and south-western corner of the Site (about 40% of the Site boundary) would be subject to 'business park' style development.

The Structure plan further identifies the broader setting of the Site would comprise:

- Western Sydney Airport to the south-west - the alignment of the first runway would have aircraft taking off and landing over the Site, with the runway located to the south-west
- South of Elizabeth Drive, 'flexible employment' uses continue about 2.5 km to the south
- To the east, the South Creek Corridor (at a width of about 1 km), beyond which is located further 'flexible employment' land
- To the north, the confluence of Badgerys Creek, Kemps Creek and South Creek, and the Twin Creeks residential estate
- To the west of Badgerys Creek, a relatively narrow band of 'flexible employment' adjoined by the extensive Outer Sydney Orbital/Western Sydney Airport/M12 Motorway Interchange.

Within the context of the above, the proposed landform would have an entirely different relationship with the surrounding landscape to that currently in place. For much of the above areas, the proposed landform has the potential to continue to comprise a visually prominent, engineered landform that rises noticeably higher than proximate surrounding areas.

9.3.2 Visual impact assessment

Overview

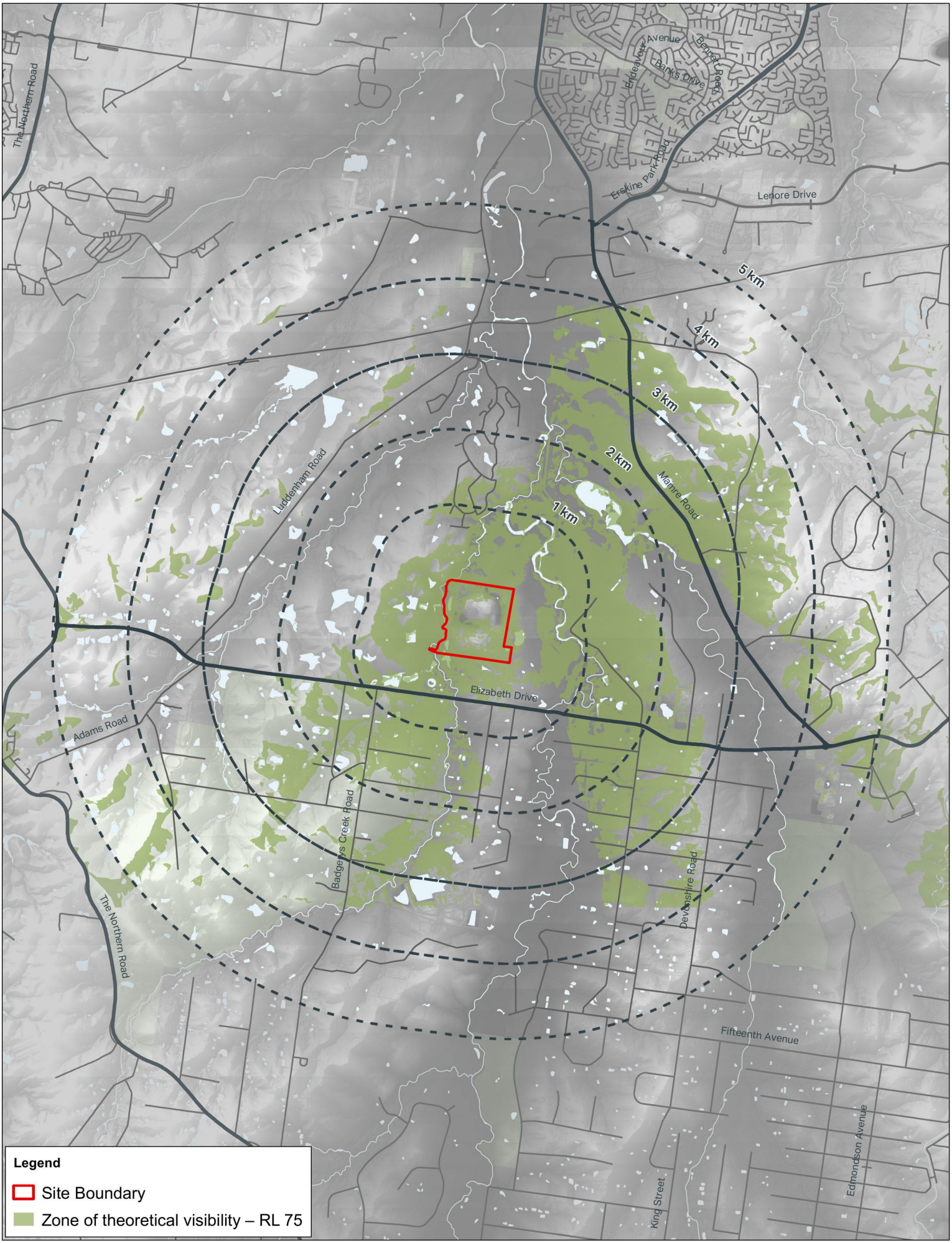
The assessment of visual impacts is based on the difference between the currently approved final landform (RL 80) and that of the final Project landform (RL 95). The Site is currently an operational landfill and has been since the late 1980s. The nature of the Site is that the landform is continually changing due to the importation of waste, the extraction of quarry material and associated earthworks.

During continued operation (beyond the currently scheduled closure date of approximately 2025) the key activities that may be visible from surrounding areas include:

- Remaining earthworks involved with the stockpiling and movement of material across the Site
- Landfill operational plant and equipment moving over the Site
- Waste trucks entering and exiting the Site during normal business hours
- Location of communication and security camera towers on elevated areas of the site
- Changing colours and form of the stockpiles and final cap as they expand over time and are gradually capped with grass cover
- Visibility of the Site gradually increasing as it grows towards its new height and shape.

The potential visibility of both the existing landfill and proposed final landform has been subject to ZTV Mapping which provides a comparison of where the existing landfill (RL 75 as of 2018) and the proposed final landform (RL 95) may be visible from. The ZTV mapping is provided in **Figure 9.3** and **Figure 9.4**. As shown in the ZTV mapping, area in which the Project would be visible would be more extensive encapsulating ta greater area of the Twin Creeks residential estate along with increasing general visibility in the area immediately surrounding the Site.

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FIGURE 9.3: ZONE OF THEORTICAL VISIBILITY - EXISTING LANDFORM, DEC 2018 (RL 75)

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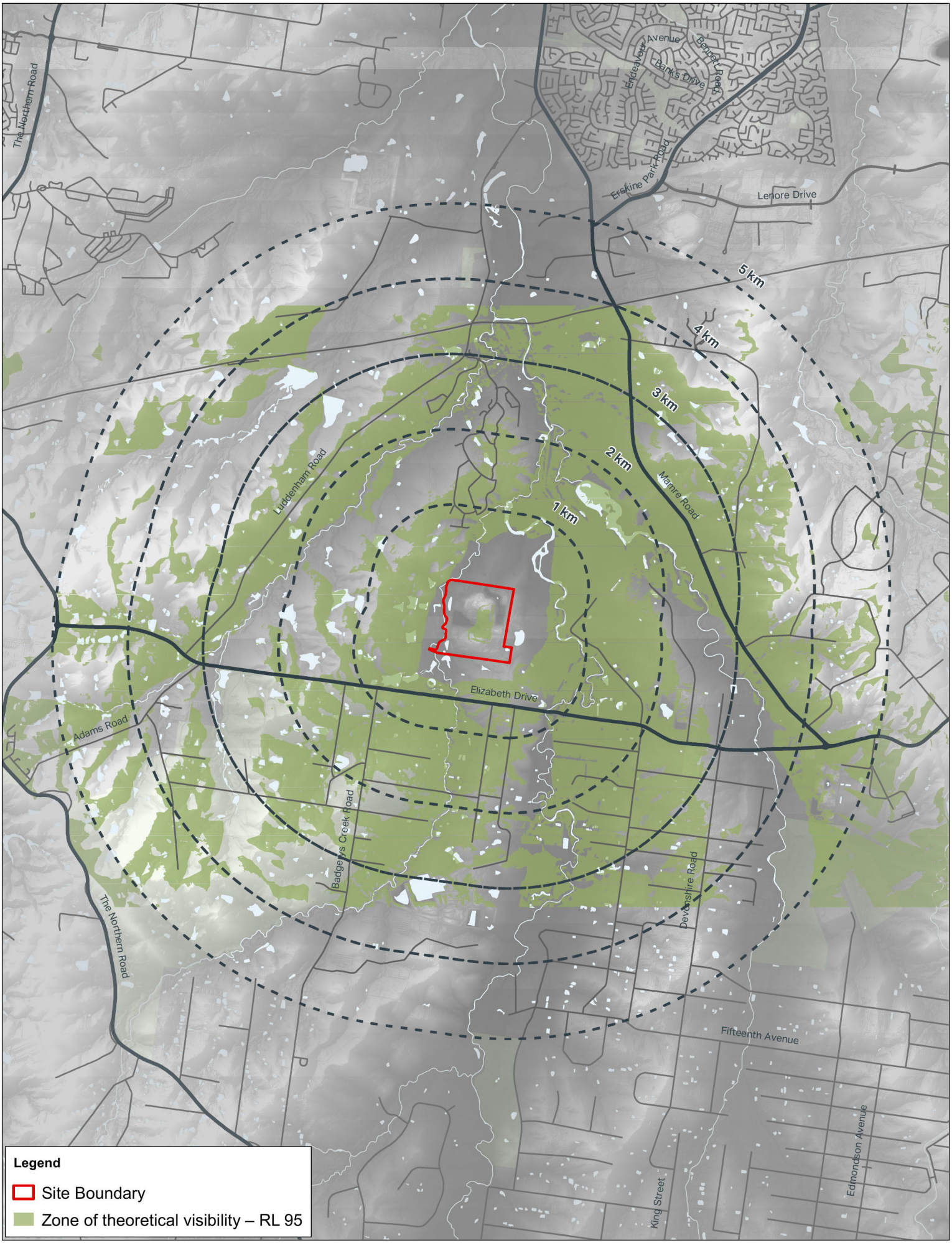
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FIGURE 9.4: ZONE OF THEORETICAL VISIBILITY – PROPOSED LANDFORM (RL 95)

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Visual impact assessment rating

Table 9.6 provides an assessment of visual impacts from key visual receptor location in **Figure 9.2** arising from the completed Project.

Table 9.6 Visual impact assessment

Receptor	Anticipated change to view	Sensitivity to change	Magnitude of change	Significance of Change
V01: Road – Elizabeth Drive	Views looking north-west towards the Project would comprise partial glimpse views of the top of the landfill structure beyond the South Creek vegetated corridor and roadside vegetation.	Low	Low	Low
V02: Road - Badgerys Creek Road / Elizabeth Drive Intersection	The proposed landfill would be seen across its nearly one kilometre long edge, rising above the Badgerys Creek riparian corridor.	High	Moderate	Moderate to high
V03: Resident / Employment – Western Road	Views north-west across the rural small holdings landscape and the South Creek floodplain towards the Project would be expected to be limited to the upper part of the Project due to intervening tree cover and built form.	Low	Low	Low
V04: Road – Luddenham Road	Views to the south-east towards the Project from this elevated position along the road would include glimpses of the landfill structure in the far distance beyond the intervening open ridgeline between Cosgroves Creek and Badgerys Creek.	Moderate	Moderate	Moderate
V05: Resident – Twin Creeks Residential Development	The view south towards the Project would contain a noticeably larger grassed landform than that for the approved landform. The proposed landform would include a flatter top and increased visual mass. It would also extend moderately further east and west than for the approved landform.	High	Moderate	Moderate to high
V06: Road – Mamre Road	The proposed landform would periodically be seen in the background at a distance of about 4,500 metres, projecting above the riparian corridor.	Low	Low	Low
V07: Road – Mamre Road	The proposed landform, at a distance of about 3,000 metres would be visible from this location, comprising an uncharacteristic regular form, which would potentially be projecting above the horizon line.	Low	Low	Low

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Receptor	Anticipated change to view	Sensitivity to change	Magnitude of change	Significance of Change
V08: Resident – Mount Vernon	Looking west towards the Project from hillside residences in this locality would provide filtered, distant views of the proposed landform rising above the well vegetated valley floor, and set against the majestic backdrop of the Blue Mountains.	Low	Low	Low
V09: Road – Mamre Road	It is considered highly unlikely that the Project would be visible from this location.	Low	No Impact	No Impact

9.4 Management of impacts

Mitigation measures to minimise the level of visual impact during the operation of the Project and following completion of the final landform are outlined in **Table 9.7** below. A Draft Landscape Plan has been prepared which identifies locations for supplementary screen planting, buffer zones and grass cover areas (refer to **Figure 9.5**). Implementation of the Landscape Plan following completion of the project would minimise potential ongoing visual and landscape impacts.

Table 9.7 Environmental management measures – landscape and visual impact

Impact	Reference	Environmental management measures	Timing
Visual	LV01	Gas extraction piping will be buried prior to capping and final landscaping works of the completed landfill	Operation
Visual	LV02	Final capping will allow for augmentation of the landfill cap at a later time to facilitate a landscape feature, or suitable for a range of alternative uses	Post Completion
Visual	LV03	A mix of native grasses and associated ground layer species will be used in lieu of pasture species for: • Habitat supportive of the adjoining Badgerys Creek riparian corridor • Specific habitat deterrent in support of the Western Sydney Airport precinct and its operations • Visual interest and seasonal colour • A medium to long term low maintenance outcome once established.	Operation / Post Completion
Visual	LV04	The Badgerys Creek riparian corridor will be maintained, protected and enhance to safeguard visual and landscape buffers to the Project	Post Completion
Visual	LV05	A landscape management plan will be prepared for the establishment and long-term management of the proposed landfill	Post Completion
Visual	LV06	Existing screening vegetation around the perimeter of the Site will be maintained and augmented as per the landscape plan.	Operation / Post Completion

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Existing access road

Existing endemic vegetation cover along Badgerys Creek corridor

Buffer zone to be retained west of site and incorporate the rehabilitation of existing bushland. Degraded areas to be rehabilitated and provide a robust community of endemic plants for screening and habitat opportunities.

The incorporation of well integrated screen planting along the site boundary to minimise the extent of the final landform when viewed from surrounding locations.

Supplementary screen planting to site boundary. The reinstatement of endemic vegetation with characteristics of local plant communities to provide a consistent landscape character. Supplementary screen planting will consist of endemic trees and a bush understorey including shrubs, grasses and groundcovers.

Final cap surface to be stabilised using a mix of grass species and maintained via slashing/ mowing. The specific mix of grass species to be determined based upon ongoing discussions with Western Sydney Airport with view to discouraging congregation of birds.

KEY

- Supplementary screen planting
- Existing vegetation cover
- Buffer zone
- Landfill pasture grass cover
- Stormwater dams
- Site boundary
- Extent of proposed new capping

GENERAL NOTES

- Plant species to be sourced from local suppliers and to be of local provenance.
- Provide rabbit guards to tree and shrub species only.
- Existing endemic vegetation and tree cover to be retained and protected
- Bush regeneration work to be undertaken by members of the Australian Association of Bush Regenerators.

0 200m

AECOM

Client: SUEZ **Project Name:** Badgerys Creek Landfill Expansion Project

Date: 24/06/19 **Landscape Plan**

Figure 9.5: **Landscape Plan**

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Chapter 10

Air quality

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10.0 Air quality

Executive summary

Dust dispersion modelling shows that incremental dust impacts from the Project are relatively minor and are fairly typical for a landfilling operation such as the Project. The inclusion of background particulate matter levels pushes predicted cumulative concentrations higher, but the majority of days are still well below the respective dust fraction criteria.

The nature of the waste to be received at the landfill would continue to generally be non-odorous. Should odorous waste be deposited the implementation of measures such as covering of trucks and rapid covering of deposited waste would reduce the potential for impacts. Additionally the expansion of the landfill gas collection system and the continued combustion and flaring of landfill gas would minimise odour impacts.

The air quality assessment concluded that the Project would not result in significant air quality impacts.

This chapter provides a summary of the findings of the Air Quality Impact Assessment (AQIA) undertaken by AECOM (refer to **Appendix D**).

Table 10.1 sets out the SEARs relevant to air quality and identifies where the requirements have been addressed in this EIS.

Table 10.1 SEARs - air quality

SEARs	Where addressed in this EIS
A description of all potential sources of air and odour emissions.	Sections 10.1 and 10.2
An air quality impact assessment in accordance with relevant Environment Protection Authority guidelines.	Section 10.3
A description and appraisal of air quality impact mitigation, management and monitoring measures.	Section 10.5

10.1 Assessment approach

10.1.1 Overview

The air quality impact assessment was prepared with consideration given to the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, 2016* (EPA, 2016). This document was generally referenced as a source of factors needing to be considered when assessing air quality impacts.

The scope of the assessment included the following:

- Identification of relevant ambient air quality criteria
- Discussion of existing air quality based on available Office of Environment and Heritage (OEH) data
- Discussion of local meteorology and climate conditions based on available Bureau of Meteorology (BoM) data
- Identification of potential sources of air emissions from surrounding land uses
- A quantitative assessment of particulate emissions from onsite operations through appropriate dispersion modelling

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- A qualitative assessment of the potential for the Project to result in odour impacts
- Provision of recommended mitigation measures.

Only a single worst-case scenario was modelled for the AQIA. The scenario was chosen based on proximity of the expected landfilling activities to the nearest receptor on the eastern side of the Site.

Sources of particulate and exhaust emissions from the project used in the AQIA included:

- Excavators on landfill
- Dump trucks on landfill
- Bulldozer on landfill
- Intermediate cover scraping
- Grader
- Wheel generated dust from unpaved roads
- Wheel generated dust from paved roads
- Wind erosion
- Water carts.

10.1.2 Air quality criteria

Given the nature of the local area and the activities to be undertaken, the principal pollutant of concern included in this assessment is fine particulate matter (dust). Dust would be generated as a result of any activities that disturb the soil or waste material, resulting in suspended particulates (dust suspended in the air) and deposited dust (dust settled on surfaces).

Particulate matter refers to the many types and sizes of particles suspended in the air we breathe. Particulate matter is often classified according to the following size fractions:

- Total suspended particulates (TSP). Particles with an aerodynamic diameter of less than or equal to 30 micrometres (µm) are collectively referred to as TSP.
- Particles with an aerodynamic diameter less than or equal to ten µm (referred to as PM_{10}).

In order to determine the potential impact on general air quality within the air shed, ambient pollutant concentrations were compared to the criteria specified in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2016) and represent maximum allowable pollution levels at the boundary of the premises. The criteria for the fine particulate matter are reproduced in **Table 10.2** below**.**

Table 10.2 Regulatory air quality criteria

Pollutant of Concern	Standard µg/m^3	Averaging Period
TSP	90	Annual
PM_{10}	50	24-hour
	25	Annual
$PM_{2.5}$	25	24 hour
	8	Annual
Deposited dust	2 g/m^2/month[1]	Annual
	4 g/m^2/month[2]	Annual

Notes
1 Maximum increase in deposited dust level.
2 Maximum total deposited dust level.

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Only non-putrescible waste is currently accepted for landfilling within the Project Area. The landfilling operation has been ongoing for approximately thirty years, during which time it has been demonstrated that there is little to no odour associated with the main landfilling activity. This scenario would continue under the Project. Despite this, there is the potential for potentially odorous waste (for example restricted solid waste) to be accepted at the landfill in the future. Odour is therefore also a potential pollutant of concern. A qualitative odour impact assessment was included as part of this assessment.

10.1.3 Sensitive receptors

Surrounding sensitive receptors were identified within 1 km of the Site and input into the air quality dispersion modelling. These receptors are shown in **Figure 10.1** and described in **Table 10.3**.



Figure 10.1Location of modelled sensitive receptors

Table 10.3 Sensitive receptors

Receptor number	Receptor type (description)	Distance from the Site (m)
1	Residential	120
2	Residential	180
3	Residential	410
4	Residential	470
5	Residential	830
6	Residential	820
7	Residential	730
8	Residential	690
9	Residential	720
10	Residential	630
11	Residential	640

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Receptor number	Receptor type (description)	Distance from the Site (m)
12	Residential	600
13	Residential	690
14	Residential	320
15	Residential	1020
16	Residential	730
17	Residential	770
18	Residential	950

10.2 Existing environment

10.2.1 Meteorology

Local meteorological conditions heavily influence the direction of pollution transport along with the rate of mixing and hence dispersion in the atmosphere. Local meteorological data for the Project was taken from Bureau of Meteorology (BoM) monitoring locations at Badgerys Creek and Horsley Park. Meteorological data from the Badgerys Creek and Horsley Park stations show the following:

- The warmest temperatures occur in summer, with the average maximum temperature recorded in January (30.1° C at Badgerys Creek and 30.0° C at Horsley Park)
- July is the coldest month with an average minimum temperature of 4.1° C at Badgerys Creek and 5.8° C at Horsley Park
- Rainfall is highest in February (mean rainfall of 98.5 mm at Badgerys Creek and 107.0 mm at Horsley Park) and lowest in July (mean rainfall of 23.6 mm) at Badgerys Creek and September (mean rainfall of 34.1 mm) at Horsley Park
- Annual average rainfall is 680.9 mm at Badgerys Creek and 765.0 mm at Horsley Park
- Wind data show the following patterns:
    - January (summer) - morning winds are variable at both Badgerys Creek and Horsley Park in January and February with increased south westerly winds at both stations in March, more pronounced at Badgerys Creek. Calm conditions range from 6 to 16% at Badgerys Creek and 5 to 13% at Horsley Park. Afternoon winds increase in strength changing to predominantly from the east in all months with low (up to 2%) calm conditions at both stations.
    - April (autumn) - morning winds are predominantly from the southwest at Badgerys Creek but variable at Horsley Park with calm conditions ranging from 12 to 20% at Badgerys Creek and 6 to 9% at Horsley Park. Afternoon winds increase in strength becoming variable in all months with calm conditions ranging from 1 to 4% at Badgerys Creek and 4 to 6% at Horsley Park.
    - July (winter) - morning winds are predominantly from the southwest at Badgerys Creek with higher levels of west and northwest winds at Horsley Park. Calm conditions range from 7 to 22% at Badgerys Creek and 3 to 9% at Horsley Park. Afternoon winds increase in strength becoming variable in all months with calm conditions ranging from 1 to 3% at Badgerys Creek and 1 to 5% at Horsley Park.
    - October (spring) - morning winds are variable a both stations with calm conditions ranging from 5 to 7% at Badgerys Creek and 4% at Horsley Park. Afternoon winds increase in strength changing to predominantly from the east at Badgerys Creek and southeast at Horsley Park in all months with very low (up to 1%) calm conditions at both stations.

10.2.2 Terrain

The Site is situated in the western hinterland of the Sydney basin. The original terrain of the Site is generally flat with a gentle downward slope towards Badgerys Creek to the west. The physical

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presence of the landfill itself will affect wind flow, especially as its elevation progresses towards final Project elevation. Wind speeds will likely be higher at the top of the landform, which will be about 45 m above the surrounding land. Terrain data used in the air quality modelling was modified to account for this.

10.2.3 Land use

The Site is bounded at all sides by rural zoned land with widely spaced residential dwellings. The nearest residentially zoned land is located approximately 630 metres to the north of the Site in the estate of Twin Creeks.

Surrounding industrial land uses include the Hi-Quality Group quarry 2.3 km to the east of the Site and the Australian Native Landscapes (ANL) composting facility 2.2 km to the south. These industrial sites would produce their own dust emissions but are far enough from the Site that cumulative impacts are not expected.

10.2.4 Existing air quality

The NSW EPA operates the Bringelly and St Mary's air quality monitoring locations six kilometres to the south and 8 km to the north of the Site respectively. A summary of the maximum background pollutant concentrations from both locations is presented in **Table 10.4**.

Table 10.4 Summary of existing background pollutant concentrations

Pollutant of concern	Maximum background concentration (µg/m^3)	Criterion (µg/m^3)	Averaging period
TSP	39.6	90	Annual
PM_{10}	100.2[1]	50	24-hour
	19.8	25	Annual
$PM_{2.5}$	93.2[1]	25	24 hour
	8.7	8	Annual

Note
1 PM_{10} and $PM_{2.5}$ assessed contemporaneously due to high background concentrations

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10.3 Potential impacts

The maximum predicted pollutant concentrations at sensitive receptors identified through the dispersion modelling is presented in **Table 10.5**.

Table 10.5 Summary of air dispersion modelling results

Pollutant of concern	Averaging period	Maximum pollutant concentration at a receptor (µg/m³)		Receptor	Criteria (µg/m³)	Comment
		Project Only	Cumulative			
TSP	Annual	7.0	46.6	1	90	Complies
PM_{10}	Annual	4.0	23.8	1	25	Complies
	24-hour	18.1	**68.2**[1]	1	50	Single exceedance due to background[1]
$PM_{2.5}$	Annual	0.7	**9.4**	1	8	Exceedance due to elevated background[1]
	24-hour	3.1	**29.6**[1]	1	25	Two exceedances due to background
Deposited dust	Annual	1.0 g/m²/month	-	1	2 g/m²/month (incremental)	Complies

Note:
1 Cumulative concentration predicted by means of contemporaneous assessment.

In summary the Project is anticipated to result in the following predicted impacts:

- Predicted cumulative TSP concentrations were below the criterion at all receptors. The highest Project contribution was 7.0 µg/m³, or about 8% of the criterion.
- A single exceedance of the 24-hour PM_{10} criterion was predicted (at Receptor 1). The exceedance was due to an elevated background concentration which was already above the criteria. No additional exceedances of the criterion were predicted at any receptor. The highest Project contribution was 18.1 µg/m³, or about 36% of the criterion.
- Two exceedances of the 24-hour $PM_{2.5}$ criterion were predicted for cumulative concentrations. One exceedance was due to a background concentration above the criterion. The second exceedance was primarily due to a background concentration which was at 99 % of the criterion. No further exceedances of the criterion were predicted at any receptor. The highest Project contribution was 3.1 µg/m³, or about 12% of the criterion.
- Cumulative annual average PM_{10} concentrations were predicted to be below the criterion at all receptors. The highest Project contribution was 4.0 µg/m³, or about 16% of the criterion.
- The background annual average $PM_{2.5}$ concentration was above the criterion and therefore all cumulative predictions at receptors were also above the criterion. The highest Project contribution was 0.7 µg/m³, or about 9% of the criterion.

[1] See table 10.4

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- Predicted incremental rates of deposited dust were below the criteria at all modelled sensitive receptors..

Potential odour emissions due to the acceptance and handling of RSW would be managed by covering delivery truck loads and covering waste in the landfill cells upon deposition. In this manner, exposure to air of any odorous materials and potential odour impacts off site would be minimised. Fugitive landfill gas emissions would be managed via the LFG extraction system. LFG would be combusted and flared in the existing LFG to energy system. The combination of RSW handling practices and the LFG extraction/energy system are expected to keep odour emissions from the Project to a minimum. The impact of odour arising from Project activities on surrounding receivers is therefore expected to be negligible.

Overall, predicted Project contributions to dust concentrations at sensitive receptors were relatively low compared to the criteria. However, the Project is located is Western Sydney and as such, background particulate concentrations can be elevated at times, which emphasises the need for the Project to manage dust emissions appropriately. A range of mitigation measures have been identified for Project operations. With these mitigation measures in place, the Project is not expected to result in significant air quality impacts upon nearby sensitive receptors.

While only a single worst case scenario was modelled for the AQIA assessment, involving landfilling along the eastern boundary, given the distance to the Site boundary and prevailing wind patterns, it is likely that concentrations at all other sensitive receptors would experience emissions lower than predicted for Receptor 1, regardless of the location of landfilling activities within the Project Area.

10.4 Future land use

The Project has been assessed in this EIS according to existing land uses and sensitive receptors. However, the area surrounding the Site is included in the Western Sydney Priority Growth Area, which will result in changes to land use surrounding the Site. The existing rural land surrounding the site is likely to be rezoned as commercial and industrial as nearby projects such as the Western Sydney Airport, M12 Motorway, M9 Motorway and North South Rail Link come commence.

Construction earthworks for some of the future projects listed above will likely overlap to a varying degrees with the Project (up to 2031) and will almost certainly result in cumulative dust impacts with the Project. However, as the spatial and temporal distribution and magnitude of dust emissions from these future projects is unknown, assessment of cumulative impacts associated with these projects is not possible at this stage. Management of any cumulative dust impacts (taking into account emissions from the Project) would need to be considered as part of the assessment and approval process for any other nearby proposal.

The potential for the Project to affect any nearby future operational uses would be subject to the nature of the particular land use. While the specific nature of nearby development is unknown at this stage it is likely to comprise industrial or commercial uses. The susceptibility of these uses to dust impacts varies dramatically with the type of business and industry. For example, fine manufacturing and processing can be highly susceptible to the broader dust environment, while other industry such as timber processing or plant propagation are less likely to be affected. It is expected that dust-sensitive activities or industries would account for the potential for dust generation from the Site when selecting a site on which to locate a business, potentially avoiding nearby properties while the landfill is still active.

It is acknowledged that the Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan designates future active transport along most of the main waterways in the vicinity of the Site. This includes both South Creek (approximately 640 to the east of the Site) and Badgerys Creek (immediately adjacent to the Site's western boundary). The impact of Project-generated dust on South Creek is likely to be effectively mitigated by the separation from the Site. Impacts upon Badgerys Creek would be minimal given that the western permitter road within the Site is sealed and dust generation along that boundary is minimal.

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10.5 Management of impacts

A range of mitigation measures were included in the calculation of emissions for the modelling scenario. These strategies are considered the minimum requirement for the Project to ensure that offsite air quality impacts are kept to a minimum. These strategies, along with additional measures to further reduce potential emissions and odour are included in **Table 10.6** below.

Table 10.6 Environmental management measures – Air quality

Impact	Reference	Environmental management measures	Timing
Dust impacts	AQ1	The haul road along the eastern boundary of the Site will be sealed to the point where trucks move westward onto the landfill itself	Operation
Dust impacts	AQ2	Unsealed haul roads will be watered down when conditions are dry and/or when dust lift-off is visible	Operation
Dust impacts	AQ3	Areas of intermediate cover and non-active landfilling will be revegetated with grass cover as soon as practicable	Operation
Dust impacts	AQ4	All trucks entering and leaving the Site will have loads covered. Empty trucks are not required to be covered	Operation
Dust impacts	AQ5	Areas of active landfilling will be watered down when dust is visibly blown by strong winds towards surrounding receptors	Operation
Dust impacts	AQ6	The sealed haul road will be watered down or swept if high dust loads are tracked-out from the unsealed areas and dust lift-off becomes visible from the sealed road	Operation
Dust impacts	AQ7	Plant and equipment will be maintained according to manufacturer's specifications to reduce the potential for abnormal exhaust particulate emissions	Operation
Dust impacts	AQ8	Diesel particulate filters will be in good working order where fitted to plant and equipment	Operation
Dust impacts	AQ9	Staff will be trained in proper use of all equipment from a dust-minimisation perspective	Operation
Dust impacts	AQ10	A register will be maintained for all dust-related complaints received from nearby residents. All complaints will be investigated and further mitigation applied as required	Operation
Dust impacts	AQ11	On days of high background PM_{10} or $PM_{2.5}$, dust-generating activities will be reduced or ceased as required. Alternatively, additional mitigation will be applied to ensure no visible dust is produced onsite. This will be outlined in the LEMP	Operation
Dust impacts	AQ12	All waste delivery trucks will have their loads covered when entering site	Operation
Odour	AQ13	RSW material will be covered as soon as practicable upon deposition	Operation
Odour	AQ14	LFG extraction and combustion/flaring will be maintained	Operation

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Chapter 11

Noise and vibration

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11.0 Noise and vibration

Executive summary

The noise and vibration impact assessment identified that the Project would result in a change in noise level between the currently approved and proposed landfilling activity of only 1 dB(A) for any receiver. This represents a potential noise exceedance of SUEZ' Environment Protection licence (EPL) 4068 noise limits of up to 8 dB(A).

The Noise Policy for Industry (NPfI) outlines that exceedances of less than 2 dB(A) would not be discernible by the average listener and therefore does not warrant receiver-based treatments or controls. Exceedances between 3 and 5 dB(A) are considered by the NPfI to be marginal and are acceptable based upon the application of architectural treatments at affected receivers. Noise reduction berms were modelled to reduce noise impacts under both the interim and final landform scenarios. For the interim scenario, EPL noise limits were shown to be exceeded by 2 dB(A) at two receivers, and by 3 dB(A) at one receiver when winds are blowing towards the receiver and landfilling activities are taking place at the nearest edge of the Project Area. There are no exceedances during standard (calm) meteorological conditions.

Noise modelling of the final landform scenario indicated one exceedance of the EPL 4068 noise limits of 1 dB(A) under noise-enhancing meteorological conditions only. As outlined above, this exceedance is considered to be negligible and does not warrant further measures.

The forecast change in heavy vehicle trip volumes is minimal and would not cause any noticeable increase in existing road traffic noise in the vicinity of the Site.

This chapter provides a summary of the findings of the Noise and Vibration Impact Assessment (NVIA) undertaken by AECOM (refer to **Appendix C**)

Table 11.1 sets out the SEARs relevant to noise and vibration and identifies where the requirements have been addressed in this EIS.

Table 11.1 SEARs – Noise and vibration

SEARs	Where addressed in this EIS
Identify all noise sources or potential sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.	Section 11.2 Appendix C
Specify the times of operation for all phases of the development and for all noise producing activities.	Section 11.3 Appendix C
For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks.	Section 11.3.3

11.1 Assessment approach

11.1.1 Overview

The noise impact assessment involved the following activities:

- Identification of noise sensitive receivers
- Unattended continuous noise monitoring to determine background noise levels
- Attended noise monitoring surrounding the site to quantify existing noise sources in the area

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- Establishment of operational and construction noise criteria based on EPA guidelines and the results of noise monitoring
- Assessment of potential construction, operation and traffic noise impacts, by:
  - noise modelling to predict the potential for impacts at sensitive receivers
  - assessing predicted impacts against noise criteria
  - considering relevant EPA guidelines including the 'Interim Construction Noise Guideline' (EPA 2009), 'Industrial Noise Policy' (EPA 2000), and 'Environmental Criteria for Road Traffic Noise' (EPA 1999).

The noise environment within the Project Area is primarily regulated by the Environment Protection Licence No. 4068 (EPL 4068). The relevant conditions of EPL 4068 were reviewed and have been used to identify appropriate criteria to assess potential noise and vibration impacts of the Project

This chapter also considers the EPA Noise Policy for Industry (NPfI) (EPA, 2017). The NPfI provides noise trigger levels for assessing the potential impact of noise from industry and includes a framework for considering feasible and reasonable noise mitigation measures. While the NPfI has been considered only the EPL noise limit has be assessed when determining noise compliance and mitigation measures.

11.1.2 Noise management conditions

EPL 4068 applies to the main Project Area only and does not include the SAWT within the Site which is managed by a separate EPL. The requirements under condition 'L4 – Noise Limits' are reproduced below:

L4.1 Noise from the premises must not exceed:

a. an LA10(15 minute) noise emission criterion of 50 dB(A) during the day (7am to 10pm);

b. an LA10(15 minute) noise emission criterion of 45 dB(A) during the night (10pm to 7am);

except as expressly provided by this licence.'

L4.2 Noise from the premises is to be measured at the most affected point on or within the residential property boundary to determine compliance with condition L4.1. If the most affected residential property boundary is greater than 30 metres from the premises, then the noise is to be measured at any point 30 metres from the nearest residence or noise sensitive area within the vicinity of the premises to determine compliance with condition L4.1. If the noise is substantially tonal, repetitive, frequency varying, or impulsive in character, 5 dB(A) must be added to the measured level for each characteristic, up to a maximum of 10 dB(A).Noise modelling

The approach to noise modelling has been based on defined operating scenarios. These scenarios seek to characterise activities being undertaken within the Site on a realistic worst case basis.

Landfilling activities during the Project would take place in specific locations and elevations at a time, resulting in the noise impact of landfilling activities on nearby sensitive receivers changing over time depending on the location of the active landfilling operation. As such interim and final scenarios were modelled for the proposed landform.

All operational activities were modelled five metres below the final landform elevation to represent a realistic landfilling scenario as only capping activities would occur at the final landform elevation. For example, for the proposed landform (RL95) the landfilling activities were modelled at RL90.

While noise modelling resulted in an output of predicted LAeq,15min noise levels, noise limits presented in EPL 4068 are based on the LA10,15min descriptor. Therefore, for the noise assessment against EPL 4068 noise limits, a 3 dB(A) correction has been made to the predicted LAeq,15min noise levels to convert them to LA10,15min levels; this is a widely accepted correction and is generally supported by empirical data.

The noise models take into account significant noise sources and locations, screening effects, receiver locations, ground topography and noise attenuation due to geometrical spreading, air absorption, ground absorption and the effects of the prevailing weather conditions.

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11.2 Existing Environment

11.2.1 Noise catchment areas

To assist in determining noise criteria for the receivers surrounding the Project, four Noise Catchment Areas (NCAs) were identified. The noise environment within each NCA is considered to be comparable and can be used to develop assessment criteria for similar noise environments. The NCAs are outlined in **Table 11.2** and shown in **Figure 11.1**.

Table 11.2 Noise catchment areas

NCA	Description
NCA1	Residences located south of Elizabeth Drive, adjacent to the eastern boundary of the Western Sydney Airport site
NCA2	Residences located to the west of the Site
NCA3	Residences to the north of the Site, located in the Twin Creeks Estate, Luddenham
NCA4	Residences located east of the Site

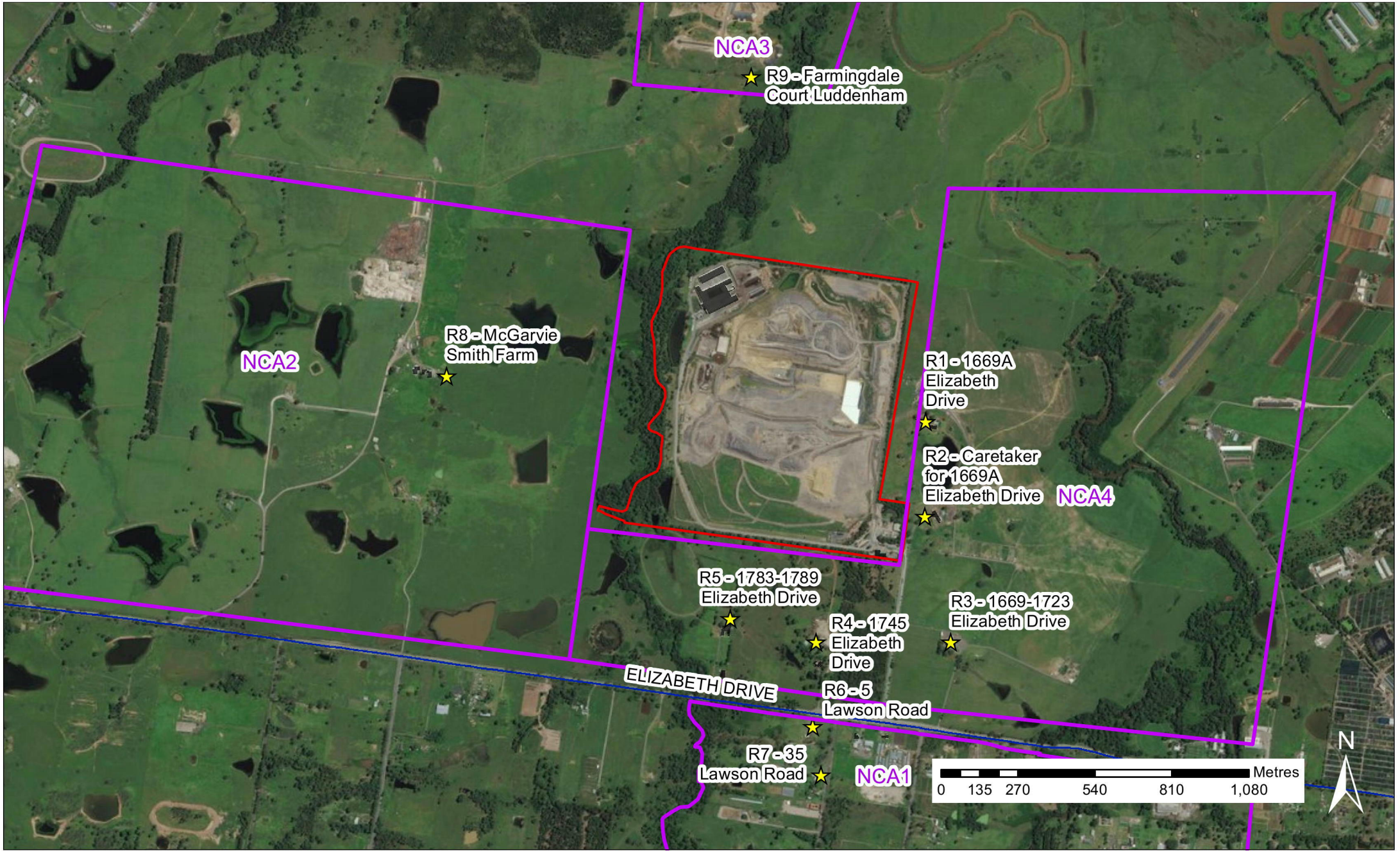
11.2.2 Noise sensitive receivers

Noise sensitive receivers that could potentially be affected by the Project are listed in **Table 11.3**. These receivers are considered to be representative of other assessment locations within the area. The nearest residential receivers are located to the east of the site, approximately 120 metres from the Site boundary.

Table 11.3 Representative residential receivers

Receiver ID	NCA	Receiver	Distance from Site (metres)	Comments
R1	NCA4	1669A Elizabeth Drive	120	Horse stud East of the Project Area
R2	NCA4	Caretakers Residence 1669A Elizabeth Drive	170	East of the Project Area
R3	NCA4	1669-1723 Elizabeth Drive	420	Horse stud East of the Project Area
R4	NCA4	1745 Elizabeth Drive	330	South of the Project Area
R5	NCA4	1783-1789 Elizabeth Drive	300	South of the Project Area
R6	NCA1	5 Lawson Road, Badgerys Creek	630	South of the Project Area, set back from Elizabeth Drive
R7	NCA1	35 Lawson Road, Badgerys Creek	790	South of the Project Area, set back from Elizabeth Drive
R8	NCA2	McGarvie Smith Farm	790	Owned by University of Sydney West of the Project Area
R9	NCA3	Farmingdale Court Luddenham	650	Residential subdivision as part of the Twin Creeks Estate, north of the Project Area

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NCA

Assessment location

Site Boundary

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SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 11.1: REPRESENTATIVE NOISE SENSITIVE RECEIVER MAP

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11.2.3 Noise monitoring results

Unattended continuous noise monitoring

Ambient unattended noise monitoring was conducted at four representative locations around the Site during July and August 2018. Noise logging was used to determine L_{Aeq} ambient noise level of the surrounding environment. Noise monitoring was also used to determine the L_{A90} levels with has been taken as the Rating Background Noise Level (RBLs) as outlined within Fact Sheet B of the NPfI.

A summary of the measured L_{A90} background noise levels and existing L_{Aeq} ambient noise levels is presented in **Table 11.4**.

Table 11.4 Existing RBL and ambient noise levels, dB(A)

Measurement location	Noise catchment area	RBL, dB(A)			Ambient noise level, L_{Aeq} dB(A)		
		Day[1]	Evening[1]	Night[1]	Day[1]	Evening[1]	Night[1]
NL1	NCA1	36	34	30	54	49	48
NL2	NCA2	31	32	30	46	39	41
NL3	NCA3	31	32	29	49	43	41
NL4	NCA4	34	33	31	47	40	42

Notes:

1. In accordance with the NPfI, time of day is defined as follows :
   Day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays
   Evening – the period from 6 pm to 10 pm.
   Night – the remaining periods.

Attended noise monitoring

Attended monitoring was also conducted at the four unattended monitoring locations on 25 July 2018. Each measurement was conducted over a 15 minute period. Weather conditions during monitoring were overcast with light to moderate winds. The attended measurement data is presented in **Table 11.5.**

Table 11.5 Attended noise monitoring results

Monitoring location / NCA	Time	Description	$L_{Amax, 15min}$, dB(A)	$L_{A10, 15min}$, dB(A)	$L_{Aeq, 15min}$, dB(A)	$L_{A90, 15min}$, dB(A)
NL1 / NCA1	14:00	• Wind noise in surrounding trees dominant. • Bird noise audible in absence of wind. • Occasional vehicle pass by along Lawson Road. • Road traffic noise from Elizabeth Drive barely audible in the absence of wind. • Occasional plane flyover, clearly audible.	84	54	56	43
NL2 / NCA2	14:50	• Wind noise dominant. • Line of sight to landfill, however equipment operating in the site inaudible. • Helicopter flyover, clearly audible.	67	50	46	38

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Monitoring location / NCA	Time	Description	$L_{Amax, 15min}$, dB(A)	$L_{A10, 15min}$, dB(A)	$L_{Aeq, 15min}$, dB(A)	$L_{A90, 15min}$, dB(A)
NL3 / NCA3	15:50	• Wind noise dominant. • Bird noise audible. • Some construction noise audible in the distance (not associated with the Project), but not dominant.	67	51	48	39
NL4 / NCA4	16:33	• Wind noise dominant. • Bird noise audible. • Traffic faintly audible, unable to attribute it to trucks entering the landfill site or travelling along Elizabeth Drive.	68	48	45	40

11.3 Potential impacts

11.3.1 Overview

The landfill operations considered in this assessment consist of two different elements which occur simultaneously:

- For the purpose of this assessment it has been assumed that the EPL 4068 noise limits apply to all truck delivery of waste into landfill cells and to the SAWT facility; and
- Landfilling operations

11.3.2 Landfilling

Without mitigation

Table 11.6 presents the noise levels associated with the final landform operational scenario for the existing approved landfill (RL 80). This has been modelled at RL 75 as a worst case scenario, as final capping would prevent landfilling activities up to the full height of RL 80. Notable exceedances of EPA criteria were identified at a number of receivers under both standard and noise-enhancing meteorological conditions.

Table 11.7 presents the noise levels associated with the final landform operational scenario for the Project (RL 95). This has been modelled at RL 90 as a worst case scenario, as final capping would prevent landfilling activities up to the full height of RL 95. Notable exceedances of EPA criteria were identified at a number of receivers under both standard and noise-enhancing meteorological conditions.

Table 11.8 compares the results of both above scenarios to demonstrate the additional noise impact resulting from the Project. This shows that predicted increases in noise levels as a result of the Project are no more than 1 dB(A) at all assessment locations under both standard and noise-enhancing meteorological conditions. The predicted increase in noise levels associated with the Project are therefore considered inconsequential and would be imperceptible at all of the assessment locations.

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Table 11.6 Predicted maximum noise levels at all representative receiver locations during daytime for approved landform scenario RL75 – without mitigation

Receiver	NPfI Project noise trigger levels, dB(A)	EPL 4068 noise limits, dB(A)	Standard conditions				Noise enhancing meteorological conditions			
			Result, dB(A)		Exceedance, dB(A)		Result, dB(A)		Exceedance, dB(A)	
	$L_{Aeq,15min}$	$L_{A10,15min}$	$L_{Aeq,15min}$	$L_{A10,15min}$	NPfI	EPL 4068	$L_{Aeq,15min}$	$L_{A10,15min}$	NPfI	EPL 4068
R1	40	50	52	55	12	5	55	58	15	8
R2	40	50	50	53	10	3	54	57	14	7
R3	40	50	44	47	4	-	49	52	9	2
R4	41	50	47	50	6	-	51	54	10	4
R5	41	50	47	50	6	-	51	54	10	4
R6	40	50	43	46	3	-	47	50	7	-
R7	40	50	41	44	1	-	46	49	6	-
R8	40	50	40	43	-	-	44	47	4	-
R9	40	50	41	44	1	-	45	48	5	-

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Table 11.7 Predicted maximum noise levels at all representative receiver locations during daytime for proposed landform scenario RL90 – without mitigation

Receiver	NPfI Project noise trigger levels, dB(A)	EPL 4068 noise limits, dB(A)	Standard conditions				Noise enhancing meteorological conditions			
			Result, dB(A)		Exceedance, dB(A)		Result, dB(A)		Exceedance, dB(A)	
	$L_{Aeq,15min}$	$L_{A10,15min}$	$L_{Aeq,15min}$	$L_{A10,15min}$	NPfI	EPL 4068	$L_{Aeq,15min}$	$L_{A10,15min}$	NPfI	EPL 4068
R1	40	50	48	51	8	1	51	54	11	4
R2	40	50	49	52	9	2	52	55	12	5
R3	40	50	45	48	5	-	49	52	9	2
R4	41	50	47	50	6	-	51	54	10	4
R5	41	50	46	49	5	-	50	53	9	3
R6	40	50	43	46	3	-	48	51	8	1
R7	40	50	42	45	2	-	46	49	6	-
R8	40	50	41	44	1	-	45	48	5	-
R9	40	50	42	45	2	-	47	50	7	-

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Table 11.8 Noise level difference between the proposed and approved landforms, note that the predicted levels have been rounded to the nearest decibel

Receiver	Standard meteorological conditions			Noise-enhancing meteorological conditions Noise-enhancing meteorological conditions		
	Predicted maximum noise levels for approved landform scenario RL75, dB(A)	Predicted maximum noise levels for proposed landform scenario RL90, dB(A)	Noise level difference between the proposed and approved landforms (i.e. increase in noise levels), dB(A)	Predicted maximum noise levels for approved landform scenario RL75, dB(A)	Predicted maximum noise levels for proposed landform scenario RL90, dB(A)	Noise level difference between the proposed and approved landforms (i.e. increase in noise levels), dB(A)
	$L_{Aeq,15min}$	$L_{Aeq,15min}$		$L_{Aeq,15min}$	$L_{Aeq,15min}$	
R1	52	48	-	55	51	-
R2	50	49	-	54	52	-
R3	44	45	<1	49	49	-
R4	47	47	-	51	51	-
R5	47	46	-	51	50	-
R6	43	43	-	47	48	<1
R7	41	42	<1	46	46	-
R8	40	41	1	44	45	1
R9	41	42	1	45	47	1

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With mitigation

The noise impact assessment has identified potential noise exceedances of the EPA noise criteria for the Site for both the approved and proposed landforms. Various measures have therefore been explored to avoid, reduce or manage this impact. These investigations focused, in order, on managing noise at the source, followed by the pathway and then the receiver.

A five metre noise protection berm was modelled on the horizontal edge along the eastern side of the batter at heights RL 65 and RL 90, representing interim and final operating scenarios. The results of these assessments are present in **Table 11.9** and **Table 11.10**.

Predicted noise levels associated with the inclusion of noise berm along the eastern side indicates compliance with EPL noise limits at all assessment locations for the RL 90 final landform operational scenario.

During noise-enhancing meteorological conditions the RL 65 interim landform scenario would result in three exceedances of the EPL 4068 noise limits. Receivers R1, R2 and R4 would exceed by 3 dB(A), 2 dB(A) and 2 dB(A) respectively. The NPfI considers a 2 dB(A) exceedance to be negligible and does not warrant receiver-based treatments or controls.

The 3 dB(A) exceedance is considered by the NPfI as *marginal* and presents examples of receiver-based mitigation treatment of '*Provide mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/*amenity'.

Furthermore, the operational scenarios modelled were developed as 'reasonable' worst case scenarios and the activities would only temporarily take place in specific locations and elevations at a time. These exceedances are only occur under noise enhancing meteorological conditions, when the wind is blowing towards receivers. The results of this assessment do not represent the noise levels across the entire operational life of the Project.

During noise-enhancing meteorological conditions the RL 90 final landform scenario would result in one exceedance of the EPL 4068 noise limits at receiver R1, which exceeds by 1 dB(A). As outlined above, the NPfI considers a 1 dB(A) exceedance to be negligible and does not warrant receiver-based treatments or controls.

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Table 11.9 Predicted maximum noise levels at all representative receiver locations during daytime for proposed landform operational scenario RL65 – With mitigation

Receiver	NPfI Project noise trigger levels, dB(A)	EPL 4068 noise limits, dB(A)	Standard conditions				Noise enhancing meteorological conditions			
			Result, dB(A)		Exceedance, dB(A)		Result, dB(A)		Exceedance, dB(A)	
	$L_{Aeq,15min}$	$L_{A10,15min}$	$L_{Aeq,15min}$	$L_{A10,15min}$	NPfI	EPL 4068	$L_{Aeq,15min}$	$L_{A10,15min}$	NPfI	EPL 4068
R1	40	50	47	50	7	-	50	53	10	3
R2	40	50	46	49	6	-	49	52	9	2
R3	40	50	42	45	2	-	46	49	6	-
R4	41	50	45	48	4	-	49	52	8	2
R5	41	50	41	44	-	-	45	48	4	-
R6	40	50	42	45	2	-	46	49	6	-
R7	40	50	40	43	-	-	44	47	4	-
R8	40	50	39	42	-	-	43	46	3	-
R9	40	50	38	41	-	-	42	45	2	-

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Table 11.10 Predicted maximum noise levels at all representative receiver locations during daytime for proposed landform operational scenario RL90 – With mitigation

Receiver	Project noise trigger levels, dB(A)	EPL 4068 noise limits, dB(A)	Standard conditions				Noise enhancing meteorological conditions			
			Result, dB(A)		Exceedance, dB(A)		Result, dB(A)		Exceedance, dB(A)	
	$L_{Aeq,15min}$	$L_{A10,15min}$	$L_{Aeq,15min}$	$L_{A10,15min}$	NPfI	EPL4068	$L_{Aeq,15min}$	$L_{A10,15min}$	NPfI	EPL 4068
R1	40	50	45	48	5	-	48	51	8	1
R2	40	50	43	46	3	-	46	49	6	-
R3	40	50	38	41	-	-	42	45	2	-
R4	41	50	39	42	-	-	43	46	2	-
R5	41	50	36	39	-	-	40	43	-	-
R6	40	50	38	41	-	-	42	45	2	-
R7	40	50	37	40	-	-	41	44	1	-
R8	40	50	37	40	-	-	41	44	1	-
R9	40	50	32	35	-	-	37	40	-	-

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Summary

The predicted noise levels at nearby sensitive receivers for the RL 65 operational scenario are greater than the noise levels predicted for the RL 90 elevation under both standard and noise-enhancing meteorological conditions. This is expected as a 25 meters increase in height equates to the landform itself providing greater barrier effect (i.e. increase noise attenuation) due to the loss of line of sight. In addition, the RL 65 scenario uses the same noise sources though these are located 50 metres closer to noise sensitive receivers than the RL 90 scenario due to the progressive slope of the landfill batter as the height increases.

11.3.3 Traffic noise

The forecasted change in heavy vehicle trip volumes as presented in the AECOM report *Traffic and Transport Impact Assessment* is minimal and will not cause any noticeable increase in existing road traffic noise in the vicinity of the landfill site. Therefore a detailed traffic noise impact assessment is not required.

11.3.4 Future land zoning

As outlined in **Chapter 8**, due to the development of the Western Sydney Airport and Aerotropolis, the area surrounding the Site will be subject to significant additional future development. Western Sydney Airport is expected to be operational by 2026 with flight paths planned directly over the Site and existing nearby residential receivers.

Given the impending change to the surrounding environment of the Site, it is highly likely that the future noise environment will change dramatically. It is likely that the area will generally become significantly noisier, with much of this noise related to major new transport and industrial noise sources. Additionally, the land immediately around the around the Elizabeth Drive landfill is likely to be zoned for commercial or industrial purposes, which will raise the relevant noise criteria under the NPfI.

The exceedances of applicable noise criteria predicted in this assessment are likely to become irrelevant under the above scenario as it is expected that the vast majority of nearby residential receivers will not exist beyond the airport's opening date of 2026. Further to this, based on the results of modelling undertaken for this assessment, it is likely that very few, if any, future nearby commercial receivers would be subject to noise levels exceeding the 63 dB(A) noise limit for commercial activities under the NPfI.

11.3.5 Vibration

Vibration has been considered, however with the large distances (at least 100 m) between the operations and nearby sensitive receivers, a detailed assessment was deemed to not be required as the safe working distances will not be encroached even at the nearest point of operations to the receivers.

11.4 Management of impacts

The currently approved landfilling operations are not expected to change as a result of the Project and have been modelled to be as close as possible to current operations. The modelling undertaken as part of this assessment indicates that increases in noise levels associated with the Project are less than one dB(A) at all assessment locations under standard and noise enhancement meteorological conditions.

However, given the significant growth expected to occur in the immediate vicinity in the near future and the fact that the actual noise impacts of the landfilling operations will vary overtime, it is proposed that SUEZ develop a noise mitigation action plan that would trigger a management response for the investigation and consideration of noise mitigation measures.

The modelling of noise protection berms, as proposed by SUEZ, indicates that they are effective in reducing the noise impact of the landfilling operations when they are used in the line-of-sight between receivers and the noise sources. The noise berms would reduce landfill operational noise levels at receivers such that they comply with the EPL noise limits.

The proposed noise mitigation action plan should be further developed and included in the noise management strategy outlined in the LEMP for the Site.

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Table 11.11 Environmental management measures – Noise and vibration

Impact	Reference	Environmental management measures	Timing
Operational noise	NV1	A noise mitigation action plan will be implemented which will outline strategies for additional noise management and mitigation measures. This will be included in the LEMP.	Construction/ Operation
Operational noise	NV2	Noise protection berms will be included in the design of the proposed interim landform	Construction/ Operation

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Chapter 12

Traffic and transport

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12.0 Traffic and transport

Executive summary

The traffic and transport modelled the performance of Elizabeth Drive and the Site Access Road under existing conditions (2019), with and without the Project in 2025 and with the project in 2031. The number of additional trips predicted to be generated by the Project under the 'with project' scenarios was four two-way trips in the AM peak hour and twelve two-way trips in the PM peak hour.

The performance of intersections is typically measured in level of service (LoS), rated from A to F. LoS A indicates a well-functioning intersection within minimal delays, while LoS F indicates intersection failures.

The intersection modelling undertaken for the Project shows that the level of service (LoS) for vehicles exiting the Site Access Road is currently LoS F, with an average delay of between 2 and 5 minutes during the AM peak (worst case scenario conditions). This remains LoS F in 2025 with and without the project, with the 'with project' scenario resulting in an additional delay of approximately four to five minutes for vehicles exiting the Site Access Road. Under the 2031 'with project' scenario the intersection remains LoS F, with increased delays. Through traffic on Elizabeth Drive is unaffected under all scenarios and remains LoS A.

Although the traffic modelling presents failures at the intersection, the impact that the Project would have on intersection performance is nominal. The modelling shows an increase in delay for a nominal increase in the number of trips generated by the Project. This is primarily largely due to forecast organic increases in background traffic growth to occur along Elizabeth Drive.

It is recognised that Elizabeth Drive is proposed to be upgraded by Roads and Maritime Services. This includes a new signalised intersection at Martin Road, 140 m east of the Site Access Road/ Elizabeth Drive intersection. This may present benefits for vehicles turning right out of the Site Access Road in that it will provide gaps when traffic stops for red lights.

This chapter provides a summary of the findings of the Traffic and Transport Impact Assessment (TTIA) undertaken by AECOM for the Project (refer to **Appendix B**)

Table 12.1 sets out the SEARs relevant to traffic and transport and identifies where the requirements have been addressed in this EIS.

Table 12.1 SEARs – traffic and transport

SEARs	Where addressed in this EIS
Details of road transport routes and access to the Site	Section 12.2.1 and Section 12.2.4
Road traffic predictions for the development during construction and operation	Section 12.3
An assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development	Section 12.3.5 and Section 12.4

12.1 Assessment Approach

12.1.1 Overview

An assessment was undertaken of the impact of the Project on the surrounding road network. This included modelling of the performance of the Elizabeth Drive and Site Access Road intersection using modelling package SIDRA 8. This assessment modelled the current and future performance of this

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intersection with an increased filling rate of 950,000 tpa. Performance indicators applicable to the Project were:

- Degree of Saturation (DoS) – measure of the ratio between traffic volumes and capacity of the intersection is used to measure the performance of isolated intersections. As DoS approaches 1.0, both queue length and delays increase rapidly. Satisfactory operations usually occur with a DoS of less than 0.9.
- Average Delay – duration, in seconds, of the average vehicle waiting at an intersection, which corresponds to the Level of Service (LoS) – a measure of the overall performance of the intersection. Intersection performance criteria are outlined in **Table 12.2**.

Table 12.2 – Level of service performance criteria

Level of Service	Average Delay (secs/vehicle)	Give Way and Stop Signs
A	Less than 14	Good Operation
B	15 to 28	Acceptable delays and spare capacity
C	29 to 42	Satisfactory, but accident study required
D	43 to 56	Near capacity and accident study required
E	57 to 70	At capacity; requires other control mode
F	>70	At capacity; requires other control mode

Source – Guide to Traffic Generating Developments, RTA, 2002

Intersection counts were undertaken at the Elizabeth Drive and Site Access Road intersection in May 2019 to establish the existing traffic volumes for all vehicles and to allow modelling forecasts to be generated.

12.1.2 Modelled Scenarios

The intersection modelling has reviewed the following four scenarios.

- Existing operation (2019) – based on a filling rate of 750,000 tpa
- Future operation without project (2025) – based on a filling rate of 750,000 tpa
- Future operation with project (2025) – based on a filling rate of 950,000 tpa
- Future operation with project (2031). – based on a filling rate of 950,000 tpa

The peak hours used in the model were based on the peak hours surveyed for the surrounding road network. These were:

- AM weekday peak hour: 7.00am – 8.00am
- PM weekday peak hour: 4.00pm – 5.00pm
- Weekend peak hour: 12.15pm – 1.15pm.

12.1.3 Traffic Volumes

The long term filing rate for the Site is approximately 750,000 tpa. Traffic volumes associated with the future standard operating scenario (filling rate of 950,000 tpa) were derived by scaling up existing representative heavy vehicle traffic numbers using an average calculated waste volume of 12.7 tonnes per vehicle. The numbers of light vehicles entering the Site and heavy vehicles accessing the SAWT were not scaled.

Future non-Site traffic volumes (i.e. through traffic on Elizabeth Drive) were based on a general 'background' growth factor of 2.2% applied to the traffic count data.

12.2 Existing Environment

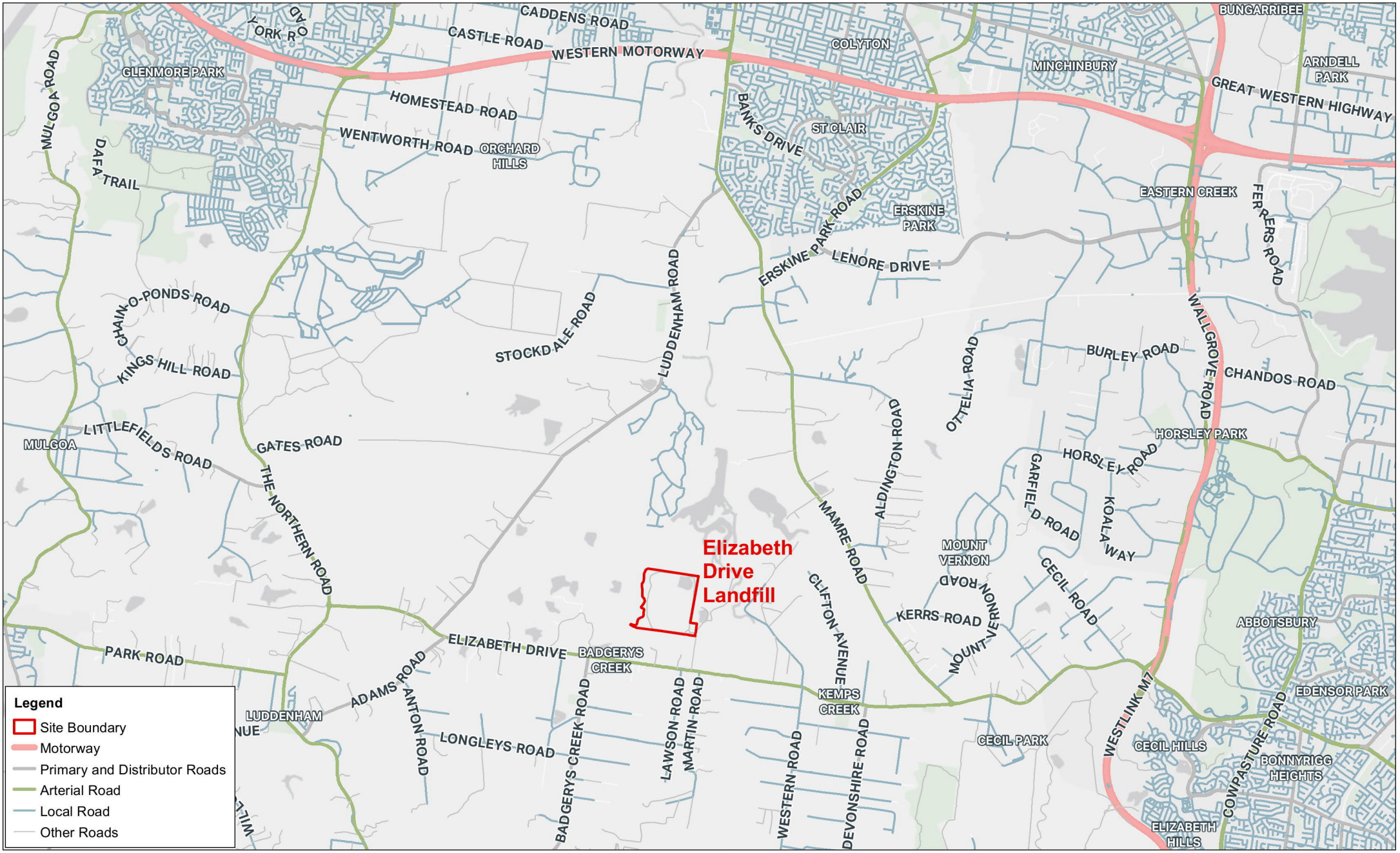
The surrounding road and public transport network of the Site is provided in **Section 12.2.1** and **12.1.3**. There are no pedestrian or cycle routes/facilities (including footpaths) in the vicinity of the Site.

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12.2.1 Surrounding Road Network

The surrounding road network is discussed below and illustrated on **Figure 12.1**.

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SUEZ

SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 12.1: ROAD NETWORK

0 0.5 1 2 km

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12.2.1.1 Elizabeth Drive

Elizabeth Drive is a State road which connects traffic from Westlink M7 (M7) near Cecil Hills with The Northern Road (A9) and Luddenham Road near Luddenham. The route is predominately signed at 80 km/h in both directions. It currently caters for regional and local access, and through traffic linking the M7 motorway and the A9 The Northern Road. As well as connecting the Site to these regional north-south links, it also provides access to key links to the north on Luddenham Road and Mamre Road (which forms part of a State road link), as well as to the south on Badgerys Creek Road and Devonshire Road.

12.2.1.2 Westlink Motorway (M7)

The M7 is a tolled motorway with two lanes in each direction. The route is signed at 100 km/h in both directions. The motorway provides a strategic north/south link in Sydney's west, intersecting with the M5 motorway to its south and the M2 motorway to its north. The motorway also provides access to the M4 motorway south of Penrith. Access between the Site and the M7 would be via Elizabeth Drive. There are entry and exit ramps from the M7 onto/from Elizabeth Drive servicing travel in all directions.

12.2.1.3 Western Motorway (M4)

The Western motorway, also known as the M4 is a motorway with three lanes in each direction. The route is predominately signed at 110 km/h in both directions. The motorway provides a strategic east-west link across Sydney, intersecting with the Great Western Highway (A4) at Homebush to its east, and the A32 at its west. Site traffic would be able to access the M4 via Mamre Road, utilising the entry and exit ramps onto Mamre Road from the M4, or via the M7 or The Northern Road, which also connect to the M4.

12.2.1.4 The Northern Road (A9)

The Northern Road, also known as the A9, is an arterial road with between one and three lanes in each direction. The route is predominately signed at 80 km/h in both directions. The route provides a strategic north-south link in Sydney's west, intersecting with Windsor Road (A2) to its north, and Camden Valley Way to its south. The A9 continues as Narellan Road from this point to provide a connection to the Hume Motorway (M31). Site traffic would be able to use The Northern Road via Elizabeth Drive and a roundabout intersection which provides access from The Northern Road onto the western most section of Elizabeth Drive.

12.2.1.5 Mamre Road

Mamre Road is part of a State road link between Elizabeth Drive and the Great Western Highway. It is a two lane road and is predominately signed at 80 km/h in both directions. It provides a key link for the Site to the M4 and to the Great Western Highway.

12.2.1.6 Luddenham Road

Luddenham Road is a local two lane road. Site vehicles would be able to access Luddenham Road via Elizabeth Drive, to connect to Mamre Road near St Clair. Luddenham Road is signed at 80 km/h in both directions.

12.2.1.7 Site Access Road

The Site Access Road between Elizabeth Drive and the Site is 600 m in length and provides one traffic lane in each direction, with an additional 185 m queuing lane on the northbound lane approaching the Site. This road is a public road. Managed by PCC, which provides access to the Site and the several neighbouring properties. The road is used by both light and heavy vehicles.

12.2.2 Public Transport Network

Sydney buses operates the 801 service on weekdays along Elizabeth Drive, connecting Badgerys Creek and Liverpool. There a two bus stops located within 200 metres of the Site servicing both directions.

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12.2.3 Existing Traffic Volumes

Intersection counts were undertaken at the intersection of Elizabeth Drive/Access road on Thursday 16 May 2019 between 7.00am – 9.00am and 4.00pm – 6.00pm and on Saturday 18 May 2019 between 10.00am – 2.00pm. Analysis of the counts at the intersection had the following peak hours:

AM weekday peak hour: 7.00am – 8.00am

PM weekday peak hour: 4.00pm – 5.00pm

Weekend peak hour: 12.15pm – 1.15pm.

A summary of the turning movements recorded at this intersection during the weekday AM, PM and weekend peak hours are illustrated in **Figure 12.2** to **Figure 12.3**.

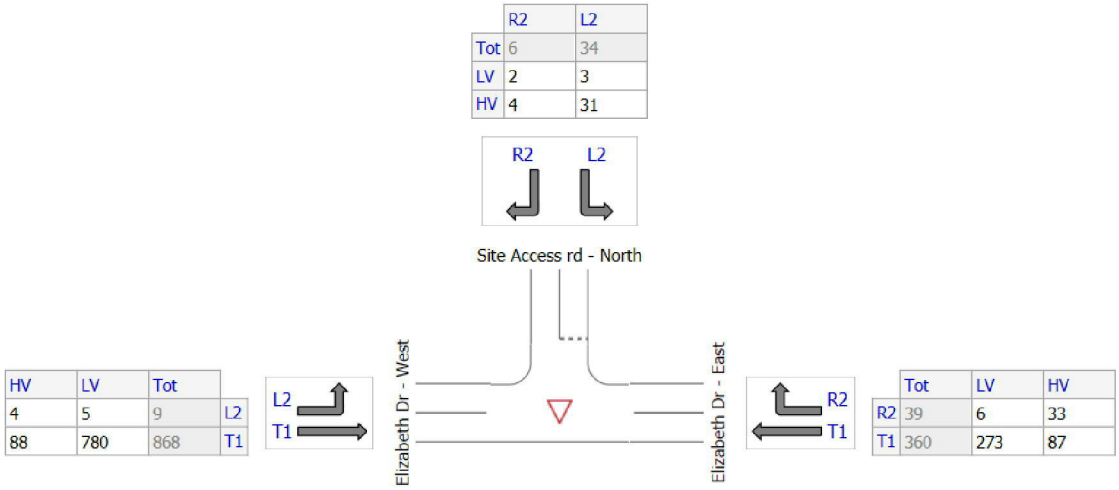


Figure 12.2Surveyed weekday AM peak hour traffic volumes

'HV' refers to Heavy Vehicles, 'LV' refers to Light Vehicles, 'Tot' refers to Total Vehicles

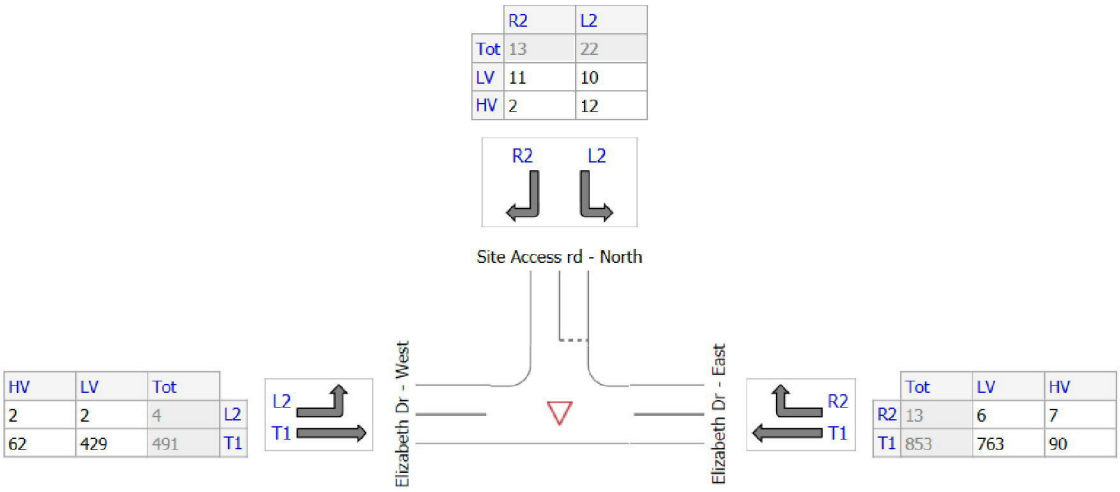


Figure 12.3Surveyed weekday PM peak hour traffic volumes

'HV' refers to Heavy Vehicles, 'LV' refers to Light Vehicles, 'Tot' refers to Total Vehicles

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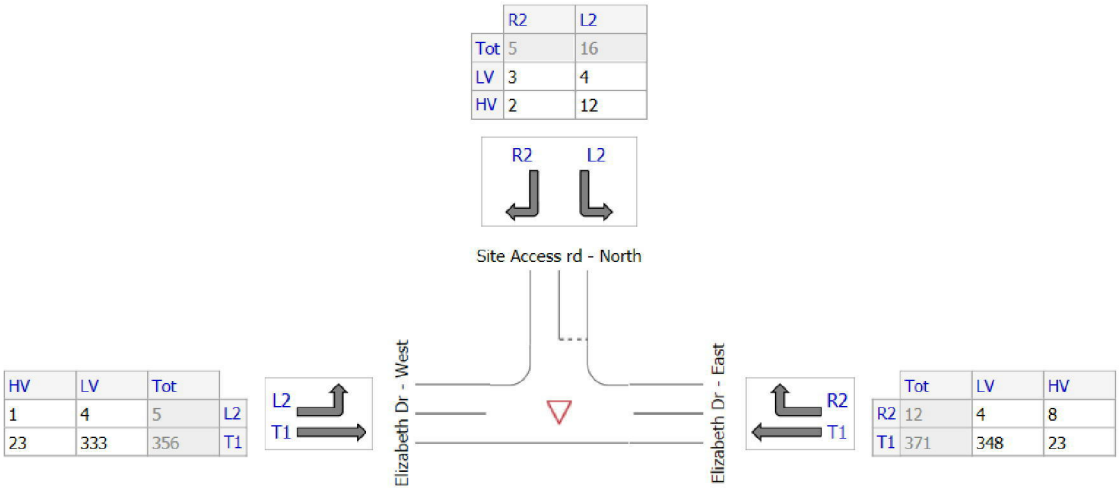


Figure 12.4 Surveyed weekend peak hour traffic volumes

'HV' refers to Heavy Vehicles, 'LV' refers to Light Vehicles, 'Tot' refers to Total Vehicles

12.2.4 Site access and haulage routes

Vehicles predominantly access the Site by travelling westbound along Elizabeth Drive and making a right turn into the Site Access Road. A small portion of vehicles access the Site by traveling eastbound along Elizabeth Drive and turning left into the Site Access Road. Similarly, vehicles predominantly exit the Site by travelling southbound along the Site Access Road and turning left to travel eastbound on Elizabeth Drive, with a small portion turning right to travel westbound.

The various Site access routes for heavy vehicles, and the percentage split for each of these routes for each of the peak periods are shown on **Figure 12.5** and **Figure 12.6**.



Figure 12.5 Site access routes and distribution for heavy vehicles – AM and PM peak hours

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Figure 12.6 Site egress routes and distribution for heavy vehicles – AM and PM peak hours

12.2.5 Intersection configuration

The configuration of the intersection of Elizabeth Drive and the Site Access Road is shown on **Figure 12.7**.

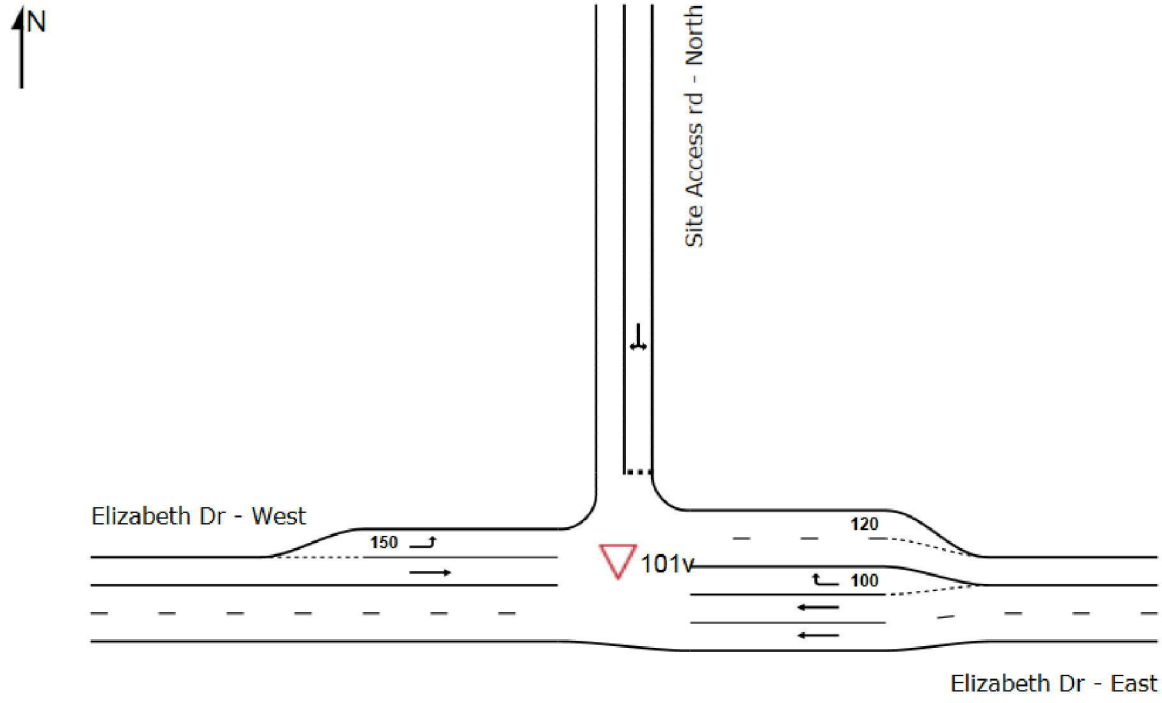


Figure 12.7 Existing Elizabeth Drive/Site Access road modelled intersection layout

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12.3 Potential impacts

The likely traffic impacts of the Project on the local road network during the typical weekday AM and PM peak hours have been assessed and are presented below. The weekend peak hour has been omitted from this assessment as the AM and PM weekday peak hours represent the busiest periods on the network, and provides for a comprehensive and worst case assessment.

12.3.1 Existing operation (2019)

Table 12.3 presents the weekday AM and PM peak hour intersection performance under the existing operations scenario. This scenario uses the traffic volumes reported by SUEZ (weighbridge data) equivalent to a filling rate of approximately 750,000 tpa.

Table 12.3 Summary of existing intersection LoS under Standard operating conditions

	Standard operating scenario (750,000 tpa)	
	2019	
Intersection Leg	AM Peak	PM Peak
East Leg – Elizabeth Drive	A	A
North Leg – Site Access Road	F	F
West Leg – Elizabeth Drive	A	A

The intersection generally performs satisfactorily during the AM and PM peaks hours, with an average delay of 5.2 seconds in the AM peak hour, and 1.8 seconds in the PM peak hour.

- Through movement along Elizabeth Drive in both directions operates at LoS A during both peaks.
- The right turn from Elizabeth Drive into the Site Access Road operates at LoS C during the AM peak hour with an average delay of 38 seconds. This level of delay is considered acceptable, and queue lengths are contained within the extremities of the right turn bay on Elizabeth Drive.
- In both the AM and PM peak hours, the right turn out from the Site Access Road performs at LoS F. These vehicles need to wait on average between 2 and 5 minutes to turn right at the intersection. This is likely to be attributed to the high traffic flows along Elizabeth Drive, with right turning vehicles from the Site finding it difficult to find gaps in traffic flow to exit. As there is only one exit lane on the Site Access Road, this would also explain why left turning vehicles may also experience delays exiting. Queue lengths however are not significant on the Site Access Road due to the overall low volumes of vehicles exiting the Site.

12.3.2 Future operation without project (2025)

The 2025 ‘without project’ scenario assesses how the Elizabeth Drive/ Site Access road intersection would perform under a disposal rate of 750,000 tpa. This scenario assumes a background traffic growth of 2.2% p.a. on Elizabeth Drive.

Table 12.4 Summary of 2025 without project intersection LoS

	Without project scenario (750,000 tpa)	
	2025	
Intersection Leg	AM Peak	PM Peak
East Leg – Elizabeth Drive	A	A
North Leg – Site Access Road	F	F
West Leg – Elizabeth Drive	A	A

The intersection generally performs satisfactorily during the AM and PM peak hours with an overall average delay of 14.1 seconds in the AM peak hour and 3.7 seconds in the PM peak hour.

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- The through movement along Elizabeth Drive in both directions operates at LoS A during both peak periods.
- The right turn from Elizabeth Drive into the Site Access Road operates at LoS D during the AM peak hour with an average delay of 56 seconds. This level of delay is considered acceptable, and queue lengths are contained within the extremities of the right turn bay on Elizabeth Drive.
- In both the AM and PM peak hours, the right turn out from the Site Access Road performs at LoS F. These vehicles need to wait on average between 4 and 12 minutes to turn right at the intersection. This is likely to be attributed to the high traffic flows along Elizabeth Drive, which are expected to increase due to background traffic growth compared to existing conditions. Queue lengths along the Site Access Road are expected to be in the region of 115 metres.

12.3.3 Future operation with project (2025)

The 2025 'with project' scenario assesses how the Elizabeth Drive/Site Access road intersection would perform under a disposal rate of 950,000 tpa. This scenario assumes a background traffic growth of 2.2% p.a. on Elizabeth Drive.

Table 12.5 Summary of 2025 with project intersection LoS

	Without project scenario (750,000 tpa)	
	2025	
Intersection Leg	AM Peak	PM Peak
East Leg – Elizabeth Drive	A	A
North Leg – Site Access Road	F	F
West Leg – Elizabeth Drive	A	A

The intersection generally performs satisfactorily during the AM and PM peaks hours, with an average delay of 25 seconds in the AM peak hour, and 3.9 seconds in the PM peak hour.

- The through movement along Elizabeth Drive in both directions operates at LoS A during both peak periods
- The right turn from Elizabeth Drive into the Site Access Road operates at LoS D during the AM peak hour with an average delay of 55 seconds. This level of delay is considered acceptable, and queue lengths are contained within the extremities of the right turn bay on Elizabeth Drive
- In both the AM and PM peak hours, the right turn out from the Site Access Road performs at LoS F. These vehicles need to wait on average between 4 and 16 minutes to turn right at the intersection. This is likely to be attributed to the high traffic flows along Elizabeth Drive, which are expected to increase due to background traffic growth compared to existing conditions. Queue lengths along the Site Access Road are expected to be in the region of 200 metres.

Comparing the 2025 with and without project scenarios, the overall intersection performance experiences an average of 10 seconds of additional delay.

- Traffic flows along Elizabeth Drive continue to operate at LoS A during both peak periods
- The right turn from Elizabeth Drive into the Site Access Road also continues to operate at LoS D in the AM peak hour with the same level of average delay and queue length
- In both the AM and PM peak hours, the right turn out from the Site Access Road continues to perform at LoS F. Due to the degree of saturation surpassing 1 in the AM peak hour in both the without and with Project scenarios, this represents a failure at the intersection, and therefore the average delay and queue lengths increase exponentially. Queue lengths are expected to increase by 95 metres, and delays by 4 minutes. This is to be expected as background traffic volumes along Elizabeth Drive will have experienced traffic growth, with over 1,000 vehicles travelling in a single direction within a single lane. Traffic volumes along Elizabeth Drive are therefore

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approaching mid-block capacity, which may have detrimental impacts to traffic speeds and queueing along Elizabeth Drive . This would likely occur regardless of the Project

- Right turning vehicles would continue to find it increasingly more difficult to find suitable gaps in traffic to exit with or without the Project, with delays and queue lengths increasing due to the increase in heavy vehicle movements generated by the Project. It should be noted that the proposed increase in heavy vehicle movements is of a low volume. However as the Site Access Road leg of the intersection is saturated, small traffic volume increases would yield significant increases in the reported delay and queue lengths.

12.3.4 Future operation with project (2031)

The 2031 'with project' scenario assesses how the Elizabeth Drive/Site Access road intersection would perform under a disposal rate of 950,000 tpa. This scenario assumes a background traffic growth of 2.2% p.a. on Elizabeth Drive.

Table 12.6 Summary of 2031with project intersection LoS

	Without project scenario (750,000 tpa)	
	2025	
Intersection Leg	AM Peak	PM Peak
East Leg – Elizabeth Drive	A	A
North Leg – Site Access Road	F	F
West Leg – Elizabeth Drive	A	A

The intersection generally performs satisfactorily during the AM and PM peaks hours, with an average delay of 34.9 seconds in the AM peak hour, and 10.5 seconds in the PM peak hour.

- The through movement along Elizabeth Drive in both directions operates at LoS A during both peak periods.
- The right turn from Elizabeth Drive into the Site Access Road would operate at LoS F during the AM peak hour with an average delay of 106.4 seconds. This level of delay would generally be considered unacceptable. However as queue lengths would still be contained within the extremities of the right turn bay on Elizabeth Drive, and due to the increase in background traffic volumes on Elizabeth Drive, this level of delay could be considered acceptable.
- In both the AM and PM peak hours, the right turn out from the Site Access Road performs at LoS F. These vehicles need to wait on average between 10 and 21 minutes to turn right at the intersection. As previously discussed, right turning vehicles would continue to find it increasingly more difficult to find suitable gaps in traffic on Elizabeth Drive to exit due to the high vehicle volumes travelling along Elizabeth Drive. Queue lengths along the Site Access Road are expected to be in the region of 253 metres.

12.3.5 Road Safety

A qualitative assessment of the impacts that the Project may have on road safety identified that due to longer delays, drivers turning into/out of the Site Access Road may accept shorter than recommended gaps as they become frustrated. This may lead to an increase in right angle crashes between turning vehicles and through traffic along Elizabeth Drive. This is not necessarily due to the Project, and is likely to be the case under the existing approved operations in 2025 with mid-block volumes reaching 1,000 vehicles per hour along Elizabeth Drive.

In addition, the queue for right turning vehicles into the Site from Elizabeth Drive is not expected to extend out of the right turn lane. However, the queue is forecast to extend to the end of the right turn lane in 2031. Under periods of unexpectedly high traffic volumes in 2031, vehicles may queue outside of the right turn lane pocket, and obstruct through traffic. This may lead to an increase in rear crashes between vehicles waiting to turn right and through traffic westbound along Elizabeth Drive.

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12.3.6 Summary

Key findings of the assessment are as follows:

- Through traffic on Elizabeth Drive is unaffected by the Project
- The LoS issues along Elizabeth Drive relate to vehicles turning right into the Site Access Road. As Elizabeth Drive reaches its mid-block capacity, heavy vehicles would struggle to find suitable gaps in eastbound traffic. However, the right turn lane is 100 metres in length, and the forecast maximum queue for right turning vehicles into the Site in 2031 is approximately 96 metres. Therefore it is unlikely that these queues would affect westbound through traffic performance.
- The LoS issues along the Site Access Road generally relate to vehicles turning right to head westbound on Elizabeth Drive. Similarly, in both 2025 and 2031 heavy vehicles under this scenario would struggle to find suitable gaps in both eastbound and westbound traffic.
- The Project is likely to increase heavy vehicle trips by four trips in the AM peak hour and twelve trips in the PM peak hour. This increase in trips is nominal, and represents an additional trip approximately every 15 minutes during the AM peak hour and six minutes during the PM peak hour. Growth in background traffic results in the mid-block reaching capacity on Elizabeth Drive, which in turn would cause the performance of Elizabeth Drive to deteriorate regardless of the Project. This suggests that upgrades would be required to increase capacity along Elizabeth Drive to cater for these projected increases in background traffic growth (with or without the Project).
- Although the traffic modelling presents failures at the intersection, the impact that the Project would have on intersection performance is nominal. The modelling shows an exponential increase in delay for a nominal increase in the number of trips generated by the Project. This is primarily due to forecast traffic performance failures along Elizabeth Drive due to organic increases in background traffic growth.

12.3.7 Cumulative impacts

12.3.7.1 Western Sydney Infrastructure Plan

The Western Sydney Infrastructure Plan (WSIP) is the Australian and NSW governments' 10 year, $3.6 billion road investment program for Western Sydney. It will deliver major road infrastructure upgrades and provide improved road transport capacity ahead of future traffic demand, as planned residential and employment development comes online in Western Sydney growth areas and the Western Sydney employment area.

Major components of the WSIP in the vicinity of the Site include:

- Upgrade of The Northern Road to a minimum of four lanes from Narellan to Jamison Road, and
- Construction of the M12 Motorway which is a proposed east-west motorway to connect the airport to the M7 Motorway and The Northern Road.

Construction of M12 would provide a bypass for traffic around Elizabeth Drive, generally for through traffic. It is expected therefore that through traffic volumes would decrease as a result of the M12 motorway. However, this fall in through traffic on Elizabeth Drive is expected to be accompanied by an increase in freight traffic as future freight demand is expected to grow considerably in the local area, with Elizabeth Drive located within the Western Sydney Airport growth area, and the M12 Motorway expected to unlock development opportunities along Elizabeth Drive.

The impacts of the proposed Western Sydney Airport and construction of the M12 motorway have not been considered as a part of the future year modelling assessment as there is insufficient information and data available. However it is noted that Elizabeth Drive has been mentioned as a key east-west road link for the south of the Aerotropolis in the Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan.

Currently, Roads and Maritime Services is engaging with the community, and undertaking site investigations as part of the preparation of the access strategy and ongoing development of the project to upgrade Elizabeth Drive. At this early stage, the extent of the upgrades are unknown, and cannot be

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included in the cumulative impact assessment due to insufficient information being made available. However, it can be concluded that any changes to the road geometry and capacity of Elizabeth Drive is likely to have a direct impact on the performance of the intersection of Elizabeth Drive and the Site Access Road. Any increase in the capacity along Elizabeth Drive (such as lane duplication) would likely improve intersection performance and traffic flows along Elizabeth Drive. This in turn could assist drivers entering and exiting the SUEZ Site in finding safe gaps in traffic flow to enter the Site, and therefore reducing the forecast queue lengths and delays highlighted in this assessment.

12.4 Management of impacts

As outlined above, the impact of the Project on the performance of the surrounding road network, and the Site Access Road/Elizabeth Drive intersection would be nominal. The Project would contribute an additional four two-way trips in the AM peak hour and twelve two-way trips in the PM peak hour. Given the negligible difference in intersection performance between the 'without project' and 'with project' scenarios additional management measures are not considered necessary.

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Chapter 13

Social and economic

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13.0 Social and economic

Executive summary

The Project has the potential to result in a number of minor impacts to local amenity. These include very low level exceedances of noise and air quality thresholds for a small number of receptors, as well as broader landscape character and visual impacts to a large number of different receptors. Traffic impacts would be limited to the Site Access Road, with through traffic on Elizabeth Drive unaffected. Given the nature of the surrounding area and the scale of the impacts, amenity impacts were not expected to result in significant socio-economic impacts.

Similarly, the Project would not result in any substantial change in the nature of surrounding land use. As such, the socio-economic impact of changes to land use were deemed to be low.

Given the footprint would not change and its offsite impacts would be minimal, the Project would not be expected to alter the existing degree of community cohesion or change community values.

The Project would provide socio-economic benefit though the continuation of an important service to the broader Sydney region – a facility for the responsible and safe disposal of non-putrescible waste. The Project would not result in any distinct disadvantages or changes to local businesses and as such the Project is considered to result in a medium positive economic outcome.

This chapter outlines the potential social and economic impacts associated with Project. These include direct and indirect impacts as outlined in **section 13.5**.

The Project SEARs did not reference any specific requirements for socio-economic impact assessment. Despite this, the following socio-economic impact assessment has been undertaken to understand potential impacts and to inform future management of the Site. Assessment approach

13.1.1 Overview

The key components of the social and economic assessment included:

- Desktop assessment and analysis of impacts on amenity, connectivity and access, future land use, community identity, values and cohesion
- Consideration of community issues
- Identification and consultation with stakeholders who could be affected by the project
- Identification and consultation with community who could be affected by the project.

13.1.2 Policy and strategic plans

The assessment has been undertaken with consideration of the following:

- Greater Sydney Region Plan 2018
- Western City District Plan 2018
- Western Sydney Aerotropolis Stage 1 Land Use and Infrastructure Implementation Plan 2018
- Penrith City Council Strategy 2017
- Penrith City Council Community Plan 2017
- Our Home Liverpool – Community Plan 2027
- Australia Bureau of Statistics (ABS) census data (2016).

Whilst still in the early stages, the Site's surrounds are currently undergoing a significant transformation in terms of land use, infrastructure, employment and demographics. This change is being driven by the new Western Sydney Airport, which is currently under development in close proximity to the Site.

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The nearest boundary of the airport site is approximately 600 metres to the south west of the Site, with the proposed runways running in a southwest to northeast alignment. This alignment would result in aircraft approaching and taking off directly over the Elizabeth Drive Landfill Site during certain weather conditions. The airport is proposed to commence operations in December 2026.

The above plans and policies have heavily influenced the nature of the development of this region, and will continue to do so for several decades. This is expected to dramatically alter the local socio-economic environment. While it is not possible to know the fine detail of this planning at this early stage of transformation, the community outcomes of the above documents have been considered in this assessment and with specific reference to how the Project may affect their achievement, both positively and negatively.

13.1.3 Study area

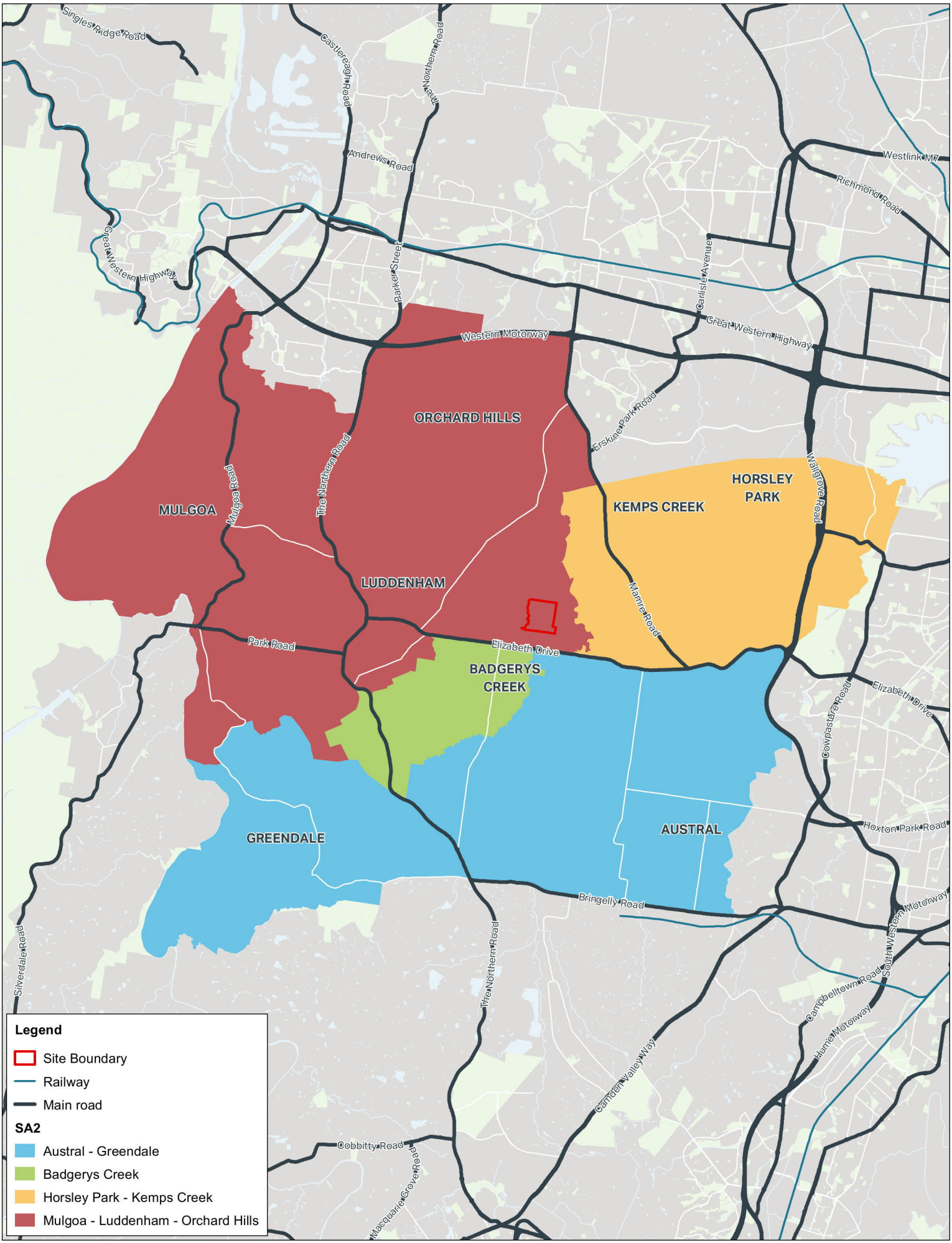
The scale of the study area for the Project has been selected based on its likely area of social influence and consideration of the broader, more regional-scale impacts. This aims to account for aspects such as employment and other economic opportunities facilitated by the project.

Specifically, the study area takes into account the following geographic areas, each defined by the Australian Bureau of Statistics (ABS) as a 'Statistical Area Level 2' (SA2):

- Austral-Greendale
- Horsley Park-Kemps Creek
- Mulgoa-Luddenham-Orchard Hills
- Badgerys Creek

The geographic extent of the above SA2 areas, as well as the overall study area, is shown on **Figure 13.1**.

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SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 13.1: STATISTICAL AREA 2 (SA2) BOUNDARIES

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Disclaimer Spatial data used under licence from Land and Property Management Authority, NSW © 2018.

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13.2 Methodology

The social and economic impact assessment has addressed the direct and indirect impacts and benefits of the Project by considering:

- Local amenity, including traffic, air quality, noise and the landscape and visual environment
- Property and land use within both the existing and future context
- A broad consideration of business impacts in the context of surrounding industry
- Community identity, values and cohesion
- Social impacts, including amenity, community identity and cohesion
- A broad consideration of economic consequences.

Social impacts may be evaluated quantitatively, such as the likely effects on future population growth and employment, or qualitatively, which may include community perceptions toward a proposal, environmental concerns and effect on cohesion. This assessment has utilised both approaches as appropriate and is based upon the degree and quality of available baseline data.

This assessment has employed a standardised matrix approach to the assessment of social and economic impacts. This approach considers both the sensitivity of the receptor and the magnitude of the specific impact. This includes consideration of the following factors:

- Spatial extent of the impact - the geographic area affected. This may be project-only, local, suburb, regional or beyond
- Intensity/severity of the impact - the scale or degree of change from the existing condition
- Duration of the impact - the timeframe over which the impact would occur
- Sensitivity of the receptor - the susceptibility or vulnerability of people, receivers or receiving environments to adverse changes caused by the impact, or the importance placed on the matter being affected.

The significance of an impact is determined from the combination of the magnitude of impact and sensitivity of receptor, as shown in **Table 13.1**.

Table 13.1 Significance of social and economic impacts

		Magnitude			
		Negligible	Low	Moderate	High
Sensitivity	Negligible	Negligible	Negligible	Low	Medium
	Low	Negligible	Low	Medium	Medium
	Moderate	Negligible	Low	Medium	High
	High	Negligible	Medium	High	High

This assessment has been prepared primarily with reference to the existing socio-economic context of the Site. The Project's impact upon future land use has been considered as far as feasible in **section 13.6** below.

13.3 Stakeholder consultation

The social and economic assessment has been informed by stakeholder and community consultation undertaken for the project including:

- Meetings with local councils and government agencies
- Briefings with elected representatives
- Consultation and briefings with the community generally, particularly surrounding landowners

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A community information session was held on 14 November 2018 to provide information about the Project, the EIS process, and allow community members to ask questions and provide direct feedback to the Project team.

Issues raised during the consultation included:

- Understanding the scope of the Project including confirmation that the Project would not expand the landfill's existing footprint or whether the SAWT was included
- Odour generation from the Project and the Site more generally
- Dust and traffic generation
- The visual nature of the interim and final capped landforms
- Future use of the Site after final capping.

Further details regarding consultation undertaken for the Project (up to the exhibition of the EIS) are provided in **Chapter 6**.

13.4 Existing Environment

13.4.1 Demographic profile

Detail of demographic indicators of relevance to the Project as derived from ABS 2016 census data 2016, is provided in **Table13.2**. Demographic data for the Greater Sydney metropolitan area has also been provided to allow for comparison with the selected demographic indicators within the study area.

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Table13.2 Demographic information for study area precincts (ABS 2016)

	Austral-Greendale	Horsley Park-Kemps Creek	Mulgoa-Luddenham-Orchard Hills	Badgerys Creek	Greater Sydney
Population by age	• Population: **9,121** • Median age: 38.9 • 26.8% of people born overseas • Aboriginal and Torres Strait Islander population: 1.7%	• Population**: 4,637** • Median age:40.8 • 26.8% of people born overseas • Aboriginal and Torres Strait Islander population: 1.1%	• Population: **10,395** • Median age:34.4 • 18% of people born overseas • Aboriginal and Torres Strait Islander population: 1.8%	• Population: **62** • Median age:33 • 30% of people born overseas • Aboriginal and Torres Strait Island population: 0%	• Population: **5,132,355** • Median age:35.8 • 30% of people born overseas • Aboriginal and Torres Strait Islander population: 1.5%
Education and employment	• Completed year 12 or equivalent: 33.5% • People 15 and over with post school qualifications: 48.4% • Unemployment rate: 5.2% • Top four employment industries: - Construction: 16.5% - Retail trade: 9.9% - Agriculture, Forestry and Fishing: 8.9% - Transport, postal and warehousing: 8.4%	• Completed year 12 or equivalent: 38% • People 15 and over with post school qualifications: 52.8% • Unemployment rate: 3.7% • Top four employment industries: - Construction: 19.4% - Retail trade: 9.2% - Transport, postal and warehousing: 6.3% - Other services: 5.7%	• Completed year 12 or equivalent: 44.6% • People 15 and over with post school qualifications: 59% • Unemployment rate: 3.8% • Top four employment industries: - Construction: 15.8% - Retail trade: 9.2% - Manufacturing: 7.4% - Education and training: 7.2%	• Completed year 12 or equivalent: 30.8% • People 15 and over with post school qualifications: 48.1% • No available data on unemployment • Top four employment industries: - (data not available)	• Completed year 12 or equivalent: 60% • People 15 and over with post school qualifications: 62.3% • Unemployment rate: 6% • Top four employment industries: - Administrative & support services: 11% - Health care & social assistance: 11% - Professional scientific & technical services: 10% - Retail: 9%
Dwellings	• Separate house: 99% • Semi-detached, terrace, townhouse etc: <1%	• Separate house: 99% • Semi-detached, terrace, townhouse etc: <1%	• Separate house: 95% • Semi-detached, terrace, townhouse etc: 2% • Flat or apartment: 2%	• Separate house: 100% • Semi-detached, terrace, townhouse etc: 0%	• Separate house: 57% • Semi-detached, terrace, townhouse etc: 14%

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	Austral-Greendale	Horsley Park-Kemps Creek	Mulgoa-Luddenham-Orchard Hills	Badgerys Creek	Greater Sydney
	• Flat or apartment: <1% • Other: <1%	• Flat or apartment: <1% • Other: <1%	• Other: 1%	• Flat or apartment: 0% • Other: 0%	• Flat or apartment: 28% • Other: 1%
Households	• Average household size: 3.3 • Average monthly rental payment: $1,658 • Average monthly mortgage payment: $2,377	• Average household size: 3.4 • Average monthly rental payment: $1,684 • Average monthly mortgage payment: $2,730	• Average household size: 3.2 • Average monthly rental payment: $1,921 • Average monthly mortgage payment: $2,579	• Average household size: 2.2 • Average monthly rental payment: $553 • Average monthly mortgage payment: n/a	• Average household size: 2.8 • Average monthly rental payment: $1,996 • Average monthly mortgage payment: $2,384
Income	• Median weekly income: $1,070.12	• Median weekly income: $989.62	• Median weekly income: $1,094.81	• Median weekly income: $647.79	• Median weekly income: $975.46
Journey to work	Top three modes: • Car: 71% • Work from home: 13% • Train: 3%	Top three modes: • Car: 74% • Work from home: 10% • Train: 2%	Top three modes: • Car: 78% • Work from home: 7% • Train: 3%	Top three modes: • Car: 100%	Top three modes: • Car: 61% • Train: 12% • Bus: 6%

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The demographic profile in **Table13.2** shows the total population of the study area is 24,215. The median age across the four SA2 areas ranges between 33 and 40 years, which is comparable to the greater Sydney average of 35.8. The proportion of the population of people born overseas across these areas is comparable to the broader Sydney region (30%), with the exception of Mulgoa-Luddenham-Orchard Hills, where only 18% of people were born overseas.

Education levels in the study area are substantially lower than the greater Sydney average though the number of people with post-school qualifications is comparable or slightly lower.

Unemployment is substantially lower then Greater Sydney, with the exception of Austral-Greendale, which is comparable. Common job types in the study area include construction, transport, postal and warehousing and retail trade. This is in contrast with Greater Sydney where only retail trade features within the top four overall job types across the city at 9% (which is a similar proportion to retail trade workers in the study area).

Housing stock in the study area is almost exclusively detached houses, with all SA2 areas being 95-100% this type. This compares to an average across Greater Sydney of 57% and is consistent with the rural and peri-rural nature of the area.

Household size, in terms of number of people, is generally higher in the study area compared to Greater Sydney, with the exception of Badgerys Creek which is lower. Compared to Greater Sydney median weekly household incomes are higher for all SA2 areas with the exception of Badgerys Creek which is $647 compared to $975 for Greater Sydney. Similarly, rental and mortgage payments across the study area are comparable to Greater Sydney, with the exception of rental payments in Badgerys Creek ($553 compared to $1,996 for Greater Sydney).

The predominate mode of travel to work across the study area is by car (around 75%), being higher than the Greater Sydney average (61%). The proportion of people travelling to work by public transport is substantially lower in the study area (2-3%) compared to Greater Sydney (18%).

13.4.2 Social infrastructure

Social infrastructure refers to the facilities, structures and services that support the physical, social, cultural or intellectual development or welfare of the community. This includes a range of physical facilities such as schools, medical centres, sporting and recreational facilities (including passive open space), community facilities, libraries, and the activities and programs that operate within them.

Given the rural nature of the surrounding area, social infrastructure in the vicinity of the Site is limited and as such a search radius of 4-5 km has been used when outlining social infrastructure facilities in the area. These include:

- Kemps Creek Public School
- Christadelphian Heritage College Sydney
- Twin Creeks Golf and Country Club
- Overett Reserve
- Bill Anderson Park
- Kemps Creek Sporting and Bowling Club
- Western Sydney Parklands
- Sydney International Shooting Centre
- Hubertus Country Club (shooting range)
- Kemps Creek Cemetery and Crematorium.

Transport around the study area relies heavily upon private vehicles, with only the one bus (route 801) operating throughout the week. The nearest railway stations are Penrith and Liverpool, both approximately 15 km from the Site.

There are no places of worship within the immediate vicinity of the Site, with the nearest being in Erskine Park (7 km north) and Horsley Park (7.5 km east).

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The only aged care facility in proximity to the site is the Emmaus Retirement Village, located approximately 4 km to the northeast.

The nearest health or medical facilities are Luddenham Medical Centre (6 km west) and West Hoxton Medical Centre (7.5 km southeast).

It should be noted that the Site itself is a critical piece of local and regional infrastructure. Responsible waste management and disposal is an essential service to the community and the continuation of operations at the Site, in the absence of new landfills being developed in the Greater Sydney region, provides an important and lower impact way of ensuring ongoing waste management availability.

Further information on site context is outlined in **Chapter 2.**

13.4.3 Community values and cohesion

Community values refers to the set of principles or ethics that are generally shared by a community group such as residents, businesses or visitors in relation to their local area. This includes shared visions around the enhancement of quality of life or sense of place and the future identity of the community as a whole.

An important influence upon community values and identity is the sense of cohesion. This refers to the connections and relationships between individuals and their neighbourhoods. Levels of community cohesion and sense of belonging are said to be good where communities have access to a diverse range of local and regional infrastructure, barriers to movement are minimised and there are a variety of meeting places which encourage strong support networks.

While focusing primarily upon community values at the local government level, the unique nature of this Site and it's transforming context means that the social objectives contained within broader strategic plans should also be recognised. As such relevant elements of these overarching documents have been included below as they relate to the Project potential socio-economic effects. The consistency of the Project with these objectives is considered in **section 13.5** below.

Greater Sydney Region Plan 2018

As outlined in the Greater Sydney Region Plan 2018, the Site is located within the Western Sydney Aerotropolis - an 11,200 hectare site comprising nine 'precincts', which aims to deliver an 'economic hub' within the Western Sydney Parkland City. The Region Plan also outlines a vision for transport infrastructure, including major road and rail improvements as well as the promotion of active transport along existing waterways such as Badgerys and South Creeks, whilst contributing to the protection and promotion of the management of remnant vegetation. Objective 29 of the Region Plan specifically identifies the need to ensure the protection of environmental, social and economic values in rural areas.

Western City District Plan 2018

The Western City District Plan (the District Plan) outlines a range of 'planning priorities' for managing growth in the context of economic, social and environmental matters in order to achieve the 40-year vision for Greater Sydney.

The District Plan clearly places a distinct emphasis on the positive development of the social and economic aspects of the Western City. Whilst too numerous to include in full, a selection of relevant community actions from the plan include:

- The provision of adequate and accessible social facilities and services as the area grows
- Urban forms and the use of public land to encourage diversity, liveability, connection and inclusion
- Consideration of the needs of the community's full age spectrum
- The promotion of active and healthy lifestyles
- Protection and promotion of heritage, biodiversity and scenic values
- The provision of affordable housing
- Growing investment, business opportunities and jobs in strategic centres.

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Western Sydney Aerotropolis Stage 1 land use and Infrastructure Implementation Plan

The Aerotropolis Land Use and Infrastructure Implementation Plan contains a structure plan defining precinct areas and the 'green spines' and infrastructure lands around them. The Land Use and Infrastructure Implementation Plan also outlines objectives for the socio-economic development of the Aerotropolis, including:

- Liveable neighbourhoods
- The provision of cultural infrastructure including access to artistic and creative spaces
- Adequate transport infrastructure
- Green spines along waterways for recreation, environmental conservation and active transport.

Penrith City Council City Strategy 2013

The Penrith City Strategy identifies key issues the Council will face over the next 10-20 years. This document informs the Penrith Council Community Plan and includes a range of specific policy goals to improve the lives of residents and the environment. A selection of relevant policy goals include:

- H1: Protection of the City's agreed urban and rural boundaries
- I2: Well-researched advocacy achieves the delivery of critical regional infrastructure
- I3: Social and public infrastructure meets the needs of the community
- I7: Essential resource recovery infrastructure is provided by the state government
- C2: Social interaction in the community
- C9: Our neighbourhoods and communities have a sense of place and unique identity
- C11: Our City has iconic places that instil a sense of pride
- C15: Promote health and wellbeing
- E1: Priority conservation areas and flora and fauna corridors are protected and improved
- E7: Development and activities do not adversely impact on waterways and catchments
- P2: Protection and enhancement of the City's rural landscapes, natural areas and character
- P3: Diverse agricultural opportunities in the City's rural areas are promoted, existing rural activities are supported, and new rural enterprises are encouraged
- P8: Residents have access to employment and training opportunities.

Our Home, Liverpool 2027 – Community Strategic Plan

The Liverpool Community Plan is based around four directions: creating connection, strengthening and protecting the environment, generating opportunity, and leading though collaboration. Key community desires outlined under these directions include:

- Connection is created between all people in the community
- Well-managed development
- Creation of well-planned, attractive and people-friendly urban environments
- Support economic growth and attract more jobs and businesses to the area
- Improved traffic management
- Well managed use of resources

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13.5 Impact assessment

13.5.1 Amenity

Amenity refers to the quality of a place, its appearance, feel and sound, and the way its community experiences the place. The Project has the potential to affect amenity as a result of changes to aspects such as traffic, noise, air quality and odour and the visual environment. These aspects are assessed separately below.

Noise and vibration

Exposure to noise and vibration has the potential to create annoyance, intrude on daily activities or the enjoyment of these activities, interfere with concentration and memory, disrupt sleep and rest patterns and create or exacerbate health concerns.

The noise and vibration assessment undertaken for the Project groups similar surrounding receivers types into NCAs. Due to the nature of the surrounding area, these NCAs are organised according to residences present in each direction from the Site.

Noise levels associated with the Project were modelled taking account of the nature of the ongoing activities on Site, the proximity of residences and the three dimensional profile of the proposed increased cap height (as well as intermediate scenarios as the landfill rises over time). These noise levels were compared to relevant noise amenity criteria for the Site.

Measures to mitigate and manage off-site noise impacts were also developed. With the application of these measures, activities associated with the development of the Project were shown to comply with the Site's existing EPL limits under standard conditions. Minor exceedances of 1 to 3 dB(A) were returned when operations were assessed under conditions where noise is carried towards sensitive receivers by unfavourable winds. Noise increases of less than 3 dB(A) are generally not perceivable in the context of existing background noise.

The single 3 dB(A) exceedance when wind is blowing towards the relevant receiver is considered by the NPfI as marginal. For exceedances between 3 dB(A) and 5 dB(A), the NPfI suggests receiver-based treatment be applied such as mechanical ventilation/comfort condition systems. In this case the relevant receiver has already been treated by SUEZ as part of previous works. This included the installation of an air conditioning system and double glazing on affected windows. As such the internal amenity impact of the Project on this receiver would be negligible.

The assessment also compared noise levels of the Project (to a height of RL 95) with the already approved height of RL 80. This demonstrated that increases in noise levels associated with the Project would be less than 1 dB(A) at all assessment locations under both standard and noise-enhancing meteorological conditions. This is attributed to the enhanced barrier effect provided by the landform of the raised landfill.

Given the large distances (at least 100 m) between the operations and nearby sensitive receivers, safe working distances would not be encroached even at the nearest point of operations to the receivers and as such no vibration impacts would occur.

On the basis of the above the magnitude of noise amenity impacts is considered to be negligible. The sensitivity of receivers is high, and the overall socio-economic significance of noise amenity impacts is **negligible**.

Traffic

Changes to the level of traffic has the potential to affect amenity, with increased traffic giving rise to elevated noise and air quality impacts, as well as congestion and visual clutter. An increase in traffic volume also affected people's travel, including trip duration, wait times at intersections, road safety and access to properties and community infrastructure.

The traffic assessment undertaken for the Project assesses predicated impacts associated with the Project. These include increases in traffic associated with expansion in the average filling rate of the Site (from 750,000 tpa to 950,000 tpa), as well as an extension in the life of the Project past the current projected end date of 2025. Specifically, the assessment considers the impact upon the local road network around the Site, including the Site Access Road and Elizabeth Drive, and the performance of this intersection for an additional five and a half years.

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Modelling undertaken for the above intersection assumes a continuation of the current background growth in traffic on Elizabeth Drive up to 2031. Applying this assumption to the existing road layout means that Elizabeth Drive would reach its capacity by 2025 during the AM and PM peaks. Substantial delays are forecast for heavy vehicles seeking to turn right into and out of the site in 2025 and beyond, under both 'with Project' and 'without Project' scenarios. This is despite the Project contributing only six two-way trips in the AM peak hour and two two-way trips in the PM peak hour, in addition to the approved scenario.

These results do not account for any future enhancement of Elizabeth Drive, though it is known that Roads and Maritime Services is currently planning for this upgrade. The timing of this upgrade is not known, though it could be assumed that this would be planned to be operational to service the latter stages of construction, and the commissioning of, Western Sydney Airport. This upgrade would substantially improve the operation of this intersection by 'spacing out' traffic on Elizabeth Drive, leading to an increase in opportunities for vehicles to enter from the Site Access Road.

Regardless of any future road upgrades, the Project's impact upon the operation of the arterial road network is negligible. Impacts may be apparent along the Site Access Road, though this would affect only a single household that shares this road. On the basis of the above the magnitude of impacts is considered to be negligible. The sensitivity of receivers is moderate, and the overall socio-economic significance of traffic amenity impacts is **negligible**.

Visual amenity

The Site currently has development consent for the landfill to be capped at RL 80. Under the Project this would increase to RL 95 in approximately 2031, resulting in a visual change for nearby receivers.

The potential for changes in the landscape and visual environment to affect the amenity of a nearby receivers varies substantially according to the location of the receiver and their land use type e.g. residential or commercial. It is also influenced by the nature of the activities being undertaken and whether receivers are moving through the environment or are static.

When the Project is complete the final landform will broadly appear as a large, 'mesa-like' grassed hill. This will include gradients on all sides with horizontal benching evenly distributed along the slopes, and a near flat top at an elevation of RL 95. This landform would be grassed and maintained in a similar manner to that proposed for the currently approved RL 80 cap.

Nine viewpoints around the Site were considered in the landscape and visual impact assessment. The significance of the Project's impact on each was considered to be low, with the exception of the following:

- Badgerys Creek Road/Elizabeth Drive Intersection: moderate
- Luddenham Road: low-moderate
- Twin Creeks Estate: high-moderate.

Impacts at the Badgerys Creek Road/Elizabeth Drive Intersection and along Luddenham Road are associated with the view of passing motorists and the generally scenic nature of these rural lands. The visual impacts upon residents within their dwellings in these areas however is limited.

Visual impacts to Twin Creeks Estate are of a greater magnitude based on available views from residential properties and the relative close proximity of the Site.

Despite these visual impacts, the overall impact of the Project on the visual amenity of the area is considered to be low. The sensitivity of affected stakeholders is considered to be moderate, resulting in an overall **low** socio-economic significance.

Air quality

The ongoing operation of the Project has the potential to increase dust and air emissions, and therefore affect amenity of the local environment. Nuisance dust generated from construction activities may affect dwellings and other nearby sensitive receivers. Increased dust can also reduce the capacity of the community to enjoy their local environment and can increase health risks for receivers, particularly those with respiratory and health issues such as asthma and allergies.

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The air quality assessment for the Project considered the impacts of changes to air quality associated with an increased rate of filling and prolonged operation. The impacts were assessed and considered cumulatively against background air quality data derived from existing nearby air quality monitoring stations.

The air quality impact assessment established the primary pollutants of concern for the Project to be suspended particulate matter and deposited dust. Results of this assessment indicated that the Project would exceed cumulative thresholds for 'PM_{10} 24 hour', '$PM_{2.5}$ Annual' and '$PM_{2.5}$ 24 hour' at one receptor located immediately to the east of the Site. All other receivers fall below the assessment criteria and would not be adversely affected by the Project.

Predicted cumulative TSP concentrations were below the criterion at all receptors. Concentrations of 'PM_{10} Annual' and deposited dust were also below criteria.

Overall, the assessment showed that Project incremental dust impacts are relatively minor and are fairly typical for a landfilling operation. It is only the occasional days with high background particulate concentrations that result in elevated cumulative particulate concentrations close to or above in rare cases, the Project criteria. The occurrence of high background particulate concentrations is typically due to exceptional events, such as hazard reduction burning, bushfires, or dust storms.

With the application of mitigation measures such as the sealing of the eastern haul road, watering of the unsealed roads and ongoing progressive revegetation, impacts associated with suspended particulate matter and deposited dust would be negligible.

Odour was also addressed within the air quality assessment. This outlined the nature of the waste to be deposited at the Site as well as landfill gas generation. This assessment indicated that with appropriate management, including rapid covering of deposited waste and the collection and flaring of gas, the Project's contribution to odour impacts on surrounding receivers would be negligible.

Given that both odour and particulate matter and deposited dust impacts would be negligible, there would be no recognisable change in amenity due to air quality. On this basis the magnitude of impact is considered to be negligible and the sensitivity of receivers is high. As such the overall socio-economic significance of air quality amenity impacts is **negligible**.

Overall amenity

The above changes to local amenity would be short term (noise, traffic, air quality) and long term (visual impact). Based on the above discussion, the overall magnitude of these impacts is considered low. The sensitivity of receivers within this area is considered to be moderate based upon their existing exposure to the amenity impacts of the landfill and the otherwise relatively high amenity value of the surrounding area. As such the overall socio-economic impact of changes to local amenity associated with the Project would be **low**.

13.5.2 Property and land use

The current approval states the site would be capped and grassed over once it reaches RL 80. The Project raises this height to RL 95 and in doing so creates slightly steeper side batter slopes. The overall RL 95 landform will be more of a 'mesa-like' shape, rather than the currently approved rounded hill.

In both cases the landfill would be capped at a height greater than natural ground level. Both landforms would also be subject to a similar degree of long term settlement, which would limit the type and nature of structures placed upon it. As such the future utility of the Project area would not change dramatically under the Project compared to the current approved landform. Future beneficial uses may still be accommodated, with the flatter top of the Project's proposed landform likely to offer a slightly greater degree of utility.

Landfilling and quarrying activity has been carried out at the Site for over 30 years. In this time land uses in the surrounding area have remained reasonably consistent, being mainly rural with selected other industrial uses. The presence of the landfill has not adversely influenced the beneficial use of surrounding land and there would be no change over, the life of the Project, approximately another 5.5 years.

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On this basis the Project's magnitude of impact upon land use is considered to be low. The sensitivity of the receptor (the existing waste management land use within the Site and other land uses on surrounding land) is deemed to be moderate, with the overall significance of impact being **low**.

13.5.3 Community values and cohesion

As outlined in **section 13.4.3**, the Site and its surrounds are subject to a number of plans and policies. These cover strategic land use, infrastructure provision, urban design and community development, among others**. Table 13.3** assesses the Project against a selection of the community values identified in these plans and policies.

It should be noted that the landfill operation at the Site predates all of the plans and policies outlined below. As such it can be reasonably assumed that these have been developed taking account of its ongoing presence.

Based on the proposed development timetable for Western Sydney Airport it is assumed that the implementation of all plans and policies would overlap the Project's continued operation.

Table 13.3 Assessment of impacts to community values

Policy goal or intent	Potential impacts
Western City District Plan	
• The provision of adequate and accessible social facilities and services as the area grows • Urban forms and the use of public land to encourage diversity, liveability, connection and inclusion • Consideration of the needs of the community's full age spectrum • The promotion of active and healthy lifestyles • Protection and promotion of heritage, biodiversity and scenic values • The provision of affordable housing • Growing investment, business opportunities and jobs in strategic centres	The Project would not prevent these development goals from being realised. It is expected that the future zoning and development of the area around the Site would take into account the Project's (minor) ongoing off-site amenity impacts. The Project would support much of the future development in this area through the provision of a waste management facility positioned close to where the waste is generated. The Project would not affect the ongoing protection of biodiversity or heritage values, and would have only a minor impact on visual amenity.
Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan	
• Liveable neighbourhoods • The provision of cultural infrastructure including access to artistic and creative spaces • Adequate transport infrastructure • Green spines along waterways for recreation, environmental conservation and active transport	The Project would not affect the realisation of the development of physical, social and cultural infrastructure on land surrounding the Site. This includes the waterway of Badgerys Creek, which would not be affected by the Project and on which the 'green spine' principle in the Plan may be realised.

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Policy goal or intent	Potential impacts
PCC Community Plan 2017	
The plan seeks to improve resident's ability to: • Work closer to home • Remain healthy • Connect with the community • Move around easily • Live in safe and vibrant spaces whilst caring for the environment.	As with the broader plans above, the Project would not affect the ability of the ideals outlined in the community plan to be realised. As outlined elsewhere in this chapter and EIS, the project's off-site impacts upon amenity would be negligible to minor, while continuing the provision of essential waste management services to the community.
PCC City Strategy 2013	
H1: Protection of the City's agreed urban and rural boundaries	• The Project would not alter the nature of the rural/urban boundaries of the city
I2: Well-researched advocacy achieves the delivery of critical regional infrastructure	• The Project itself is a critical piece of regional infrastructure and is situated within the LGA, reducing transport impacts
I3: Social and public infrastructure meets the needs of the community	• The Project would not affect the ability to deliver this infrastructure in surrounding lands as they develop
I7: Essential resource recovery infrastructure is provided by the state government	• The Site includes resource recovery infrastructure which would continue to operate during the Project
C2: Social interaction in the community	• The Project would not affect social interaction in the community
C9: Our neighbourhoods and communities have a sense of place and unique identity.	• The landfill has been present for over 30 years and is now an accepted part of the area. The Project would not affect the future development of the sense of place or identity in this area
C11: Our City has iconic places that instil a sense of pride.	• The Project would not adversely affect any iconic places within the LGA
C15: Promote health and wellbeing	• The Project would not affect the promotion of health and wellbeing. Direct amenity impacts have been minimised and managed to a suitable level
E1: Priority conservation areas and flora and fauna corridors are protected and improved	• The Project would not affect the integrity or presence of critically endangered ecological communities adjacent to and in the vicinity
E7: Development and activities do not adversely impact on waterways and catchments	• Surface water and leachate would continue to be managed effectively within the Site as part of the Project. Flooding of Badgerys Creek would not be affected
P2: Protection and enhancement of the City's rural landscapes, natural areas and character	• The Project would have only a minor impact upon the rural landscape and character, and would potentially be a welcome green element within a landscape of 'hard' development in the future
P3: Diverse agricultural opportunities in the City's rural areas are promoted, existing rural activities are supported, and new rural enterprises are encouraged.	• The Site has not historically affected the use of surrounding land for agricultural purposes. The Project would not affect any future use in this regard

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Policy goal or intent	Potential impacts
P8: Residents have access to employment and training opportunities.	• The Project would continue the employment of all staff currently working on landfill operations within the Site for several more years than previously planned.
Our Home, Liverpool 2027	
• Connection is created between all people in the community	The Project is outside of the Liverpool LGA, though would not result in off-site impacts that affect the ability for individuals or the community to connect
• Well-managed development	The Project would support well managed development through the local provision of waste disposal services
• Creation of well-planned, attractive and people-friendly urban environments	The Project would not adversely affect this community goal
• Support economic growth and attract more jobs and businesses to the area	Economic growth within Liverpool would be supported by the continuation of local waste management provided by the Project
• Improved traffic management	The Project would not adversely affect traffic travelling past the Site on Elizabeth Drive, this being the boundary with the Liverpool LGA.
• Well managed use of resources	The Project would continue to provide for a local and well managed waste disposal solution for people and businesses within Liverpool

As outlined in the table above, the Project is unlikely to adversely affect the ability for community and social goals to be realised at the state, regional or local scale. The Project would not occupy any new land and would not alter the current level of community severance in the short term. The Project would continue to allow for a future land use of the site (post final capping) that may allow public access and increase community cohesion.

Based on the above, the overall magnitude of the Project's impact upon community values and cohesion is considered to be negligible. The sensitivity of the community to these impacts generally is considered to be high, with the overall socio-economic significance being **negligible**.

13.5.4 Economic impacts

Economic benefits associated with the Project include:

- Job creation and the continuation of employment – elements of the Project would require major goods and services including excavation and earthmoving equipment, building materials and ongoing services such as transport. Where possible, future employees would be sourced from the local area or region, as would major types of goods and services used. The Project would continue to employ the 30 people currently working at the Site for approximately another five and a half years
- Generation of income – the Project would generate income within the local and wider community by providing income for direct and indirect employment, together with the multiplier effect of Project income expenditure. This would continue the support of the local community through a period of rapid and transformative change
- Supply of goods and services – local businesses would benefit from Project by providing the Project with general goods and services
- Cost-competitive – the continued operation of the landfill is considered to be more cost-competitive than the option of diversion of waste from the local and wider area to other landfills further afield in the Sydney basin and beyond. It also compares favourably against the development of a new landfill, locally or further afield, particularly in light of new road transport infrastructure planned for the area

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- Electricity generation – the Project would provide an additional source of local clean electricity generation through the provision of a greater volume of landfill gas to the existing electricity generation facility on Site.

Economic costs associated with the development of the Project include:

- Direct capital cost – the anticipated capital cost of the Project is in the order of $2 million. This would be fully borne by SUEZ
- Travel costs – the transport of waste from major sources in the Sydney central and eastern cities would still result in transport costs to businesses and individuals. This would not change as part of the Project
- Infrastructure costs – the Project would continue to place demands on service infrastructure particularly during a time of rapid development in the local area
- Monitoring – On-going monitoring works would be required during continued operation of the landfill. These costs would be incurred for another approximately five years under the Project. Future post-capping monitoring costs would not be affected.

There are no significant long term additional employment opportunities expected to result from the project, though the Project would require ongoing materials and services during its extended operation. As current waste landfills in the Sydney basin are approaching capacity, the Project is required in order to adequately service the waste management requirements of the local and regional community.

On the basis of the above the overall magnitude of economic impact is considered to be low positive. The sensitivity of the receiver (local businesses and community) is considered to be high. As such the overall socio-economic significance of impact is **medium positive**.

13.6 Future land use

As outlined in Chapter 7 Land Use, the surrounding area is at the start of a transformative degree of urban, economic and social development. This includes the provision of major transport infrastructure such as the Western Sydney Airport, M12 motorway corridor, M9 Outer Sydney Orbital Motorway and the north-south rail link. Strategic land use planning has already commenced, with a view to providing a range of employment lands centred on the airport precinct.

The Project is located in the centre of this extensive breadth and depth of development activity. The ongoing operation of the landfill as part of the Project would not hinder this development, and may contribute positively through the provision of a local waste management facility in the short term and through the provision of a capped land surface for further development in the long term.

Given this, the overall magnitude of the Project's impact upon future land use in the area is considered to be low positive. The sensitivity of the receiver (future business and residents) is considered to be high. As such the overall socio-economic significance of impact is **medium positive**.

13.7 Management and mitigation measures

Social and economic impacts associated with other key environmental issues would be managed in accordance with the recommended management and mitigation measures outlined in their respectively sections. Mitigation measures to address direct impacts on sensitive receivers and to manage socio-economic impacts specifically are summarised in **Table 13.4**.

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Table 13.4 Environmental management measures – social and economic

Impact	Reference	Environmental management measures	Timing
Amenity	SE1	The LEMP will be implemented to manage amenity impacts associated with ongoing operations at the Site	Operation
Community engagement	SE2	The existing community engagement program for the Site will continue under the Project. This will include meeting with community representatives at times agreed with the community and no more than on a biannual basis	Operation
Community engagement	SE3	Complaints received from the community will continue to be accepted, monitored and acted upon	Operation
Employment and procurement	SE4	Local people, services and materials will be prioritised as far as practical, including for final capping activities	Operation / Post Completion
Future land use	SE5	Consultation with PCC or other individuals regarding beneficial ongoing use of the final capped Site will be undertaken as needed. Consultation will be guided by the need to manage off-site impacts, particularly regarding local amenity and impacts upon aviation	Post Completion

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Chapter 14

Greenhouse gas

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14.0 Greenhouse gas

Executive summary

The Project would generate around 2,300,000 tonnes of CO2 equivalent (t CO2-e) of additional greenhouse gas (GHG) emissions compared with the baseline scenario due to the proposed extended life of the landfill. The annual landfill gas emissions (primarily comprised of methane) contribute the highest source of GHG emissions in both the baseline and Project scenarios (90% and 92% of the total emissions respectively). As a percentage of NSW greenhouse gas inventory for 2016, the Project would contribute 0.07%.

Although the total emissions and average annual emissions increase with the Project due to the proposed increase in waste disposal rate and the additional duration of landfilling, the emissions intensity of the Project scenario is lower than the Baseline scenario due to the proposed increase in total waste disposal quantity (approximately 4.8 million m^3). Under this scenario landfill gas would continue to be captured and combusted for electricity generation, or flared. This scenario is considered more beneficial compared to the potential alternative of this waste being disposed of at a landfill facility that does not combust or flare landfill gas.

This chapter provides an assessment of GHG emissions anticipated to be generated as part of the Project and provides recommended mitigation measures for their reduction. There are no SEARs specific to GHG emissions for this Project.

Greenhouse gases are gases in the atmosphere that absorb and re-radiate heat from the sun, thereby trapping heat in the lower atmosphere and influencing global temperatures. Emissions of GHGs into the atmosphere are caused by both natural processes (e.g. bushfires) and human activities (e.g. burning of fossil fuels to generate electricity). Since the industrial revolution there has been an increase in the amount of GHGs emitted from human activities, increasing the concentration of GHGs in the atmosphere.

The primary source of GHGs from landfilling activities is landfill gas. Landfill gas is generated through the decomposition of organic waste in landfills. Depending on the type of waste deposited, this gas typically comprises around 50 per cent methane, 38 per cent carbon dioxide, and 12 per cent other gases (Warnken ISE, 2007).

14.1 Assessment approach

14.1.1 Legislation and guidelines

The methodology for this GHG assessment is based on relevant GHG reporting legislation and national and international reporting guidelines, including:

- *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (World Council for Sustainable Business Development and World Resources Institute, 2005)
- *Greenhouse Gas Protocol for the quantification of greenhouse gas emissions from waste management activities* version 5.0 (World Council for Sustainable Business Development and World Resources Institute, 2013)
- *National Greenhouse and Energy Reporting (NGER) Act 2007* (Commonwealth)
- AS/ISO 14064.1:2006 *Greenhouse Gas Part 1: Specification with guidance at the organisational level for quantification and reporting of greenhouse gas emissions and removals*
- The current *Australian National Greenhouse Accounts: National Greenhouse Accounts Factors* (NGA Factors) (DoEE, 2018a)
- The *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (DoEE, 2018b)

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- The *National Greenhouse and Energy Reporting Scheme Measurement, Technical Guidelines for the estimation of greenhouse gas emissions by facilities in Australia* (DoEE, 2017)
- The *NGER Solid Waste Calculator* 2017-18 (Australian Government Clean Energy Regulator, 2018).

14.1.2 Overview of approach

To estimate the GHG emissions associated with the Project the following steps were undertaken:

1. The GHG assessment boundary for the Project was defined (refer **section 14.1.3**).
2. The scenarios for comparison between landfill gas generation for the existing approved landfill and the Project were defined (refer **section 14.1.4**).
3. The assumptions and data to be used were determined (e.g. quantities of fuel, electricity and waste).
4. The quantity of GHG emissions were estimated, as follows:
   - GHG emissions from fuel use and electricity consumption (purchased from the grid) were calculated using the methodology, equations and emissions factors set out within the NGA Factors (DoEE, 2018a).
   - GHG emissions (methane) released from the landfill were calculated using the methodology, equations and factors contained within the *National Greenhouse and Energy Reporting Scheme Measurement Technical Guidelines* and using the Elizabeth Drive Landfill NGER Solid Waste Calculator 2017-18.
   - GHG emissions from the combustion of landfill biogas (methane) from electricity production and flaring were calculated using the methodology, equations and factors contained within the *National Greenhouse and Energy Reporting Scheme (Measurement) Determination* 2008 (DoEE, 2018b), as amended.

Appendix H (Greenhouse gas calculations) provides a detailed description of the GHG assessment methodology, including the calculation methods used to estimate the GHG emissions from waste decomposition, fuel combustion, and electricity consumption. As the Project involves raising the currently approved finished height of the landfill, and this raising would occur fully within the Project area, no changes to land use have been accounted for in this GHG assessment.

GHG emissions are reported in this assessment as tonnes of carbon dioxide equivalent (t CO_2-e). This standard metric accounts for the different global warming potentials of different GHGs, and expresses the cumulative effect in a common, universal unit of measurement. This allows for all GHGs associated with the Project (e.g. methane from landfill gas) to be combined into one emissions calculation. For example, the global warming potential assigned to methane in carbon accounting is 25, thus one tonne of methane has a greenhouse effect equivalent to 25 tonnes of carbon dioxide.

14.1.3 GHG assessment boundary

The GHG assessment boundary defines the scope of GHG emissions and the activities to be included in the assessment.

Emissions sources are categorised into the following three 'scopes':

- Scope 1 – direct emissions: GHG emissions generated by sources owned or controlled by the Project, for example fugitive emissions of landfill gas or emissions generated by the use of diesel fuel in Project-owned plant, equipment or vehicles.
- Scope 2 – indirect emissions: GHG emissions from the consumption of purchased electricity in Project-owned or controlled equipment or operations. These GHG emissions are generated outside the Project's boundaries, for example the use of electricity purchased from the grid.
- Scope 3 – indirect upstream/downstream emissions: GHG emissions generated in the wider economy due to third party supply chains as a consequence of activity within the boundary of the Project, for example GHG emissions associated with the off-site extraction, production and transport of purchased fuels.

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Table 14.1 summarises the emission sources and activities considered within the Project's GHG assessment boundary, according to scope.

Table 14.1 Emission sources by Scope

Scope 1 – direct emissions	Scope 2 – indirect emissions	Scope 3 – indirect upstream/downstream emissions
• The on-site consumption of fuel by plant/equipment • Landfill gas emissions (methane) • The combustion of landfill gas for electricity production and flaring.	• The on-site use of electricity purchased from the grid.	• The extraction, production and transport of purchased fuels • The consumption of fuel for the transport of waste to Site • The consumption of fuel for the transport of staff to/from Site • Transmission and distribution losses within the electricity network for electricity purchased from the grid.

The GHG emissions associated with the operation of the SAWT have not been assessed as the SAWT facility operates under a separate consent and EPL to the landfill and is not considered part of the Project. The SAWT will continue to operate independently but alongside the landfill. It is also noted that the combustion of landfill gas doesn't occur within the Project area, but rather within the broader licenced area of the Site; however as this is a direct product of the landfill operation it has been included in the assessment of Scope 1 emissions.

14.1.4 Assessment of landfill gas emissions

Landfill gas emissions are considered anthropogenic as human activities create the anaerobic conditions which cause the decomposition of organic waste, when waste is buried and contained in an unnaturally low-oxygen environment such as a landfill. Methane generation from waste in landfill is therefore required to be assessed as part of a GHG assessment under the *National Greenhouse and Energy Reporting Act 2007* (Cth). Carbon dioxide (CO_2) emitted as landfill gas is not considered in the assessment of GHG as it is considered to be part of the natural carbon cycle, and would be emitted from the decomposition of organic materials regardless of human intervention.

The anaerobic decomposition of waste varies depending on the composition of waste within the landfill, namely the quantity of organic waste, and is influenced by local climatic conditions. Landfill gas is not generated immediately at the time of disposal of the waste as it takes time for the chemical reactions and methane-producing bacteria to break down the waste (Warnken ISE, 2007). Around 23% of degradable waste is estimated to remain after 30 years and 11% after 50 years (NSW EPA, 2012). Legacy landfill gas emissions can therefore continue to be generated post-closure of the landfill, requiring the ongoing management of landfill gas.

This assessment estimates the anticipated GHG emissions from the Project. The assessment considers two scenarios:

- **Baseline scenario:** existing landfill operations continue for a further six years (for the purposes of this assessment). Actual landfill data for the year to June 2018 has been used to inform the assessment of emissions, with continued operation of the landfill expected to be based on a disposal rate of 750,000 tonnes per annum between the years 2018 and 2025.
- **Project scenario:** expansion of the landfill by raising the final cap height by 15 metres within the Project Area, and continued operation of the landfill for approximately five and a half years beyond the current lifespan, to around 2031. Actual landfill data for the year to June 2018 has been used to inform the assessment of emissions, with continued operation of the landfill

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expected to be based on a disposal rate of 950,000 tonnes per annum. The landfill would continue to accept non-putrescible general solid waste and restricted solid waste in accordance with the current operations.

Fugitive emissions from the landfill were considered for 50 years following closure. Landfill gas is typically produced at a stable rate for a period of around 20-30 years, with gas continuing to be generated for 50 or more years following landfill closure (US EPA, 2017). A 50 year period also aligns with the findings of a previous study undertaken to model the landfill gas generation capacity at the Elizabeth Drive Landfill (Tonkin & Taylor, 2017), and the landfill gas modelling conducted for the concept design during this study, which shows that the rate of landfill gas generation would decline to near zero after a period of around 50 years following closure.

The existing landfill gas collection system would remain in operation and be extended progressively as required throughout the extended life of the landfill, and beyond. Landfill gas would continue to be used by the on-site landfill gas-powered electricity generators to supply power to the SAWT facility and external power grid network. Any excess landfill gas would be flared and destroyed.

14.2 Existing environment

14.2.1 Policy setting

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (the Kyoto Protocol) (UNFCCC, 1998) was signed in 1997 and Australia ratified the protocol in December 2007. The Kyoto Protocol serves to give effect to the UNFCCC's objective of reducing global GHG emissions by setting reduction targets and reporting requirements for certain ratifying countries. These targets are set using the relevant ratifying countries' 1990 baseline emissions. Australia committed to a target of 108 per cent of its 1990 GHG emission levels by the end of 2012. In December 2012, Australia signed the Doha Amendment to the Kyoto Protocol (UNFCCC 2012), agreeing to a second commitment period, from 1 January 2013 until 2020, of five per cent below 2000 emission levels by 2020.

In 2015 the Australian Government announced its commitment to a target of reducing GHG emissions by 26 to 28 per cent below 2005 levels by 2030, building on its previous 2020 target, irrespective of what other countries do. The Australian Government submitted this new target as its intended nationally determined contribution to the UNFCCC for negotiation at the 21st Conference of the Parties (COP21) held in Paris in December 2015.

The Australian Government's Direct Action Plan sets out how the 2030 emissions reduction target will be achieved. As part of the Direct Action Plan, the Emissions Reduction Fund aims to reduce Australia's GHG emissions by creating positive incentives to adopt better technologies and practices to reduce emissions. Landfill gas projects which collect and combust methane generated by a landfill, are potentially eligible under the Emissions Reduction Fund as administered by the Department of Environment and Energy and the Clean Energy Regulator.

In 2016 the NSW Government released the NSW Climate Change Policy Framework (Office of Environment and Heritage (OEH), 2016), which includes a Draft Climate Change Fund Strategic Plan 2017-2022 and A Draft Plan to Save NSW Energy and Money. The Draft Plan to Save NSW Energy and Money is proposed to meet the NSW Government's energy efficiency target of 16,000 gigawatt hours of annual energy savings by 2020 and contribute to the Climate Change Policy Framework's aspirational target of NSW achieving net-zero emissions by 2050. The draft plan summarises the preferred options for achieving the State's energy savings target, which include opportunities for implementing waste reduction standards for State significant developments and major infrastructure projects.

14.2.2 National and State GHG emissions reporting

The Clean Energy Regulator and the Department of the Environment and Energy are responsible for administering the Australian Government's GHG emission policies, regulations and initiatives. The National Greenhouse and Energy Reporting (NGER) Scheme is a national framework for obligated corporations to report on GHG emissions, energy use and energy production. The NGER Scheme operates under the *National Greenhouse and Energy Reporting Act 2007* (Cth) (NGER Act).

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The most recently published Australian National Greenhouse Accounts estimate National GHG emissions for the year March 2017 to March 2018 to be 547.0 million tonnes of carbon dioxide equivalent (Mt CO_2-e) as reported under the Kyoto Protocol (Department of the Environment and Energy 2018c). This figure is 1.9 per cent below 2000 levels and 11.2 per cent below 2005 levels, and demonstrates progress towards achieving Australia's targets for emissions reductions (refer **section 14.2.1**). The waste sector contributes around two per cent of Australia's total GHG emissions (Department of the Environment and Energy 2018c).

For 2016, annual NSW GHG emissions totalled around 131.6 Mt CO_2-e (Department of the Environment and Energy 2018c). Total emissions for the State decreased in 2016, with an 18.7 per cent reduction on 2005 levels. A decrease in emissions from the waste sector contributed to the reduction in NSW emissions between 2005 and 2016.

14.2.3 Elizabeth Drive Landfill gas generation

Chapter 2 of this EIS (Site context and background) describes the process undertaken to manage landfill gas at the Elizabeth Drive Landfill, including the monitoring and collection of landfill gas. The landfill gas to energy system, including two 1.4 megawatt (MW) generators powered by landfill gas, located on the Site is not within the Project area (refer **Chapter 2** and **Figure 2-2**).

The Elizabeth Drive Landfill is obligated to report its emissions under the NGER Act on an annual basis. Results of the Elizabeth Drive Landfill NGER reporting for the year ending June 2018 have been used to inform the input data for this GHG assessment.

14.3 Potential impacts

The following sections present the results of the GHG emissions calculations, which have been estimated for two scenarios, the Baseline scenario and the Project scenario (refer **section 14.1.4**).

14.3.1 Baseline scenario

The Baseline scenario estimates the GHG emissions anticipated to be generated from activities associated with the continued operation of the Project, in line with existing conditions. **Table 14.2** shows that continued operation of the landfill to 2025 and legacy emissions for 50 years post closure would generate around 3,740,000 t CO_2-e, of which the majority is attributed to Scope 1 landfill gas emissions (methane), which contribute around 90% of the total emissions.

Table 14.2 Estimated total GHG emissions (Baseline scenario – 2018 to 2025 with 50 years post closure)

Emissions source	GHG emissions (t CO_2-e)			Total GHG emissions (t CO_2-e)
	Scope 1	Scope 2	Scope 3	
Solid waste disposal				
Landfill gas emissions (methane)	3,141,593			3,141,593
Combustion of landfill gas				
Combustion of landfill gas to produce electricity	45,531			45,531
Landfill gas flared	55,349			55,349
Fuel use – transport energy purposes				
Diesel oil for landfill excavation	72,362		3,695	76,057
Diesel oil for waste placement	49,459		2,525	51,984
Petroleum based lubricants and greases	93		96	189
Diesel oil for the transport of waste to Site (Scope 3)			355,188	355,188

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Emissions source	GHG emissions (t CO_2-e)			Total GHG emissions (t CO_2-e)
	Scope 1	Scope 2	Scope 3	
Gasoline for the transport of staff to/from Site (Scope 3)			3,216	3,216
Electricity use				
Electricity purchased from the grid		8,535	1,041	9,576
Total emissions	**3,364,387**	**8,535**	**365,761**	**3,738,683**
% of total emissions	**90 %**	**0.2 %**	**9.8 %**	**100 %**

Note: numbers may not sum to totals due to rounding

14.3.2 Project scenario

The Project scenario estimates the GHG emissions anticipated to be generated from activities associated with the Project. **Table 14.3** shows that continued operation and expansion of the landfill until 2031 with legacy emissions for 50 years post closure would generate around 6,026,000 t CO_2-e, of which the majority is attributed to Scope 1 landfill gas emissions (methane), which contribute around 92% of the total emissions.

Table 14.3 Estimated total GHG emissions (Project scenario – 2018 to 2031 with 50 years post closure)

Emissions source	GHG emissions (t CO_2-e)			Total GHG emissions (t CO_2-e)
	Scope 1	Scope 2	Scope 3	
Solid waste disposal				
Landfill gas emissions (methane)	5,185,340			5,185,340
Combustion of landfill gas				
Combustion of landfill gas to produce electricity	71,033			71,033
Landfill gas flared	83,430			83,430
Fuel use – transport energy purposes				
Diesel oil for landfill excavation	100,980		5,156	106,135
Diesel oil for waste placement on-site	69,019		3,524	72,543
Petroleum based lubricants and greases	130		134	264
Diesel oil for the transport of waste to Site (Scope 3)			489,808	489,808
Gasoline for the transport of staff to/from Site (Scope 3)			3,543	3,543
Electricity use				
Electricity purchased from the grid		11,911	1,453	13,363
Total emissions	**5,509,932**	**11,911**	**503,617**	**6,025,459**
	91.4 %	**0.2 %**	**8.4%**	**100%**

Note: numbers may not sum to totals due to rounding

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14.3.3 Summary of results

The Baseline scenario would generate an average annual GHG emission rate of around 64,460 t CO_2-e per year, based on six years of continued operation and 50 years post closure.

The Project scenario would generate an average annual GHG emission rate of around 92,700 t CO_2-e per year, based on 12 years of continued and expanded operations and 50 years post closure. Although the total emissions and average annual emissions are high due to the proposed increase in waste disposal rate to 950,000 tpa and additional five and a half years of landfilling, the emissions intensity of the Project scenario is lower than that of the Baseline scenario due to the proposed increase in total waste disposal quantity (approximately 4.8 million tonnes).

The Project would generate around 2,300,000 t CO_2-e of additional GHG emissions over a period of 65 years compared with the Baseline scenario. The Scope 1 landfill gas emissions (methane) contribute the highest source of emissions in both scenarios (90% and 92% of the total emissions respectively).

14.3.4 Comparison with National and State emissions

The average annual GHG emissions of around 64,460 t CO_2-e generated by the Baseline scenario would represent 0.01% of the Australian national inventory for the year ending March 2018, and 0.05% of the NSW inventory for 2016, as discussed in **section 14.2.2**.

The average annual GHG emissions of around 92,700 t CO_2-e generated by the Project scenario would represent 0.02% of the Australian national inventory for the year ending March 2018, and 0.07% of the NSW inventory for 2016.

In the absence of the Project, the same quantity of waste proposed to be accepted as part of the Project would need to be accommodated by an alternative landfill facility. Not all landfill facilities generate landfill gas at quantities that make the collection and combustion of gas for electricity production viable. These methods are only economically feasible where sufficient quantities of methane can be reliably collected over a long period of time. The existing landfill gas collection system would remain in operation and be extended as required under the Project. Landfill gas would continue to be used by the on-site landfill gas-powered electricity generators to supply power to the SAWT facility and external power grid network. When anthropogenic methane is burned in air to produce carbon dioxide and water, the carbon dioxide produced is equal to the amount that would have been produced by natural decomposition, and is not considered anthropogenic GHG emissions. As a result, the proposed expansion of the Elizabeth Drive Landfill under the Project and the continued combustion of landfill gas to produce electricity is considered more beneficial compared to the potential alternative of this waste being disposed of at a landfill facility that does not combust landfill gas.

14.4 Management of impacts

Table 14.4 outlines measures to reduce/offset the GHG emissions generated by the landfill and the proposed expansion (the Project). Further detail regarding the ongoing management of the landfill, including the management of landfill gas, is provided in **Chapter 17**.

Table 14.4 Environmental management measures – Greenhouse gas

Impact	Reference	Environmental management measures	Timing
GHG emissions generated through the combustion of fuel	GG1	The fuel efficiency of plant/equipment will be assessed prior to selection and, where practical, use equipment with the highest fuel efficiency or equipment which uses lower GHG intensive fuel such as biofuels will be used(e.g. biodiesel, ethanol).	Operation

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Impact	Reference	Environmental management measures	Timing
GHG emissions generated through the consumption of purchased electricity	GG2	Plant/equipment and transport vehicles will be maintained to reduce energy efficiency losses associated with damaged/poorly maintained equipment	Operation
Landfill gas emissions	GG3	Landfill activities will be planned to avoid the double handling of materials and unnecessary fuel use, where possible	Operation
Monitoring and reporting	GG4	Purchasing policies that favour electrically efficient equipment will be implemented. The use of renewable energy will be considered to reduce the quantity of electricity purchased from the grid	Operation
Landfill gas management following closure	GG5	The existing landfill gas collection system will be maintained to collect and combust landfill gas and to supply power to the SAWT facility and the external grid	Operation
Monitoring and reporting	GG6	Annual GHG emissions for the Site will continue to be quantitatively measured, recorded and reported in accordance with the NGER Act	Operation
Landfill gas management following closure	GG7	A closure plan will be developed in accordance with the requirements of the POEO Act 1997, the requirements of the Site EPL and any other relevant consent conditions. The closure plan will outline the key landfill closure activities and document the proposed landform, capping detail, leachate and gas management and monitoring protocols to be adopted for the landfill closure process. The closure plan will be prepared in consultation with the NSW EPA and all landfill closure works will be carried out in accordance with the final approved closure plan.	Operation (at least 12 months prior to the last load of waste being landfilled)

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Chapter 15

Hazards and risk

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15.0 Hazards and risk

Executive summary

The main hazards presented by the Project are increased bush fire risk and the potential for impacts to future aircraft operations at Western Sydney Airport. A bush fire assessment undertaken for the Project indicated that existing bush fire protection measures including asset protection zones (APZs), access arrangements and firefighting equipment, would be sufficient for the minimisation of bush fire risk and enable ongoing protection of the facility.

Key potential hazards to aircraft overflying the site during operation of Western Sydney Airport would primarily relate to convection currents associated with the continued flaring of landfill gas and the possibility of bird strikes. The Project would not however alter the nature of landfill gas flaring or the location of stormwater dams, where most birds congregate on the site.

Landfill gas is currently combusted and flared on-site. This would continue during the prolonged filling operations at the landfill, and for several decades beyond final capping. Whilst no plume rise assessment has been undertaken, the potential for interference with aircraft operations is expected to be minimal.

At present birds are generally restricted to the stormwater ponds located around the periphery of the Site. Upon capping, the Site would be managed in such a way as to discourage congregation of birds. This would include a specific grass mix, regular slashing to discourage groundcover and shrub layer vegetation and maintenance of on-site drainage. These measures would reduce the overall bird strike risk.

SUEZ has engaged with Western Sydney Airport on these topics and would continue to do so prior to the commencement of the airport's operation.

A preliminary risk screening undertaken for the Project indicated that the Project is not considered potentially hazardous. As such a preliminary hazard assessment was not required, as the potentially hazardous materials stored on site (diesel fuel) do not exceed the respective thresholds.

This chapter provides an overview of the hazards and risk environment relevant to the Project. This assessment has been prepared in line with the requirements of SEPP 33 and the publications *Hazardous Industry Planning Advisory Paper No. 6 'Guidelines for Hazard Analysis'* (HIPAP 6) and *HIPAP No. 4 'Risk Criteria for land Use Safety Planning'*.

This chapter also provides a summary of the bush fire hazard assessment provided in **Appendix G** along with a quantitative assessment of potential hazards to the neighbouring proposed Western Sydney Airport through the likelihood of bird strikes and the flaring of landfill gas.

Table 15.1 sets out the SEARs relevant to hazards and risk, alongside the desired performance outcomes of the Project, and identifies where the requirements have been addressed in EIS.

Table 15.1 SEARs - Project description

SEARs	Where addressed in this EIS
A preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* and *Applying SEPP 33* (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the Project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis* (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011); and	**Section 15.2.1**

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SEARs	Where addressed in this EIS
An assessment of the risk of bush fire, including addressing the requirements of *Planning for Bush Fire Protection 2006* (RFS). Any proposed Asset Protection Zones must not adversely affect environmental objectives (e.g. buffers). Provision is to be made for their appropriate management into the future.	**Section 15.2.2** **Appendix G**
An assessment of bushfire risks and asset protection zones (APZ) in accordance with NSW Rural Fire Service guidelines	**Section 15.2.2**
Technical information on the environmental protection equipment to be installed on the premises such as air, water and noise controls, spill clean-up equipment and fire (including location of fire hydrants and water flow rates at the hydrant) management and containment measures.	**Section 15.2.2**

15.1 Assessment approach

15.1.1 Hazard

SEPP 33 presents a systematic approach to planning and assessing proposals for potentially hazardous and offensive development for the purpose of industry or storage. SEPP 33 applies to any proposals which fall under the policy's definition of 'potentially hazardous industry' or 'potentially offensive industry'.

For development proposals classified as 'potentially hazardous industry', the policy establishes a comprehensive test by way of a preliminary hazard analysis (PHA) to determine the risk to people, property and the environment at the proposed location and in the presence of controls.

This chapter provides hazard and risk screening in accordance with the requirements of SEPP 33, to identify if SEPP 33 applies, and therefore if a PHA is required. The preliminary screening methodology concentrates on the storage of specific Dangerous Goods classes that have the potential for significant off-site effects. Specifically, the assessment involves the identification of classes and quantities of all Dangerous Goods to be used, stored or produced on-site with an indication of storage depot locations.

15.1.2 Bush fire

A bush fire assessment was undertaken by Australian Bushfire Consulting Services (refer to **Appendix G**). The bush fire assessment was undertaken in order to meet the requirements of both the SEARs and the aims and objectives of the *Planning for Bush Fire Protection* (PBP) (RFS, 2006). In 2018 the NSW Rural Fire Service (NSW RFS) prepared a pre-release version of Planning for Bush Fire Protection (PBP) 2018. The purpose of the pre-release version was to provide a transition period between the current 2006 edition of PBP and the new edition. The intention of the RFS was to align the adoption of PBP with the release of NCC 2019 and the new AS3959:2018 (1 May 2019).

However, given the breadth of changes and the complexity of the associated administrative processes, the adoption of the new edition of PBP has been delayed. At this stage, the legislative adoption of the new PBP is anticipated to occur in September 2019. Importantly, until the new PBP is published and legislated, the current 2006 edition of PBP will continue to remain in force.

The bush fire risk assessment was supported through a site inspection undertaken on 28 August 2018, along with consultation with the NSW Rural Fire Service.

In addition, the following documents were reviewed in the preparation of the bush fire assessment:

- *Penrith Local Environmental Plan 2010*;
- Penrith Development Control Plan 2014;
- Penrith City Council's Bush fire Prone Land Map;
- AS3959 – 2009 Construction of buildings in bush fire prone areas;

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- *Rural Fires Act 1997*;
- *Rural Fires Regulation 2013*;
- 10/50 Vegetation Clearing Code of Practice;
- NSW RFS Guide for bush fire prone land mapping V5b Nov 2015; and
- Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales – David Andrew Keith 2006

15.1.3 Bird strikes

A qualitative assessment of the likelihood of the Project increasing the risk of bird strikes occurring from the operation of the neighbouring future Western Sydney Airport was undertaken. A quantitative bird strike risk assessment was not considered warranted for the following reasons:

- The waste currently and proposed to be disposed of in the Project Area is non-putrescible, which substantially reduces the potential for attracting birds
- Existing management practices seek to minimise the surface area of uncovered waste, and these would continue under the Project
- The overall area of exposed waste at any one time would not increase compared to current operations
- There would be no increase to the size of stormwater basins within the Site
- The overall increase in the height of the landfill is modest and is not expected to substantially alter the potential maximum flight height of bird species typical at the Project Area to the extent that passing aircraft would be placed at risk.

15.2 Existing Environment

15.2.1 Preliminary hazard risk screening

15.2.1.1 Dangerous goods inventory

SUEZ stores one Dangerous Good above NSW WorkCover's threshold quantity as shown in **Table 15.2**.

Table 15.2 Dangerous Goods storage

Chemical	UN	Class	Packing group	Hazchem code	On-site storage capacity
Diesel	1202	3	III	3Z	55,000 L (48.7 tonne)

15.2.1.2 Dangerous goods storage screening

Under SEPP33, Class 3 Dangerous Goods are arranged by their packing group and evaluated against a threshold above which the Site would be deemed 'potentially hazardous'. The proposed inventory of Dangerous Goods to be stored and utilised within the Project Area is not proposed to change with the Project and is provided in **Table 15.3**.

Table 15.3 Dangerous Goods screening

Chemical	Maximum quantity on-site	Requirements for quantity on-site
Diesel	48.7 tonne	• Must be at least 8 m from facility boundary • Must be at least 12 m from a sensitive receptor

In order to avoid exceeding the screening threshold, the inventory of diesel must be stored more than five metres from the Site boundary and more than eight metres from a sensitive receptor. The diesel storage tank on the Site is located 70 metres from the eastern boundary and does not exceed the potentially hazardous industry threshold criteria.

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If future changes occur to the inventories or types of Dangerous Goods to be stored within the Project Area, it is recommended that the screening process be repeated in order to determine if those changes trigger the need for a PHA to be conducted.

15.2.1.3 Transportation screening

During operation, the Project would involve a number of vehicles entering the surrounding road network. Many of these vehicles would be trucks delivering waste to the facility. Workers and visitors to the Project Area would also generate additional traffic on the surrounding road network. Due to the small quantity of Dangerous Goods stored in the Project Area, it is expected that vehicles transporting Dangerous Goods would only make up a very small portion of the total vehicle movements. The transportation screening thresholds for the movement of Dangerous Goods (both incoming and outgoing) are listed in **Table 15.4**. The SEPP 33 threshold only applies to movements of greater than 10 tonnes.

Table 15.4 Vehicle movements of Dangerous Goods

Chemical	Cumulative Annual	Peak Weekly
Diesel	>1000	>60

As the total weekly movements of Class 3 Dangerous Goods would be significantly below the peak weekly and the annual threshold, it is concluded that the transport of Dangerous Goods is not potentially hazardous and therefore does not require a route evaluation.

15.2.1.4 Summary of screening results

According to SEPP 33, if any of the screening thresholds are exceeded then the Project should be considered 'potentially hazardous' or 'potentially offensive' and a PHA is required. The results of the Dangerous Goods storage and transport screening indicate that the Project would not result in any of the thresholds being exceeded. As a result, the Project is not considered to be 'potentially hazardous' and a PHA is not required.

15.2.2 Bush fire

Penrith City Council's Bush fire Prone Land Map identifies the Site as containing Category 1 and Category 2 Vegetation along with identified Vegetation Buffer zones. The potential bush fire prone vegetation is wooded vegetation in the riparian corridor along Badgerys Creek to the west, and potential grassland hazard within surrounding properties in all other directions.

15.2.2.1 Vegetation

The vegetation along Badgerys Creek comprises a mix of eucalypt and she oak trees 10 – 25 metres in height having approximately 50 – 60% canopy foliage cover, with an understorey consisting of a sparse scattering of shrubs. Land within surrounding properties consists of large open plain grazing paddocks. During the site inspection grasses were found to be very short, cured and in areas non-existent with bare earth exposed. It is assumed that the lack of significant grass cover is due to recent below average rainfall and it is recognised that the grasses retain the potential to pose a grassland bush fire hazard.

15.2.2.2 Topography

Planning for Bush Fire Protection (RFS 2006) (PBP) outlines that slopes adjacent to subject properties must be assessed over a distance of at least 100 m from the existing property boundary (or building footprint) towards the various vegetation communities constituting the hazard. The surrounding pastures were found to be flat to slightly undulating downslope away from the Site. Along Badgerys Creek there appeared to be little discernible fall in either direction although Badgerys Creek itself drains to the north.

15.2.2.3 Asset protection zones

Existing asset protection zones (APZ) around the perimeter of the Project Area were observed to achieve or exceed the relevant requirements under PBP.

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15.2.2.4 Access

Access to the Site is provided via an 8 metre, two way public access driveway extending approximately 560 metres to the south to Elizabeth Drive. The Site is bounded by an internal perimeter access trail of approximately 4 - 5 metres in width. The perimeter access trail is subject to frequent traffic movements and has verges along either side to enable passing in opposite directions at regular intervals along its entire length. Dissecting the Site are a number of vehicle tracks designed to enable the movement of heavy articulated vehicles involved in the operation of the Site. Access arrangements for the Site are considered suitable and upgrades to existing service trails are not required for the proposed expansion.

15.2.2.5 Services

An existing overhead electrical supply cable runs internally through the Site to the SAWT. Reticulated water mains are also available throughout the Site and hydrants are located at intervals around the perimeter and adjacent structures. Several large dams (sediment basins) are located on the Site with the ability to be accessed by both tanker and aerial units should the need arise.

The Site currently has three water carts (trucks) used for wetting down the roads and each cart is fitted with a water cannon. The carts are capable of suppressing fires on-site and have been used to fulfil this role as a first response resource in the past. The current water carts include:

- 30 tonne CAT truck with spray bar and water cannon
- Volvo 9,000 litre cart with spray bar and water cannon.

As part of its operation, SUEZ collects landfill gas and utilises it to generate electricity in an on-site power station. Any excess landfill gas is flared. The landfill gas generation plant and the flare are located greater than 140 metres from any wooded vegetation and greater than 100 metres from any grassland vegetation. Furthermore, combustion of landfill gas does not generate embers or fire brands. There is minimal risk or potential ignition of surrounding bushland from this operation.

15.3 Potential impacts

15.3.1 Dangerous goods

The results of the Dangerous Goods storage and transport screening indicate that the Project would not result in any of the thresholds outlined in SEPP 33 being exceeded. As a result, the Project is not considered to be a 'potentially hazardous industry' and a PHA is not required.

15.3.2 Bush fire

The Project would not result in the construction of new buildings or a change of use or occupancy of the Site. The expansion would however result in an increase in the operational life of the facility. The current bush fire risk of the Site is low and the proposed expansion would not result in any increase to the ongoing bush fire risk of the Site. In addition, the proposed expansion would not compromise the effectiveness of any existing bush fire protection measures currently present.

Existing bush fire protection measures including APZs, access arrangements and firefighting equipment are deemed to be sufficient for the minimisation of bush fire risk and ongoing protection of the facility.

15.4 Western Sydney Airport considerations

As presented in **Chapter 6 Consultation**, SUEZ has engaged with WSA concerning the potential for risk to future aircraft operations arising from the Project. WSA indicated its primary issues related to:

- Obstacle limitation surface (OLS)
- Aircraft navigation aids
- Bird population on-site
- Landfill gas flaring operations.

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As part of this consultation SUEZ has indicated to WSA that the landfill and all temporary stockpiles would be more than 15 metres clear of the OLS at all times. SUEZ has also provided additional detail about the landfill gas flaring operations that are ongoing at the Site. It is noted that there would be no increase to the rate of gas flaring as part of the Project, though the overall duration of this activity would extend based upon the greater volume of waste to be landfilled.

The Project would not alter the level of approved lighting at the Site. As such there are not expected to be any impacts to aircraft navigation aids.

Bird strike issues have been assessed in **Chapter 16** of this EIS. At present birds are generally restricted to the stormwater ponds located around the periphery of the Site. These ponds would not be increased in area as part of the Project. Upon capping, the site would be managed in such a way as to discourage congregation of birds. This would include a specific grass mix, regular slashing to discourage groundcover and shrub layer vegetation as well as maintenance of on-site drainage.

Landfill gas is currently combusted and flared on-site. This would continue during the prolonged filling operations at the landfill, and for several decades beyond final capping. Whilst no plume rise assessment has been undertaken, the potential for interference with aircraft operations is expected to be minimal. SUEZ has engaged with Western Sydney Airport in relation to bird strike and plume risk risks, and would continue to do so prior to the commencement of the airport's operation.

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15.5 Management of impacts

Table 15.5 Environmental management measures – Hazards and risk

Impact	Reference	Environmental management measures	Timing
Unintentional contact or spill of Dangerous goods	HR01	Dangerous Goods will be transported to site and stored in accordance with the Australian Dangerous Goods Code. Appropriate safe work procedures will also be implemented for the safe handling of the Dangerous Goods, including spill prevention and clean up requirements. Any smaller quantities of Dangerous Goods (aerosols, paints, cleaners etc.) that may be used on site are to be stored and used in accordance with the Australian Dangerous Goods Code, including appropriate labelling, separation where necessary and disposal	Operation
Asset protection zones	HR02	The existing 10 metre asset protection zone (APZ) along the northern, eastern and southern perimeter and 25 metre APZ along the western perimeter will be maintained throughout the extended life of the landfill	Operation
Bush fire	HR03	The Kemps Creek Resource Recovery Park Emergency Response Plan will be updated to include appropriate triggers and responses to a bush fire event onsite. The plan will include the cessation of hot works on any predicted 'catastrophic' fire danger weather days or when a total fire ban has been declared (unless and exemption has been obtained from the Commissioner of the NSW RFS)	Operation
Litter generation and migration off-site	HR04	Litter arising from the site will be minimised by the progressive use of cover over the active fill areas and by the provision of measures such as fences and berms around the area being landfilled. During the normal operation of the landfill, the size of the working face will be minimised to as small an area as practicable. Litter pickers will patrol the site periodically to recover any litter blown off the active landfill	Operation
Sediment tracking off-site	HR05	An automatic wheel washing facility will be maintained for all vehicles prior to leaving the landfill site to prevent tracking of material onto the Site Access Road. A street sweeper to be utilised for the purpose cleaning out tracked muds on the approach road especially during wet weather conditions	Operation

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Impact	Reference	Environmental management measures	Timing
Pollution management	HR06	The following protocols will be implemented during operation: • During dry weather, potential dust nuisance will be controlled by regular wetting down of unsealed haul roads and manoeuvring areas • The Project will use well-maintained machinery manufactured to appropriate design specifications • All vehicles will be required to adhere to site sign posted speed limits • Storage stockpiles and boundary vegetation will be managed to provide acoustic shielding • All vehicles will be operated as per the hours of operations specified in the EPL • Subsurface gas wells around perimeter of site will be maintained. Surface gas emission monitoring will continue to detect high areas of gas leaks (possible improvement areas) • Gas infrastructure will be installed according to design specification for adequate collection of landfill gas • All leachate collection systems will be monitored for ongoing operation • All handling and transport of leachate will be carried out in a manner to prevent spills. Workers to be trained on the landfill leachate management SOP • Waste will be covered as soon as practical upon deposition in the landfill • Odour associated with the landfill will be monitored on a daily basis during operating hours • Stormwater management will be implemented as outlined in the LEMP and elsewhere in this EIS.	Operation

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Chapter 16

Other issues

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16.0 Other issues

Executive summary

Aboriginal and non-Aboriginal heritage

There are no recorded Aboriginal sites within the Project Area. It is therefore anticipated that the Project would present no additional impacts to items of Aboriginal heritage significance. Two items of local non-Aboriginal heritage significance were identified within one kilometre of the Site, however, it is not anticipated that the Project would result in any additional or new significant impacts upon the heritage value of either listed item.

Biodiversity

The Project does not include any changes to the existing footprint of landfilling activities within the Site and as such no additional vegetation is proposed to be cleared. Off-site ecological impacts associated with the extended duration of operation, increased rate of filling and increased cap height are expected to be minimal.

The nature of the grass mix on the final cap would be subject to consultation with Western Sydney Airport with a view to discouraging congregation of birds. This would not substantially alter the long term habitat value of the cap which would be low regardless of the grass mix.

Weeds within the Site would continue to be managed as per existing site management arrangements. Upon final capping regular slashing and targeted weed eradication would be undertaken as necessary to manage weeds in the long term.

Surface water, flooding and groundwater

Existing cell linings would remaining operational and the overall footprint of the landfill would remain as per the approved design, retaining the same overall rainwater catchment as present. As such the rate of leachate generated within the Project Area is expected to remain broadly consistent with current operations. The Project does not alter the operation of the existing leachate management controls in place to avoid groundwater interaction.

Appropriate erosion and sediment control measures would continue to be used throughout the extended life of the landfill, including diversional drains around operational landfill cells and ongoing maintenance and monitoring of all surface water basins. The final cap has been designed to drain to existing surface water dams which would continue to be managed to reduce off-site discharges. Overall, the Project is not expected to result in substantial changes to the existing water quality of surface water runoff during either operation or post closure.

The Updated South Creek Flood Study (Worley Parsons, 2015) indicates that no flood event of Badgerys Creek, up to and including the probable maximum flood (PMF), would be expected to reach any areas where landfilling has historically occurred. As such the Project would be carried out at a level above the PMF and would not contribute to potential flooding impacts in the wider area.

Soils, geology and contamination

The Site contains no natural surface soils due its extended history of quarrying and landfilling. Existing on-site management measures would continue to be applied to manage off-site soils impacts.

The Project would allow for an additional volume of waste material to be placed within the Project Area, having the potential to increase contamination impacts. Existing management measures would continue to be implemented to ensure that potential contamination is managed and offsite contamination is avoided.

Litter and illegal dumping

The Project would result in an increase in the duration of potential litter impacts occurring as part of the standard operation of the Site including from transportation of waste to the Site and from litter moved by wind or stormwater. This would continue to be managed by daily covering of waste, use of litter screens, moving the tipping area and suspension of operations in windy conditions.

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This chapter provides assessment of issues associated with the Project that have been identified as being a lower overall risk to the environment and local amenity in **Chapter 7**. This prioritisation reflects the nature of the Project, the Site and surrounding area.

The following issues are assessed in this chapter:

- Aboriginal and non-Aboriginal heritage
- Biodiversity
- Surface water, flooding and groundwater
- Soils, geology and contamination
- Litter and illegal dumping.

Table 16.1 sets out the SEARs relevant to the above issues, alongside the desired performance outcomes of the project, and identifies where the requirements have been addressed in this EIS.

Table 16.1 SEARs - Project description

SEARs	Where addressed in this EIS
Soil and water including: • a description of local soils, topography, drainage and landscapes • details of water usage for the proposal including existing and proposed water licensing requirements in accordance with the *Water Act 1912* and/or the *Water Management Act 2000* • details of sediment and erosion controls • a detailed site water balance • an assessment of potential impacts on the quality and quantity of surface and groundwater resources • details of the proposed stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts • a description and appraisal of impact mitigation, management and monitoring measures	**Section 16.3** **Section 16.4**
Biodiversity including • accurate predictions of any vegetation clearing on site or for any road upgrades • a detailed assessment of the potential impacts on any threatened species, populations, endangered ecological communities or their habitats, groundwater dependent ecosystems and any potential for offset requirements • details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies • a detailed description of the measures to avoid, minimise, mitigate and offset biodiversity impacts	**Section 16.2**
Heritage including • Aboriginal and non-Aboriginal cultural heritage	**Section 16.1**

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16.1 Aboriginal and non-Aboriginal heritage

This section provides an assessment of Aboriginal and non-Aboriginal heritage values and potential impacts upon these values arising from the Project.

16.1.1 Existing environment

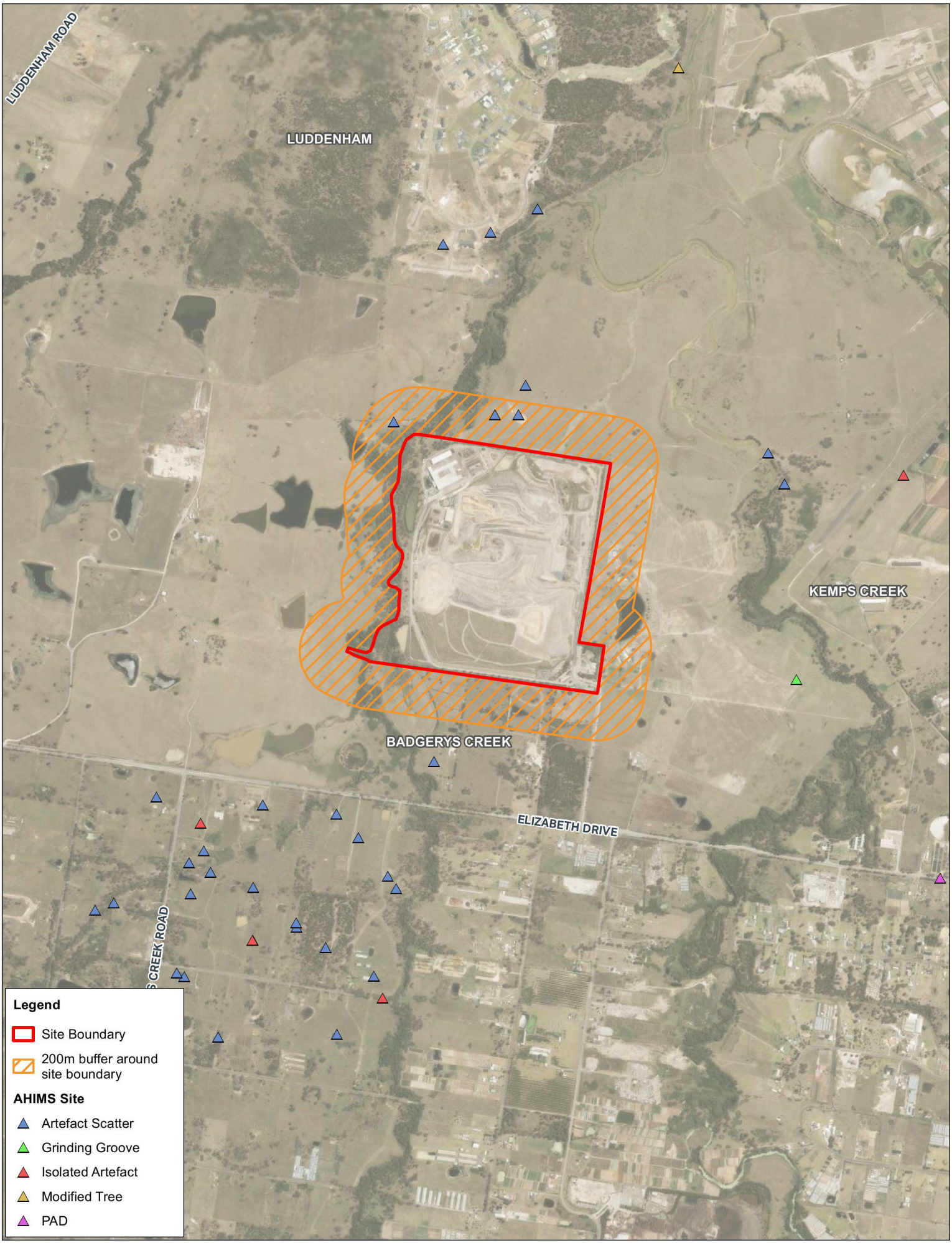
Aboriginal heritage

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) was undertaken on 16 August 2018 for the Site. This search identified three recorded sites within a 200 metre buffer around the perimeter of the Site. An additional two sites were also identified within 500 metres of the Site boundary. Registered Aboriginal heritage sites are described in **Table 16.2**. All recorded sites were found to be located outside of the Site boundary.

Table 16.2 Registered AHIMS sites within 500 metres of the Site

Site name	AHIMS number	Site feature	Approximate distance from the Site boundary
Fleurs Prospect	45-5-0528	Artefact Scatter	250 m
M12 A2	45-5-4748	Artefact Scatter	120 m
M12 A3	45-5-4750	Artefact Scatter	140 m
M12 A1	45-5-4747	Artefact Scatter	150 m
BC/ED1	45-5-2309	Artefact Scatter	400 m

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FIGURE 16.1: AHIMS SEARCH RESULTS

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Non-Aboriginal heritage

Searches of the following heritage databases was undertaken on 17 August 2018 to determine items of non-Aboriginal heritage in the vicinity of the Site:

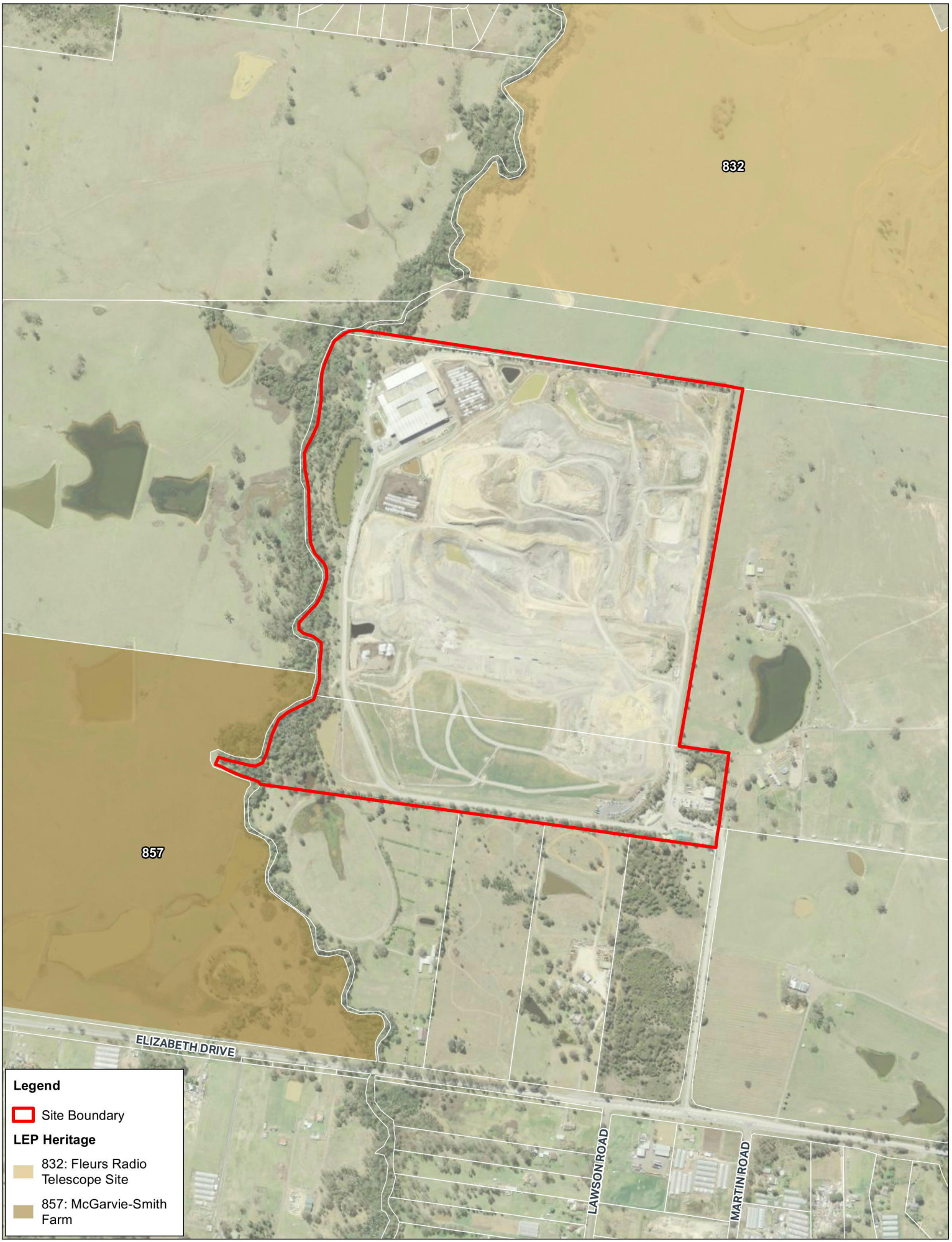
- EPBC Protected Matters Search Tool
- State agency Section 170 registers
- State Heritage Register
- Penrith LEP 2010.

Searches of the EPBC search tool. State agency Section 170 register and State Heritage Register databases did not identify any items of Non-Aboriginal heritage significance within a one kilometre radius search area from the Site.

Two items of local heritage significance were identified in the vicinity of the Site under the Penrith LEP 2010, including:

- McGarvie-Smith Farm (857), 1790-1951 Elizabeth Drive
- Fleurs Radio Telescope Site (832), 885(a) Mamre Road.

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FIGURE 16.2: NON-ABORIGINAL HERITAGE

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16.1.2 Potential impacts

Aboriginal heritage

There are no recorded Aboriginal sites within the Site or the Project area. The Project area has been subject to significant disturbance from quarrying and landfilling activities. As the Project involves constructing the landfill on top of existing landfilled material (i.e. from RL80 to RL95 metres), the potential for undiscovered Aboriginal artefacts or items of Aboriginal heritage significance within the Project Area is considered to be negligible. It is therefore anticipated that the Project would present no additional impacts to items of Aboriginal heritage significance.

Non-Aboriginal heritage

Two items of local heritage significance were identified within one kilometre of the Site. A minor change to the magnitude of the visual impact from the landfill would occur at each location due to the increased height of the landfill, however, it is not anticipated that the Project would result in any additional or new significant impacts upon the heritage value of either listed item.

16.1.3 Management of impacts

Table 16.3 Environmental management measures – Aboriginal and non-Aboriginal heritage

Impact	Reference	Environmental management measures	Timing
Heritage	HE01	An unexpected finds procedure will be developed and included in the LEMP. This will outline the procedures to follow if unexpected Aboriginal or non-Aboriginal heritage items were discovered during operation of the Project.	Operation

16.2 Biodiversity

16.2.1 Assessment approach

A desktop biodiversity assessment was undertaken to determine the potential impacts of the proposal on the biodiversity value of the Site and surrounding environment. The assessment was informed through desktop searches of publicly available information to identify threatened flora, fauna species, populations and ecological communities with the potential to be affected by the Project. In addition a qualitative discussion of the potential for the Project to affect bird strike during the operation of the nearby future Western Sydney Airport is provided.

The desktop searches of publicly available information included the following biodiversity resources:

- The Commonwealth Department of the Environment and Energy (DoEE) Protected Matters Search Tool for MNES (DoEE, 2018d), including threatened and migratory biota, known or predicted to occur within one kilometre of the Site
- The DoEE online species profile and threats database
- NSW Office of Environment and Heritage (OEH, 2018c) BioNet Atlas for records of threatened species populations and endangered ecological communities listed under the BC Act recorded within 10 kilometres of the Site
- OEH threatened biodiversity profile search
- Southeast NSW Native Vegetation Classification and Mapping (VIS_ID 2230) (OEH, 2018d)
- BoM Groundwater Dependant Ecosystems Atlas to determine the presence of aquatic and terrestrial Groundwater Dependant Ecosystems.

Legislative context

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act 1999 requires that Commonwealth approval be obtained for certain actions, and establishes an assessment and approvals system for actions that have or are likely to have, a significant impact on MNES. The MNES considered in this technical report include listed threatened species, populations and ecological communities as well as migratory species protected under

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international agreements. Particular consideration has been given to potential impacts on threatened biota that occur or could occur in the vicinity of the Project.

Biodiversity Conservation Act 2016

The BC Act protects threatened flora and fauna species and ecological communities and their habitats within NSW. Particular attention has been given to potential impacts on threatened biota that occur or are likely to occur within the study area.

Section 7,7 of the BC Act outlines that if a proposed development is likely to have a significant impact upon threatened species then a Biodiversity Development Assessment Report (BDAR) is required. The Project would not clear any additional vegetation nor would it result in off-site impacts that would significantly harm threatened species. As such a BDAR has not been prepared.

Fisheries Management Act 1994

The FM Act protects threatened species, populations and ecological communities of fish and marine vegetation, and other living resources of Australian waters. Species listed under this act are considered alongside those of the BC and EPBC Acts.

Biosecurity Act 2015

Under the *Biosecurity Act 2015*, SUEZ, as the landowner, is required to prevent, eliminate or minimise the risk posed by a prohibited matter as outlined in Schedule 2 of the Act so far as is reasonably practicable. **Section 16.2.3** considers weeds declared as priority weeds in the Penrith LGA that occur within the study area. A priority weed is one that should be prevented, managed, controlled or eradicated in the region.

16.2.2 Existing environment

Desktop searches

Biodiversity databases

Searches of the DoEE PMST and NSW Bionet atlas were undertaken for a radius of 10 km from the site. These searches identified the potential for the presence of a number of threatened species and ecological communities within the vicinity of the Site.

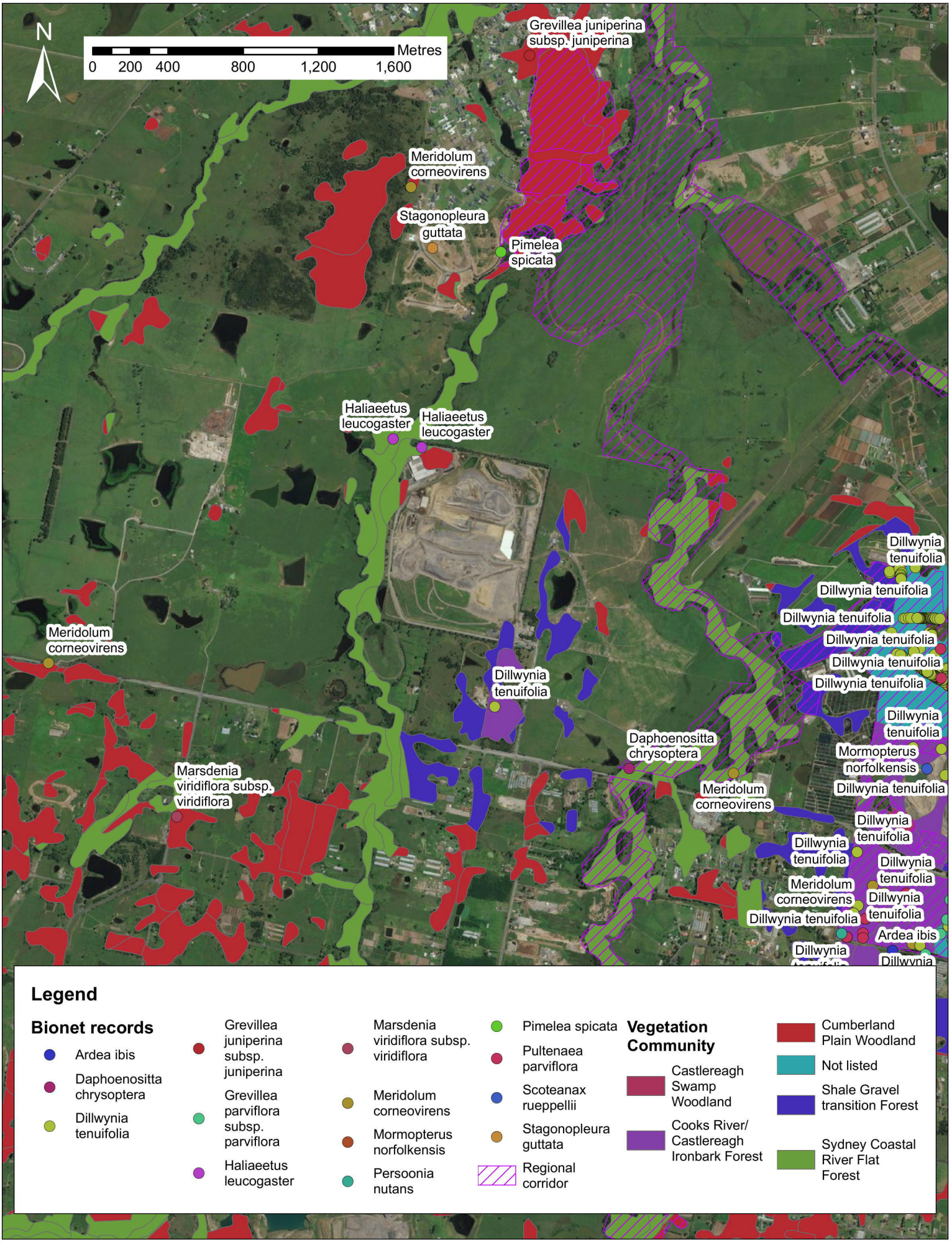
Table 16.4 Threatened species and ecological communities within 10km

Type	EPBC Act	BC Act	FM Act
Vulnerable species	23	15	0
Endangered species	13	5	0
Critically endangered species	4	1	0
Vulnerable ecological communities	-	1	0
Endangered ecological communities	6	15	0
Migratory species	15	-	-

Note: PMST and Bionet are independent databases and some species may be included in both lists.

The results of the NSW Bionet searches were mapped for the immediate area around the Site. This accounted for threatened species records from the last 25 years only (**Figure 16.3**).

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FIGURE 16.3: BIODIVERSITY

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PROJECT 60571292
DRAWN JM

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Groundwater dependant ecosystems

The BoM Groundwater Dependant Ecosystems Atlas, identified a high potential for terrestrial groundwater dependant ecosystems to be present within the Badgerys Creek corridor. As described in **section 16.3**, the Project is not anticipated to result in notable changes in groundwater levels or quality. The existing landfill contains significant barriers to prevent groundwater interaction which would continue during the proposed landfill expansion. No impacts on identified areas of potential groundwater dependence are therefore predicted to occur.

Vegetation

A search of the Southeast NSW Native Vegetation Map (VIS_ID 2230) (OEH, 2018d) identified two native vegetation communities occurring within and adjacent to the Site which have previously been removed. The Cumberland River Flat Forest, which was historically present along Badgerys Creek forms part of the *River Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community*. The community consists of a tall open tree layer of eucalypts, which may exceed 40 m in height with the most dominant species including forest red gum (*Eucalyptus tereticornis*), cabbage gum (*E. amplifolia*), rough-barked apple (*Angophora floribunda*) and broad-leaved apple (*A. subvelutina*).

In addition a pocket of Castlereagh Ironbark Forest was mapped immediately to the south of the Site and to the west of the site access road.

Wildlife connectivity corridors

The Biodiversity Investment Opportunities Map for the Cumberland Plain (OEH 2015) was reviewed in the context of regional corridors. This mapping identifies both the South Creek and Kemps Creek corridors to the east of the site as a priority for conservation. Whilst not specified within this mapping, the Badgerys Creek corridor is also likely to provide opportunities for north-south movement through the area.

These wildlife corridors have been recognised in future land use planning for this area. These have been specifically excluded from development for employment purposes, though it is noted that these areas may still include a degree of recreational use where this does not significantly conflict with conservation objectives.

Critical habitat

None of the land in or around the Site is listed as critical habitat for any species.

Field inspection

A high-level field inspection undertaken of the Site on 11 April 2018 was carried out from a vehicle (for safety reasons), with particular attention focussed on stormwater basins and stands of existing vegetation within the boundary of the Site. No detailed flora or fauna assessment was undertaken though habitat features of the Site and evidence of fauna use was noted.

Conditions during the survey were warm, approximately 30 degrees with light cloud cover, and a light wind.

Vegetation

The inspection confirmed that the Site retains very little of its remnant vegetation, with none present within the Project area. Regenerated and remnant vegetation in isolated stands around the perimeter of the Site would not be affected by the Project.

It was noted that vegetation along the western boundary of the Site is likely to be consistent with *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (Sydney Coastal Riverflat Forest), which is listed as an endangered ecological community (EEC). No individual threatened flora species were noted.

Fauna habitat

All five stormwater basins around the perimeter of the site contained some degree of occupation by birds, with the most densely occupied being the basin immediately south of the SAWT. This basin

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contained approximately 100 Australian White Ibis. All birds within the basins were common, comprising:

- Pacific black duck (*Anas superciliosa*)
- Australian wood duck (*Chenonetta jubata*)
- Australian White Ibis (*Threskiornis molucca*)
- Silver gull (*Chroicocephalus novaehollandiae*)

In addition to the stormwater basins, the existing vegetation along the western boundary of the Site would provide a degree of habitat. This vegetation fringes the waterway of Badgerys Creek and is likely to be utilised by a variety of threatened and non-threatened mammals, birds, reptiles, amphibians and invertebrates. This area would however not be subject to any direct impacts from the Project.

16.2.3 Potential Impacts

Threatened species

The potential of the Project to result in a significant impact upon the full suite of threatened species returned by the searches was considered. This took into account

- The likelihood that the species is present at the Site
- The nature of the existing Site (largely devoid of habitat)
- The nature of the immediate surrounding area
- The specific detail of the proposed landfill expansion and the potential for direct impacts
- The potential for indirect and offsite impacts, particularly to nearby habitats.

The Project does not include any changes to the existing footprint of landfilling activities within the Site and as such no additional vegetation is proposed to be cleared. Existing landfilling activities at the Site would continue, including ongoing management of off-site impacts such as stormwater discharge, dust, noise and light. On this basis the degree to which the Site is currently used by threatened species is not expected to change during the extended operation period.

Once landfilling ceases the final cap would be revegetated using a suitable grass mix to provide rapid cover and to bind soils/reduce dust. The composition of this grass mix would be the subject of consultation with WSA, with the aim of discouraging birds from foraging or congregating at the site.

The cap area would be mowed for operational reasons. Whilst some native grasses would be expected to propagate naturally on the cap, the ongoing ecological value of the Project area would be expected to remain low. The cap may provide foraging opportunities for some urban-adapted mobile species though this would be limited (intentionally, in the case of birds). This scenario is typical of completed landfill sites, both managed and unmanaged.

Off-site ecological impacts associated with the extended duration of operation, increased rate of filling and increased cap height are expected to be minimal. The site would continue to operate under the existing EPL, which requires monitoring and management of off-site water, air and noise discharges.

Loss of vegetation

The Project would not involve an increase in the footprint of the landfill and would avoid the area zoned as E2 Environmental Protection adjacent to Badgerys Creek. No additional areas of vegetation or threatened ecological communities would therefore require removal. Impacts upon potential habitat for any listed threatened species are consequently not anticipated.

Wildlife Corridors

Of the three nearby wildlife corridors identified above, only the Badgerys Creek corridor is relevant to the Project. This corridor as it passes through the Site, along with a portion of the Site's operational land, is zoned as E2 Environmental Conservation under the Penrith LEP 2010, where landfilling activities are prohibited. For this reason no new development as part of the Project is proposed in this zone, and subsequently no impact upon the integrity of the existing wildlife corridor is expected.

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Weeds

The ongoing movement of vehicles and personnel into and throughout the Site has the potential to facilitate the spread of weeds. This risk would continue during the extended duration of landfilling operations associated with the Project. During this period weeds would continue to be managed as per existing site management arrangements.

Once landfilling has finished the final cap would be constructed. This would be revegetated using an exotic grass mix to provide rapid cover, which would reduce opportunities for weeds to establish. The cap would also be mowed and targeted weed eradication would be undertaken as necessary, which would further work to suppress weed colonisation. As such overall weed impact associated with the Project is considered to be minimal.

Bird strike

The Elizabeth Drive Landfill is located approximately one kilometre from the threshold of the runway for the Western Sydney Airport (currently under construction). As noted above, virtually all bird activity within the Site is limited to the five existing stormwater basins. These include a variety of waterfowl and generalist species.

Within the landfill area birds are not generally present, with the exception of a small number occasionally foraging. The lack of bird activity within the landfill area is attributable to:

- The deterrent effect associated with ongoing activity within the landfill area (light vehicles, waste trucks, heavy earthmoving machinery)
- The general lack of a food source – the landfill is comprised of non-putrescible waste, generally comprising commercial, industrial, construction and demolition waste and as such provides virtually no foraging resource. Bird foraging is further discouraged within active landfilling areas by the daily use of tarps or stockpiled soil/shale to cover deposited material.

As part of the Project, the Site would remain active as a landfill until around 2031. It is recognised that the Western Sydney Airport is due to open for first flights from December 2026. As such there would be approximately four years during which time both the airport and landfilling operation would be active. Based on the above listed factors the degree of bird activity is not expected to be any higher during this period than currently experienced across the Site.

Upon closure of the landfill around 2031 the site would be capped. This cap would generally comprise rehabilitation in the form of a grass covering so as to reduce ongoing runoff and dust impacts. At this stage the deterrent effect of landfilling activity (vehicles, machinery) would also have ceased.

Whilst these factors would alter the bird occupation profile across the site, the ongoing bird strike risk is not expected to increase dramatically as:

- Surface water basins would remain in their existing locations and would not be increased in size
- Grass cover over the cap would be specified so as to discourage foraging or congregation of birds. This mix would be specified in consultation with WSA.
- The grass cap would be maintained by mowing so as to prevent any woody shrub or canopy layer vegetation which may attract birds to congregate on the cap. This would not substantially alter the long term habitat value of the cap which would be low regardless of the grass mix
- The cap would be adequately drained so as to prevent the formation of wet areas that may attract certain bird species.

Bird strike has already been the subject of consultation between SUEZ and WSA. This consultation would continue throughout the development of the Project and the airport.

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16.2.4 Management of impacts

Table 16.5 Environmental management measures – Biodiversity

Impact	Reference	Environmental management measures	Timing
Biodiversity	BD01	Relevant workers will be provided an environmental induction prior to commencing work on site. This will include information on the ecological values of the Site and its surrounds, protection measures to be implemented to protect biodiversity and penalties for breaches	Operation
Biodiversity	BD02	No remnant native vegetation will be cleared as part of the Project	Operation
Weeds	BD03	Existing control measures will be maintained to limit the spread of weeds downstream of the Site. This includes sediment control devices, such as silt fences. Weed management will be undertaken during the landfilling and post-capping phases of the project. This will include the management and disposal of the weeds discovered within the footprint, including the priority weeds in accordance with the Biosecurity Act 2015.	Operation
Vegetation	BD04	Prior to final capping, a vegetation management plan will be prepared for implementation on the final cap. This plan will address measures for managing vegetation in and around the full Site, including; • maintenance of the integrity and structure all native perimeter vegetation and native riparian vegetation along Badgerys Creek, particularly mature trees • management of the cap with view to discouraging congregations of birds • management and suppression of priority and environmental weeds throughout the site • procedures in the event that vegetation clearing is required for unexpected maintenance purposes, including revegetation and rehabilitation.	Operation
Vegetation	BD05	Stormwater and sediment management measures will be implemented as outlined in the LEMP and elsewhere in this EIS to minimise transfer of sediments into adjacent waterways and vegetated areas.	Operation

16.3 Surface water, flooding and groundwater

16.3.1 Assessment approach

The existing surface water, flooding and groundwater conditions within the Site were assessed through a review of available online searches and existing site documentation (including the LEMP and 2017 Annual Environmental Monitoring Report (ERM, 2018) (AEMR). A search of the WaterNSW Real Time Data Viewer was also undertaken to identify all registered groundwater bores within one kilometre of the Site.

A qualitative assessment of impacts to surface water resources (including flooding and riparian land), and groundwater resources in the Project Area was then undertaken.

16.3.2 Existing environment

Groundwater

Given the relatively shallow shale bedrock of the Site, groundwater is expected to flow within fractures of the bedrock. Gauging of static water levels undertaken during for the AEMR indicates that groundwater is present at varying depths across the Site, varying between three and 15 metres below

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ground surface. The variable depth of groundwater is likely related to the identified fractures within the shale bedrock.

Twelve groundwater monitoring bores are located around the perimeter of the Site to monitor for potential offsite groundwater impacts originating from the Site (refer to **Table 16.6**). Extensive leachate containment infrastructure included in the landfill design includes the lining of landfill cells with impermeable layers, the ongoing management of leachate levels and collection of leachate through a gravel drainage blanket feeding into a leachate sump for treatment. Furthermore, leachate levels in the cells are managed to ensure a slight negative hydraulic head is maintained against the groundwater.

Table 16.6 Groundwater bores within 1 km of the Site

Bore number	Type	Status
GW112174	Monitoring Bore	Active
GW112170	Monitoring Bore	Active
GW112168	Monitoring Bore	Active
GW112169	Monitoring Bore	Active
GW112166	Monitoring Bore	Active
GW112167	Monitoring Bore	Active
GW112116	Monitoring Bore	Active
GW112171	Monitoring Bore	Active
GW072774	Groundwater Exploration	Active
GW112172	Monitoring Bore	Active
GW112165	Monitoring Bore	Active
GW112173	Monitoring Bore	Active

Recent groundwater monitoring (AEMR, 2018) did not determine the flow direction of groundwater at the Site. Previous investigations (Golder, 1991) calculated the flow direction towards the north west towards Badgerys Creek. Given the hydrogeological setting of the Site (i.e. fractured shale bedrock and alignment of Badgerys Creek) it has been assumed that groundwater flow remains consistent with the Golder assessment.

An additional domestic stock bore was identified approximately 1.5 km to the south of the Site (GW105016). Given the controls implemented at the Site along with anticipated groundwater flow to the north west, impacts of landfilling activities on this bore are not anticipated. It is possible that unregisters bores exist in the vicinity of the Site for non-potable or irrigation purposes however, owing to agricultural land use surrounding the Site.

Groundwater in the vicinity of the Site is known to contain high background levels of total dissolved solids (TDS) due to elevated conductivity in the marine shale bedrock, known to be high in salinity (AEMR, 2017). This high background level of TDS makes it unlikely that groundwater is used for drinking purposes. Concentrations of ammonia and nitrogen are broadly elevated across the Site, indicating that background concentrations across the wider area may be elevated in comparison to the benchmark level outlined by NEPM 2013. As per the 2016 and 2017 data, the concentrations of ammonia and nitrogen have been consistent with very minimal changes in concentration values. In cases where changes are evident, these changes are considered negligible. Therefore, the consistent concentrations of ammonia and nitrogen indicates that the elevated values are not primarily related to the operation of the landfill.

The EPL for the Site imposes an ammonia concentration limit in groundwater monitoring bores of 15mg/L. No exceedances of the EPL ammonia concentration limit was reported during any sampling event during 2017 (ERM, 2018).

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Surface water

The Site is located adjacent to Badgerys Creek, a 16 km long minor tributary of South Creek which is a tributary of the Hawkesbury River. Badgerys Creek flows approximately 600 metres to the east of the Site. The South Creek catchment drains approximately 414 km^2 in western Sydney, stretching from Narellan in the south to the confluence with the Hawkesbury River at Windsor in the north.

Surface water drainage within the Project Area predominantly involves diversion drainage around the ridge of each active waste disposal cell to control surface water runoff flowing into the cells. It typically comprises of open channel drains on the outer edge of earthen bunds. Surface water is then collected in drains, swales and ponds before being diverted into one of five surface water basins around the Site boundary.

Surface water discharge is permitted in accordance with the water quality limits set out in the EPL, via licenced discharge points at each basin to agricultural land to the north and east, or to Badgerys Creek. EPL concentration limits are applied for ammonia and total suspended solids (TSS). Exceedances of the TSS discharge limit are permitted by the EPL in the event of rainfall exceeding 48 millimetres over any consecutive five day period.

Sampling of surface water in Badgerys Creek both upstream and downstream of the Site is undertaken quarterly, as required by the LEMP and EPL. Results of sampling activities are included in the AEMR and provided to PCC. The 2017 AEMR identified that water quality both upstream and downstream of the Site was acceptable, with tadpoles sighted during December sampling, indicating a healthy watercourse. While minor TSS exceedances were reported within some surface water basins on Site at each sampling event throughout the year, offsite concentrations of both TSS and ammonia were reported below the EPL discharge limits.

A search of the NSW Water Register (WaterNSW) was undertaken to identify surrounding licences and approvals under both the *Water Act 1912* and *Water Management Act 2000.* Searches included lots that could be potentially affected by activities at the Site, including lots immediately adjacent to the Site as well as downstream waterways, to the confluence of South Creek and Cosgrove Creek approximately 3.5 kilometres north of the Site. Three water licences (10BL154345, 10BL156375 and 10BL157456) registered to the Site were identified. Details for the onsite water licences were not available however given activities on the Site, it is assumed these licences relate to onsite groundwater monitoring bores. No further licences or approvals were identified for other properties within the search area.

Flooding

The *Penrith LEP 2010* flood planning map identifies the riparian area adjacent to Badgerys Creek as a Flood Planning Area. Section 7.2 of the Penrith LEP outlines the development objectives and provisions regarding lands designated as Flood Planning Areas. The objectives of Flood Planning Areas are:

a. *to minimise the flood risk to life and property associated with the use of the land,*
b. *to limit uses to those compatible with flow conveyance function and flood hazard,*
c. *to manage uses to be compatible with flood risks,*
d. *to enable safe and effective evacuation of land,*
e. *to ensure the existing flood regime and flow conveyance capacity is not compromised,*
f. *to avoid detrimental effects on the environment that would cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or waterways.*

In addition development consent cannot be granted for development on land that is at or below the flood planning level unless the consent authority is satisfied that the development:

a. *is compatible with the flood hazard of the land, and*
b. *if located in a floodway, is compatible with the flow conveyance function of the floodway and the flood hazard within the floodway, and*

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c. *is not likely to adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and*

d. *is not likely to significantly alter flow distributions and velocities to the detriment of other properties or the environment, and*

e. *is not likely to adversely affect the safe and effective evacuation of the land and the surrounding area, and*

f. *is not likely to significantly detrimentally affect the environment or cause avoidable erosion, destruction of riparian vegetation or affect the restoration and establishment of riparian vegetation, or a reduction in the stability of river banks or waterways, and*

g. *is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding, and*

h. *incorporates appropriate measures to manage risk to life from flood, and*

i. *is consistent with any relevant floodplain risk management plan.*

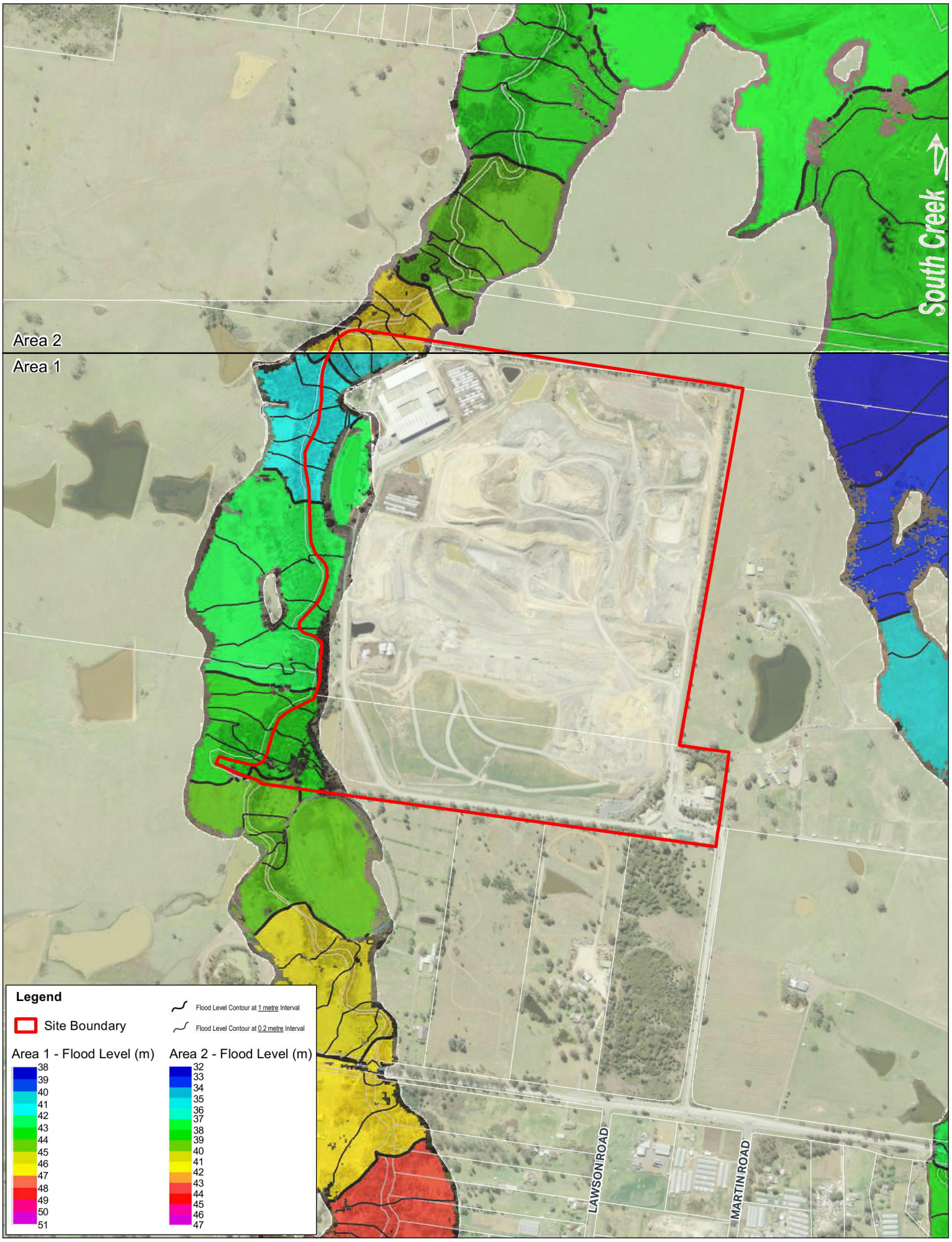
The Project is considered to be consistent with the objectives of Flood Planning Areas and as described in **section 16.3.3** below, would not result in a significant change in the flood behaviour or characteristics of Badgerys Creek.

An *Updated South Creek Flood Study* (Worley Parsons, 2015) was prepared to determine flood characteristics within the South Creek Catchment, including Badgerys Creek. The study identified a peak recorded flood elevation of 46.13 m AHD in 1988 (approximately three metres above the creek bed) at the Badgerys Creek Crossing of Elizabeth Drive, up-gradient and 575 metres to the south of the Site.

The riparian zone surrounding Badgerys Creek includes relatively steep banks and a natural overall fall of approximately five metres from the Site to the creek bed. The flood study identifies that the Project Area is not located in an area of flood storage and it is not expected that flood waters would affect the operational areas within the Project Area, including during a PMF event.

The existing 100 Year Annual Recurrence Interval (ARI) and PMF levels as outline in the *Updated South Creek Flood Study* (Worley Parsons, 2015) are presented in **Figure 16.4** and **Figure 16.5**.

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SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 16.4: FLOOD LEVELS - 100yr ARI

AECOM suez

0 100 200 m

N

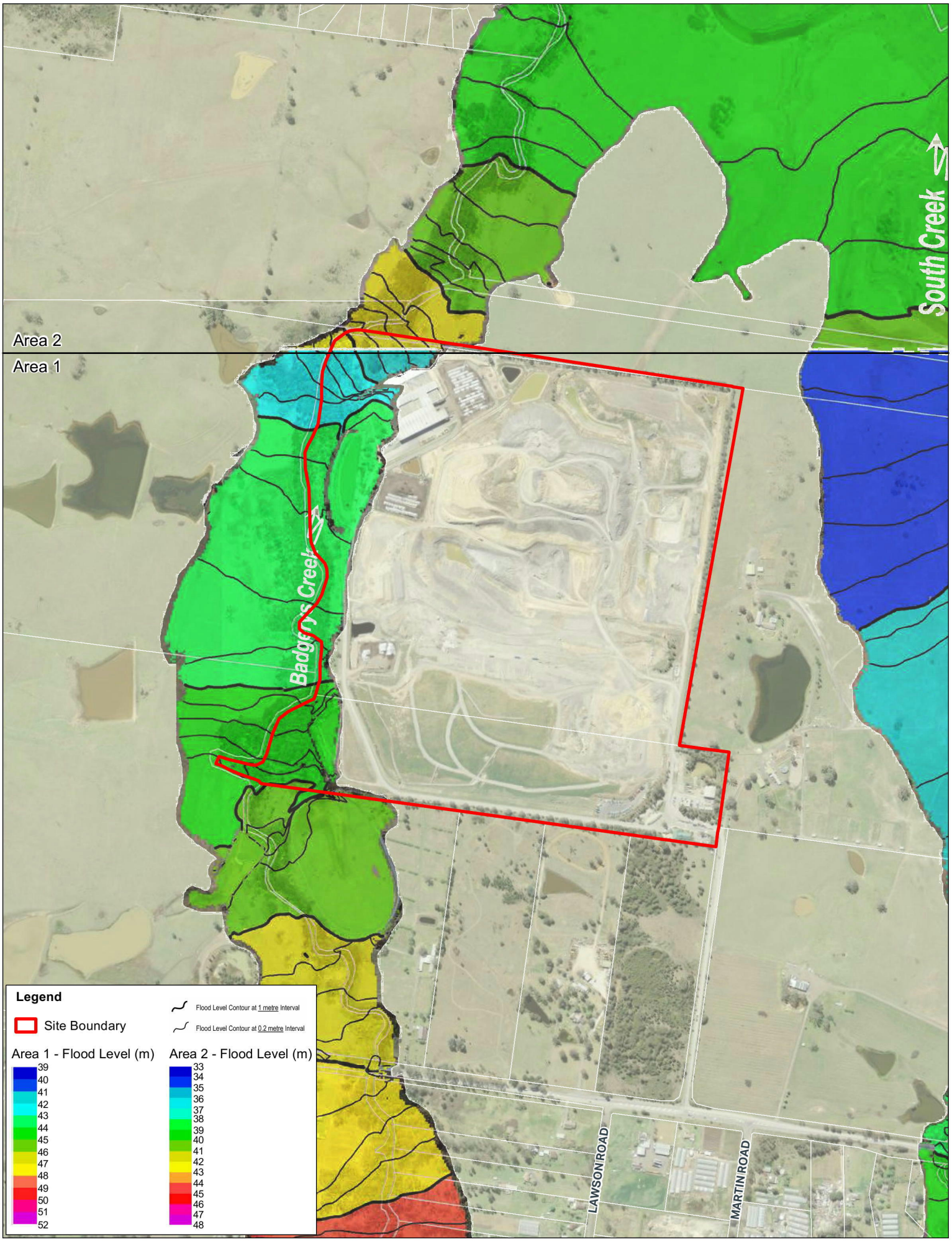
Disclaimer Spatial data used under licence from Land and Property Management Authority, NSW © 2018.

AECOM makes no representations or warranties of any kind, about the accuracy, reliability, completeness, suitability or fitness for purpose in relation to the map

DATE	05-Oct-18
SCALE	1:10,000
PROJECT	60571292
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Source: Wolley Parsons 2018, *Updated South Creek Flood Study*



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SUEZ

SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 16.5: FLOOD LEVELS - PMF

0 100 200 m

N

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DATE	05-Oct-18
SCALE	1:10,000
PROJECT	60571292
DRAWN	MA

Document Set ID: 8776905
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Source: Wolley Parsons 2018, *Updated South Creek Flood Study*

16.3.3 Potential Impacts

Groundwater

The approved design for landfill cell construction includes a compacted clay lining and leachate collection infrastructure for both general and restricted waste cells. Interaction of leachate generated at the Project Area and underlying groundwater is minimised as far as practicable. In addition, in order to further minimise the likelihood of groundwater contamination, leachate levels in the cells are managed to ensure a slight inward groundwater hydraulic gradient. The Project seeks only to alter the final cap height of the landfill. The overall footprint of the landfill would remain as per the approved design, and therefore the overall rainwater catchment would remain unchanged. As such the rate of leachate generated within the Project Area is expected to remain broadly consistent with current operations and the leachate collection, storage or management regime would be augmented for the Project. Raised areas will be progressively capped to minimise leachate generation through rainfall.

Leachate detection sumps would continue to operate to ensure any escape of leachate is rapidly identified and can be managed. Leachate is managed separately for restricted and general waste cells so as not to cross contaminate cells or leachate. All leachate generated within the Project area is collected and recirculated within landfill cells. The excess leachate is transported to a SUEZ liquid treatment facility at Spring Farm, NSW,

The landfilling works would be completed with a layered capping system that would include an initial sealing layer, and overlying protection layer, followed by a surface vegetation layer (e.g. grass). The landform of the upper parts of the capped landfill would be designed to achieve greater than five per cent gradient as recommended by the EPA (DECC, 2008) to manage stormwater infiltration and ensure infiltration from the base of the final cap remains less than five per cent of the annual rainfall. The design of the landfill cap would reduce the potential for leachate generation and consequent impacts on underlying groundwater and down-gradient receptors.

Surface water

The main operational parts of the Project area are highly disturbed and generally devoid of all vegetation with a minimal area of groundcover. As such the Project Area is subject to high surface water runoff volumes and rates. This runoff is generally captured either:

- As surface water in the base of open landfill cells, which is pumped out, or
- Via temporary and permanent surface water management structures at or above natural ground level.

In both cases surface water is directed to one of five surface water basins around the perimeter of the Site.

Given the highly disturbed surfaces throughout the Project Area, the potential for erosion and sedimentation is high. This is generally managed through careful design of surface water management structures including swales and velocity arresting devices and surface water basins.

As the Project would not result in an expansion of the footprint of the Site, it is not anticipated that there would be a notable increase in runoff volumes. Existing surface water basins are considered to contain sufficient storage capacity for the Project. The additional height and increased gradient of the proposed final landform may result in runoff flowing at a slightly higher velocity than the existing approved final landform, though this would be heavily restricted by the presence of benches and drainage channels integrated into the design of the final proposed landform.

Appropriate erosion and sediment control measures would continue to be used throughout the extended life of the landfill, including diversional drains around operational landfill cells and ongoing maintenance and monitoring of all surface water basins. Erosion and sediment control measures on Site would continue to be in accordance with the Blue Book Volume 1 (Landcom, 2004) and Blue Book Volume 2b (DECC 2008).

The Project is not expected to result in substantial changes to the existing water quality of surface water runoff during either operation or post closure. Final capping of the Project Area would be undertaken following the completion of the expanded landfill and would include a low permeability compacted clay layer (or an EPA approved alternative) to reduce the generation of leachate through

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rainfall infiltration. Additionally, overland flow across the Site would be managed appropriately to control the volume and velocity of flows. The detailed design of these elements would be undertaken during the operation of the landfill as appropriate, with final stormwater management measures implemented as part of the final cap design.

The Project Area would continue to be managed in accordance with the LEMP and within EPL limits, including those for water quality, to ensure offsite impacts are kept within acceptable limits. As such the Project is not expected to result in significant impacts upon the volume or quality of surface water leaving the Project Area, including that towards Badgerys Creek.

Water sourcing and security

There would be no major increase in the demand for water needed for site activities as the existing landfill is expanded, capped and revegetated. The Project would not increase the area of the active landfilling face or require substantially increased uncapped working areas when compared to current operations. The primary ongoing demand for water would be for dust suppression, the need for which would decrease over time as exposed areas are final capped. Where possible, captured surface water runoff would be used for dust suppression to reduce the need to use potable water within the Project Area.

All surface water basins and their discharges would continue to be managed in line with the existing EPL conditions for the Site, and no modification to the EPL in this regard is proposed.

Flooding

The Project, raising the final cap level of the landfill from RL80 to RL 95 metres, would take place at a height of approximately 50 metres above the original natural surface level of the surrounding area. The Updated South Creek Flood Study (Worley Parsons, 2015) indicates that no flood event of Badgerys Creek, up to and including the PMF, would be expected to reach any areas where landfilling has historically occurred, including the western portion of the Site. As such the Project would be carried out at a level above the PMF and would not contribute to potential flooding impacts in the wider area.

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16.3.4 Management of impacts

Table 16.7 Environmental management measures – Surface water, flooding and groundwater

Impact	Reference	Environmental management measures	Timing
Surface water	WT01	The LEMP will be updated to include measures to manage potential surface water impacts of the proposed expansion including: • Continued use of existing measures in place to minimise demand for potable water, including reuse of water captured in surface water basins for dust suppression • Where possible, minimising exposed areas over which sediment may be collected through maintenance of both natural and artificial ground cover such as grass or geofabrics and daily cover of landfill areas with tarps. • Capturing of the majority of sediment-laden runoff as close as possible to the point of generation through the maintenance of stormwater management devices • Appropriate management of vehicle movements to minimise generation and transport of sediment • Appropriate management of material stockpiles including locating them as far from drainage lines as feasible • Continuation of surface water monitoring as prescribed in the EPL • Progressive revegetation of capped areas • Design and maintain surface water basins and stormwater management infrastructure to minimise discharge of water containing sediment or other contaminants • Design of erosion and sediment control devices in accordance with the requirements of the 'the Blue Book' Volume 1 (Landcom, 2005) and Volume 2b (DECC, 2008). Erosion and sediment controls will be subject to ongoing maintenance and inspections.	Operation
Groundwater	WT02	A groundwater monitoring system will be implemented and described in the LEMP to monitor changes in leachate associated with the expanded landfill. This may include one or more of the following: • Ongoing assessment of leachate volumes and generation rates and updating of the landfill Hydrologic Evaluation of Landfill Performance (HELP) model that compares expected infiltration volumes against collected leachate volumes • Characterisation and monitoring of leachate levels in leachate collection wells for changes to water levels • Implementation of an improved collection system if discrepancies are found in the existing water balance and/or overall changes in leachate levels and volumes are observed, and taking into account groundwater quality data.	Operation

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Impact	Reference	Environmental management measures	Timing
Groundwater	WT03	Leachate management will occur until such time as the leachate volume/quality monitoring confirms that ongoing risk to groundwater is consistent with approval requirements. Ongoing leachate management requirements following landfill closure will be incorporated into the Post-Closure Environmental Management Plan.	Closure
Groundwater	WT04	Ongoing monitoring of groundwater wells will occur as required by licence conditions.	Operation / Post Closure

16.4 Soils, geology and contamination

16.4.1 Assessment approach

The existing soil conditions and types, geology and contamination environment within the Site were determined through a review of available online databases and mapping. As part of the desktop assessment, information was extracted from the Sharing and Enabling Environmental Data (SEED) Portal (NSW Government, 2018). This assessment included extracts from the following datasets and reports:

- Australian Soil Classification (ASC) Soil Type Map of NSW
- NSW 1500k Surface Geology
- Managing Urban Stormwater Soils and Construction – Volume 2B – Waste Landfills (DECC 2008).

Information from these sources was collated and analysed in order to provide a characterisation of the Site.

16.4.2 Existing environment

A search of the ASC Soil Type Map of NSW reveals that although the Site was not specifically assessed, surrounding areas are dominated by the Kurosol soil type with areas adjacent to Badgerys Creek characterised by Hydrosols. Kurosols, also known as duplex soils, have a strong texture contrast between the surface and the B horizon. They often have low water holding capacity and are often saline.

The Site is located within the Sydney Basin geological area and surface geology is comprised of Triassic sedimentary rocks consisting of the Bringelly Shale formation. The Bringelly Shale bedrock provides a natural non-permeable layer for the landfill cells, supplementing the lining of the landfill cells. Shale bedrock is relatively shallow below the Site at only five metres below the natural ground surface.

16.4.3 Potential Impacts

Contamination

Potential contamination from the Project Area is managed by a number of measures including the lining of landfill cells, suitable base geology (shale), landfill gas extraction, active management of leachate, ongoing monitoring of groundwater and surface water, re-fuelling controls (e.g. bunding) and intermediate cover placed over completed landfill cells. These measures prevent landfill workers from coming into contact with contaminated material and work to prevent escape of this material into the surrounding environment.

The Project would allow for an additional volume of waste material to be placed within the Site. The additional volume of waste has the potential to increase contamination impacts to the receiving environment if not suitably managed. The existing management measures outlined above would continue to be implemented for the Site to ensure that potential contamination is managed adequately and significant offsite contamination is avoided. The existing protocols for the acceptance of restricted solid waste, would remain unchanged. All such waste would continue to be deposited within the restricted waste cells, and as per existing practices, this will continue under the Project.

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Soils

The Project Area no longer has any naturally occurring surface soil present due to its extended history as a quarry. The Project Area does however contain stockpiles of excavated subsurface material (mostly shale). Stockpiled material would continue to be used as part of the ongoing landfill operations and/or for final capping of the landfill. On site management of stormwater and discharges in accordance with EPL 4068 would minimise off site impacts to soils arising from the Project

Final use

Following completion of the landfilling of waste, the Project Area would be capped to contain the waste and reduce leachate generation by rainfall infiltration and control the collection of landfill gas.

Assuming the final landfill capping layer is maintained and that the post closure environmental management plan and post-closure monitoring program are appropriately implemented, it is unlikely that future users of the Project Area would come into contact with contaminated material stored within the capped landfill cells. A Post-closure environmental management plan (EMP) would be prepared in accordance with EPA requirements.

The post-closure EMP would include the relevant environmental and operational activities associated with the management of leachate, landfill gas, the landfill cap at the Project Area once landfilling activities cease. Regardless of the final land use, the post-closure EMP would remain in place to ensure environmental performance of the Project Area is maintained.

Landslip and subsidence

The proposed final landform would be shaped with side batters initially graded at 1:3.5 (Vertical:Horizontal distance) and expected to reduce to 1:4 over time as the site settles. The top of the cap would be formed with a minimum fall of five percent to reduce rainfall infiltration. The final cap profile would be considered as part of the final detailed design, to ensure that significant post-closure subsidence is avoided, and that the Project Area is engineered to be fit for future beneficial land use (yet to be determined).

16.4.4 Management of impacts

Table 16.8 Environmental management measures – Soils, geology and contamination

Impact	Reference	Environmental management measures	Timing
Erosion	CT01	Stockpiles will not exceed RL 105 (i.e. 10 metres above the final landform). Long term stockpiles will be stabilised using vegetation or approved stabilisation methods where required.	Operation
Erosion	CT02	Regular site inspections will be undertaken along the site boundaries to monitor and identify any significant dust sources	Operation
Contamination	CT03	Refuelling of plant and equipment will continue to be managed through measures outlined in the LEMP including: • The refuelling area and workshop will be bunded with chemicals stored in a covered storage area • Accidental spills will be immediately cleaned up • The EPA will be notified immediately of any reportable environmental incident including spills or other unexpected releases.	Operation

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Impact	Reference	Environmental management measures	Timing
Contamination	CT04	The Post-Closure EMP will be implemented until the residual impact of the landfill meets relevant approval requirements and will include: • A stormwater monitoring and maintenance plan prepared in accordance with the requirements of the 'the Blue Book' Volume 1 (Landcom, 2005) and Volume 2b (DECC, 2008). This plan will detail requirements such as inspection locations, inspection frequencies, maintenance and corrective actions • The maintenance of erosion and sediment control measures until the site is stabilised through revegetation • Ongoing maintenance of leachate management infrastructure to minimise the potential for surface water and groundwater pollution by leachate. This includes maintaining the integrity of the final capping profile and final surface/stormwater drainage works • A gas monitoring and maintenance program for the landfill gas extraction system and adjacent landfill gas to energy system. This will include inspection locations, inspection frequencies and corrective actions.	Closure

16.5 Litter

16.5.1 Potential Impacts

The Project would increase the duration of landfilling operations by approximately 5.5 years. This would result in an increase in the duration of potential litter impacts occurring as part of the standard operation of the Site.

Transportation of waste to the Project Area has the potential to generate litter through the improper containment of truck loads. Vehicles entering the Project Area would be subject to the requirements of Clause 70 of the *Protection of the Environment Operations (Waste) Regulation 2014* which requires waste transported by a vehicle to be covered during its transportation.

There would continue to be a risk of waste/litter blown offsite, or moved offsite by stormwater. SUEZ would continue to implement management and mitigation of litter through measures documented in the LEMP, including daily cover of active landfilling areas with a tarp, capturing of litter in portable litter screens and monitoring of wind conditions and managing operations accordingly. To improve on the existing controls for the management of litter generated within the site, SUEZ has recently constructed an approximately 5.8 m elevated litter fence along the site's eastern boundary.

In addition an employee litter management education program is undertaken as part of Site inductions.

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16.5.2 Management of impacts

Table 16.9 Environmental management measures – Litter

Impact	Reference	Environmental management measures	Timing
Litter	LT01	A suite of prevention, mitigation and rectification measures for litter will be detailed in the LEMP. These measures will be implemented as required during the ongoing operation of the expanded landfill operation. Key measures outlined in the LEMP will include: • On windy days, the use of a portable litter screen downwind of the working face to contain loose paper and other windblown refuse which might otherwise escape prior to the daily cover or tarp being applied • Litter 'pickers' will patrol the landfill workface area and boundaries, recovering escaped litter materials, as required • Daily cover of exposed active landfill areas with tarps • Operations will cease in unsafe (strong) wind conditions.	Operation

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[redacted]

Chapter 17

Landfill management

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17.0 Landfill management

Executive summary

This chapter outlines the nature of the waste operations at the Elizabeth Drive Landfill. This includes the types and quantities of waste and operational management within the Site with reference to the revised final landform at RL 95. The Project would not affect these operations, other than that they would continue beyond the currently planned closure date of approximately 2025.

Landfill gas and leachate have been considered with reference to the Project. Based on landfill gas modelling undertaken as part of the concept design the Project would increase landfill gas generation by an average of 40%. This would continue to be managed in accordance with the existing landfill gas management system.

The results of Hydrologic Evaluation of Landfill Performance (HELP) modelling undertaken for the Project demonstrate that the Project would not significantly affect the total leachate generation from the capped landfill. This would result in leachate generation consistent with the current scenario.

This chapter provides information on the following landfill design and operational management aspects of the Project:

- Waste acceptance and filling
- Landfill gas management
- Leachate management
- Pest and vermin

Table 17.1 outlines the SEARs relevant to Landfill Management alongside the desired performance outcomes of the project, and identifies where the requirements have been addressed in this environmental impact statement (EIS).

Table 17.1 SEARs - Project description

SEARs	Relevant section in EIS
Waste management – including: • Details of the type, quantity and classification of waste to be received at the site; • Details of waste handling including transport, identification, receipt, stockpiling and quality control; and • The measures to be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelins in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21.*	**Section 17.1.1** **Section 3.1.2**

17.1 Waste acceptance and Landfill Design

17.1.1 Waste acceptance and filling

The Site includes 25 landfill cells which either currently or historically have accepted waste material. The Site is licensed under EPL 4068 to accept the following waste streams into the landfill cells:

- General solid waste (non-putrescible)
- Restricted solid waste.

From the historical waste composition derived from weighbridge data from 1991 through to 2016, the approximate overall breakdown of waste types is provided in the following table. It is noted that more

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recent waste from 2017 through to the present is largely inert with some degradable fractions at a lesser proportion than previously received.

Table 17.2 Historical waste composition, 1991-2016

Waste Stream	Food	Paper and paper board	Garden and park	Wood and wood waste	Textiles	Sludge	Nappies	Rubber and Leather	Inert Material
Average	0%	12.0%	3.5%	10.9%	2.8%	1.1%	0%	2.4%	67.2%

The Project would provide an additional landfill airspace capacity for non-putrescible general solid waste of approximately 4.8 million cubic metres and extend the life of the landfill by approximately 5½ years.

The existing landfill currently accepts on average approximately 750,000 tonnes per annum (tpa) of non-putrescible general solid waste and restricted solid waste. It is envisaged that the rate of filling would increase slightly to take into account changes in the volume of waste being generated and disposed of in NSW and the industry capacity to receive the waste. Under the Project approximately 950,000 tpa of non-putrescible general solid waste and restricted solid waste is expected to be received during the extended life of the landfill. The Project would continue to receive and dispose of the waste types within the general solid waste landfill cells in accordance with the EPL:

- General solid waste (non-putrescible)
- Restricted waste.

Waste receipt, disposal and management for the Project would be undertaken in accordance with the operations described in the Landfill Environmental Management Plan (LEMP) for the Site, dated 14 November 2018 and in accordance with SUEZ's Standard Operating Procedures.

Vehicles entering the Project Area to dispose of waste are required to enter/exit via a controlled weighbridge and boom gates. Vehicles disposing of waste are directed to the appropriate disposal area upon arrival at the weighbridge, by the operator. Workers monitor waste disposal areas to ensure the correct type of waste streams are disposed of in the allocated cells (either general solid waste cells or restricted solid waste cells) using various communication methods. All vehicles entering and existing the site must be covered except during loading and unloading. All commercial waste vehicles are required to exit via a wheel wash.

The Site accepts waste from commercial customers and would continue to remain closed to the general public.

Waste deposited in the landfill would be spread and compacted in layers. At the end of each day all exposed waste surfaces would be covered with a suitable daily cover, for example 15 cm of virgin excavated natural material (VENM) or an approved alternative daily cover (ADC). Under EPL 4068 the approved ADC are ConCover and tarpaulins.

Where filled areas have not reached the final landform level but will remain inactive for an extended time (longer than 90 days), an intermediate cover of 30 cm of VENM would be applied.

The final cover, including capping layer would be progressively constructed as soon as practicable after reaching final landform levels.

17.1.2 Landfill design

The available airspace, and therefore lifespan of the landfill, is proposed to be expanded by raising the final landform levels from those currently approved. As such the Project is essentially a vertical expansion of the available airspace within the current landfill footprint. The concept design proposes to construct the final design levels in three stages. Once waste has been placed at the proposed design levels each stage will be capped to minimise leachate generation, windblown litter, potential odour and dust.

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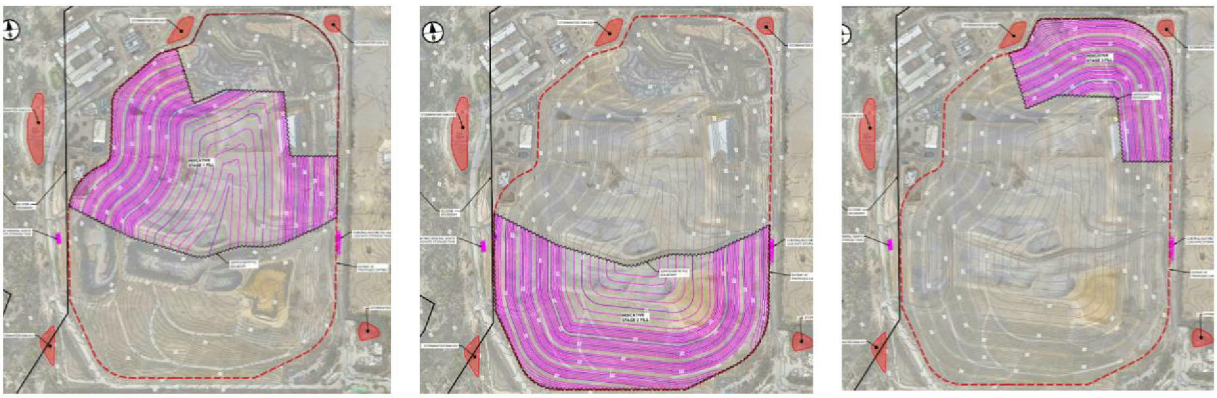


Figure 17.1Layout of landfill stages

To enable the final landform to be raised the cap grading design has adopted a series of batters and benches, which has slopes ranging from approximately 1 in 12 to 1 in 16. The proposed design results in an overall batter slope of approximately 1 in 3.5 (pre settlement) eventually settling to 1 in 4.05 (post settlement). The crest of the proposed cap has slopes of approximately 1 in 20, which is not expected to change substantially throughout the settlement period.

The cross section of the proposed batter slopes is shown on **Figure 17.2** below. The cross section includes batters at a pre-settlement slope of 1 in 3.5 with 10 m wide benches. The benches are graded inwards to a swale drain at the toe of the higher batter thereby controlling stormwater flows to within the drainage system and preventing greater stormwater flows down the steeper batters.

Following waste settlement it is expected that batter slopes will flatten out to approximately 1 in 4.05. Refer **section 17.1.3** for further discussion on waste settlement.

The proposed top platform of the cap reaches a highest level of RL 95 m (95 m AHD).

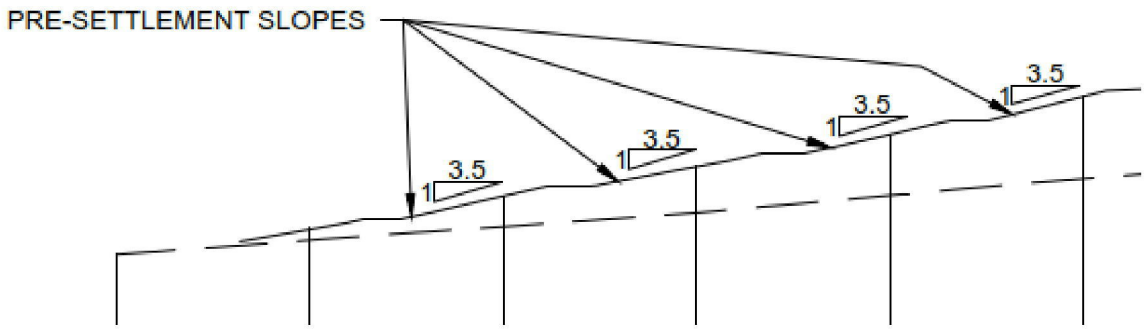


Figure 17.2Typical side slope design

17.1.3 Capping Design

As per EPL 4068 Condition O6.20 – O6.22, the general solid waste (non-putrescible) landfill cell final capping must consist of the following from top to bottom:

- A revegetation layer at least 300 mm thick
- A sealing layer of at least 500 mm of compacted clay or shale having permeability of less than k=1 x 10^{-8} ms^{-1} as described in the NSW EPA Solid Waste Landfill Guidelines
- A seal bearing layer of no less than 300 mm.

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Figure 17.3 and **Figure 17.4** provide the capping profiles adopted for both the general solid waste and restricted solid waste cells. Further information in relation to the interface and extent of the cap profiles is provided in the approved GHD drawings referenced.

The proposed expansion of the landfill does not include a change to the cap design described in the EPL.

As per the Final Capping Layer Design prepared by GHD Pty Ltd, dated November 2006, the final cap design includes a network of gas collection trenches 450 mm by 450 mm consisting of brick/tile fill that is required to exhibit a permeability greater than 5 x 10^{-5} m/s. The gas collection trenches would be located below the seal bearing layer.

The whole extent of waste at the Site will be capped in sections with either the general solid waste or restricted solid waste cap as the waste reaches final levels. At a minimum the final cap would be rehabilitated with grass cover to encourage binding and stabilisation of the soil. Capping of general solid waste cells has already been completed in the southern portion of the Project Area where waste levels have met the currently approved contour design. In these areas it is intended to exhume the capping layers where practicable for later re-use at the proposed design levels.

Figure 17.3 General solid waste cell cap profile (source: GHD drawing 21-27038-C023)

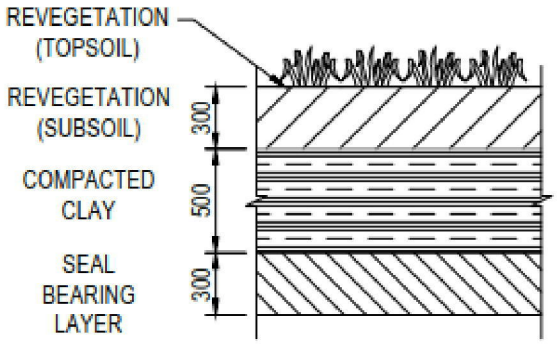
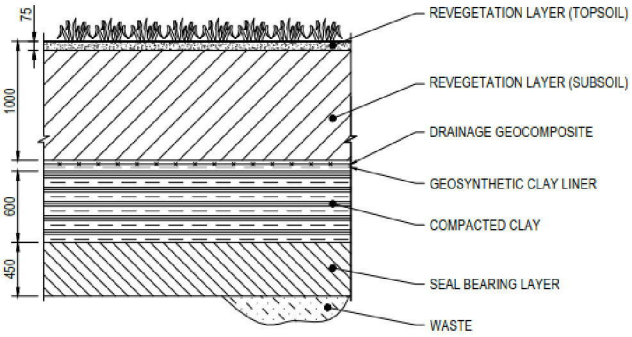


Figure 17.4 Restricted solid waste cell cap profile (source GHD drawing 21-27038-C023)



Management of leachate and landfill gas generated by the Project is discussed below.

17.1.4 Landfill gas management

Gas infrastructure is currently maintained and monitored by a landfill gas contractor to ensure that landfill gases are being effectively managed. Landfill gas monitoring includes surface gas monitoring, subsurface gas monitoring and gas accumulation monitoring of buildings and structures (e.g. service pits and weighbridge hatches).

The gas infrastructure and collection system consists of gas extraction wells, the associated header pipe, a knock-out pot, and blower/flare station and turbine. The Site employs an active gas extraction system, with gas extracted under negative pressure from within the landfill. The active gas extraction system compliments the engineered containment system as it provides advective pressure relief, reducing the risk of a breach in the containment system and reducing upward migration of landfill gas prior to the construction of final capping.

Gas that is extracted from the body of the landfill is transported via a series of wells and polypipes to a gas processing area adjacent to the SAWT. Here the gas is utilised to drive a turbine that generates renewable electricity, which is then used to supply 100% of the electricity supply for the SAWT and with excess being exported to the local grid. Due to limitations on the local grid not all gas can be utilised for electricity generation with the excess being flared directly. Combustion and flaring of this gas allows for the effective destruction of landfill gas, in excess of 98% of NMOC and methane.

The active extraction coupled with a flare allows the effective destruction of landfill gas (in excess of 98% of NMOC and methane).

Landfill gas extraction wells have historically been progressively installed in areas that have been final capped.

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Based on landfill gas modelling undertaken as part of the concept design (refer to **Appendix F**) the Project would increase landfill gas generation would potentially increase by an average of 40% due to additional volume of waste that would be disposed at the landfill. Subject to further detailed modelling during the detailed design, the results indicate that the existing landfill gas capture and management infrastructure would be need to be expanded to accommodate the increase in landfill gas as part of the Project.

Gas extraction wells would continue to be installed progressively in operational areas as gas develops and the landfill develops.

17.1.5 Leachate management

Leachate is generated at the site from water percolating through the landfill body and from the high moisture content of certain disposed wastes. The waste cells are designed for leachate to percolate through the waste, until it reaches the landfill liner and drains to the leachate sump.

To avoid the migration and contamination of leachate to groundwater and surface water, SUEZ has constructed leachate barrier systems during the initial construction of landfill cells. Due to the varying age and quality of leachate barrier systems installed historically, in some locations minor groundwater infiltration is present. All landfill cells are designed to maintain an inward groundwater hydraulic gradient, with groundwater contributing to the total leachate volume albeit in very small quantities.

Surface water drainage infrastructure has been constructed to prevent surface water from adding to leachate reservoirs where feasible.

Leachate is collected via a grid of trapezoidal shaped drains incorporated in the bottom on the cell liner. These drains are filled with porous material and slope to header lines leading to a collection sump within each cell.

Leachate from the GSW cells is removed from the sump and transferred to four on-site storage tanks. Leachate from the RSW cells is kept separate from the GSW leachate and stored in eight on-site storage tanks. From the storage tanks the leachate is then re-circulated in the landfill. Some of the leachate is lost to evaporation and the remainder is retained with the solid waste. Any excess leachate is currently transported off site to a licensed facility for treatment. While re-circulation through refuse cells and ad hoc disposal currently meets leachate generation levels in the short term, as the volume of leachate generated increases, pump and treatment infrastructure will be installed.

Leachate from the Project would be managed in accordance with the leachate management measures of the existing Site which include:

- Regular daily covering and smooth rolling of the cover to allow sheet flow of surface water to collection points from where water is pumped to sediment ponds
- Bunding of the working face to prevent ingress of surface water
- Use of daily and intermediate cover for areas that are not being landfilled
- Proposed progressive capping of the landfilled areas as the final landform is reached to reduce rainfall infiltration
- Use of cell liners in all GSW and RSW cells, the specification of which is agreed with the EPA
- Basal gradients of 1.5% longitudinally and 3% transversely across the final surface of the cell liner to direct leachate towards the leachate collection sumps
- A 300 mm continuous gravel leachate collection layer incorporating a network of HDPE perforated leachate collection pipes
- Recirculation of leachate from the non-putrescible waste cells.

In order to maintain the leachate head on top of the liner to less than 300 mm, and therefore minimise leakage through the basal liner (based on Darcy's Equation), level indicators have been installed within the leachate sumps to monitor the depth of accumulated leachate.

The above leachate collection system has been designed to facilitate the collection and direction of leachate towards the leachate sumps to which submersible pumps and sidewall risers are constructed

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to allow leachate extraction. The sidewall risers also allow for the monitoring and maintenance (flushing) of the leachate collection pipes.

It is noted that the arrangement and minor construction details of the leachate collection layer varies between landfill cells, which reflect changes in best practice design throughout the life of the Site.

As per Section 2.3 of the Landfill Guidelines 2016, a water balance model should be conducted for new landfill cells to estimate the required leachate storage capacity. The concept design (**Appendix F**) includes the results of the Hydrologic Evaluation of Landfill Performance (HELP) model conducted for the Project.

The results of the HELP modelling demonstrate that the Project would not significantly affect the total leachate generation from the final capped landfill area. In both the currently approved final cap design and proposed final cap design models zero leachate was captured within the leachate drainage aggregate layer and therefore there was zero leakage through the basal liner (compacted clay).

Where the intermediate cap is placed on Stage 1, assuming no progressive final capping as the worst case scenario, for the 90th percentile rainfall year (1978) a total of 311 m^3 of leachate would be captured from the leachate drainage aggregate layer. This is within the capacity of the existing on-site leachate tanks. Therefore the Project would continue to be undertaken in accordance with the existing leachate management measures for the Site.

SUEZ are currently using an automated leachate riser pump control system for both General Solid Waste Cells and Restricted Solid Waste Cells. This system is an automated level-control where the leachate level can be monitored remotely and will pump out once it reaches to a certain level as per requirements to ensure that the leachate level will always be maintained low.

17.1.6 Pest control and management

The management of pests and vermin would be conducted in accordance with the LEMP for the Site and the requirements of the '*Site Maintenance – Infrastructure Facilities SOP'*. The purpose of pest and vermin management would be to reduce the impact on amenity to neighbours and the community caused by the attraction of vermin and pests to waste materials.

As per the LEMP the following management measures would be applicable to the Project:

- Security fencing installed around the perimeter of the Site
- Compaction and daily cover of waste materials
- Application of intermediate cover to exposed areas of greater than 90 days
- Pest control contractor engaged monthly
- Rat and mouse baiting (office areas)
- Minimising the active tip area
- Management of revegetated and vegetated areas via contractor
- Revegetation of completed landfill areas.

17.2 Management of Impacts Summary

Table 17.3 includes a summary of the management measures applicable to landfill management not captured under the other chapters of this EIS.

Table 17.3 Environmental management measures – Landfill Management

Impact	Reference	Environmental management measures	Timing
Landfill management	LM1	The Project would be managed in accordance with the existing LEMP for the Site. The LEMP for the Site would be updated to include a description of operations on the expanded landfill	Operation

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Impact	Reference	Environmental management measures	Timing
Landfill gas	LM2	Gas extraction wells would continue to be installed progressively in operational areas as gas is generated and the landfill develops.	Operation
Landfill gas	LM3	During the detailed design of the Project a review of the gas collection infrastructure would be undertaken.	Operation
Leachate	LM4	The Project would be undertaken in accordance with section 5.7 of the LEMP for the Site.	Operation
Pest control	LM5	The Project would be undertaken in accordance with section 5.13 of the LEMP for the Site.	Operation

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[redacted]

Chapter 18

Cumulative impacts

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18.0 Cumulative impact assessment

Executive summary

The area surrounding the Site is subject to significant change due to a number of planned and approved developments associated with the proposed Western Sydney Priority Growth Area. The existing rural land surrounding the site is likely to be rezoned as commercial and industrial as nearby projects such as the Western Sydney Airport, M12 Motorway, Outer Sydney Orbital, North South Rail Link, Elizabeth Drive upgrades and various commercial and industrial projects are completed.

The construction of these projects has the potential to change the magnitude and type of potential environmental impacts as sensitive receivers and the biophysical environment changes around the site. Generally the project itself would not have a significant negative impact on the surrounding environment and community given the large scale of future projects surrounding the site.

Cumulative impacts may arise as a result of the Project occurring concurrently or sequentially with other major activities and/or developments within the area. This chapter outlines a summary of the findings for key issues which require consideration as cumulative impacts. The issues outlined below have been developed from those outlined in topic specific chapters and technical studies undertaken on behalf of the Project.

The cumulative impact assessment has considered:

- cumulative impacts of the Project alongside other activities and/or developments in the area
- cumulative impacts of the Project in the context of the existing landfill operation i.e. extension of duration of landfilling activities.

The Project has been assessed according to existing land uses and sensitive receptors in the surrounding area. However, it is recognised that the area surrounding the Site will be subject to significant change due to a number of planned and approved developments associated with the Western Sydney Airport and Western Sydney Priority Growth Area. The existing rural land surrounding the site is likely to be rezoned for employment purposes as nearby projects such as the Western Sydney Airport, M12 Motorway, Outer Sydney Orbital, North South Rail Link, Elizabeth Drive upgrades and various commercial and industrial projects are completed.

As such this cumulative impact assessment provides an assessment against both current and potential future land use scenarios. Assessment against the current land use scenario is provided based on assessments prepared and presented throughout this EIS. Assessment against future land use scenarios is based upon discussion of future impacts in each technical chapter. In this latter case it has not been possible to predict these impacts with high accuracy, however the information presented is considered to be a reasonable consideration of this scenario.

18.1 Surrounding developments

Searches of the NSW DPE Major Projects Register and Sydney Western City Planning Panel Development and Planning Register were undertaken to determine the presence of major projects within 5 km of the Site having the potential to result in cumulative environmental impacts as shown in **Table 18.1**.

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Table 18.1 Major projects relevant to the cumulative impact assessment

Project	Description	Address	Approximate distance from Site	Status
Western Sydney Airport	Stage 1 consisting of a single 3.7-kilometre runway and facilities for up to 10 million annual passengers.	Badgerys Creek	1.0 km southwest	Under construction (opening 2026)
Twin Creeks residential development and golf and country club	Staged construction of Twins Creek Resort including 165 room hotel and alterations and additions to existing golf and country club.	2-8 Twin Creeks Drive, Luddenham	0.6 km north	Approved 30/05/2018
Resource Recovery Facility	Establish a Resource Recovery Facility for 95,000 tonnes per annum of construction and demolition waste	55 Martin Road, Badgerys Creek	0.9 km south	Approved 17/04/2019
Kemps Creek Warehouse and Logistics Hub	Proposed Warehouse and Logistics Hub, comprising: • Site Area (112 ha) • Bulk Earthworks • Estate Infrastructure • Built Form (165,185 m^2 gross floor area)	657-769 Mamre Road, Kemps Creek	2.8 km northeast	SEARs issued 14/09/2018
M12 Motorway	A new dual-carriageway motorway to connect the M7 Motorway with the Western Sydney Airport and The Northern Road. The motorway will be initially two lanes in each direction, with capacity for an additional future lane in each direction	Between the M7 Motorway, Cecil Hills and The Northern Road, Luddenham	Corridor adjacent to northern boundary of the Site	SEARs issued 30/09/2018
Sydney Science Park	Secondary school (Years 7-12), accommodating approximately 1,140 students within the 'First Community" precinct of Sydney Science Park.	565-609 Luddenham Road, Luddenham	2.4 km northwest	SEARs issued 24/05/2018
Western Sydney Resource Recovery Facility	To construct and operate a resource recovery facility with the capacity to process up to 300,000 tonnes per annum of general solid waste including, construction and demolition waste, VENM, concrete and recovered aggregate	1725 -1743 Elizabeth Drive	Adjacent to the southern boundary of the Site	SEARs issued 19/12/2017
Bulk Recovery Solutions Kemps Creek Resource Recovery Facility	Import, store, process, treat and recover waste materials up to 300,000 tonnes per year.	146-196 Clifton Avenue, Kemps Creek	1.5 km east	Preparing environmental scoping assessment

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Project	Description	Address	Approximate distance from Site	Status
Luddenham Clay and Shale Quarry	Relocate previously approved stockpiling and composting activities from Commonwealth leased land to quarry-owned land.	2440 Elizabeth Drive, Badgerys Creek	2.8 km west	More information required - addendum response to submissions report released October 2017
Badgerys Creek Resource Recovery and Landscaping Facility	The establishment of a resource recovery facility and landscape supplies facility in Badgerys Creek. The operation will accept and process up to 500,000 tonnes per year with no more than 100,000 tonnes stored on site at any given time. Construction will involve the demolition of existing structures, removal of foreign material, construction of the facility and associated components, the installation of processing plant, and associated car parking and landscaping works.	80 Martin Road, Badgerys Creek	1.2 km south	SEARs issued 5/02/2018
Badgerys Creek Quarry and Brickworks (MOD3)	The modification proposes to update the brick making facility by removing and replacing the existing manufacturing equipment, developing a NATA Accredited Advanced Testing Laboratory, constructing and operating a roof manufacturing facility and improving approaches to water management on-site.	235 Martin Rd, Badgerys Creek	2.5 km south	Modification Report (MR) exhibition concluded 16/05/2019. Proponent preparing RTS report
Badgerys Creek Quarry and Brickworks (MOD4)	Modify the Project Approval to permit or allow the following additional development or changes to the approved project: • Dewatering of Pit 1 and the extraction of the remaining clay resource to a depth of 35m below the pre-existing natural surface of the ground; • Importation of VENM to backfill Pit 1 (potentially other pits), to rehabilitate the site; and • The establishment of a grid connected solar farm.	235 Martin Rd, Badgerys Creek	2.5 km south	MR exhibition concluded 16/05/2019. Proponent preparing RTS report

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Project	Description	Address	Approximate distance from Site	Status
Brandown Resource Recovery Facility	The project proposes to optimise existing operations at the site through extending the hours of operation, relocating various existing infrastructure and ancillary structures on the site in addition to proposing new infrastructure and operational activities including a Refuse Derived Fuel (RDF) Production Facility, Mechanical Biological Treatment (MBT) Facility and a Cement Stabilisation Facility.	Lot 90 Elizabeth Dr, Kemps Creek	4.4 km east	SEARs issued 13/02/2019
Community Facility - Place of Public Worship	Development of a Place of Public Worship including Hindu Temple (Mandir), assembly hall, community kitchen and dining hall, monks residence, landscaped areas, internal roads, car parking and associated site works	230-242 Aldington Road, Kemps Creek	3.2 km northeast	Under assessment, registered December 2017

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18.2 Cumulative environmental impacts

18.2.1 Land use

The site is currently surrounded on all boundaries by rural and rural/residential properties. The Project would not alter the Site's existing land use, though it would delay the final capping of the site by approximately five and a half years. This is unlikely to affect the nature of surrounding land uses, some of which have been neighbours of the landfill (and previously a quarry) for over 30 years.

In the future the nature of the surrounding land use is expected to change dramatically. The proposed changes in local land use are now well known and would span the currently approved and proposed extended operation of the Project. During this time the surrounding land uses are likely to be rezoned, moving them away from rural land uses towards a heavily urbanised environment. The immediately surrounding land is likely to be rezoned as commercial and/or industrial, with the exception of the Badgerys Creek corridor, which is likely to remain under some form of environmental protection zoning (albeit potentially increased in size compared to the current E2 zone).

The transition of the surrounding land uses away from rural residential towards commercial and/or industrial will result in a substantial change in the nature of receivers within these areas. Nearby land that is currently sensitive to amenity impacts such as noise, air quality and the visual environment will change dramatically towards receivers that are substantially less sensitive. As such the presence of the active landfill would not alter the ability of the land to be gainfully occupied for industrial and infrastructure purposes.

Furthermore, the presence of an operating landfill is likely to influence the type of businesses that would choose to occupy surrounding lands. Those that may be sensitive to dust, for example, are unlikely to select a site near an active landfill. This self-selection of suitable development would reduce the sensitivity of surrounding land uses therefore effectively avoiding amenity impacts.

Following capping of the landfill the only ongoing amenity impact would be visual. This impact would however be substantially improved from that of the active landfill, and would potentially even be a net positive generally in the context of the likely heavily developed and urbanised future surrounding landscape.

The potential for the Project to contribute to land uses changes alongside the development proposed above is considered to be minimal. Many of these projects, such as the Western Sydney Airport and M12 Motorway, are transformative and would substantially alter the nature of the surrounding land regardless of the Project.

18.2.2 Landscape and visual

The proposed final landform would result in the Site having a different relationship with the surrounding landscape to that currently in place. The Project would change the final landform from a 'rounded hill' to a more engineered landform, including batters slopes and benches. Landscaping in the form of grass coverage would be the same in both scenarios.

In the context of surrounding land uses, the proposed landform would comprise a more visually prominent landscape feature. This would result in a greater impact upon the landscape and visual character of the existing rural and residential area. However, this change, when viewed in the context of the above listed projects, is likely to be negligible given the highly industrialised nature of many of the proposed nearby developments (e.g. Western Sydney Airport and M12 Motorway) and the likely transformative effect these will have on the existing landscape character and visual environment.

Under the future land use scenario, the Site is likely to be surrounded by commercial and industrial land uses, as well as the major infrastructure and commercial development outlined above. In this case the final landform, consisting of a grassed hill, has the potential to serve as valuable green space, providing an overall positive contribution to the area's landscape character and visual environment. As such the future cumulative impact is likely to be negligible to minor positive.

18.2.3 Air quality and odour

It is likely that the earthworks associated with the construction of nearby projects will likely overlap to varying degrees with the Project. This will almost certainly result in cumulative dust impacts with the Project. However, as the spatial and temporal distribution and magnitude of dust emissions from future

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surrounding projects is unknown, assessment of cumulative impacts associated with these projects is not possible. Management of any cumulative dust impacts (taking into account existing emissions from the Project) would need to be considered as part of the assessment and approval process for each of the specific future projects.

Future development around the Site, beyond the projects listed above, is likely to comprise industrial or commercial uses. The sensitivity of these uses to dust impacts would vary according to the type of business or industry. It is expected that dust-sensitive activities or industries would account for the potential for dust generation from the Site when determining where to locate a business and as such it would be expected that these industries would avoid occupying nearby property while the landfill is still active.

The Project is likely to lead to a negligible impact on odour. On this basis there would be no residual odour impact and as such no potential for the Project to contribute cumulatively to existing odour in the area, both currently and under a future land us scenario.

18.2.4 Noise and vibration

The Project is likely to result in negligible to minor noise impacts on nearby sensitive receivers (i.e. rural residential properties). Whilst no quantitative assessment of cumulative noise impact has been undertaken as part of this assessment, it is likely that the physical separation between the Project and other major projects (particularly Western Sydney Airport and the M12 Motorway) would prevent significant cumulative noise impacts.

Vibration associated with the project will be negligible. As such cumulative vibration impacts with other major projects alongside the Project are also likely to be negligible.

Given the expected rezoning of surrounding land for commercial and industrial purposes, it is clear that the future noise environment will change dramatically. Based on the results of modelling undertaken for this assessment, very few, if any, future nearby commercial receivers would be exposed to Project noise levels greater than the 63 dB(A) noise limit for commercial activities outlined in the NPfI. Following opening of Western Sydney Airport in 2026 overflying aircraft is likely to dominate the surrounding noise environment, with noise levels exceeding 100 dB(A) during landings (500m from runway end)[1]. This would likely render any noise emissions from the project irrelevant in the context of the wider noise environment.

18.2.5 Traffic and access

The Traffic and Transport assessment indicates that the Project would not result in any residual impacts upon the operation of Elizabeth Drive. Egress from the Site using the Site Access Road would deteriorate over time, though this would be expected to the alleviated by Roads and Maritime Service's proposed upgrade of Elizabeth Drive.

Construction of the M12 Motorway will provide a parallel route for traffic otherwise travelling on Elizabeth Drive. It is expected therefore that through traffic volumes would decrease as a result of the opening of the M12 Motorway. However, this fall in through traffic on Elizabeth Drive is expected to be accompanied by an increase in freight traffic as future freight demands are expected to grow considerably in the local area, with Elizabeth Drive located within the WSA growth area, and the M12 Motorway expected to unlock development opportunities along Elizabeth Drive.

As outlined above, Roads and Maritime plans to upgrade Elizabeth Drive. This upgrade would seek to address existing capacity issues on the road, as well as to accommodate the expected increase in traffic growth associated with WSA and development of the Aerotropolis precinct generally. However, at this early stage the discrete nature of the upgrade and its impacts upon the road network cannot be included in the cumulative impact assessment due to insufficient information being available. Despite this it can be reasonably assumed that any changes to the road geometry and capacity of Elizabeth Drive (such as lane duplication) would be likely to result in a direct benefit to the performance of the intersection of Elizabeth Drive and the Site Access Road.

[1] https://www.westernsydneyairport.gov.au/files/eis/WSA-EIS-Volume-2a-Chapter-10-Noise-aircraft.pdf

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18.2.6 Social impacts

The social and economic impact assessment considered the significance of the amenity impacts associated with the Project. These were considered to be negligible. Given there would be no discernible residual impact associated with the Project, cumulative amenity impacts would not occur.

Under the future land use scenario most of the surrounding lands would be progressively rezoned into employment precincts (e.g. commercial or industrial zoning). The presence of the Project would not impede this process, and may contribute positively through the provision of a local waste management facility in the short term and through the provision of available open space for further development in the long term. As outlined above the presence of the existing landfill is likely to influence the type of businesses that would choose to occupy surrounding lands during this conversion, which would subsequently work to reduce sensitivity and avoid amenity impacts. As such, the overall socio-economic significance of potential impacts of the project in the context of future developments is considered a medium positive.

18.2.7 Greenhouse gas

The Project would generate a total around 2,300,000 t CO2-e of additional GHG emissions over its life compared with the baseline scenario due to the proposed increase in waste disposal rate to 950,000 tonnes per annum. The annual landfill gas emissions (methane) contribute the highest source of emissions in both scenarios (90% and 92% of the total emissions under the baseline and Project scenario respectively).

The Project scenario would generate an average annual GHG emission rate of around 92,700 t CO2-e per year. This represents 0.02% of the Australian national inventory for the year ending March 2018, and 0.07% of the NSW inventory for 2016.

The above results account for the combustion and flaring of landfill gas within the Site.

18.2.8 Hazard and risk

Bird strike during operation of Western Sydney Airport (currently under construction) presents an ongoing risk during the Project. At present birds are generally restricted to the stormwater ponds located around the periphery of the Site. These ponds will not be increased in area as part of the Project and will continue to manage site stormwater. The development of the surrounding area for commercial and industrial uses would generally reduce available habitat for birds in the wider area. Following capping, the landfill itself would provide limited habitat for birds and is not considered an ongoing risk to the operation of the airport.

18.2.9 Other issues

Table 18.2 Cumulative impacts with other environmental aspects

Environmental aspect	Potential cumulative impacts
Aboriginal and non-Aboriginal heritage	No residual impact on Aboriginal or non-Aboriginal heritage are anticipated as a result of the Project and hence cumulative impacts are not possible.
Biodiversity	The Project would remain as a grassed engineered landform post closure that would provide limited ongoing habitat for certain species. Proposed surrounding commercial and industrial development would likely remove the majority of habitat in the area. Through retaining vegetation the project would generally have a minor positive cumulative impact on biodiversity.
Surface water, flooding and groundwater	While the Project is not expected to result in substantial changes to the existing water quality of surface water runoff into Badgerys Creek during either operation or post closure, the construction and operation of the Western Sydney Airport has the potential to result in changes in water quality within Badgerys Creek. Should a large rainfall event occur, discharges into Badgerys Creek from both projects could result in an adverse impact on this waterway. The implementation of erosion and sediment controls and the ongoing use and management of stormwater dams within the Site would minimise potential cumulative impacts to Badgerys Creek.

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Environmental aspect	Potential cumulative impacts
Soils, geology and contamination	No residual impact on soils, geology or contamination are anticipated as a result of the Project and hence cumulative impacts are not possible.
Litter	No residual impact on litter are anticipated as a result of the Project and hence cumulative impacts are not possible. Litter would continue to be managed in accordance with measures in the LEMP.

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Chapter 19

Environmental management

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19.0 Environmental management

This chapter outlines how the potential environmental impacts of the Project would be mitigated, managed and monitored during the Project and following completion (final capping).

19.1 Management plans

Measures to address the potential impacts of the Project are provided in each of the technical chapters in this EIS and are summarised below. These measures would be detailed, as relevant, within management plans including:

- A Landfill Environmental Management Plan (LEMP) would detail the environmental controls, mitigating measures, contingency plans and monitoring program during the Project. The LEMP would include specific management strategies for:
  - Landfill gas
  - Leachate
  - Water
  - Air and dust
  - Odour
  - Litter
  - Noise
  - Pests and vermin
  - Vegetation.
- A Traffic Management Plan
- A Post-Closure Plan which would detail the environmental controls, mitigating measures, contingency plans and monitoring programs for the Project Area following completion of final capping.

19.2 Summary

Table 19.1 provides a summary of the proposed mitigation and management measures that would be implemented during the Project, and which would be incorporated into the LEMP and PCEMP as required.

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Table 19.1 Summary of mitigation and management measures

Reference	Mitigation and management measures	Timing
Landscape and visual		
LV01	Gas extraction piping will be buried prior to capping and final landscaping works of the completed landfill	Operation
LV02	Final capping will allow for augmentation of the landfill cap at a later time to facilitate a landscape feature, or suitable for a range of alternative uses	Post Completion
LV03	A mix of native grasses and associated ground layer species will be used in lieu of pasture species for: • Habitat supportive of the adjoining Badgerys Creek riparian corridor • Specific habitat deterrent in support of the Western Sydney Airport precinct and its operations • Visual interest and seasonal colour • A medium to long term low maintenance outcome once established.	Operation / Post Completion
LV04	The Badgerys Creek riparian corridor will be maintained, protected and enhance to safeguard visual and landscape buffers to the Project	Post Completion
LV05	A landscape management plan will be prepared for the establishment and long-term management of the proposed landfill	Post Completion
LV06	Existing screening vegetation around the perimeter of the Site will be maintained and augmented as per the landscape plan.	Operation / Post Completion
Air quality		
AQ1	The haul road along the eastern boundary of the Site will be sealed to the point where trucks move westward onto the landfill itself	Operation
AQ2	Unsealed haul roads will be watered down when conditions are dry and/or when dust lift-off is visible	Operation
AQ3	Areas of intermediate cover and non-active landfilling will be revegetated with grass cover as soon as practicable	Operation
AQ4	All trucks entering and leaving the Site will have loads covered. Empty trucks are not required to be covered	Operation
AQ5	Areas of active landfilling will be watered down when dust is visibly blown by strong winds towards surrounding receptors	Operation
AQ6	The sealed haul road will be watered down or swept if high dust loads are tracked-out from the unsealed areas and dust lift-off becomes visible from the sealed road	Operation
AQ7	Plant and equipment will be maintained according to manufacturer's specifications to reduce the potential for abnormal exhaust particulate emissions	Operation

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Reference	Mitigation and management measures	Timing
AQ8	Diesel particulate filters will be in good working order where fitted to plant and equipment	Operation
AQ9	Staff will be trained in proper use of all equipment from a dust-minimisation perspective	Operation
AQ10	A register will be maintained for all dust-related complaints received from nearby residents. All complaints will be investigated and further mitigation applied as required	Operation
AQ11	On days of high background PM_{10} or $PM_{2.5}$, dust-generating activities will be reduced or ceased as required. Alternatively, additional mitigation will be applied to ensure no visible dust is produced onsite. This will be outlined in the LEMP	Operation
AQ12	All waste delivery trucks will have their loads covered when entering site	Operation
AQ13	RSW material will be covered as soon as practicable upon deposition	Operation
AQ14	LFG extraction and combustion/flaring will be maintained	Operation
Noise		
NV1	A noise mitigation action plan will be implemented which will outline strategies for additional noise management and mitigation measures. This will be included in the LEMP.	Construction/ Operation
NV2	Noise protection berms will be included in the design of the proposed interim landform	Construction/ Operation
Social and economic		
SE1	The LEMP will be implemented to manage amenity impacts associated with ongoing operations at the Site	Operation
SE2	The existing community engagement program for the Site will continue under the Project. This will include meeting with community representatives at times agreed with the community and no more than on a biannual basis	Operation
SE3	Complaints received from the community will continue to be accepted, monitored and acted upon	Operation
SE4	Local people, services and materials will be prioritised as far as practical, including for final capping activities	Operation / Post Completion
SE5	Consultation with PCC or other individuals regarding beneficial ongoing use of the final capped Site will be undertaken as needed. Consultation will be guided by the need to manage off-site impacts, particularly regarding local amenity and impacts upon aviation	Post Completion

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Reference	Mitigation and management measures	Timing
Greenhouse gas		
GG1	The fuel efficiency of plant/equipment will be assessed prior to selection and, where practical, use equipment with the highest fuel efficiency or equipment which uses lower GHG intensive fuel such as biofuels will be used(e.g. biodiesel, ethanol).	Operation
GG2	Plant/equipment and transport vehicles wil be maintained to reduce energy efficiency losses associated with damaged/poorly maintained equipment	Operation
GG3	Landfill activities will be planned to avoid the double handling of materials and unnecessary fuel use, where possible	Operation
GG4	Purchasing policies that favour electrically efficient equipment will be implemented. The use of renewable energy will be considered to reduce the quantity of electricity purchased from the grid	Operation
GG5	The existing landfill gas collection system will be maintained to collect and combust landfill gas and to supply power to the SAWT facility and the external grid	Operation
GG6	Annual GHG emissions for the Site will continue to be quantitatively measured, recorded and reported in accordance with the NGER Act	Operation
GG7	A closure plan will be developed in accordance with the requirements of the POEO Act 1997, the requirements of the Site EPL and any other relevant consent conditions. The closure plan will outline the key landfill closure activities and document the proposed landform, capping detail, leachate and gas management and monitoring protocols to be adopted for the landfill closure process. The closure plan will be prepared in consultation with the NSW EPA and all landfill closure works will be carried out in accordance with the final approved closure plan.	Operation (at least 12 months prior to the last load of waste being landfilled)
Hazards and risk		
HR01	Dangerous Goods will be transported to site and stored in accordance with the Australian Dangerous Goods Code. Appropriate safe work procedures will also be implemented for the safe handling of the Dangerous Goods, including spill prevention and clean up requirements. Any smaller quantities of Dangerous Goods (aerosols, paints, cleaners etc.) that may be used on site are to be stored and used in accordance with the Australian Dangerous Goods Code, including appropriate labelling, separation where necessary and disposal	Operation
HR02	The existing 10 metre asset protection zone (APZ) along the northern, eastern and southern perimeter and 25 metre APZ along the western perimeter will be maintained throughout the extended life of the landfill	Operation
HR03	The Kemps Creek Resource Recovery Park Emergency Response Plan will be updated to include appropriate triggers and responses to a bush fire event onsite. The plan will include the cessation of hot works on any predicted 'catastrophic' fire danger weather days or when a total fire ban has been declared (unless and exemption has been obtained from the Commissioner of the NSW RFS)	Operation

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Reference	Mitigation and management measures	Timing
HR04	Litter arising from the site will be minimised by the progressive use of cover over the active fill areas and by the provision of measures such as fences and berms around the area being landfilled. During the normal operation of the landfill, the size of the working face will be minimised to as small an area as practicable. Litter pickers will patrol the site periodically to recover any litter blown off the active landfill	Operation
HR05	An automatic wheel washing facility will be maintained for all vehicles prior to leaving the landfill site to prevent tracking of material onto the Site Access Road. A street sweeper to be utilised for the purpose cleaning out tracked muds on the approach road especially during wet weather conditions	Operation
HR06	The following protocols will be implemented during operation: • During dry weather, potential dust nuisance will be controlled by regular wetting down of unsealed haul roads and manoeuvring areas • The Project will use well-maintained machinery manufactured to appropriate design specifications • All vehicles will be required to adhere to site sign posted speed limits • Storage stockpiles and boundary vegetation will be managed to provide acoustic shielding • All vehicles will be operated as per the hours of operations specified in the EPL • Subsurface gas wells around perimeter of site will be maintained. Surface gas emission monitoring will continue to detect high areas of gas leaks (possible improvement areas) • Gas infrastructure will be installed according to design specification for adequate collection of landfill gas • All leachate collection systems will be monitored for ongoing operation • All handling and transport of leachate will be carried out in a manner to prevent spills. Workers to be trained on the landfill leachate management SOP • Waste will be covered as soon as practical upon deposition in the landfill • Odour associated with the landfill will be monitored on a daily basis during operating hours • Stormwater management will be implemented as outlined in the LEMP and elsewhere in this EIS.	Operation
Other issues (heritage, biodiversity, surface water, flooding and groundwater, soils, geology and contamination and litter)		
HE01	An unexpected finds procedure will be developed and included in the LEMP. This will outline the procedures to follow if unexpected Aboriginal or non-Aboriginal heritage items were discovered during operation of the Project	Operation
BD01	Relevant workers will be provided an environmental induction prior to commencing work on site. This will include information on the ecological values of the Site and its surrounds, protection measures to be implemented to protect biodiversity and penalties for breaches	Operation
BD02	No remnant native vegetation will be cleared as part of the Project	Operation

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Reference	Mitigation and management measures	Timing
BD03	Existing control measures will be maintained to limit the spread of weeds downstream of the Site. This includes sediment control devices, such as silt fences. Weed management will be undertaken during the landfilling and post-capping phases of the project. This will include the management and disposal of the weeds discovered within the footprint, including the priority weeds in accordance with the *Biosecurity Act 2015*.	Operation
BD04	Prior to final capping, a vegetation management plan will be prepared for implementation on the final cap. This plan will address measures for managing vegetation in and around the full Site, including; • maintenance of the integrity and structure all native perimeter vegetation and native riparian vegetation along Badgerys Creek, particularly mature trees • management of the cap with view to discouraging congregations of birds • management and suppression of priority and environmental weeds throughout the site • procedures in the event that vegetation clearing is required for unexpected maintenance purposes, including revegetation and rehabilitation.	Operation
BD05	Stormwater and sediment management measures will be implemented as outlined in the LEMP and elsewhere in this EIS to minimise transfer of sediments into adjacent waterways and vegetated areas.	Operation
WT01	The LEMP will be updated to include measures to manage potential surface water impacts of the proposed expansion including: • Continued use of existing measures in place to minimise demand for potable water, including reuse of water captured in surface water basins for dust suppression • Where possible, minimising exposed areas over which sediment may be collected through maintenance of both natural and artificial ground cover such as grass or geofabrics and daily cover of landfill areas with tarps. • Capturing of the majority of sediment-laden runoff as close as possible to the point of generation through the maintenance of stormwater management devices • Appropriate management of vehicle movements to minimise generation and transport of sediment • Appropriate management of material stockpiles including locating them as far from drainage lines as feasible • Continuation of surface water monitoring as prescribed in the EPL • Progressive revegetation of capped areas • Design and maintain surface water basins and stormwater management infrastructure to minimise discharge of water containing sediment or other contaminants • Design of erosion and sediment control devices in accordance with the requirements of the ‘the Blue Book’ Volume 1 (Landcom, 2005) and Volume 2b (DECC, 2008). Erosion and sediment controls will be subject to ongoing maintenance and inspections.	Operation

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Reference	Mitigation and management measures	Timing
WT02	A groundwater monitoring system will be implemented and described in the LEMP to monitor changes in leachate associated with the expanded landfill. This may include one or more of the following: • Ongoing assessment of leachate volumes and generation rates and updating of the landfill Hydrologic Evaluation of Landfill Performance (HELP) model that compares expected infiltration volumes against collected leachate volumes • Characterisation and monitoring of leachate levels in leachate collection wells for changes to water levels • Implementation of an improved collection system if discrepancies are found in the existing water balance and/or overall changes in leachate levels and volumes are observed, and taking into account groundwater quality data.	Operation
WT03	Leachate management will occur until such time as the leachate volume/quality monitoring confirms that ongoing risk to groundwater is consistent with approval requirements. Ongoing leachate management requirements following landfill closure will be incorporated into the Post-Closure Environmental Management Plan.	Closure
WT04	Ongoing monitoring of groundwater wells will occur as required by licence conditions.	Operation / Post Closure
CT01	Stockpiles will not exceed RL 105 (i.e. 10 metres above the final landform). Long term stockpiles will be stabilised using vegetation or approved stabilisation methods where required.	Operation
CT02	Regular site inspections will be undertaken along the site boundaries to monitor and identify any significant dust sources	Operation
CT03	Refuelling of plant and equipment will continue to be managed through measures outlined in the LEMP including: • The refuelling area and workshop will be bunded with chemicals stored in a covered storage area • Accidental spills will be immediately cleaned up • The EPA will be notified immediately of any reportable environmental incident including spills or other unexpected releases.	Operation
CT04	The Post-Closure Plan will be implemented until the residual impact of the landfill meets relevant approval requirements and will include: • A stormwater monitoring and maintenance plan prepared in accordance with the requirements of the ‘the Blue Book’ Volume 1 (Landcom, 2005) and Volume 2b (DECC, 2008). This plan will detail requirements such as inspection locations, inspection frequencies, maintenance and corrective actions • The maintenance of erosion and sediment control measures until the site is stabilised through revegetation • Ongoing maintenance of leachate management infrastructure to minimise the potential for surface water and groundwater pollution by leachate. This includes maintaining the integrity of the final capping profile and final surface/stormwater drainage works • A gas monitoring and maintenance program for the landfill gas extraction system and adjacent landfill gas to energy system. This will include inspection locations, inspection frequencies and corrective actions.	Closure

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Reference	Mitigation and management measures	Timing
LT01	A suite of prevention, mitigation and rectification measures for litter will be detailed in the LEMP. These measures will be implemented as required during the ongoing operation of the expanded landfill operation. Key measures outlined in the LEMP will include: • On windy days, the use of a portable litter screen downwind of the working face to contain loose paper and other windblown refuse which might otherwise escape prior to the daily cover or tarp being applied • Litter 'pickers' will patrol the landfill workface area and boundaries, recovering escaped litter materials, as required • Daily cover of exposed active landfill areas with tarps • Operations will cease in unsafe (strong) wind conditions.	Operation

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Chapter 20

Revised conditions of consent

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20.0 Revised conditions of consent

The earliest record of development consent at the Elizabeth Drive Landfill was in response to an EIS prepared in 1989 for 'the continued operation and backfilling of the Badgerys Creek quarry'. This consent (DA 451/89) was issued by Penrith City Council on 22 October 1990. Since this time various consents and modifications have been awarded to cover a variety of activities and developments within the Site, not all of which directly relate to the Project.

This chapter provides a review of how this existing consent may be affected by the Project. The intention of this review is to outline how SUEZ proposes to operate the Site in a compliant manner.

20.1 Existing consents

The Site's primary existing consent (DA08/0958) was most recently issued by Penrith City Council on 9 November 2009. This existing consent includes the original conditions from 1990, as well as updates arising from several modification between 1992 and 2009. The consent also includes notes outlining where and how various redundant conditions have been removed or superseded.

The existing consent covers the entirety of the Site, as outlined in **Figure 20.1**. This includes:

- the western fringe of the site that was rezoned by Council to 'E2 Environmental Conservation' around 2010
- the SAWT facility which is subject to an additional, separate consent (06_0185) granted on 15 April 2008. Part of this facility is within the E2-zoned land.

The main over the Site was granted prior to the establishment of the E2 zone and continues as an existing use. The consent for the SAWT was granted after the establishment of the E2 zone, though was permissible by virtue of section 4.38 of the EP&A Act, which allows consent to be granted for State Significant Development (SSD) that is partially prohibited.

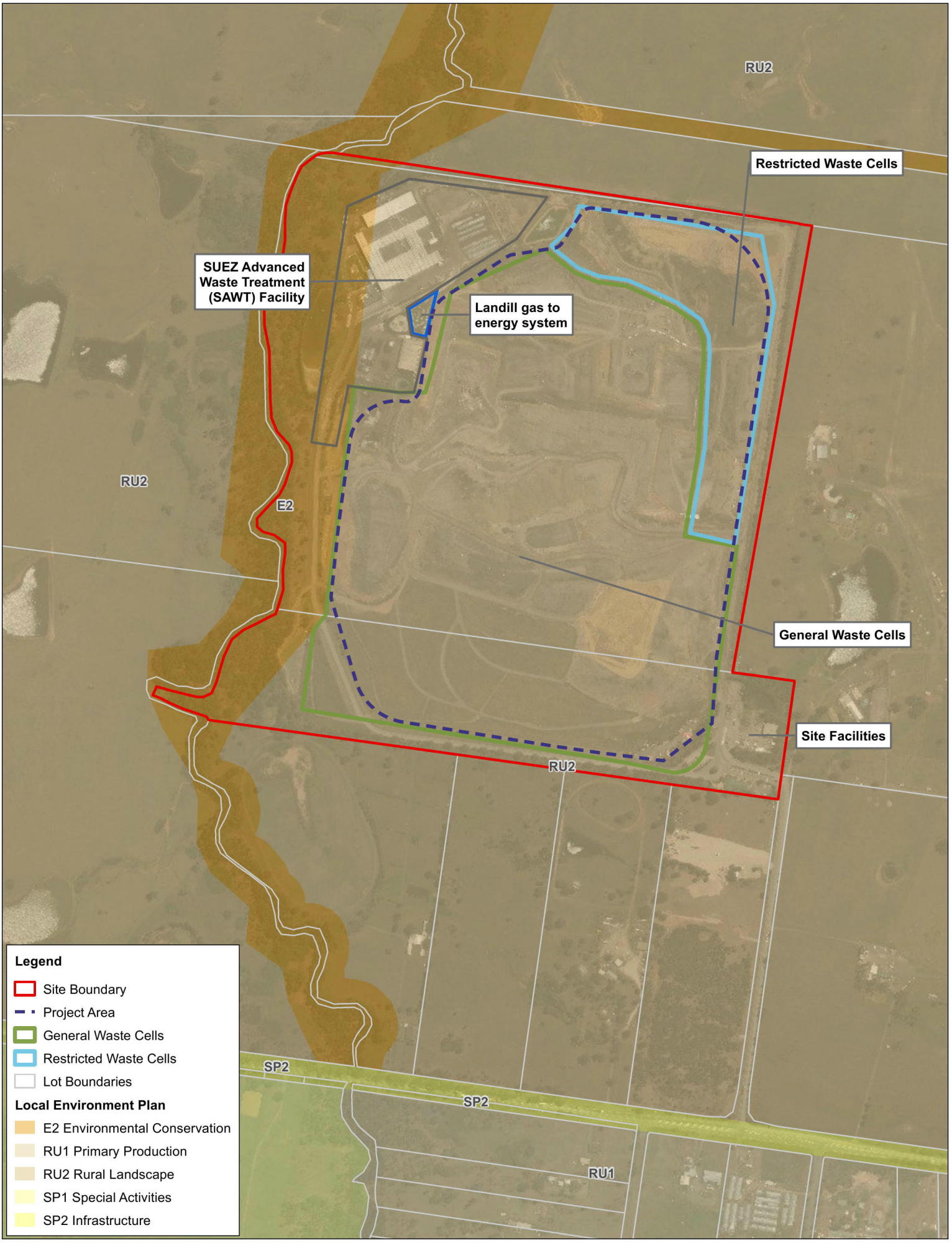
20.2 The Project

The Project does not enjoy the benefit section 4.38 of the EP&A Act as it is designated development and not SSD. For this reason all works proposed as part of the Project are restricted to RU2-zoned land only. Existing waste management activities such as landfilling and associated activities located within the E2-zoned land will continue as an existing use under DA08/0958.

As such, the review below has been prepared with view to managing Project activities within the main body of the landfill that is zoned RU2. The conditions of consent provided for DA08/0958 (9 November 2009) were reviewed based on the outcomes of the assessments within this EIS to determine their relevance to the continued operation of the Elizabeth Drive Landfill.

Table 20.1 identifies which conditions are relevant to the Elizabeth Drive Landfill and provides a reason for proposed updates and changes.

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SUEZ ELIZABETH DRIVE LANDFILL

FIGURE 20.1: SITE LAYOUT AND ZONING

AECOM

suez

0 50 100 200 m

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Disclaimer Spatial data used under licence from Land and Property Management Authority, NSW © 2018. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DATE	10/07/2019
SCALE	1:8,000
PROJECT	60571292
DRAWN	CP

20.3 Conditions

The conditions of consent of DA 08/0958 have been reviewed for their ongoing relevance to the Project (**Table 20.1**). The following formatting has been applied:

- Text proposed to be deleted has been indicated by ~~strikethrough~~ text
- New text proposed to be added has been indicated by **bold** text
- All text that is not bold or strikethrough is unchanged from the original conditions of consent.

Where relevant comment has been provided to outline justifications or reasons for the proposed change.

Table 20.1 Consolidated conditions of consent

Condition No	Condition	Comment
Definitions	In respect of the development consent. the following definitions apply: "The Applicant" means ~~Camide Pty Ltd~~ **SUEZ Recycling and Recovery Pty Ltd** "The Operator" means ~~Camide Pty Ltd~~ **SUEZ Recycling and Recovery Pty Ltd** or its duly authorised contractor. "The Council" means Penrith City Council and includes any Officer of the Council authorised to inspect the site and/or monitor compliance with conditions of consent. "The Consent" means the consent of Council for use of the lands defined hereunder for extractive industry and disposal of non-putrescible solid wastes through landfilling followed by progressive site rehabilitation. "The Lands" means Lot 1 D.P. 542395 and Part Lot 74 D.P. 752022 ~~Parish of Claremont County of Cumberland shown on Plan 1.2 of the Environmental impact Statement which accompanied Development Application Number D.25050/13602 DA.2.~~ "the Plans" means the site plans and cross-sectional drawings forming part of the application, or the plans as amended or prepared for the purposes of this consent. ~~"Non-Putrescible Solid Waste" means landfill material as defined by the Waste Management Authority and in summary, means natural excavated material, demolition material and inert manufacturing by-products. It does not include waste containing organic matter which is liable to putrefaction (rapid degradation by micro-~~	Updated to be consistent with existing owner/operator, current legislation and the current development application

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Condition No	Condition	Comment
	~~organisms), e.g. materials containing food, offal, dead animals, etc. generated by restaurants, food manufacturers or processors, butchers, abattoirs, fish shops or litter bins, etc.~~ **"Non-putrescible solid waste" has the same meaning as "General solid waste (non-putrescible)" as outlined in the Waste Classification Guidelines Part 1: Classifying waste (EPA, 2014)** "Stockpile" means any heap, mound, stack, or other accumulation and "stockpiling" has a corresponding meaning. "Rehabilitation" relates to any excavated areas, or other disturbed areas and can include: a. replacing soil, clay, overburden and residues into excavated (and/or areas backfilled with non-putrescible **solid** wastes) to produce land surfaces consistent with ~~the detailed site management plan approved by Council that~~ **those outlined in the Elizabeth Drive Landfill Expansion Environmental Impact Statement dated [Day] [Month] 2019.** b. spreading of topsoil on final surfaces to a depth of at least 10cm and revegetating with grass and tree species as ~~shown on the detailed site management plan approved by Council~~ **outlined in the Elizabeth Drive Landfill Expansion Environmental Impact Statement dated [Day] [Month] 2019.** "The Site Access Road" means the road from Elizabeth Drive to the site entrance ~~and marked on Plan No. 1.2 of the Environmental Impact Statement which accompanied the application.~~ "The Occupier" means the applicant or the person, firm or corporation in apparent occupation of the land from time to time. "Plant" means all buildings, machinery, tools, equipment, accessories, articles and materials which have been put on the land by the applicant or operators for the extraction, landfilling and land rehabilitation operations.	

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Condition No	Condition	Comment
	"Works", "worked" means and includes any and every opening, excavation and operation associated with the extraction of material, the backfilling operation and the rehabilitation and maintenance phases. Excepting the definitions above, all words and expressions will have the meanings assigned in the Local Government Act ~~1919~~ **1993**, (as amended), the Environmental Planning and Assessment Act 1979 ~~(as amended), interim Development Order No. 93, the draft Local Environmental Plan for Rural Lands, Sydney Regional Environmental Plan Nos. 9 & 20 (Extractive industry and Hawkesbury Nepean River)~~, **Environmental Planning and Assessment Regulation 2000, Penrith Local Environment Plan 2010**.	
General		
1	This consent relates to the extraction of clay, shale sandstone and laminate, crushing of sandstone and laminate and progressive site rehabilitation by backfilling quarried areas with ~~solid,~~ non-putrescible **solid** waste to a vegetated landscape~~, capable of supporting grazing~~ and achieving a ~~final compatible in its appearance an physical character with the surrounding landscape~~ **landform as outlined in the Elizabeth Drive Landfill Expansion Environmental Impact Statement dated [Day] [Month] 2019.** It is approved subject to **the** conditions ~~1 to 84~~ detailed below. ~~except where varied by the requirements of the Landfill Environmental Management Plan dated 1 January 1998 defined in EPA Licence No 004585 dated 11 October 2001 as approved by Council in the modification of this consent. Subsequent Landfill Environmental Management Plans are not approved by this consent.~~ ~~*As amended under Section 96 of the Environmental Planning and Assessment Act 1979 by modification to DA45/89 dated 16 November 2001*~~	Updated to reflect current DA
~~2~~	~~It is the applicant's responsibility to advise Council's Environmental Planning Department prior to the commencement of operations. The site will be inspected to ensure that all essential preliminary development works have been completed.~~	No longer relevant to operations on Site
~~3~~	~~It is the applicant's responsibility to arrange inspections with, and obtain the necessary approvals from, Council's Health and Building Department as required.~~	No longer relevant to operations on Site
4	All alterations to services and city facilities necessitated by the development shall be the responsibility of the applicant, including all costs for such alterations or works.	

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Condition No	Condition	Comment
5	This consent shall lapse if the development to which it refers is not commenced within two years after the date of the consent. However, Council may grant an extension of the consent beyond that period if good cause is shown in a written application requesting an extension of time.	
6	Development is to take place as specified within the Environmental Impact Statement prepared on behalf of the applicant by ~~R W Corkery and Planners North Pty Ltd~~ **AECOM Australia Pty Ltd** and submitted to Council as part of the development application on Council's file ~~D25050/13602 DA2~~ **[DA number]** ~~except where amended or altered by these conditions or the Landfill Environmental Management Plan dated 1 January 1998 defined in EPA Licence No 004068 dated 11 October 2003 as approved by Council in the modification of this consent or drawing no.21/17412/C005, dated 08.05.08 prepared by GHD and entitled "Proposed Landfill Contours Increase of Depth of Fill over DA Contours" consent~~ or as directed otherwise by Council from time to time. ~~*As amended under Section 96 of the Environmental Planning and Assessment Act 1979 by modification to DA45/89 dated 16 November 2001.*~~ ~~*As amended on the 9th November 2009 under Section 96 of the Environmental Planning and Assessment Act 1979.*~~	
6a	The proposal is to operate in accordance with the **environment protection** license issued by ~~the Department of Environment, Climate Change and Water~~ **NSW Environment Protection Authority** at all times	Updated to new reflect nomenclature.
~~6b~~	~~Construction of a timber fence on top of the existing earth bund along the southern boundary in accordance with the plan stamped and approved with the section 96 application. The fence height is to be either 1.8m or 2.0m following discussions with the adjoining property owner to the south. The fence is to be constructed within 2 months from the date of the approved granted for the section 96 application.~~	Removed as works were previously completed.
~~6c~~	~~Suitable landscaping is to be planted along the southern side of the bund wall along the southern property boundary in the vicinity of the timber fence required by the above condition. The species are to be similar to the other planting undertaken on the northern side of the bund wall. The landscaping is to be maintained at all times and any plantings that die are to be replaced.~~	Removed as works were previously completed.

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Condition No	Condition	Comment
~~6d~~	~~The landfill operation adjacent to Lot 1 DP 240718, 1783 Elizabeth Drive. Badgerys Creek should be completed within 12 months from the date of this modification. The area will then be capped in accordance with the modification consent and the Landfill Environmental Management Plan.~~ ~~*As amended on the 9th November 2009 under Section 96 of the Environmental Planning and Assessment Act 1979.*~~	Removed as works were previously completed.
7	Council staff or agents at Council may enter the site at all reasonable times to inspect the works and rehabilitation and any other operational aspects as necessary.	
8	The applicant is to provide, or arrange provision of any information required by, or on behalf of Council in relation to the compliance or otherwise with any of the Conditions. Information should be furnished within 2 weeks of any request except as agreed otherwise by Council.	
9	The applicant shalt indemnify and keep indemnified the Council from and against all damages, claims, demands, proceedings, costs and expenses which arise from any aspect of the operation.	
10	The applicant is to provide an annual report to Council in relation to the compliance or otherwise with any of the Conditions. This report will also indicate the response of the applicant and/or operator to emergencies, accidents, etc.	
Statutory Requirements		
11	The applicant shall meet the requirements of all public authorities having statutory responsibilities in respect of the proposed development.	
Other Approvals	**~~Department of Environment Climate Change and Water~~ NSW Environment Protection Authority**	
~~12~~	~~Prior to the commencement of any works forming part of, or preparatory to, the development, the applicant shall obtain and furnish copies of all statutory approvals required under the Clean Waters Act 1970, Noise Control Act 1975 and State Pollution Control Act, 1970, to Council.~~	Separate approvals no longer required
~~13~~	~~In the absence of requiring scheduling under the Clean Air Act 1961, the applicant must comply with Conditions 29, 30 and 69 imposed by Council for controlling air pollution.~~	Clean Air Act 1961 no longer exists.

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Condition No	Condition	Comment
14	The applicant shall comply with the requirements of the ~~Department of Environment Climate Change and Water~~ **NSW Environment Protection Authority** as detailed in ~~Conditions 11, 14, 15, 31, 33, 35, 36, 39-41, 51-58, 60-69 and 72-74 in this~~ consent **the site's Environment Protection Licence 4068**. ~~Any breach of the Conditions of Approval as specified by the Department Environment of Climate Change and Water shall give cause for the revocation of this approval.~~	All relevant requirements now captured in EPL
~~15~~	~~The Department of Environment Climate Change and Water has the right to impose any additional control or treatment measures as may, in its opinion, become necessary upon the site of operation.~~ ~~*As amended under Section 96 of the Environmental Planning and Assessment Act 1979 by modification to DA45/89 dated 16 November 2001.*~~	The EPA retains the power to regulate the Site via the EPL
Transportation Matters		
~~16~~	~~The intersection of the proposed site access road and Elizabeth Drive is to be upgraded to provide right turn deceleration and acceleration lanes from just west of Lawson Road to east of Martin Road, to the satisfaction of the Roads and Traffic Authority (and in accordance with the amended plan of Project Planning Associates Pty Ltd – marked Plan 1 and attached to this consent). All land is to be dedicated public road, and all costs associated with this work are to be borne by the applicant.~~	Removed as works completed.
17	The **site** access road to the site from Elizabeth Drive ~~is to be sealed to 7.4m in width and 320mm thick, with 2m shoulders on either side to at least the site entrance. This~~ is to be maintained to Council's satisfaction by the operator for the life of the project, including final removal of stockpiled resources after landfilling is complete. **This commitment will cease in the event that the Site Access Road is redesigned, diverted or otherwise upgraded by or on behalf of any road authority, or ceases to be under the ownership of Penrith City Council.**	Removed part relating to completed works
18	The applicant is to ensure that the access road and Elizabeth Drive are kept clean ~~and dust free~~. Any costs incurred by public authorities, in cleaning activities resulting from the development, will be reimbursed by the applicant. **This commitment will cease in the event that the Site Access Road is redesigned, diverted or**	Requirement to be dust free is impractical

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	otherwise upgraded by or on behalf of any road authority, or ceases to be under the ownership of Penrith City Council.	
19	A truck washing bay is to be provided near the site exit. Trucks, including wheels, are to be washed prior to leaving the site to ensure that mud or excess dust is not carried from the site at any time.	
20	The applicant is to ensure that all table and mitre drains on the access road are maintained in a stable, vegetated condition.	
21	~~On the western boundary extraction will only occur up to the western boundaries of cells B1, B7, B8, B9 and B10 shown on Plan No.2.1 contained in the Environmental Impact Statement except where carried by the provisions of the Landfill Environmental Management Plan dated 1 January 1998 defined in EPA Licence No 004585 dated 11 October 2000 as approved by Council in the modification for this consent.~~ The applicant is to ~~establish~~ maintain vegetative screening of the operation around all boundaries except the common boundary of lots 1 and 74 ~~immediately extraction recommences~~. *As amended under Section 96 of the Environmental Planning and Assessment Act 1979 by modification to DA45/89 dated 16 November 2001.*	Extraction activities are ceasing in 2019/2020 Vegetation has been established and would be maintained
22	Buildings, works, plant and parking areas must be erected, constructed, placed or sited further than 30m from any main or ~~County Road~~ **classified road** and further than 15m from the **site** access road, public place or public reserve.	
23	Any roads within the development which are within 300m of any residential buildings will be properly graded and sealed.	
24	Total vehicle movements are not to exceed 780 per day.	
~~25~~	~~Weight and loading of heavy vehicles is to be to the satisfaction of the Roads and Traffic Authority.~~	Not relevant to current operations
~~26~~	~~Material won from the site and waste transported to the site will be transported from the site with vehicles restricted to Elizabeth Drive, The Northern Road. Mamre Road, the F4 Freeway and the site access road, within the Penrith City area. If the destination is within the Penrith City area and not next to one of the above roads, then the vehicles may use appropriate other roads but only where shortest route on the other roads is utilized.~~	SUEZ has no direct control over the origin or destination of customer vehicles; Extraction and transportation of extracted material are ceasing in 2019/2020

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Condition No	Condition	Comment
~~27~~	~~*Deleted by modification to consent DA45/89 dated 19th October 1999*~~	Previously deleted
~~28~~	~~*Deleted by modification to consent DA45/89 dated 19th October 1999*~~	Previously deleted
Air Pollution Control		
29	All unsealed roads on or serving the development shalt be dampened by a water cart to ~~prevent~~ reduce dust generation. The water cart shall be available for on-site use at all times.	
30	Radiator fan backwash and engine exhaust gases from all mobile equipment on the premises will be directed away from the ground.	
Extraction/ Landfill/ Rehabilitation Operations and Monitoring		
General		
~~31~~	~~Extraction and waste disposal shall be undertaken in accordance with the provisions of the Landfill Environmental Management Plan dated 1 January 1998 defined in EPA licence No 004585 dated 11 October 2000 as approved by Council in the modification of this consent. The LEMP shall address the following matters:~~ ~~i. Specifications for all proposed erosion and sediment control and water quality maintenance works. including batters, flumes and contour banks, sediment traps, leachate controls;~~ ~~ii. specific details on the progressive rehabilitation programme and final levels of fill and landforming, which are outlined briefly in the Environmental Impact Statement;~~ ~~iii. any other landscape architectural details.~~ ~~This plan is also to be submitted to the Department of Land and Water Conservation. This part of Landfill Environmental Management Plan is to be considered and approved by Council. Approval will be established by written confirmation being provided to the applicant. The Landfill Environmental Management Plan will require annual review in the form of a report that will be submitted to the NSW Environment Protection Authority and Council. The report shall include a plan from a registered surveyor showing the volumes of voids, the quantity of waste placed in those voids, and progressive earthworks/rehabilitation works to date.~~	Detail captured in condition 1 above

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Condition No	Condition	Comment
	~~*As amended under Section 96 of the Environmental Planning and Assessment Act 1979 by modification to DA45/89 dated 16 November 2001.*~~	
32	Extraction of materials from the site is to be monitored. The monitoring will identify the type of material that has been extracted and its destination either within the site (as cover material, etc) or off the site. Materials will be classified as: • light firing clay • dark firing clay • light firing shale In conjunction with the annual review of the **landfill environment** management plan an audited report is required to be **provided to the NSW Environment Protection Authority** indicating the total amounts of each type of material extracted and their destinations. Light firing clay/shales are to be made available only to brick making companies and in addition are not to be used as cover material or restoration material.	Updated to clarify obligations to the EPA under the Site's EPL
33	Six monthly meetings will be held with Council, **NSW Environment Protection Authority** ~~the Waste Management Authority, the State Pollution Control Commission, Soil Conservation Service, Roads and Traffic Authority,~~ **Roads and Maritime Services,** ~~Council,~~ selected resident representatives ~~from adjoining owners~~, the applicant and the operator to monitor the development and assist in resolving any problems which may occur from time to time. This group will be known as the monitoring committee.	Updated to reflect current government agencies
~~34~~	~~A buffer zone is to be retained between the western boundary of extraction/waste disposal activities and Badgerys Creek. In the 25m immediately east of Badgerys Creek (Area 1 - as shown on Figure 2.1 attached to this consent), activities other than tree planting or general improvement of amenity are to be excluded. From the eastern edge of Area 1 to the proposed western boundary of the quarry (Area 2 - as shown on Figure 2.1 attached to this consent), endemic vegetation is to be planted. The only other activities permissible in Area 2 are placement of monitoring holes, sampling activities, sedimentation dams and necessary access tracks. The buffer zone is to be separated from the extraction/waste disposal area by fencing as per condition 35.~~	Removed as this consent does not affect any land adjacent to Badgerys Creek

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Condition No	Condition	Comment
35	The site is to be fenced with industrial chainwire fencing with 3 strands of barbed wire at the top, to a minimum height at 1.8m with gates of similar construction. ~~In the western portion of the site, the fencing is to be placed along the western margin of the extraction/waste/disposal area to provide separation of the buffer zone defined in condition 34. Gates may be positioned to provide access to the buffer zone. In addition, temporary wire netting fences at least 1.8m high are to be erected around any area being used currently for waste disposal to assist in controlling windblown material.~~ All fences and gates are to be maintained in good condition.	Removed as this consent does not affect any land adjacent to Badgerys Creek
36	The applicant is to undertake or arrange for litter patrols (and collection where necessary) on a fortnightly basis.	
~~37~~	~~Extraction will not take place within 50 metres of any Main Road Reserve or within 15 metres of the access road or any boundary of the lands other than the common boundary of Lots 1 and 74, excepting the western boundary defined by Badgerys Creek, which is subject to the provisions of Condition 34.~~	Extraction activities are ceasing in 2019
Operating Hours		
~~38~~	~~*Deleted by Modification to Consent 451/89 dated 22nd September 1999*~~	Previously deleted
38a	~~i. Quarrying activities and waste compaction are to be confined within the hours at 7.00am to 6.00pm Monday to Friday, 7.00am to 5.00pm Saturdays, and 8.00am to 5.00pm Sundays and Public Holidays.~~ ~~ii. Waste receipt is to be confined to the hours at 6.00am to 6.00pm Mondays to Fridays, 7.00am to 5.00pm Saturdays, and 8.00am to 5.00pm Sundays and Public Holidays.~~ ~~iii. Waste receipts in the period 6.00am to 7.00am Monday to Friday shall not exceed 15 vehicles.~~ ~~iv. Maintenance and other site activities can occur outside the nominated hours provided that they do not create a noise problem.~~ **The Site shall be operated in accordance with the hours of operation outlined in Environment Protection Licence 4068.**	Updated to maintain constancy with the Site's EPL
38b	The applicant shall ~~obtain the necessary approvals from~~ **maintain the Site's Environment Protection Licence (4068) as issued by** the NSW Environment Protection Authority (EPA)	

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Condition No	Condition	Comment
38c	The **following** noise control measures ~~recommended in acoustic report No 94152, revision B, prepared by Wilkinson Murray Pty Ltd and dated June 1998,~~ shall be implemented to control noise emissions~~. These are~~: • Establishment of a 60km/hr speed limit along the **site** access road from Elizabeth Drive • Establishment of a 30km/hr speed limit along internal haul roads • ~~Construction of noise bunds as part of the capping skirt along the eastern boundary of the site and adjacent to haul roads. Such bunds will be in accordance with figure 5, 6a and 6b attached to acoustic report no. 94152.~~ **Maintenance of the existing noise bund along the eastern boundary of the site to a height of 2 metres**	The original noise report could not be located. A height of 2 metres for the eastern perimeter bund has been adopted.
38d	The noise bund ~~being~~ constructed along the eastern side boundary shall incorporate a catch drain to ensure that surface runoff is contained on the site.	
~~38e~~	~~"noise problem" Refer to in condition 38a (iv) shall be interpreted to mean Offensive Noise as defined by the Protection of the Environmental Operations Act.~~	No longer relevant to the condition
~~38f~~	~~"Other site activities" Refer to in condition 38a (iv) shall be interpreted to mean other maintenance related activities.~~ ~~*As amended under Section 96 of the Environmental Planning and Assessment Act 1979 by modification to DA45/89 dated 22 September 1999.*~~	No longer relevant to the condition
Extraction and Operational Matters		
Water Management		
39	~~Prior to recommence of extraction, structures to divert clean water (including stormwater and seepage) around the site are to be in place. Such structures shall be designed and placed in accordance with the provisions of the Landfill Environmental Management Plan dated 1 January 1998 defined in EPA licence. Prior to recommencement of extraction~~ **S**tructures to divert clean water (including stormwater and seepage) around the site are to be ~~in place~~ **maintained according to the provisions of the Landfill Environmental Management Plan dated 1 January 1998 defined in EPA licence No 004585 dated 11 October 2000**. ~~A comprehensive plan of these works is to be submitted for approval by Council, the Waste~~	Updated for clarity and to reflect the provisions of the Site's EPL

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Condition No	Condition	Comment
	~~Management Authority, Soil Conservation Service and the State Pollution Control Commission.~~ ~~*As amended under Section 96 of the Environmental Planning and Assessment Act 1979 by modification to DA45/89 dated 16 November 2001.*~~	
40	~~Any pipeline installed for the purpose of complying with the above condition that adjoins or passes through the fill is to be constructed at special strength reinforced concrete pressure pipes with rubber ring joints. The whole of the pipeline is to be surrounded with compacted clay 1.8m in thickness to prevent infiltration of contaminated seepage from fill areas.~~	No longer relevant
41	~~Approval of the Waste Management Authority is to be obtained prior to the siting and construction of the truck washing bay. Wastes discharged from that area are to be disposed of~~ **managed** ~~in accordance with Section Three of the Authority's standard conditions of Approval: Effluent Discharge Treatment.~~ ~~"The occupier of the depot shall comply with the provisions of the Clean Waters Act, 1970, and regulations made thereunder, together with any other relevant act and regulations."~~	Covered in condition below
42	Runoff, including that from truck wash-down facilities (and sediment) from within the extraction area, ~~will not be discharged from the site~~ is to be managed in accordance with **the Site's Environment Protection Licence.**	Updated to reflect existing operations and legislation
43	All water needed for dust suppression, irrigation, fire fighting, etc. will be collected from runoff from the site or sources satisfactory to Council. Sufficient water must be available for these purposes. Water is not to be pumped from or discharged into Badgery's Creek.	
44	Surface waters and groundwaters are to be ~~monitored on a regular basis at a frequency and for parameters determined by the Council~~ **managed and monitored according to the Site's Environment Protection Licence**. ~~The results of this monitoring are to be presented to the monitoring committee.~~ **Compliance with the Environment Protection Licence shall be undertaken by the NSW Environment Protection Authority.**	Updated according to existing management of pollution on the Site. Removed reference to monitoring committee which does not exist

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Condition No	Condition	Comment
	Should any exceedance of the pollution criteria in the EPL be identified the NSW Environment Protection Authority are to be notified immediately. ~~Random sampling will be carried out by either Council or the State Pollution Control Commission. The applicant will bear the costs of having these samples tested. Should there be any evidence that leachate is approaching the creek then all leachates should be passed through a waste water treatment plant to ensure that any discharge will comply with the requirements of the Clean Water Act, 1970.~~ ~~If the applicant's sampling identifies contamination of surface waters. and/or formation of leachates, and/or migration of leachates Council and the State Pollution Control Commission are to be notified immediately.~~	
Archaeological Monitoring		
~~45~~	~~Archaeological site monitoring is to continue throughout all excavation phases and if any archaeological deposits are revealed, work in that particular area is to cease and the National Parks and Wildlife Service and Council are to be notified immediately.~~	Extraction activities are ceasing in 2019
Topsoil Management		
46	~~Prior to extraction (or other land disturbance), topsoil is to be stripped to depths recommended in Appendix 2 of the Soil Survey Report accompanying the Environmental Impact Statement prepared by Veness and Associates. Topsoil stripping will only extend west to the boundaries of cells B2, B7, B8, B9 and B10, shown on plan no. 2.1 contained in the Environmental Impact Statement.~~ Topsoil should be stockpiled separately from subsoil. Stockpiles should be placed at least 10m from drainage lines and along the contour it possible.	Topsoil excavation has been completed
47	Batters on topsoil stockpiles are not to exceed 3:1 (horizontal: vertical)	
48	If topsoil is not to be replaced within six months, stockpiles should be protected from erosion with cover crops such as oats, triticale, barley, ryecorn, Japanese millet or other suitable species.	
49	Topsoil should be spread to a depth of at least 10cm over backfilled and landformed areas.	

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Condition No	Condition	Comment
Rehabilitation		
50	~~Final landforming over backfilled areas is to provide a landform that is compatible in its appearance with the surrounding landform and in accordance with the provisions of the Landfill Environmental Management Plan dated 1st January 1998 defined in EPA licence no. 004585 dated 11th October 2000 as approved by Council in the modification of this consent. This part of Landfill Environment Management Plan is to be considered and approved by Council. Approval will be established by written confirmation being provided to the applicant.~~ ~~*As amended on the 16th November 2001 under Section 96 of the Environmental Planning and Assessment Act 1979.*~~ **The final landform of the Project is to be generally consistent with that outlined in the Elizabeth Drive Landfill Expansion Environmental Impact Statement dated [Day] [Month] 2019.**	
51	Revegetation of backfilled areas is to commence at least within six weeks of final landforming and topsoiling of each stage. Indigenous plant and tree species should be used in revegetation as much as possible, complemented by use of shallow rooted, high transpiration rate grasses ~~and trees~~.	Planting trees on the cap would endanger its integrity. All Capping and revegetation works would be as per the approved capping design in the EPL.
~~52~~	~~The finished surface shall have a minimum slope of 5% in accordance with the provisions of the Landfill Environmental Management planning dated 1st January 1998 defined in the EPA licence no. 004585 dated 11th October 2000 as approved by Council in the modification of this consent.~~ ~~*As amended on the 16th November 2001 under Section 96 of the Environmental Planning and Assessment Act 1979.*~~	Superseded by EPA guidance and condition 50 above
Waste Disposal		
53	Only non-putrescible solid wastes, as defined by the ~~Department Environment Climate Change and Water (and summarised in Section A under "Definitions")~~ **Waste Classification Guidelines Part 1: Classifying waste (EPA, 2014)** are to be accepted for disposal on the site.	Updated to reflect existing guidance

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Condition No	Condition	Comment
54	The depot operator is to ~~provide the Department Environment Climate Change and Water with analysis of all waste materials to be deposited, for approval by the Authority~~ **report on the volume and type of waste materials accepted as per the requirements of the Site's Environment Protection Licence.**	Updated to reflect operations under the EPL
55	All aspects of the operation are to comply with the **Site's Environment Protection Licence.** ~~requirements of the Department of Environment Climate Change and Water as detailed hereunder:~~ ~~a. Dusty materials are not to be disposed of on-site, except if water sprays are operated for dust suppression or if the dusty materials are in permanently sealed containers.~~ ~~The disposal of wastes shall be limited to persons engaged in the commercial disposal of non-putrescible industrial waste.~~	Updated to reflect operations under the EPL
~~56~~	~~The Department Environment Climate Change and Water are to be satisfied with the standard of earthworks which are required to be in place prior to the commencement of depot operations.~~	No longer relevant to the current stage of operations
57	The operator is to ensure that all depot users, particularly those servicing premises which may generate putrescible wastes, are aware of their obligations. This shall entail inspection of the contents of all vehicles wishing to use the depot either at the depot entrance or at the tipping face. If any wastes other than those permitted by the conditions are discharged at the site (for any reason) the operator is responsible to ensure their immediate removal to an approved depot for disposal, in accordance with directions from the ~~Waste Management Authority~~ **NSW Environment Protection Authority**	
58	The depot occupier shall comply with all requirements of the ~~Waste Management Authority~~ **NSW Environment Protection Authority** in regard to sampling and recording of vehicles and quantities of waste entering the depot. (These requirements to be conveyed separately by the Authority.)	
59	No wastes transported to the site entrance-by the general public shall be disposed of on the lands. This includes materials/wastes transported in or by conventional sedan and station wagon passenger vehicles driven by persons not engaged in commercial waste disposal.	

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60	All filled material is to be deposited in layers to a maximum compacted depth of 1.8m and be completely covered on completion of the tipping operations each day with a minimum of 150mm of earth or other material deemed suitable by the ~~Waste Management Authority~~ **NSW Environment Protection Authority**.	
61	The capping layer shall be designed and implemented in accordance with the ~~provisions of the Landfill Environmental Management Plan dated 1st January 1998 defined in EPA licence no 004585 dated 11th October 2000 as approved by Council in the modification of this consent.~~ **the approved capping design in the Site's Environmental Protection Licence**. ~~*As amended on the 16th November 2001 under Section 96 of the Environmental Planning and Assessment Act 1979.*~~	
62	Approved plant and equipment is to be kept operational full-time at the reclamation site for the purpose of compacting and covering the deposited material.	
63	All deposited refuse is to be contained to the working area and the face kept to a maximum at 40m in length.	
Safety Considerations		
64	Adequate water supply and fire fighting equipment are to be provided close to the working face. Prompt action to extinguish tires should be undertaken if required.	
65	A stockpile of at least 1000 tonnes of excavated material (not topsoil) is to be maintained on-site for use as emergency cover throughout the life of the depot.	
66	The placement ~~and awarding~~ of internal and external signs shall be subject to the prior approval of the ~~Waste Management Authority~~ **NSW Environment Protection Authority** and Council. All signs are to be maintained in good order by the applicant or operator.	
67	The whole of the site operations are to be under the control of a Site Manager whose duties will include: a. Presence at the site at all times whilst the depot is open. b. Control of all employees working on the site. c. Control of all persons on the site. The implementation or oversight of the conditions of this approval.	

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Condition No	Condition	Comment
68	All access gates are to be kept fully attended whilst the depot is operating and locked when the depot is not operating.	
69	Burning of combustible material is not to be permitted on the site.	
70	Smoking is to be prohibited at the working face and in proximity to any fuel storage and equipment maintenance facilities.	
Recycling		
71	A recycling facility is to be provided in a designated area away from the working face. Recyclable materials are required to be removed on a regular basis so as to ensure sufficient space is available at all times. The recycling facility is also to have capacity for materials that can be reused.	
Health Matters		
72	Insect (fly, cockroach), bird and rodent and other infestations are to be prevented. The measures used for this are not to cause water pollution. Prior to use. insecticides and pesticides proposed for use on-site will be approved of by the ~~Waste Management Authority~~ **NSW Environment Protection Authority**.	
73	Adequate amenities are to be provided for the staff and shall include fly-proof dining area, toilets ~~and washrooms and meet the requirements of the Department of Industrial Relations and Employment and appropriate award~~.	Department no longer exists
74	Offensive odours shall not be created. The operator will notify the ~~Waste Management Authority~~ **NSW Environment Protection Authority** ~~and Council immediately~~ **as part of periodic EPL reporting**, if any complaints are received.	
Noise		
75	The operation ~~is not to cause an increase in the background L90 noise level of more than 5 db(A) at the nearest residence~~ **should generally comply with the noise limits outlined in the Site's Environment Protection Licence**.	L90 is not an appropriate measure for noise impact

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Condition No	Condition	Comment
Performance Bond		
76	~~The applicant is to lodge a performance bond with Council before commencing any works on the land. The bond can be a bank draft drawn in favour of Councillor a sum deposited in cash. The amount required for the bond will be reviewed annually and based upon the cost of rehabilitation of the number of hectares expected to be filled and rehabilitated year, as outlined in the management plan (condition 31).~~ ~~Calculation of the performance bond is based on the net annual commitment of the applicant in addition to an indexed maintenance levy over the whole project life which increases as backfilling and rehabilitation increases. In the first instance the bond will be calculated to cover rehabilitation of the total land area subject to extraction or other degradation already, as determined by surveyor, other accurate means, as well as any other areas to be disturbed for extraction and backfilling in the first twelve months. Each year thereafter, the applicant is required to provide Council with an estimate of the subject area for backfilling and rehabilitation over the next twelve months. Council will determine the annual amount required for the bond in regard to rehabilitation and maintenance costs per hectare (ie. plant hire rates, seed, fertilizer and maintenance), indexed to the CPI. The 1990-1991 requirement per hectare will be $27,000. The annual review at the bond will entail inspection of works undertaken towards the end of each twelve month period by Council officers, and calculation of bond requirements for the area subject to backfilling and rehabilitation over the next twelve months. Where works on completed areas are satisfactory (ie. there is compliance with all relevant conditions and the management plan) the amount of that bond less a maintenance bond applicable for the life of the project can be rolled over (or refunded where appropriate) to comprise part or all of the bond for work intended over the next twelve months. Where works are not considered satisfactory the bond for the relevant area of land will be retained without provision for 'rolling over' to new areas.~~	In accordance with EPL, a financial assurance, in favour of EPA, in the amount of $1,250,000 must be maintained during the operation of the facility and thereafter until such time as the EPA is satisfied that the premises is environmentally secure. This assurance must be replenished to the full amount should the EPA have reason to call up the assurance, or part thereof, to correct environmental problems which have not been remedied by the occupier upon being given notice to do so. SUEZ confirms that it has lodged the full amount of this bond with the EPA.

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Condition No	Condition	Comment
	~~This will apply whenever it is Council's opinion that conditions have not been complied with, or duly performed or observed at any time. In these cases, Council will notify the applicant in writing indicating the subject conditions and compliance within a specified time period. If noncompliance or only partial compliance with the subject conditions remains evident after 28 days, Council will evaluate whether credit should be given if some works have been undertaken (ie. if reshaping has been done but not topsoiling~~ ~~and revegetation, credit will be given for the cost of reshaping) and then use the bond as it sees fit to undertake remedial or other works as required. The maintenance bond retained is to be $1,500 per hectare at 1990-91 rates. indexed to the CPI annually. This will be retained to the end of the project lite and used for re-cultivation, re-seeding, fertilizing or any other works to ensure full compliance with conditions if required.~~ ~~Whenever the annual review of the performance bond reveals that an increase in the amount required, Council will notify the applicant of the amount. The applicant is to deposit this sum within 28 days of the notice.~~	
77	~~Council is at liberty to use the performance bond monies as required when default of one or more of the conditions is evident.~~	See above comment.
78	~~All plant is to be removed from the land within two months of completion of final rehabilitation, unless Council agrees otherwise.~~ **Upon completion of final rehabilitation** the site is to be left in a clean and tidy condition and tree from debris, to the satisfaction and approval of Council.	The SAWT may continue operation beyond the closure of the landfill operations
79	Monitoring of the site will continue after removal of plant until the site is considered to be stable and safe by Council and ~~Government authorities~~ **the NSW Environment Protection Authority**. Whatever is necessary to make the site stable and safe will be the responsibility of the applicant. ~~These conditions have been imposed tor the following reasons:~~ ~~1. To ensure compliance with the terms of the relevant Planning Instruments Interim Development Order No. 93, Sydney Regional Environmental Plan No.9, Sydney Regional Environmental Plan No. 20 and State Environmental Planning Policy No. 11.~~	The reasons for this condition are unnecessary

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	~~2. To ensure that appropriate environmental protection measures are incorporated.~~ ~~3. To ensure that effective monitoring procedures are incorporated.~~ ~~4. To ensure that adequate road and road maintenance works are provided.~~ ~~5. To ensure that requirements relating to Health & Building matters will be met.~~ ~~Notice is hereby given of the right of appeal against the decision of Council pursuant to the Environmental Planning and Assessment Act, 1979.~~ ~~The granting of the above application does not relieve the Applicant of the obligation to obtain any other approval required under the Local Government Act, 1919, or any other Act and Ordinances under such Acts.~~	
~~80~~	~~The mini transfer area is not to take the place of the recycled materials area as set out in condition 71.~~ ~~*Added by Modification to DA451/89 dated 28 February 1992.*~~	No longer relevant to existing operations
~~81~~	~~The operator is to provide Council with a three monthly report on the types and amounts of recycled materials that have been collected at the depot.~~ ~~*Added by Modification to DA451/89 dated 28 February 1992.*~~	No longer relevant to existing operations
~~82~~	~~Prior to any blasting activities on site occurring, all necessary licences from the Environmental Protection Authority shall be obtained.~~ ~~*Added by Modification to DA451/89 dated 27 October 1993.*~~	No longer relevant to existing operations
~~83~~	~~Monitoring of all blasting activity and compliance with the Environment Protection Authority regulation shall be undertaken throughout the blasting process. Reports shall be submitted to Council after the initial and subsequent blast indicating compliance with the Environment Protection Authority requirements as well as residents responses to the blasting activity.~~ ~~*Added by Modification to DA451/89 dated 27 October 1993.*~~	No longer relevant to existing operations
~~84~~	~~Council reserves the right to terminate this consent if, following the conclusion of the second blast. the performance criteria of the consent have been achieved.~~	No longer relevant to existing operations

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Condition No	Condition	Comment
	~~*Added by Modification to DA451/89 dated 27 October 1993.*~~	

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Chapter 21

Justification and conclusion

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21.0 Justification and conclusion

21.1 Introduction

This chapter provides and evaluation of the proposed modification works and the outcomes of this EIS, including a justification for proceeding with the Project. This chapter also provides:

- An environmental risk assessment (ERA)
- An assessment of the modification works against the principles of Ecologically Sustainable Development (ESD)
- A description of the benefits of the Project
- Consideration of the consistency of the Project with the objects of the EP&A Act
- The justification for the Project.

21.2 Environmental risk assessment

The following ERA provides an analysis of the environmental risks that have been identified and outlined as part of this EIS.

An initial qualitative environmental scoping exercise was completed in **Chapter 7**. This exercise identified the key environmental issues for the Project, described them and categorised them according to their risk of resulting in a significant impact.

The assessment has confirmed that for the potential environmental impacts associated with the Project, application of the proposed mitigation measures for those impacts significantly reduces their potential significance.

The analysis categorised levels of risk for a given event based on the outcome of impacts (consequences) and the manageability of those impacts (likelihood). The measures of likelihood categories and the measures of consequences categories as well as the risk ranking matrix are detailed in **Table 21.1**, **Table 21.2** and **Table 21.3** below.

Table 21.1 Measures of Probability Categories for the ERA

Rank	Likelihood	Description
A	Almost Certain	Happens often and is expected to occur
B	Likely	Could easily happen and would probably occur
C	Possible	Could happen and has occurred elsewhere
D	Unlikely	Unlikely to happen but may occur
E	Rare	Could happen, but only in extreme circumstances

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Table 21.2 Measures of Consequence Categories for the ERA

Rank	Consequence	Description
1	Extreme	Permanent and catastrophic impacts on the environment; large impact area; reportable incident to external agency; large fines and prosecution; operational constraints; substantial community concern.
2	Major	Permanent and detrimental impacts on the environment; large impact area; reportable incident to external agency; may result in large fines and prosecution; operational constraints; high level of community concern.
3	Moderate	Substantial temporary or minor long term detrimental impacts on the environment; moderate impact area; reportable incident to external agency; action required by reportable agency; community interested.
4	Minor	Minor detrimental impacts on the environment; small impact area; reportable incident internally; no operational constraints; some local community interest.
5	Low	Nil or temporary impacts on the environment; small or isolated impact area; not reportable incident; no operational constraints; uncontroversial project no community interest.

Table 21.3 Risk Matrix used for ERA

		Consequences				
		1 Extreme	2 Major	3 Moderate	4 Minor	5 Low
Likelihood	A (Almost Certain)	VH	VH	H	H	M
	B (Likely)	VH	H	H	M	M
	C (Possible)	H	H	M	M	L
	D (Unlikely)	H	M	M	L	L
	E (Rare)	H	M	L	L	L

Risk Matrix is defined as follows: VH = Very High, H = High, M = Medium and L = Low.

In accordance with the conditions of EPL 4068, the Site maintains an Emergency Response Plan (ERP) (PLANS003.2.7 - ERP Kemps Creek Resource Recovery Park). This ERP documents procedures to deal with incidents that occur or may be associated with activities that occur within the Site which have the potential to cause environmental harm. The ERP is accessible at the Site at all times. Emergency events identified on the ERP that is likely to cause harm to environment include the following;

- Fire on Site
- Fire – green waste/mulch/compost/landfill surface
- Fire underground landfill
- Fire in received loads
- Suspicious objects or substances
- Bomb threat
- Explosion
- Leachate spill
- Toxic air emission
- Utility damage

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- Gas leak
- Earthquake
- Flood
- Lightning storm/strike
- Severe storm
- Emergency on adjacent/neighbouring property

In addition, the Site maintains a Pollution Incident Response Plan (PIRMP) in compliance to Part 153A of the POEO Act. The documents include reporting and management procedures for pollution incidents identified in the ERP, including:

- Natural disaster – Earthquake/Storm/Flood/windstorm
- Chemical Spill
- Chemical/diesel storage tank failure
- Used oil storage tank failure/damage/spill
- Bunding structural failure
- Leachate structural failure
- Leachate Dam Overflow
- Leachate Tanks Overflow
- Liquid tanker failure (Leachate)
- Liquid Tanker Failure (Diesel)
- Fire within waste
- Fire in or on Landfill
- Compost Fire
- Failure of septic system
- Spontaneous combustion – landfill gas/refining product

Immediate actions to be taken in the event of a pollution incident are in accordance to the POEO Act and the Response Procedures detailed in the Site ERP relevant to the type of pollution incident which has occurred. Following the initial response to a pollution incident, actions would be taken to combat any harm caused to the environment as a result of the incident. All actions taken would be in collaboration with the relevant authorities and where applicable SUEZ would engage qualified and experienced persons to assist in any required clean-up and mitigation activities.

Taking into account the location and nature of the Project, the mitigation measures described in **Chapters 8** to **16**, the Cumulative Impact Assessment in **Chapter 18** and the commitments provided in **Chapter 19**, **Table 21.4** provides an assessment of the mitigated and unmitigated risks associated with the Project. This has been completed for each potential environmental impact identified in **Chapter 7** based on the likelihood of occurrence and potential environmental consequence.

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Table 21.4 Environmental risk analysis

Notes: PL: Potential Likelihood; PC: Potential Consequence; RL: Residual Likelihood; RC: Residual Consequence

Environmental aspect	Potential impacts based on unmitigated inherent risk	PL	PC	Potential risk before mitigation	Actions/proposed mitigation measures	RL	RC	Residual risk post mitigation
Land use (Chapter 8)	Ground settlement resulting in risks to structural integrity making the placement of any substantial permanent structures not possible	A	5	M	CT06	A	5	M
	Restrictions on the type of activities and/or structures, equipment or vegetation based on the need to maintain integrity of the final cap and/or proximity to the OLS of the Western Sydney Airport	C	4	M	SE5	D	4	L
	Exposure to aircraft noise preventing usage for public open space	B	3	H	SE5	B	4	M
Landscape and visual (Chapter 9)	Impact to landscape character of surrounding areas due to increased height bulk and scale of final landform	B	3	H	LV02, LV03, LV04	C	4	M
	Visual impacts to individual receivers due to an increase to the zone of theoretical visibility	B	3	H	LV01, LV03, LV04, LV05	C	4	M
Air quality (Chapter 10)	The Project resulting in decreased air quality due to particulate matter at surrounding sensitive receivers through increased landfilling activities	D	5	L	AQ1, AQ2, AQ3, AQ4, AQ5, AQ6, AQ7, AQ8, AQ9, AQ10, AQ11, AQ12	E	5	L
	Odour from landfill gas, leachate spills and uncovered waste resulting in negative human health or environmental outcomes	E	3	L	HR10	E	4	L
Noise and vibration (Chapter 11)	Increase in noise levels associated with an increased final landform height	D	4	L	NV1, NV2, NV3	E	4	L
	Excessive noise generation leading to hearing defects	E	4	L	HR07	E	4	L

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Environmental aspect	Potential impacts based on unmitigated inherent risk	PL	PC	Potential risk before mitigation	Actions/proposed mitigation measures	RL	RC	Residual risk post mitigation
Traffic, transport and access (Chapter 12)	Decreased intersection performance of Elizabeth Drive and the Site Access Road resulting in wait times and reduction in road safety due to additional trucks accessing the Site for an increased duration	B	3	H	TT1	C	3	M
Social and economic (Chapter 13)	Reduction of amenity in the surrounding community as a result of traffic, noise, air quality and visual impacts	D	3	M	SE1	D	4	L
	The Project negatively impacting on the surrounding communities values and/or cohesion	E	4	L	SE2, SE3	E	5	L
	Economic benefits of the Project not benefiting the local community	E	3	M	SE4	E	4	L
	The Project resulting in a change in land use of the surrounding area	E	4	L	SE5	E	5	L
Greenhouse gas (Chapter 14)	Increased GHG emissions due to combustion of fuel from equipment and use of electricity occurring over a longer duration	C	4	M	GG1, GG2, GG4	D	5	L
	Landfill gas emissions during operation and post-closure resulting in GHG impacts	C	4	M	GG3, GG4, GG5, GG6	D	5	L
Hazards and risk (Chapter 15)	Workers unintentionally encountering or spilling dangerous goods on Site resulting in negative human health or environmental outcomes	D	3	M	HR01	E	4	L
	Fire originating at the Site resulting in bush fire migrating off Site resulting in property damage and potential loss of life	D	3	M	HR02, HR03	E	3	L
	Inhalation of dusts causing short term discomfort, eyes and throat irritation and breathlessness	C	3	M	HR06	D	4	L

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Environmental aspect	Potential impacts based on unmitigated inherent risk	PL	PC	Potential risk before mitigation	Actions/proposed mitigation measures	RL	RC	Residual risk post mitigation
	Potential to attract bird species within the vicinity of Western Sydney Airport affecting the safe operation of the airport for commercial aviation activities	E	2	M	HR04, BD06	E	3	L
Heritage (Section 16.1)	Ongoing operation of the landfill potentially uncovering previously unidentified items of Aboriginal or Non-Aboriginal significance	E	5	L	HE01	E	5	L
Biodiversity (Section 16.2)	Removal of ecological value of the Badgerys Creek riparian corridor	E	2	M	BD01, BD02, BD04, BD05	E	4	L
	Ongoing operation of the Site and grassing of the final cap resulting in the opportunity for weeds to establish on the Site	D	4	L	BD03	E	4	L
	Potential to attract bird species within the vicinity of Western Sydney Airport affecting the safe operation of the airport for commercial aviation activities	E	2	M	HR04, BD06	E	3	L
Surface water, flooding and groundwater (Section 16.3)	Ongoing operation of the Project resulting in unintentional contamination of groundwater through infiltration of leachate and contaminated surface water	D	3	M	WT02, WT03, WT04	E	4	L
	Additional landfill height resulting in increased velocity of surface water runoff increasing erosion and sedimentation in Badgerys Creek	C	3	M	WT01	D	4	L
Soils, geology and contamination (Section 16.4)	Landfill workers coming into contact with contaminated material or a unintended release of contaminated material to the surrounding environment	D	3	M	CT01, CT02, CT03, CT04. CT05	E	4	L
	Sediment tracking offsite leading to complaints and noncompliance to EPL 4068 condition	D	4	L	HR05	E	4	L

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Environmental aspect	Potential impacts based on unmitigated inherent risk	PL	PC	Potential risk before mitigation	Actions/proposed mitigation measures	RL	RC	Residual risk post mitigation
	Leachate spill resulting in negative human health or environmental outcomes	E	3	L	HR08	E	4	L
	Final landform not fit for future beneficial land uses due to landslip and subsidence	E	2	M	CT06	E	4	L
Litter and illegal dumping (Section 16.5)	Ongoing operation of the Project resulting in the offsite impacts of litter resulting from litter blowing offsite or left outside the Site as illegal dumping	C	3	M	LT01, HR04	D	4	L

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21.2.1 Summary of risk analysis

The ERA in **Table 21.4** illustrates how the assessments presented within **Chapters 8** to **16 of this EIS** have defined the nature of the environmental risk associated with the Project and how the relevant measures have been recommended to reduce this risk. Provided these management and mitigation measures are implemented and other existing management practices maintained, the remaining residual impacts are expected to be negligible.

21.3 Ecologically sustainable development

21.3.1 The principles

This section provides a review of the Project, its impacts and associated safeguards against the principles of ESD in accordance with the EP&A Regulation. The principles, as listed in the clause 7(4) of Schedule 2 of the EP&A Regulation, are as follows:

a. *the **precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation*

b. ***inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations*

c. ***conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration*

d. ***improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services*

These principles are discussed below.

21.3.2 Precautionary principle

The precautionary principle deals with certainty in environmental and technical decision-making. It provides that where there is a threat of serious or irreversible environmental damage, the absence of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation.

A development application undergoes a public process that allows for better examination of the potential effects of proposed activities or development. Thus, the assessment process can be considered as precautionary in nature. The requirement to assess the impacts of the Project is a form of regulation designed to identify and address uncertainty about the effects of these activities.

SUEZ has commissioned specialists to conduct detailed assessments on the relevant environmental aspects identified in the Project's ERA (**Chapter 7**). These assessments provide sufficient understanding of the Project and its interactions with the environment and community to enable decisions to be made that are consistent with this principle. The precautionary principle has driven the development of a number of management and mitigation measures presented within this EIS.

Project objectives

The Project would be implemented in a manner that reduces the severity of potential impacts and the likelihood of them occurring. The Project would also comply with environmental criteria, community expectations and the development consent, as well as relevant statutory requirements. This is achieved through the effective implementation of the proposed management and mitigation measures.

Project safeguards

A number of safeguards specific to the Project would ensure mitigation of impacts would be undertaken in a manner that would satisfy the precautionary principle. These include:

- **Spatial limits of the Project area footprint**: the area where the Project would be undertaken would not extend beyond the boundary of the existing landfill, aside from some activities associated with vehicle movements. Mitigation measures to manage these impacts have been proposed.

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- **Updates to and implementation of the existing LEMP**: should the Project be approved, the LEMP and associated sub plans would be updated to include specific measures for the Project. The LEMP would be implemented throughout the lifecycle of the Project.

21.3.3 Inter-generational equity

Inter-generational equity requires that the present generation pass onto the next generation an environment that does not limit the ability of those future generations to attain a quality of life at least equal to that of the current generation.

Through the implementation of mitigation and management measures for avoiding and minimising short-term or long-term environmental impacts, and the proposed rehabilitation of any disturbed areas, inter-generational social equity has been addressed. Examples of matters that are relevant to the Project are described below.

Project objectives

In the medium term the Project would enable the continued use of the Site as a waste disposal facility and support the needs of Sydney for a safe disposal location for general and restricted non-putrescible waste. In the long term the Project would enable the final capping of the landfill and it's management for an extended aftercare period.

Project safeguards

The Project would maintain inter-generational equity by ensuring components of the existing bio-physical, social and economic environment available now would also be maintained for future generations. Aspects of the Project that would assist in achieving inter-generational equity include the following:

- The Project would not result in any significant adverse impacts on ecological values or receptors in the local area
- The Project would mitigate and manage all other impacts to the bio-physical, social and economic environment such that there would be no adverse impacts on the local area
- The Project would enable the Site to continue to serve Sydney's waste disposal needs in a safe manner
- Ongoing notification and engagement with the surrounding businesses and community will continue to provide opportunities to ask questions and identify and manage areas of concern.

21.3.4 Conservation of biological diversity and ecological integrity

Biological diversity relates to the breadth and variety of life. Ecological integrity refers to maintenance of the relationships, dependencies and services supplied by all lifeforms and the physiochemical environment to each other. The conservation of these elements is critical to the proper functioning of natural environments and the biosphere in general.

Project objectives

The Project would seek to avoid or minimise any further impact upon natural systems or biological diversity by virtue of maintaining the existing Site footprint. This would not only avoid expansion into any adjacent land, but would also delay the need for a new landfill facility in or near the Sydney basin, which may result in additional biodiversity impacts.

This EIS includes an assessment of the ecological impacts of the Project. The Project would not result in any significant adverse impacts on ecological values or receptors in the local area.

Project safeguards

Measures to manage impacts upon biological diversity and ecological integrity are outlined in the relevant section of this EIS and are supplemented by those in the LEMP.

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21.3.5 Improved valuation and pricing of environmental resources

This ESD principle is premised on an assumption that all resources should be appropriately valued and that the value of environmental resources should be considered alongside any economic or cost benefit analysis for the life of the Project.

Project objectives

The Project aims to continue operation of the Elizabeth Drive Landfill. The expansion of this existing landfill values and prices environmental resources by maintaining the operation of this existing Site, recognising that the monetary and environmental cost of commencing a new landfill elsewhere would be substantially greater.

Project safeguards

The value placed by SUEZ on environmental resources is evident from the extent of planning and environmental safeguards and measures that have been undertaken historically at the Site and which would continue to be implemented to prevent damage to the local environment. This includes significant investment in measures to manage direct and indirect impacts upon the local and regional environment such as:

- Management of stormwater to minimise offsite discharges
- Management of landfill and leachate to minimise impacts on the surrounding environment
- Management of operations to minimise dust and noise impacts to surrounding receivers
- Emergency response procedures in the LEMP to prevent fire and other environmental incidents such as spills
- Preservation of the Badgerys Creek riparian corridor within SUEZ' property.

21.3.6 Compatibility with the Principles of ESD

In preparing the Project, emphasis has been placed on the avoidance of impacts through careful design as well as management and mitigation measures to minimise potential negative environmental, social and economic impacts. This has included the consideration of the principles of ESD as outlined above.

21.4 Objects of the *Environmental Planning and Assessment Act 1979*

Consideration has been given to the consistency of the Project with the objects of the EP&A Act as outlined below.

a. to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources

The Project would allow for the continued use of the Site in line with existing land use designations. The Project would support the ongoing use of the Site for employment purposes and would not result in significant adverse ecological impacts. The Project represents an effort to obtain more value from an existing asset, thereby limiting the need to utilise more of the State's resources.

b. to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment

This EIS assesses the Project and identifies the likely impacts on the environment and surrounding community. With the implementation of management and mitigation measures outlined in **Chapters 7** to **15**, residual impacts on the environment are anticipated to be negligible. The Project would support the goal of maintaining a general solid waste and restricted solid waste facility at Kemps Creek, providing a positive economic outcome for NSW.

c. to promote the orderly and economic use and development of land

The Penrith LEP 2010 provides for the land use and zoning for the Site and surrounding area. Under this plan, the Project area is primarily designated as RU2 Rural Landscape. While development for the

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purposes of a waste disposal facility is prohibited in the RU2 zone under the plan, Division 23 of *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) provides for a waste disposal facility to be permitted with development consent within the RU2 zone.

The Project utilises an existing asset in an established area. This avoids the need for new waste facilities in the local area, maintaining consistency with the principles of inter-generational equity, conservation of biological diversity and improved valuation and pricing of environmental resources.

The Project would therefore support the existing and permissible land use at the Site by ensuring that the Site would continue to be used as a waste disposal facility, which is permissible under the ISEPP for the land zones in the Penrith LEP 2010 and therefore is in line with orderly and economic use and development of land.

d. to promote the delivery and maintenance of affordable housing

The Project would not affect the provision or maintenance of affordable housing.

e. to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats

This EIS present a detailed assessment of the potential environmental impact associated with the Project. The mitigation measures outlined within this EIS would allow for the protection of the environment, including the protection and conservation of native animals and plants, threatened species, populations and ecological communities, and their habitats.

f. to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)

The Project is not anticipated to have any impact upon any items of built or cultural heritage.

g. to promote good design and amenity of the built environment

The Project would not result in a change in use of the Site which would continue to operate as a waste disposal facility. The eventual design of the capped landfill has been assessed within **Chapter 9** of this EIS. This indicates how the final landform would change, and outlines the nature of the impact on the local area and region.

h. to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants

The Project would not involve the construction or maintenance of any buildings. The existing landfill operations would continue in a safe and efficient manner.

i. to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State

The Project is to be assessed as 'designated development' under Part 4 of the EP&A Act by the Sydney Western City Planning Panel. The project would be initially assessed by PCC, with recommendations being passed to the Planning Panel as consent authority. Ongoing consultation has occurred with PCC regarding the Project and would continue through its implementation.

j. to provide increased opportunity for community participation in environmental planning and assessment.

SUEZ has an existing relationship with the community and has existing, established communication pathways including the facility website, phone lines and letterbox updates. SUEZ has consulted with the local community and other relevant stakeholders regarding the Project, as documented in this EIS (**Chapter 6**).

21.5 Project justification

The Project would involve increasing the capacity of the Elizabeth Drive Landfill, through raising of the currently approved finished cap height by 15 metres, from RL 80 to RL 95. This would provide an additional landfill capacity of 4.8 million cubic metres and extend the life of the landfill by at least five and a half years at a disposal rate of 950,000 tpa. Without this additional lifespan, waste would likely

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require transport to other facilities around the State after 2025, particularly as other landfill facilities within the Sydney Basin reach their capacity over the coming years.

The Site plays an important strategic role in Sydney's waste disposal network, removing the requirement to transport waste elsewhere within NSW, which would involve significant logistical effort and cost. The location of the Site in the Sydney basin also confers other strategic values such as supporting the city's ongoing building and infrastructure development. The Project would continue to support the demand for landfill space within the region.

The Project would provide additional time for the design and commissioning of a suitable replacement landfill within the Sydney region. The process to identify and commission a new landfill facility involving site identification, planning, approval and development could take up to 10 years. Under the existing scenario this would have required planning for such a facility to commence before 2015 to ensure it would be ready to replace the Elizabeth Drive Landfill before its currently planned closure date. As this has not occurred the Project, increasing the capacity of the existing landfill is justified.

The Project has been designed to meet landfill industry practice and in a manner that suitably manages impacts on the surrounding environment. This includes consideration of both onsite and offsite impacts, such as visual impact, stormwater management, noise, air quality and traffic. The project has also considered the nature of operations throughout the extended life of the landfill including the final capping and continued management and combustion of landfill gas. The design of the final cap has been prepared in such a way as to allow for a range of (as yet undetermined) future uses.

This assessment has also considered the nature of the surrounding environment and its ongoing changes. Specifically, all assessments include consideration of the impacts of the Project against both the existing and future surrounding land use scenarios. This provides important context for how the Site would interact with the future nature of the region, with its increasingly important role in the development of Sydney's economic future.

This EIS provides a comprehensive assessment of the Project and its relevant environmental issues. Potential impacts have been assessed and strategies to avoid, minimise and mitigate those impacts form a key part of the Project. This EIS includes a number of commitments to manage environmental impacts during the Project, which are largely consistent with the measures already in place at the Site.

This EIS has concluded that the Project should proceed as it would:

- Result in no significant long term adverse impacts to the environment or local community
- Include a range of relevant mitigation measures and commitments that would govern the responsible and appropriate implementation of Project activities
- Ensure the ongoing availability of landfill space to meet the demand driven by the ongoing development of infrastructure, housing and businesses in Sydney
- Meet the objectives of the Project
- Satisfy the principles of ESD as described in the EP&A Regulation.

On the basis of the findings detailed within this EIS, the Project is considered to be justified and is recommended to proceed subject to consent.

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Chapter 22

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