Expansion of the Advanced Waste Treatment Facility

Kemps Creek Resource Recovery Precinct

Prepared for

SITA Australia Pty Ltd

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18 January 2013

60250100

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Quality Information

Document Expansion of the Advanced Waste Treatment Facility

Ref 60250100

Date 18 January 2013

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Reviewed by Scott Jeffries

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
Draft	18-Dec-2012	Draft for client review	Scott Jeffries Associate Director - Environment	
Final	18-Jan-2013	Final for adequacy	Scott Jeffries Associate Director - Environment	

Declaration under Schedule 2, Part 3 of the Environmental Planning and Assessment Regulation 2000

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Name and Address of the Responsible Person

As above

Address of the land to which this EIS Applies

The land to which this Environmental Impact Statement (EIS) applies is within the Penrith local government area as shown in Chapter 2.

Description of the Infrastructure to which this EIS Applies

This EIS examines SITA's proposal to expand their existing Advanced Waste Treatment facility at the Kemps Creek Resource Recovery Precinct. The development would involve the construction of a new Composting Hall, Refining Building, and biofilters, and upgrade of the existing pre-treatment infrastructure and compost pads. Associated site infrastructure upgrades would include upgrades to access roads, car parking, stormwater ponds, leachate tanks and leachate ponds.

Assessment of the Environmental Impact of the Infrastructure

An assessment of the environmental impact of the infrastructure is contained in this Environmental Impact Statement.

Declaration

Pursuant to clause 6(f), Part 3, Schedule 2 of the Environmental Planning and Assessment Regulation 2000, I declare that this Environmental Impact Statement:

a. Has been prepared in accordance with the requirements of the Environmental Planning and Assessment Act 1979 and Environmental Planning and Assessment Regulation 2000;

b. Contains all available information that is relevant to the environmental assessment of the infrastructure to which this Environmental Impact Statement relates; and

c. Contains information that is neither false nor misleading.



Sarah Townsend

18 January 2013

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Project Terms

Term/acronym	Explanation
AGL	Above ground level
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
(The) applicant	SITA Australia
ARRT	Advanced Resource Recovery Treatment
ASS	Acid Sulfate Soils
Badgerys Creek	A tributary of South Creek and the Hawkesbury-Nepean River, located approximately160 to the west of the site.
BOD	Biochemical Oxygen Demand - The amount of oxygen dissolved in water necessary for microorganisms to decompose the organic matter in the water.
BoM	Bureau of Meteorology
BP	Before Present (BP) is a time scale used in archaeology, geology, and other scientific disciplines to specify when events in the past occurred. Because the "present" time changes, standard practice is to use 1 January 1950 as the origin of the age scale, reflecting the fact that radiocarbon dating became practicable in the 1950s.
CEMP	Construction Environmental Management Plan
CBD	Central Business District
C&I	Commercial and industrial
C&D	Construction and demolition
CMMS	Computerised Maintenance Management System
COAG	Council of Australian Governments
Composting Hall	A fully enclosed hall for aerobic composting which would contain a fully automated turning system.
Compost Storage Pad	Pad on the western side of the Site for storage of compost material. Compost derived from SSO is stored on the southern section of the Compost Storage Pad, and compost derived from MSW on the northern section.
CPW	Cumberland Plain Woodland
CRG	Community Reference Group
DA	Development Application
(The) Development	The proposed expansion of an existing advanced waste treatment facility at its Kemps Creek Resource Recovery Precinct
DECCW	Department
(the) Draft Subregional Strategy	The draft North West Subregional Strategy (NSW Government, 2007)
DGRs	Director General's Requirements
DP&I	Department of Planning and Infrastructure
EA	Environmental Assessment

EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
Elizabeth Drive	A major east-west arterial connection between the Northern Road and Westlink M7, located to the south of the Site. The SAWT facility access road links to Elizabeth Drive.
EPL	Environmental Protection License
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
ERP	Emergency Response Plan
ESCP	Erosion and Sediment Control Plan
Existing SAWT facility	Existing SITA advanced waste treatment facility
(The) facility	The existing SITA advanced waste treatment facility
“Fleurs”	Rural land owned by the University of Sydney to the north and adjacent to the Site.
FMP	Fire Management Plan
Footprint of the landfill	The area of land designated and permitted to performing the Elizabeth Drive landfill activities
FTE	Full time equivalent
GHG	Greenhouse Gas
Hardstand Areas	Open ground area with a prepared surface that is used for the storage of material.
HDPE	High Density Polyethylene
IPCC	The Intergovernmental Panel on Climate Change
Kemps Creek Community Reference Group	A group made up of members of the community who are interested in SITA’s facilities and operations, PCC and the EPA.
(The) landfill	Elizabeth Drive Landfill (not inclusive of the SAWT facility)
LCC	Liverpool City Council
LEP	Local Environmental Plan
LEMP	Landfill Environmental Management Plan
LGA	Local government area
Mamre Road	Major arterial road running north-south approximately 3 kilometres to the east of the site
Maturation Pads	Compost maturation includes curing partially composted material outdoors on pads made from compacted sandstone and clay, called maturation pads. The maturations pads include a leachate control system.
MBT	Mechanical Biological Treatment
McGarvie-Smith Farm	Property owned by the University of Sydney, bounds the Site to the west.
(the) Metropolitan Plan	The Metropolitan Plan for Sydney 2036
MSW	Municipal solid waste

The Northern Road	Road running north-south approximately 5 kilometres to the west of the Site
NES	(Matter of) National Environmental Significance (under the EPBC Act)
Non-putrescible waste	Waste that is not capable of significant biological transformation
NSW	New South Wales
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OHSP	Occupational Health and Safety Plan
PAD	Potential Archaeological Deposit
PCC	Penrith City Council
PEF	Processed Engineered Fuel
POEO Act	*Protection of the Environment Operations Act 1999*
(the) Precinct	The Resource Recovery Precinct
Putrescible waste	Waste that is capable of significant biological transformation
QA/QC	Quality Assurance/Quality Control Plan
Resource Recovery Building	A fully enclosed building for the treatment of waste to recover recyclables and remove contaminants prior to composting
Resource Recovery Precinct	The entire site, including the landfill, the SAWT facility, and the access road
RL	Reduced Level
RMS	Roads and Maritime Service
SAWT	SITA Advanced Waste Treatment
SAWT facility	SITA Advanced Waste Treatment facility
SAWT facility access road	The site access road , linking Elizabeth Drive with the SAWT facility
SEPP	State Environmental Planning Policy
SEPP 33	State Environmental Planning Policy 33 – Hazardous and Offensive Development
SEPP 55	State Environmental Planning Policy No. 55 – Remediation of Land
SEWPaC	(Department of) Sustainability, Environment, Water, Population and Communities
Sims property	Residential property to the south of the Resource Recovery Precinct
SITA	SITA Australia
Site	The area within the boundary of the existing SAWT facility, which is the location of the proposed Development
SOP	Standard Operating Procedure
SREP 20	Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (No.2 1997)
SSD	State Significant Development
SSO	Source Separated Organics
Study Area	The area within a 5 kilometre radius of the proposed Development
SWMP	Soil and Water Management Plan

tCO_2-e	Tonnes of carbon dioxide equivalent
TMP	Traffic Management Plan
TOC	Total Organic Compound - the amount of carbon bound in an organic compound. Often used as a non-specific indicator of water quality.
tpa	Tonnes per annum
TSC Act	*Threatened Species Conservation Act 1995*
TSS	Total Suspended Solids - A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for total suspended non-filterable solids.
Twin Creeks residential estate	Residential area to the north of the Site.
Twin Creeks Golf and Country Club	Golf and Country Club the north of the Site.
WARR Act	*Waste Avoidance and Resource Recovery Act 2001*
WARR Strategy	*Waste Avoidance and Resource Recovery Strategy 2007*
Water conductivity	A measure of the ability of water to pass an electrical current.
WBCSD	World Business Council for Sustainable Development
Wet scrubbers	Devices that remove pollutants from air or gases
WMPL	Wilkinson Murray Pty Ltd
WMP	Waste Management Plan
WRI	World Resources Institute
The Wright Review	The *Public Review - Landfill Capacity and Demand* (Wright Corporate Strategy Pty Ltd, 2009)
WSEA	Western Sydney Employment Area
VMP	Vegetation Management Plan

Executive Summary

Introduction

SITA Australia (SITA) is seeking approval for the expansion of the existing SITA Advanced Waste Treatment (SAWT) facility (the Development) at its Kemps Creek Resource Recovery Precinct (Resource Recovery Precinct) in western Sydney. This Environmental Impact Statement (EIS) has been prepared by AECOM on behalf of SITA to provide a description of the proposed Development and to assess the associated potential environmental impacts of the Development. The EIS has been prepared in accordance with Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), together with the Director-General's Requirements (DGRs) which were issued to SITA on 16 May 2012 by the New South Wales (NSW) Department of Planning and Infrastructure (DP&I).

SITA's Kemps Creek Resource Recovery Precinct is currently characterised by two principal development components: the Elizabeth Drive Landfill (the landfill) and the existing SAWT facility. The existing SAWT facility processes waste materials using a combination of mechanical separation, manual sorting, and biological composting technologies in order to produce saleable quality compost. The SAWT facility is located within the Resource Recovery Precinct. The area within the boundary of the existing SAWT facility, which is the location of the proposed Development, is referred to hereon as the Site.

The existing SAWT facility is currently operating at full capacity of 120,000 tpa of Municipal Solid Waste (MSW) and Source Separated Organic (SSO) materials. This is comprised of source separated food and garden organics and MSW from a range of councils including Penrith, Campbelltown, Camden, Wollondilly, Wingecarribee, Liverpool, Randwick City and City of Sydney. The facility also processes up to 14,400 tpa of biosolids from sewage treatment plants.

In response to market demand from the local government sector for additional waste processing, SITA now seeks approval for expansion of the existing SAWT facility. The proposed expansion of the existing SAWT facility includes the following key changes:

- An increase in capacity of the facility to 220,000 tpa of input waste.
- Modifications to the current layout of operations at the Site and enhancements to the management of waste material (including a fully enclosed composting process) and process water.
- An increase in operating hours for indoor operations from 7 am to 11 pm Monday through Saturday to 24 hours per day, seven days a week.

The Development is considered to be State Significant Development (SSD) because it exceeds the thresholds under clause 23, Schedule 1 (waste and resource management facilities) of the *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional Development SEPP) being "development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste". Accordingly, the Development Application (DA) for the Development will be assessed and determined as SSD by the Minister for Planning and Infrastructure, or the Minister's delegate, under Division 4.1, Part 4 of the EP&A Act. This EIS has been prepared to accompany the DA which will be lodged with the DP&I for the Development.

Site and Surrounds

The Site is located approximately 41 kilometres west of the Sydney Central Business District (CBD). The towns of Kemps Creek and Badgerys Creek are located approximately five kilometres east and five kilometres south west of the Site, respectively. The Site is located within the Penrith Local Government Area (LGA).

The Site is located within the boundary of the existing Kemps Creek Resource Recovery Precinct. The Site covers an area of approximately eight hectares and is located in the north western corner of the Resource Recovery Precinct. The Kemps Creek Resource Recovery Precinct and the Site has a history of quarrying and landfilling of voids with waste materials. The Site currently comprises the existing SAWT facility. The existing SAWT facility consists of:

- an access road from the main entrance to the Resource Recovery Precinct off Elizabeth Drive which is an east-west connector road providing access from the M7 Westlink from the east and The Northern Road from the west

- Receival Hall for receival of waste, Resource Recovery Building for removal of recyclables and contaminants, and Tunnel Composting System for composting waste materials
- Biofilters and Biofilter Plant room, housed in an adjacent structure
- administration annexe to the main building
- graded external paved areas for vehicle marshalling and for maturation pads
- Maturation Pads for the maturing of compost removed from the Tunnel Composting System.
- Compost Storage Pad for finished compost (this pad is located on the landfill site and operates under the landfill EPL)
- ponds for leachate, leachate overflow and stormwater management
- ancillary infrastructure such as fire water storage tanks and electrical substations.

The land surrounding the Resource Recovery Precinct consists primarily of rural agricultural land, residential holdings with stables for horses, and rural residential dwellings.

Strategic Need and Justification for the Development

There is, and has been for some time, intense pressure on the waste framework in NSW. Ageing landfill infrastructure, no new putrescible landfills being constructed in Sydney and increasing volumes of waste being generated has resulted in increasing pressure on existing facilities. The pressure is two-fold as facilities are facing pressure to increase their annual intake to meet demand they are also facing the possibility of reaching their capacity earlier than anticipated.

In addition, the Australian and State Governments have a variety of policies in place aimed at minimising waste generation and improving management, which has shaped an increased need for more sustainable waste processing technology and management from both the municipal and commercial sectors. These sectors are being increasingly driven to meet State Waste Targets identified through the NSW *Waste Avoidance and Resource Recovery Strategy 2007*, by increasing recovery and use of secondary resources and consequently reducing the need to landfill waste. Ever-increasing levels of material are required to be diverted away from landfill (66 percent for the municipal sector) in order to achieve policy outcomes for sustainable environmental management, as well as to ease pressure on ageing landfill infrastructure.

The 2009 Wright Review, commissioned by the former Minister for Planning, reviewed the remaining putrescible landfill capacity and demand in the Sydney metropolitan area to provide advice on future waste infrastructure needs, and to update the *Independent Public Assessment – Landfill Capacity and Demand* published in September 2000. The Wright Review also recognised the need for substantial investment in additional advanced waste treatment (AWT) capacity for both the municipal and C&I sectors to enable the NSW Waste Targets to be met and maintained.

While it was concluded that there is sufficient landfill capacity for more than 20 years to cater for Sydney's waste, these conclusions rely, in part, on increased investment in AWT facilities to divert greater amounts of putrescible waste from landfills. This would result in reduced pressures being placed on the remaining landfill capacity. To achieve Commonwealth and State Government policies for waste avoidance and resource recovery in Australia and NSW, there is a growing and urgent need for further investment in AWT facilities in the Sydney metropolitan area and NSW. Therefore, there are two key areas supporting the need and justification for the Development:

need with respect to the remaining limited landfill capacity, NSW State Targets and customer demand

environmental benefits that would result from the Development.

Since the release of the 2009 Wright Review, there has been limited investment in AWT facilities for municipal waste in Sydney. In fact, the review assumed that a number of proposed or approved AWT facilities would be fully operational by 2018/2019. These facilities, which would have provided an additional capacity of 440,000 tonnes per annum by 2018/2019, have not been realised (to date) or are no longer proceeding. At present, there are only a limited number of AWT facilities within the Sydney metropolitan area. This includes the existing SAWT facility, the UR-3R facility at Eastern Creek, the Earthpower facility at Camellia (which processes commercial organic waste), and to a lesser extent due to technical issues, the Spring Farm Advanced Resource Recovery Technology (ARRT) facility (formally Jacks Gully). The existing SAWT facility and Eastern Creek UR-3R facility are both currently operating at 100 percent capacity. The Spring Farm ARRT facility no longer processes biological waste and as a long term solution, organic material is mechanically separated from MSW and transported to the SAWT

facility for biological processing. The delay in development of an advanced resource recovery facility at Lucas Heights coupled with a loss of processing capacity at the Spring Farm ARRT has placed additional pressure on technically proven facilities such as the existing SAWT facility.

The Development represents a much needed investment in AWT technology in the Sydney metropolitan area, to meet growing demand and to deliver broader environmental and social benefits to Sydney and NSW by:

- diverting up to an additional 45,000 tonnes per annum of municipal waste from landfill and easing pressure on Sydney's remaining putrescible landfill capacity
- providing additional AWT capacity within the Sydney metropolitan area to address the shortfall in AWT capacity that is required to meet the demands of municipal councils
- contributing towards the realisation of the NSW *Waste Avoidance and Resource Recovery Strategy 2007* (NSW WARR Strategy 2007) and NSW State target of 66 percent diversion of municipal waste away from landfill
- enhancing the environmental performance of the existing SAWT facility.

In addition to providing a significant increase in waste diversion and treatment capacity in the Sydney metropolitan area, the Development would improve operations at the existing SAWT facility. This would be achieved with technology improvements and streamlined efficiency measures, providing additional environmental and social benefits. The proposed design includes an enclosed leachate treatment system and enclosed processing areas for treating MSW and SSO materials, effectively removing the two major sources of potential odour associated with the operation of the existing facility. A summary of the key advantages of the Development, relative to existing operations, is provided below:

- material handling and composting would be enclosed and leachate would be captured in enclosed tanks, resulting in a reduction in odour emissions
- there would be no external composting or maturation of SSO or MSW material with only limited storage of completed compost occurring in open air conditions
- inclusion of new technologies that improve recyclables recovery and contaminant removal from compost
- greenhouse gas emissions from operations (on a per input tonne basis) would be reduced as there would be a reduction in the amount of front end loader operations, improved energy efficiency and reduction in manual handling (reduced fuel and electricity consumption).

Alternatives

Alternatives were considered to meet the need for additional waste treatment capacity in Sydney and NSW. The following alternatives were considered:

- the 'do nothing' alternative
- development of a new facility in the Sydney area or a new processing facility in the wider region
- expansion of the existing SAWT facility
- technological alternatives associated with expansion of the existing SAWT facility.

The 'do nothing' alternative would require maintaining the status quo at the Site, which would mean the existing SAWT facility would continue to receive up to 120,000 tonnes per annum of MSW and SSO materials, and up to 14,400 tonnes per annum of biosolids, and the waste would be composted using existing technology. The 'do nothing' alternative was eliminated primarily on the basis that it would be a wasted opportunity to respond to the increasing demand for waste reduction and recovery in NSW and Sydney, and a lost opportunity to improve existing operations and the environmental performance of the existing SAWT facility.

The primary initial design consideration for the Development, and a crucial consideration for SITA, was whether it was preferable to expand the existing SAWT facility or develop an entirely new facility. SITA determined that a processing facility located within the Sydney Basin was preferable to one located in the wider region on the basis that it is preferable for the municipal and commercial sector to deliver waste directly to local processing facilities rather than regional facilities in order to avoid additional transport costs and associated environmental emissions.

SITA considered whether it would be preferable to develop a new facility in the Sydney area or expand the existing SAWT facility. Economically, expanding the existing SAWT facility and leveraging the existing technology

was deemed to be preferable to developing a new facility. It is difficult to acquire appropriate land for a waste processing facility in Sydney and should appropriate land be leased or acquired, it is difficult to gain the appropriate regulatory approvals for such a facility in a timely manner. Environmentally, the concentration of effects from having one large rather than two small facilities is preferable, limiting the need for additional infrastructure. In addition, the scope for potential investment in new technology is greater for one large rather than two small facilities. With environmental and cost considerations as the primary drivers, expansion of the existing SAWT facility was selected as the preferred alternative compared to development of a new facility.

In deciding to proceed with an expansion to the existing SAWT facility, technological alternatives for the upgrade were assessed by SITA including alternative processing technologies, enclosed or open composting, odour control technologies, and alternative leachate management systems. The preferred design for the expanded SAWT facility was selected on the basis that it satisfies SITA's design philosophy considerations of operability, process flows, economics and environmental performance as it:

- Provides additional throughput capacity using existing and enhanced infrastructure.
- Operates as a fully automatic and enclosed operation providing better control of the composting process, reduced susceptibility to weather conditions and reduced odour emissions.
- Upgrades the existing leachate system to an enclosed leachate system, where leachate from the composting material is captured and stored in tanks then reused in the system.

Description of the Development

SITA is seeking approval for the expansion of the existing SAWT facility at its Kemps Creek Resource Recovery Precinct in Western Sydney. The Development would comprise an expansion of the existing SAWT facility only and would not change operations at the adjacent Elizabeth Drive landfill. The existing SAWT facility currently accepts up to 120,000 tonnes per annum of MSW and SSO materials. This is comprised of source separated food and garden organics and MSW from a range of councils including Penrith, Campbelltown, Camden, Wollondilly, Wingecarribee, Liverpool, Randwick City and City of Sydney. The facility also accepts up to 14,400 tonnes per annum of biosolids.

The waste material is currently processed using a combination of mechanical separation, manual sorting, and biological composting technologies to produce approximately 40,000 to 45,000 tonnes per annum of compost. The compost is used predominantly by the mining sector for land rehabilitation, but is also suitable for forestry and broadacre agricultural applications. Compost derived from SSO materials is also used on sporting fields.

The Development would result in the following key changes:

- An increase in capacity of the facility to 220,000 tonnes per annum of input waste.
- Modifications to the current layout of operations at the Site and enhancements to the management of waste material (including a fully enclosed composting process) and process water. Key modifications to the existing facility include:
- Upgrade of the Resource Recovery Building pre-treatment processes.
- A new enclosed Composting Hall for MSW composting.
- A new Refining Building for MSW composting, plus associated storage bunkers, and refurbishment of the existing refining plant to suit SSO composting.
- Reconfiguration of the existing biofilters at the Tunnel Composting System by enclosure and adding stacks for increased dispersion.
- Installation of new enclosed and biofilters at the MSW Composting Hall with stacks for dispersion.
- Extension of the existing SSO Compost Pad for storage of fully matured SSO and MSW compost material.
- Associated Site infrastructure upgrades including upgrades to access roads, car parking, stormwater ponds, leachate tanks and leachate ponds.
- An increase in operating hours for indoor operations from 7 am to 11 pm Monday through Saturday to 24 hours per day, seven days a week.

The Development would be entirely contained within areas which are already occupied by the existing SAWT facility and landfill.

It is anticipated that construction of the Development would commence in mid 2013 and would be completed in mid 2015. The Development would not immediately accept 220,000 tpa of waste but would accept a gradual increase in the volume of waste material over time as new contracts become available. It is anticipated that the Development would be at full operational capacity sometime in 2016.

The estimated capital investment value of the Development is $49 million. It would provide long term employment for 60 people (an additional 22 positions over current employment numbers), with peak employment during construction expected to be approximately 130 people.

Consultation and Issues Identification

In preparing the EIS, the DGRs issued on 16 May 2012 have been addressed as required by the EP&A Act. As part of the formal process of preparing the DGRs, DP&I requested environmental assessment requirements from relevant statutory authorities and service providers.

In addition to this process, consultation was undertaken with relevant authorities during the preparation of the EIS to further discuss pertinent issues and the approach of the environmental impact assessment. Consultation was undertaken with DP&I, the NSW Environment Protection Authority (EPA), NSW Roads and Maritime Services (RMS), NSW Office of Water (NOW), Penrith City Council (PCC) and Liverpool City Council (LCC). Consultation was also undertaken with DP&I, the EPA and the RMS to discuss the preliminary findings of the air quality, noise and traffic assessments.

SITA considers meaningful and engaging community consultation an essential component of the Development. Community and stakeholder consultation was carried out during preparation of the EIS in order to inform the community of the proposed Development, and to identify and address issues of concern raised by local residents and other key stakeholders. Consultation was undertaken with local businesses, residents and community groups including the Kemps Creek Community Reference Group (CRG), and local schools. A community information session was held, individual meetings were conducted with neighbouring property owners, individual meetings were held with local school leaders, and briefings were held for local council and local elected state Members of Parliament.

Consultation with DP&I and relevant regulatory agencies, consultation with the community, preparation of a Preliminary Environmental Assessment, and the DGRs identified key environmental issues that may be associated with the Development. These are listed below and have been addressed in the EIS:

- Air quality emissions and amenity impacts during operation, particularly associated with odour
- Noise and amenity impacts during construction and operation
- Traffic during construction and operation
- Surface and groundwater, particularly surface water impacts during operation
- Erosion and sedimentation during construction
- Hazard and risks during operation
- Greenhouse gas emissions.

Concerns raised by regulatory agencies and the local community in relation to noise and odour contributed to SITA altering the original concept design to minimise external operations (waste handling and processing) at the Site and to eliminate the use of reversing beepers on both landfill and SAWT facility heavy equipment. Community concerns also led to a decision to relocate the Waste Collection Fleet Depot (not part of the SAWT facility operations) to an alternative site due noise impacts, particularly in the early morning.

Environmental Impact Assessment

Air Quality

Land use surrounding the Site is predominantly rural residential. Other land uses include a golf course, piggeries, poultry farms, ANL composting facility, brick making facility, the landfill, and the existing SAWT facility. Based on the nature of the land uses surrounding the Site and the nature of existing operations at the Site and the landfill, odour and particulate matter were determined to be the primary pollutants of interest in relation to the Development.

Odour

The existing SAWT facility involves a number of odour-generating activities with the key potential sources being:

- the external MSW maturation pad and stockpile pad
- the external SSO maturation pad and stockpile pad
- the leachate ponds
- a semi-enclosed biofilter with no stack
- an external trommel used for the refining of material
- fugitive emissions.

The main sources of odour at the landfill are the tipping faces for general and restricted waste, the latter consisting of contaminated soil products. As the remaining sections of the landfill are capped and fitted with a methane capture system, these areas are not expected to be a major existing source of odour.

A number of odour complaints associated with the Resource Recovery Precinct have been received by SITA over the past few years. Complaints have been primarily received from residential properties located to the south of the Site off Elizabeth Drive. The source of the odour was generally not directly linked back to a specific activity at the Resource Recovery Precinct. However, the compost stockpiles and leachate ponds were discussed as a possible source. Further, it is acknowledged that degraded operating conditions linked to an extended commissioning period and unfavourable weather conditions in 2012 (which resulted in several months to bring the maturation or composting pads back to normal operating conditions), probably led to the generation of odours with an impact on the local community. This has been highlighted by a number of complaints received during the three years of operation of the facility.

In August 2012, NSW EPA engaged The Odour Unit Pty Ltd to conduct a baseline regional odour assessment covering the Eastern Creek, Erskine Park and Kemps Creek precincts of western Sydney. The request for this assessment was in response to community odour complaints and concerns in recent times regarding the level of odours originating from the activities undertaken at ten waste management and composting facilities (the facilities) within these precincts, including the Resource Recovery Precinct. During the surveys, there were multiple occasions where the existing SAWT facility odours were detected beyond the Resource Recovery Precinct boundary. These impacts were generally near the boundary, with one occasion extending to the Erskine Park Precinct. The odours detected were generally classified as weak to distinct with MSW/garbage/cheesy, green waste/herbaceous and organic growth medium/dry compost odour characters.

A quantitative assessment was undertaken to assess the impacts of odour emissions from the Development and the cumulative impacts of odour from the Development and the landfill. The only other local odour source that is considered to be of similar character to that likely to be emitted by the Development is the ANL composting facility at Badgerys Creek. The ANL composting facility is located approximately 2.2 kilometres south of the Site. Given the distance between the Site and this facility, and that most of the sensitive receivers are located in between the two sources, it is unlikely that the receivers would be affected by odours from both sources at the same time. Therefore, the ANL composting facility was not included in the quantitative cumulative odour assessment.

The quantitative odour impact assessment was undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW Department of Environment and Conservation (DEC), 2005). An emissions inventory of the Development was developed for use in the dispersion modelling. This was generated using operational information supplied by SITA and emission factors developed through site-specific sampling conducted at both the existing SAWT facility and the landfill. Dispersion modelling was undertaken using the CALPUFF dispersion model to predict potential impacts at the closest receivers as a result of operation of the Development, as well as the cumulative impacts of the Development and the existing landfill.

The improvements proposed to the existing facility as part of the Development that are intended to reduce odour emissions were factored into the dispersion modelling. The most significant of which are as follows:

- all stages of MSW composting would be undertaken within negatively pressurised buildings
- enclosure of the refining operations within a new building (Refining Building)
- the addition of three biofilters to treat the odour collected from the additional Composting Hall and Refining Building

- the venting of currently exposed biofilters and the proposed biofilters through 15-metre stacks to increase the dispersion of emissions into the atmosphere
- collection of MSW compost leachate into enclosed storage tanks, removing the need for external MSW compost storage ponds.

The EPA specifies impact assessment criteria for odour within *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (DEC, 2005). The criteria have been designed to take into account the range of sensitivity to odours within the community based on a statistical approach relating to population size. The impact assessment criteria ranges from 2 odour units (OU) to 7 OU, with 7 OU considered the maximum level of odour to which a residence should be exposed. Based on the density of the residential population that could potentially be affected by odour from the Resource Recovery Precinct (which is estimated at 100), the relevant criterion for the assessment was determined to be 4 OU.

The results of odour dispersion modelling demonstrate that the highest predicted odour concentration attributable solely to the Development at a sensitive receiver is 1.6 OU, which is below the 4 OU assessment criterion. For the cumulative impact of the Development and the landfill, the majority of the sensitive receivers are predicted to be below the 4 OU criterion. However, odour concentrations between 4 and 5.1 OU are predicted at two receivers located adjacent to the eastern boundary of the Resource Recovery Precinct.

Given that fact that the cumulative impact is dominated by the landfill and not the Development, that the contribution of the Development to the cumulative impacts are relatively minor, and that the Development would improve the performance of the existing SAWT facility in terms of odour emissions, this level of impact is not considered to be significantly adverse. However, to respond to the exceedances in the odour criteria at two receivers adjacent to the eastern boundary of the Resource Recovery Precinct, SITA continues to discuss approaches to manage cumulative odour impacts on two sensitive receivers with the affected landowner.

Particulate Matter

Ambient air quality in the vicinity of the Site is monitored by the EPA and SITA. A review of the available EPA and SITA data shows that:

- there were exceedances of the particulate matter less than or equal to 10 µm (PM_{10}) maximum 24 hour average concentration criterion of 50 µg/m^3 at St Marys (2010 and 2011) and Bringelly (2011 only) monitoring stations
- the annual average PM_{10} concentrations met the EPA criterion of 30 µg/m^3 at both St Marys and Bringelly monitoring stations
- the annual average total suspended particulates (TSP) concentration from the St Marys data was calculated to be 34 µg/m^3, which is below the criterion of 90 µg/m^3
- the EPA criterion of 4 g/m^2/month was exceeded at most monitoring locations along the boundary of the Resource Recovery Precinct in the past five years. The highest deposition levels were recorded at the northern boundary of the Resource Recovery Precinct. The deposition results at the Resource Recovery Precinct monitoring locations may have been impacted by a few extraordinary events occurring during the monitoring period. During 2008, the construction of the existing SAWT facility was at its peak. During 2010, the excavation of landfill cell C5 at the landfill was occurring, and there was also some limited transportation of fill to an adjacent property.

SITA has made efforts to aid in the reduction of dust emissions from the Resource Recovery Precinct in recent years. This includes the capping of eight hectares of land at the landfill in the last 12 months, improved incorporation of moisture in the compost windrows during turning and the reduction of compost kept on-site.

A qualitative assessment of the potential impacts associated with emissions of particulate matter during construction of the Development was undertaken. Activities undertaken during the construction phase that have the potential to result in emissions of particulates include earthmoving during site preparation, excavation of stormwater ponds and building foundations, handling and stockpiling of excavated material and construction materials, dust emissions from the movement of vehicles, and construction vehicles and equipment exhaust emissions. Impacts on air quality as a result of the construction activities would be short term and localised to the area surrounding the construction. It is not expected to have long term adverse impacts on the surrounding area and mitigation measures would be implemented to minimise emissions of particulates during construction.

The quantitative impact assessment for particulate matter associated with operation of the Development was undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2005). An emissions inventory was developed for use in the dispersion modelling which was undertaken using the CALPUFF dispersion model to predict potential impacts at the closest receivers as a result of operation of the Development.

The internalisation of composting activities as a result of the Development would lead to improvements to air quality at the Site during operation. The results of dispersion modelling demonstrate that predicted levels of particulate emissions at surrounding receivers from operation of the Development are well below the EPA impact assessment criteria for each pollutant and the averaging period assessed. The cumulative concentrations of annual PM_{10} and TSP at sensitive receivers are also below the impact assessment criteria. However, it is acknowledged that both the existing background and predicted cumulative emissions of 24 hour PM_{10} and deposited dust exceed the impact assessment criteria. The major contributor to the cumulative impacts for both 24 hour PM_{10} and deposited dust is the background value. For both 24 hour PM_{10} and deposited dust, the additional maximum increases at any receiver of 5.3 $\mu g/m^3$ and 0.045 g/m^2.month respectively as a result of the Development are not considered to represent substantial increases over the existing background levels.

Further analysis of the results was conducted to determine the percentage of the contribution or impact of the Development when compared to the criteria, background concentrations and cumulative impacts. The Development is likely to be a minor contributor to the cumulative impacts, specifically for annual PM_{10}, TSP and dust deposition, with contributions of less than two percent of the criteria and four percent of the cumulative value. While the 24 hour PM_{10} shows a greater contribution, representing just less than 11 percent of the criteria and a little more than seven percent of the cumulative value, it is still not considered a substantial increase over the existing background levels.

Noise

Noise sources from the existing SAWT facility include mobile and external plant equipment, biofilters and tunnels fans and heavy vehicle movements. Indoor activities currently have approval to occur between 7am and 11pm Monday to Saturday, with outdoor activities and deliveries/dispatch operating under restricted hours.

The conditions of approval and the Environment Protection Licence (EPL) for the existing SAWT facility sets noise criteria for the current operations. The noise impact assessment for the current operations (year 2012) indicates that the existing SAWT is meeting the set noise limits, except at one sensitive receiver (R20) where exceedances of one dBA and two dBA are predicted during adverse metrological conditions during the evening period and morning shoulder period respectively. Exceedances in the order of up to two dBA are considered to be minor.

Within the Resource Recovery Precinct, the Landfill is also a key contributor of noise in the local environment. The Landfill is restricted to operating between 6am and 6pm Monday to Friday. Noise is generated by the delivery of waste into landfill cells, excavation of new cells, removal of excavated shale and capping of the final landform. Noise levels at the Landfill are conditioned by an EPL.

Construction Noise

Bulk earthworks, the use of construction equipment and increased traffic movements associated with construction are the key sources of noise during construction stage of the Development. Combined with the continued operations at the existing SAWT facility and the Landfill, these additional noise sources could lead elevated noise emissions from the Precinct, resulting in adverse impacts at nearby sensitive receivers. In particular, the extended construction hours and early morning arrival of construction workers to the Site have the potential to impact nearby sensitive receivers.

The assessment identified that the bulk earthworks stage of construction would be the likely nosiest activity over the two year construction period. This is because it potentially involves the largest number of plant items operating simultaneously. Bulk earthworks are expected to occur over 12 months of the two year construction period.

The construction noise impact assessment demonstrates that some minor exceedances in the order of one to two dBA would occur, and that exceedances of up to 3dBA is predicted at one sensitive receiver during the morning shoulder under adverse meteorological conditions. To mitigate these potential impacts a Construction Noise Management Plan would be implemented, including a complaints handling procedure.

Operation Noise

As a result of the Development, noise sources at the Site would change. This includes a reduction in the external plant equipment due to the internalisation of composting activities, an increase in biofilters fans, a change in the

hours of operation, an increase in light vehicle movements, and an increase in heavy vehicle movements associated with the delivery and dispatch of material.

In terms of the hours of operation, indoor operations at the Development are proposed 24 hours a day, seven days per week (including Public Holidays). Outdoor operations are proposed between 6am and 10pm Monday to Friday (with no restriction on vehicle movements).

In undertaking the impact assessment of the Development, an interactive process was undertaken to identify the necessary noise mitigation measures. These measures have been factored into the assessment model and are as follows:

- introduction of noise mitigation to the wheel loaders to ensure maximum sound power level of 108dBA or introducing new loaders with a sound power level less than 108dBA
- attenuation of all seven biofilter extraction fan ducting systems such that noise emanated from top of each stack is reduced by 10dBA. The most appropriate and effective noise mitigation for controlling the noise generated by the fans would be to introduce a silencer between the biofilter extraction fans and the stack outlets
- the cessation of wheel loader outdoor operations after10 pm
- the erection of an 8.5 metre high and 30 metre long wall of sufficient density along the northern side of the external refining bunkers to reduce noise generated by mobile plant at the northern receptors. The bunkers area would also be roofed at the same height as the refining building
- use of quackers (broadband reversing alarms) instead of tonal reversing alarms on all mobile plant.

To assess the potential impacts of the Development, an assessment against existing noise limits was undertaken for the Development operating in 2016. This demonstrated that the Development would comply with the existing noise limits during calm and adverse meteorological conditions. A cumulative impact assessment was also undertaken to consider the potential impacts of the Development and the Landfill in 2016. This assessment considered the noise limits established by the Landfill EPL, given this activity represents the industrial noise source that potentially contributes most of the noise impacts on nearby sensitive receivers. The assessment demonstrated compliance at all 37 sensitive receivers.

It is noted that the EPA requested that the assessment also consider the criteria set by the Industrial Noise Policy (INP) (EPA, 2000). The assessment found that the Development (in isolation) and with the Landfill would satisfy the amenity assessment criteria. Further, the Development is also predicted to satisfy the intrusiveness assessment criteria at all 37 sensitive receivers, except for exceedances of one to two dBA above the intrusiveness criteria at three residences. These exceedances are considered to be negligible and any further reductions are not considered reasonable or feasible.

However, greater exceedances of the intrusiveness criteria were predicted at nine sensitive receivers when assessing the cumulative impact of the Development and the Landfill. This included noise contributions up to 8 dBA over the criterion at one sensitive receiver during the daytime period under adverse meteorological conditions. However, it must be acknowledged that the Landfill is the more significant contributor to the total noise emissions of the two assessed operations. The noise mitigation strategies already implemented for the Development are considered to be reasonable and feasible. As such, any further reductions by the Development are not considered appropriate. Strategies to respond to the predicted contributions by the Landfill are beyond the scope of this development application and EIS. Nonetheless, ongoing monitoring would be undertaken, in conjunction with onsite observations, to ascertain compliance and to feed into future performance reviews of noise mitigation strategies implemented at the Resource Recovery Precinct.

Road Traffic Noise

Elizabeth Drive is the closest public road to the Precinct, which provides road access to the Resource Recovery Precinct via the Precinct access road. Existing traffic noise along Elizabeth Drive is already significantly above the recommended noise criteria of the Road Noise Policy (DECCW, 2011). In all cases, the RNP states that traffic arising from development should not lead to an increase in existing noise levels of more than 2dBA. The Development would increase traffic volumes along Elizabeth Drive, however, the resulting impact on traffic noise would be in the order of an additional one to two dBA. As such, no additional mitigation or management measures are considered necessary.

Traffic

The Site is accessed from the intersection of Elizabeth Drive and the Resource Recovery Precinct Access Road. The closest major intersections to the access road are The Northern Road and Mamre Road. The Northern Road / Elizabeth Drive and the Mamre Road / Elizabeth Drive roundabouts currently operate with minimal queuing under existing traffic flows (LoS B) during both the AM peak (7:30 to 8:30 am) and PM peak (4:45 to 5:45 pm) hour periods. The Elizabeth Drive / Resource Recovery Precinct Access Road intersection currently operates at LoS F during the AM Peak period. This is due to the high average delay caused by heavy vehicles seeking to exit the Resource Recovery Precinct during peak hour traffic flows on Elizabeth Drive. The traffic flows along Elizabeth Drive make it difficult for heavy vehicles to exit, particularly in a westbound direction. The Elizabeth Drive / Resource Recovery Precinct Access Road intersection currently operates at LoS B during the PM Peak period.

Construction activities would generate a maximum of 30 heavy vehicles or 60 heavy vehicle movements per day. Construction would also generate approximately 130 construction light vehicles or 260 light vehicle movements during the peak construction period. The majority of construction vehicle movements are expected to enter and leave the Site between 5 and 6 am and between 4 and 5 pm. The Elizabeth Drive / Resource Recovery Precinct Access Road intersection is expected to operate at level of service (LoS) LoS A during the 5 to 6 am construction peak. The results also demonstrate that the level of service of this intersection during the PM Peak period would not be impacted by construction, with the LoS being comparable to the LoS in 2014 without the Development. The LoS of The Northern Road / Elizabeth Drive and Elizabeth Drive / Mamre Road intersections would be the same in 2014 with or without the Development. It can therefore be concluded that there is minimal impact to the road network as a result of construction traffic generated by the proposed Development. Nevertheless, it is recommended that a CTMP be put in place to manage the traffic generated during construction.

Background traffic growth on Elizabeth Drive is the major traffic issue for The Development, with high volumes of additional traffic forecast to use the road in future years. This growth necessitates that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection be upgraded to a 'seagull' intersection prior to the commencement of peak operations. The 'seagull' intersection would include a waiting bay for westbound vehicles exiting the Resource Recovery Precinct. This would be located in the median of the major intersection arm. In this instance a waiting bay would be provided in the median of Elizabeth Drive immediately to the west of the Resource Recovery Precinct Access Road. Westbound vehicles leaving the Site turn into this bay before merging with other westbound traffic. Although the detailed design is yet to be undertaken, this type of intersection layout ensures that vehicles do not need to cross two lanes of traffic in a single manoeuver, improving the operation of the intersection.

During operation, there would be an increase of both light and heavy vehicles. At the peak of operation of the Development, it is anticipated that an additional 46 vehicle movements per day would be generated, of which 10 are light vehicle movements generated by operations staff and 36 are heavy vehicle movements generated by waste deliveries and compost sales. Factoring in the intersection upgrade, the future year assessment of operation of the Development in 2016 and 2026 shows that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection operates at LoS E during the AM Peak. This is a considerable improvement on the existing situation, however, heavy vehicles departing the Site may still experience some delays when turning to the west. Other movements at the intersection, namely eastbound traffic exiting the Site, show improved performance as they are no longer required to wait behind westbound vehicles. The Elizabeth Drive / The Northern Road and Elizabeth Drive / Mamre Road intersections continue to operate at LoS B during both the AM and PM peak hours in 2016 and 2026 and therefore are not impacted by the proposed Development.

Surface and Groundwater

Surface Water

The existing SAWT facility includes one harvested stormwater pond, and three leachate ponds, with one acting as an overflow pond. The ponds are used to collect surface water and leachate for reuse on-site and to reduce reliance on potable water. Any excess leachate transported off-site for treatment and disposal. Stormwater that is not captured for use at the Site drains to the west into Badgerys Creek. There is no extraction of water from Badgerys Creek to supply the operational requirements of the existing SAWT facility.

The Development would continue to manage stormwater and leachate at the Site in a similar manner, except for a number of proposed improvements that would reduce potential risks to surface water. These include use of an enclosed tank array to store process leachate, internalisation of composting activities, and the preferential use of

leachate sources to reduce reliance on potable water and to reduce the risk of spills from external ponds containing poor water quality.

As a result of these improvements, the greatest potential impacts on hydrology and water quality during operation of the Development would result from:

- the management of excess leachate generated as a result of the Development
- an increase in the volume of stormwater drainage runoff generated from an increase in impervious areas
- overflows from the MSW Stormwater Leachate Pond to the Harvested Stormwater Pond located adjacent to the car park in the event of a leachate management failure, which could lead to discharges of leachate to Badgerys Creek
- spills and leaks resulting in discharge of contaminated stormwater during operation.

Around 2,700 kL per year of excess leachate would be generated by the Development, requiring 115 truck movements per year to transport the excess leachate off site for treatment and disposal. The removal of excess leachate off site remains as the preferred leachate management measure to minimise risks to surface water. Supplementary management measures were also considered, which identified the option to increasing the size of the SSO Stormwater Leachate Pond. Further consideration to the potential expansion of the SSO Stormwater Leachate Pond would be undertaken during detailed design to ensure that the benefits associated with reducing the reliance on off-site disposal is balanced against other potential costs (design, installation and management), Site constraints (in terms of space availability) and potential implications to operational flexibility.

The risk to water quality within Badgerys Creek as a result of an increase in impervious areas, spills or leaks would be minimised given the majority of stormwater collected within operational areas is harvested for reuse. Maintenance of the surface water management system would assist in minimising any risk of system failure and potential impacts on Badgerys Creek. Further, the vegetative buffer located between the Site and Badgerys Creek would be preserved to ensure an adequate buffer zone exists to provide an additional level of water quality protection to Badgerys Creek.

In the event that stormwater leachate overflows into the Harvested Stormwater Pond adjacent to the car park, the re-use of water from that pond would be suspended and all water would be pumped to tankers for treatment at an off-site location if not suitable for re-use at the Site. Stormwater discharges to Badgerys Creek would continue as currently permitted by the conditions of the existing Environment Protection License (EPL). Surface monitoring would also continue in accordance with the EPL and Environmental Monitoring Manual (SITA, 2011).

Construction activity also poses a risk to surface water and Badgerys Creek, such as due to the increase is erosion and sedimentation. To minimise these risks, construction works would be undertaken in accordance with the Construction Environmental Management Plan (CEMP), which would include a Soil and Water Management Plan (SWMP) and monitoring program.

Flooding

Flood modelling for the Development has not been completed as design levels for new infrastructure are all located above the approximate 1 in 100 year ARI level of 42 metres AHD. Finished floor levels for new buildings would be designed to tie into existing finished floor levels. As there would be no new proposed structures within the 1 in 100 year ARI flood level planning area, it is anticipated that there would not be any additional potential impacts of flooding to the Site or local flooding regimes as a result of the Development.

Groundwater

Groundwater in the region is intercepted at approximately 47 metres AHD to the south west of the Resource Recovery Precinct, and at approximately 39 metres AHD in the low lying floodplain areas to the west/north west of the Resource Recovery Precinct in the Badgerys Creek region (GHD, 2011). According to the groundwater vulnerability map (DLWC and NSW LPI, 2001), the Site is within an area of low groundwater vulnerability

The EPL for the Resource Recovery Precinct requires that groundwater is monitored in seven bore locations surrounding the Site. No increase or decrease in groundwater quality or levels has been reported for the Site through monitoring to date, indicating that the Resource Recovery Precinct has negligible impact on the groundwater environment. Results to date taken down-gradient of the Resource Recovery Precinct show that there is no impact to groundwater when compared with up-gradient groundwater chemistry (GHD, 2011).

All waste materials would be handled and stored on impermeable, reinforced concrete surfaces eliminating the risk of leachate migrating to the subsurface. Further, the storage of leachate would be either within HDPE lined stormwater leachate ponds or within enclosed leachate collection tanks for reuse within operations on Site. There would be an increase in impermeable surfaces, however, groundwater recharge at the Site is already considered to be minimal due to the presence of the existing SAWT facility and surface clays which form a capping layer and restrict rainfall infiltration to the subsurface. As a consequence, it is unlikely that the Development would significantly change groundwater hydrology or quality. Nonetheless, groundwater monitoring would also continue in accordance with the EPL and Environmental Monitoring Manual (SITA, 2011).

Potential impacts during construction on groundwater would be minimised and managed through the implementation of the Construction Environmental Management Plan (CEMP), which would include a Soil and Water Management Plan (SWMP) and monitoring program.

Geology and Soils

Soils at the Site consist of metasediments including claystone, siltstone, laminate, sandstone, coal and highly carbonaceous claystone and tuff. The Site also contains engineered fill upon which the structures for the existing SAWT facility were constructed. Construction activities would result in disturbance of underlying soils and fill and have the potential to result in erosion of soils. An Erosion and Sediment Control Plan (ESCP) would be prepared for the Site to manage soil erosion during construction. For operation of the Development, the majority of the Site would be covered with buildings and sealed surfaces such as hardstand areas, car parking areas, and access roads which would not give rise to erosion. Any areas not covered by buildings or sealed surfaces would be minimal (e.g. drains), and would be surfaced or landscaped so that they would not be susceptible to erosion. Therefore, there would be little to no potential for erosion to occur during operation.

Although lined with appropriate HDPE liners, decommissioning of the existing leachate collection pond adjacent to the maturation pad would require appropriate excavation, management and disposal of materials lining the leachate pond as materials may contain residual contamination as a result of prolonged retention of leachate. These excavated materials would be characterised with reference to the *Waste Classification Guidelines* (DECCW, 2009) to determine whether they could be reused in construction of the Development. If deemed unsuitable for reuse, the materials would be removed from the Site and disposed of at an appropriately licensed waste facility. The extended Compost Storage Pad would be constructed in an area that has been previously landfilled with solid waste within lined cells. The Compost Storage Pad (and associated drainage infrastructure) would be constructed and operated in a manner that does not compromise the capped landfill cell.

As part of the Development, all waste processing and composting activities would be conducted within enclosed buildings thereby eliminating the potential for contamination. Process leachate from the Composting Hall and Composting Tunnel System would be collected in bunded leachate tanks to the north of the Composting Hall rather than leachate collection ponds, thereby reducing the potential for leachate to migrate to the subsurface. The new stormwater leachate pond adjacent to the Compost Storage Pad would be lined with an impermeable geofabric to prevent the migration of leachate, as well as maintaining the existing HDPE lined stormwater leachate pond to the north of the Compost Storage Pad. All chemicals used at the Site would continue to be stored in sealed containers and indoors. Therefore, there would be little to no potential for contaminants associated with operations to enter underlying soils and migrate from the Site.

Potential acid sulfate soils (ASS) are waterlogged soil layers rich in iron sulphide, primarily pyrite. They generally occur in low lying areas. When excavation or drainage brings these soils into contact with oxygen, the pyrite is oxidised to form sulphuric acid. Due to the fact that the Site was filled to raise the existing SAWT facility above the 1 in 100 year ARI flood level, there is low potential for ASS. No potential ASS were identified during previous excavations connected with the existing landfill or construction of the existing SAWT facility. ASS mapping for the Site does not indicate any presence of ASS within the Development footprint (CSIRO, 2012). Since the Site was not identified as containing ASS, there would be no potential impacts associated with the disturbance of ASS.

Soils in the vicinity of Badgerys Creek have a high potential for salinity and may be dispersible if left disturbed for a long period of time (DIPNR, 2003). The remaining portion of the Site is reported as having moderate potential for salinity (DIPNR, 2003) with infilling utilising imported fill overlying natural soils to achieve finished surface levels. The Site has low potential for salinity in the area which would be disturbed as a result of the construction activities. Salinity risks at the Site would be reduced due to Site drainage arrangements (to reduce the likelihood of waterlogging), no removal of vegetation, minimal irrigation of water at the Site (associated with landscaped areas only) and protection of the riparian area associated with Badgerys Creek (which is identified as having a high potential for salinity).

Hazard and Risk

Consistent with the DP&I Multi-Level Risk Assessment approach and the *Hazardous and Offensive Development Guidelines Applying SEPP 33 (Applying SEPP 33)* (DP&I, 2011), the Development was considered in the context of its location, the quantity and type (i.e. hazardous nature) of dangerous goods likely to be stored and used, and the technical and safety management controls to be implemented in order to determine the appropriate level of hazard and risk assessment required. It was determined that a qualitative analysis would be appropriate for the Development given that:

- it involves expansion of the existing SAWT facility which currently stores, and would continue to store, small quantities of chemicals
- the majority of hazards would arise from potential equipment failure, and fire risks within the facility and the immediate surrounds, and that the facility would continue to employ appropriate measures to mitigate hazards and risks associated with operations.

The potential for hazard impacts to result from ventilation systems and biofilter failure, hazardous materials (including asbestos, lead acid batteries, paint cans and gas bottles, and radioactive materials) handling, chemical handling and storage, compost ignition/fire, fire in the surrounding area, enclosed spaces and engulfment, vermin and pests was assessed. It was determined that through the use of existing and enhanced systems, controls and processes, and implementation of recommended mitigation measures (including installation of a fire rated wall in the composting areas, development of a shutdown procedure in case of a fire in the composting areas, and updating the existing emergency response plan and Standard Operating Procedure for spill response for the Development) the hazards associated with the proposed Development would be appropriately managed. Therefore, it has been determined that the Development is not hazardous or offensive and therefore does not require further assessment under the provisions of SEPP 33.

Strategic Land Use Planning and Property

The Development would make an important contribution towards waste recovery and sustainable growth of Sydney for the next few decades and beyond. It would increase the capacity for additional diversion of waste and contribute to the realisation of the WARR Strategy 2007 targets, the State Plan, *Metropolitan Plan for Sydney 2036* (NSW Government, 2010) and the draft North West Subregional Strategy (NSW Government, 2007) (the draft Subregional Strategy).

The draft Subregional Strategy and the Metropolitan Plan identify the need to protect rural land uses from incompatible uses to maintain the ongoing viability of agricultural production. Conversely, both documents identify the need for future employment lands in the area and, in case of the Subregional Strategy, the need to ensure strategic planning for waste management facilities (including planning controls to minimise conflict).

To minimise the potential conflicts that the Development could have with surrounding rural and rural-residential properties, a number of design improvements and management measures have been proposed to minimise and manage odour emissions from the Site (as discussed earlier). However, it is acknowledged that odour levels at two sensitive receivers would be above the 4 OU criteria when considering the cumulative impacts of the Resource Recovery Precinct. To address the predicted odour levels, SITA continues to engage in discussions with these landowners to discuss measures that could be incorporated at the properties as well as ongoing consideration of additional reasonable and feasible measures that could be applied at the odour source.

The Development is also located within an area that has been identified as the possible extension to the WSEA, which would lead to a significant change from a rural to an industrial landscape (should it eventuate). The Development is unlikely to be significantly inconsistent with the NSW Government's future vision for employment uses (should it be similar to WSEA land uses) and is unlikely to constrain the realisation of the WSEA expansion (in isolation). Design responses and mitigation measures that have been proposed to minimise land use conflicts with existing land uses could possibly apply to future employment uses. However, due to the preliminary nature of the Department's investigation, there is no certainty to conclusively make this determination and it would not be appropriate for SITA to consider mitigation responses for land that does not currently have this development potential. Nonetheless, being an existing facility, there would be a need to consider the existence of the Development during further strategic investigations and SITA would participate in the future strategic land use investigations, where appropriate.

Landscape and Visual

The Resource Recovery Precinct is situated in a relatively open rural landscape. Existing vegetation is mainly associated with the riparian corridors of Badgerys Creek to the west and South Creek to the east. Badgerys Creek is a heavily vegetated riparian corridor, which makes up the western boundary of the Resource Recovery Precinct and joins with South Creek to the north of the Precinct. South Creek remains largely unvegetated across its length to the north west of the Precinct, however, becomes more vegetated as it traverses to the east of the Site. Other areas of existing vegetation are located to the north of the Precinct around the newly developing Twin Creeks Residential Estate, just south of the south eastern corner of the Precinct, and at rural residential properties in the form of scattered trees and vegetation. Landscape planting exists along the northern, eastern and southern fence lines of the Resource Recovery Precinct.

The surrounding topography is gently undulating, with the Resource Recovery Precinct located at the peak of a gently raised ridgeline, which extends south of Elizabeth Drive. This southern ridge line tapers gently to areas of lower elevation to the west, north and east to the riparian corridors of Badgerys Creek and South Creek. To the west of Badgerys Creek, the elevation gently rises up again to form a western ridgeline. Site elevation also rises from the low point at the confluence of Badgerys, South and Kemps Creeks to the north of the Resource Recovery Precinct, to a high point north west of Mamre Road.

Surrounding land use comprises mainly rural properties, several Sydney University owned facilities (research), small business (such as market gardens and chicken farms), the Twin Creeks Golf and Country Club and the associated developing residential estate to the north of the Precinct.

The Development would not require clearing of vegetation, with perimeter vegetation retained. This would retain some screening of the construction activity over the construction period. However, there would be temporary changes to the visual appearance of the Site as construction works progress. There would be up to four cranes at the Site during the civil works, building construction and plant installation. Although temporary, the booms (when fully extended) may be visible from surrounding sensitive receivers. However, given the mobility and transient presence of the cranes at the Site, the distance to sensitive receivers and the presence of earth moving machinery at the Resource Recovery Precinct as part of the landfill operations, the presence of cranes at the Site are unlikely to generate significant visual amenity impacts at the nearby sensitive receivers. Temporary flood lighting would be utilised at the Site to allow construction under limited natural lighting conditions. This would typically only be required during the winter months in the early morning hours and evening periods of low light. This may temporarily increase light spill from the Site.

The Development would involve a number of modifications to the existing facility, however, it would not significantly change the scale or look of the existing facility and all operations would remain consistent with that currently being undertaken on-site. This includes the façade of all new buildings which would be constructed consistent with existing construction materials and colours, the height of compost stockpiles at the expanded storage areas which would not exceed the maximum height of existing stock piles and the extent of night lighting which would be designed and operated to minimise intrusive impacts consistent with existing operations. The proposed additions to the facility (including the new stacks for the biofilters) would pose minimal intrusion to the landscape in the context of the existing SAWT facility.

The visual impacts of the final Development on surrounding receivers are generally considered not to be significantly adverse, due to the relative distance of all surrounding receivers, screening provided by intervening vegetation and the future mitigative effects of the final landform levels of the landfill. In particular, the distance of nearest receivers to the Development means that the change in dimension and height of the Development from the existing facility would not be significantly noticeable or pose significant additional intrusive impacts compared to the existing situation.

It is considered that with appropriate mitigation, designing lighting to minimise light spill and maintaining or supplementing landscaping at the facility, the visual impacts of the Development can be managed so as to not result in unacceptable intrusive impacts on surrounding receivers or the landscape.

Ecology

The Site has been extensively disturbed due to the landfill and there are only small pockets of highly degraded Eucalyptus species and virtually no natural understorey. There are two Endangered Ecological Communities (EEC) within the riparian area along Badgerys Creek. These consist of a small remnant of Cumberland Plain Woodland and a larger area of River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (River-flat Eucalypt Forest) with the riparian area. During a

survey in 2004, the Threatened Cumberland Land Snail (*Meridolum corneovirens*) was observed within the riparian area.

There is a single Roughbark Angophora (*Angophora floribunda)* located on the northern border of the Site which was preserved as part of the development of the existing SAWT facility. Due to the lack of native vegetation within the Site itself, the Site has low fauna habitat value and there have been no threatened fauna identified with the Site.

Direct impacts on the adjoining riparian areas, which contain two EEC's, would not occur as part of the Development. The single Roughbark Angophora which is present at the Site would not be impacted by the Development. As such, the Development is not anticipated to have any direct or indirect impacts on ecology subject to the implementation of the recommended mitigation and management measures such as maintaining the restriction on access to the adjoining riparian areas and fencing off the single Roughbark Angophora, prior to the commencement of the construction activities.

Heritage

The original landscape of the Resource Recovery Precinct (which includes the Site) has been significantly modified as a result of past and current quarrying and waste activities. A search of the Australian Heritage Information Management System (AHIMS) database on 17 August 2012 identified four registered Aboriginal archaeological sites within a 2.5 kilometre radius of the Resource Recovery Precinct. A review of the location of the sites indicated none of these occur within the Site, with the closest, artefact scatter 45-5-0528 occurring approximately 260 metres to the north. An archaeological assessment of the Site was conducted in 1991 as part of the original construction of the Resource Recovery Precinct. No Aboriginal sites were identified within the Site during the survey, however, one artefact scatter (KC/1 – 45-5-2367) was identified directly adjacent to the western boundary of the Resource Recovery Precinct. KC/1 consisted of 22 stone artefacts exposed over an area 35 metres long and 20 metres wide, and lying within 40 metres of Badgerys Creek. Artefact scatter KC/1 - 45-5-2367 was not identified during the AHIMS database search. The Development would not have any impact on aboriginal heritage items.

A search of historic registers was undertaken for items within a one kilometre radius of the Resource Recovery Precinct.This search identified one item listed on the Penrith LEP 2010, being the Fluers Radio Telescope site. It is understood that the telescope occupied the land between South Creek and Kemps Creek, which is over one kilometre to the east of the Site. While the exact locations of the telescope remains and associated structures are not known, impacts to Fluers Radio Telescope site are not anticipated given the distance from the Development. Therefore, no impacts to historic heritage items are anticipated as a result of the Development.

Socioeconomic

The Development has the potential to result in a beneficial social impact for the local economy through job creation. In the short term, construction activities are expected to generate up to 130 skilled and unskilled construction jobs at its peak, which would contribute directly to the PCC economy. SITA has also committed to sourcing construction materials locally where possible, which would provide financial benefits to the PCC and NSW economy. During operation, the Development is expected to create 22 full time equivalent (FTE) operational jobs, at the same time as supporting ancillary services in the local economy. The additional 22 staff would provide additional job prospects for the local community, bringing the total staff numbers to 60 FTE.

The Development is an expansion of an existing facility located on a site currently used for the same purposes. There would not be any significant social or economic trade-offs, such as the loss of grazing land or the loss of a potential industry as the facility is already operating. It would not result in any social displacement, would not require any land acquisition, and would not require a change in existing land use. Rather, there are likely to be social advantages as there would be an improvement in the environmental performance of the facility and amenity of the surrounding area as a result of the Development, particularly in relation to odour emissions.

Greenhouse Gas

The Development would result in the production of Green House Gases (GHGs) during both construction and operation, however it would also result in a reduction in some emissions released into the atmosphere as it diverts waste from landfill. During the construction phase of the Development, electricity, fuel and materials would be consumed. These activities would generate a total of approximately 2,805 tonnes of carbon dioxide equivalent (tCO_2-e) Scope 1, 2 and 3 emissions. The operation phase of the Development would also generate GHG emissions, for example from the consumption of diesel fuel and electricity to run the facility and the generation of fugitive emissions. It is estimated that the total annual operational Scope 1, 2 and 3 GHG emissions associated

with the Development (approximately 77,000 tCO_2-e) are approximately equivalent to 0.05 percent of NSW's annual GHG emissions (in 2009 to 2010).

To avoid/reduce GHG emissions associated with the Development, mitigation measures are recommended which relate to minimising the quantity and/or emissions intensity of electricity used, fuel used by plant and equipment and fuel used in the transport of materials; minimising the quantity and/or embodied carbon of materials used; and avoiding the generation of fugitive GHG emissions.

Justification and Conclusion

The 2009 Wright Review, commissioned by the former Minister for Planning, reviewed the remaining putrescible landfill capacity and demand in the Sydney metropolitan area to provide advice on future waste infrastructure needs. The Wright Review also recognised the need for substantial investment in further AWT capacity for both municipal and C&I sectors to enable the NSW Waste Targets to be met and maintained. While it was concluded that there is sufficient landfill capacity for more than 20 years to cater for Sydney's waste, these conclusions rely, in part, on increased investment in AWT facilities to divert greater amounts of putrescible waste from landfills. This would result in reduced pressures being placed on the remaining landfill capacity.

To achieve Commonwealth and State Government policies for waste avoidance and resource recovery in Australia and NSW, there is a growing and urgent need for further investment in AWTs in the Sydney metropolitan area and NSW. Therefore, there are two key areas supporting the justification for the Development:

- need with respect to the remaining limited landfill capacity, NSW State Targets and customer demand
- environmental benefits that would result from the Development.

At present, there are only a limited number of AWT facilities within the Sydney metropolitan area. This includes the existing SAWT facility, the UR-3R facility at Eastern Creek, the Earthpower facility at Camellia (which processes commercial organic waste), and to a lesser extent the Spring Farm ARRT. These provide limited capacity to further increase throughput over time. As a consequence, there has been additional pressure placed on technically proven facilities such as the existing SAWT facility at Kemps Creek.

The proposed Development represents a much needed investment in AWT technology in the Sydney metropolitan area, to meet growing demand and to deliver broader environmental and social benefits to Sydney and NSW by:

- diverting up to an additional 45,000 tpa of municipal waste from landfill and easing pressure on Sydney's remaining putrescible landfill capacity
- providing additional AWT capacity within the Sydney metropolitan area to address the shortfall in AWT capacity that is required to meet the demands of municipal councils
- contributing towards the realisation of the NSW WARR Strategy 2007 and NSW State target of 66 percent diversion of municipal waste away from landfill
- enhancing the environmental performance of the existing SAWT facility such as by installing and enclosed leachate treatment system and enclosed processing areas for treating MSW and SSO waste materials.

The Development would not result in significant environmental and social impacts, and would generate economic benefits through job creation during construction and operation. Where environmental and social impacts have been identified, particularly in relation to the cumulative odour and noise impacts associated with the Development and adjacent landfill, mitigation and management measures have been recommended to ameliorate these potential impacts wherever possible. In the case of potential odour impacts, SITA is currently in discussion with the affected landowner with the aim of reaching agreement regarding suitable mitigation.

Considering the benefits of the Development in meeting a growing demand for AWT technology and diverting waste from landfill, the fact that the Development would not have significant environmental and social impacts, and that mitigation is recommended to ameliorate impacts, the Development has a strong justification for proceeding and is considered to be suitable for approval under Part 4 of the EP&A Act.

1.0 Introduction

SITA Australia (SITA) is seeking approval for the expansion of the existing SITA Advanced Waste Treatment (SAWT) facility (the Development) at its Kemps Creek Resource Recovery Precinct (Resource Recovery Precinct) in western Sydney. The location of the Resource Recovery Precinct is shown in Figure 1-1. This Environmental Impact Statement (EIS) has been prepared by AECOM on behalf of SITA to provide a description of the proposed Development and to assess the associated potential environmental impacts of the Development. The EIS has been prepared in accordance with Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), together with the Director-General's Requirements (DGRs) which were issued to SITA on 16 May 2012 by the New South Wales (NSW) Department of Planning and Infrastructure (DP&I).

This chapter provides background information on the existing SAWT facility and describes the role of SITA in the context of waste management. It also provides an overview of the proposed Development, information on the environmental impact assessment process and an overview of the structure of this EIS.

1.1 Background and Purpose

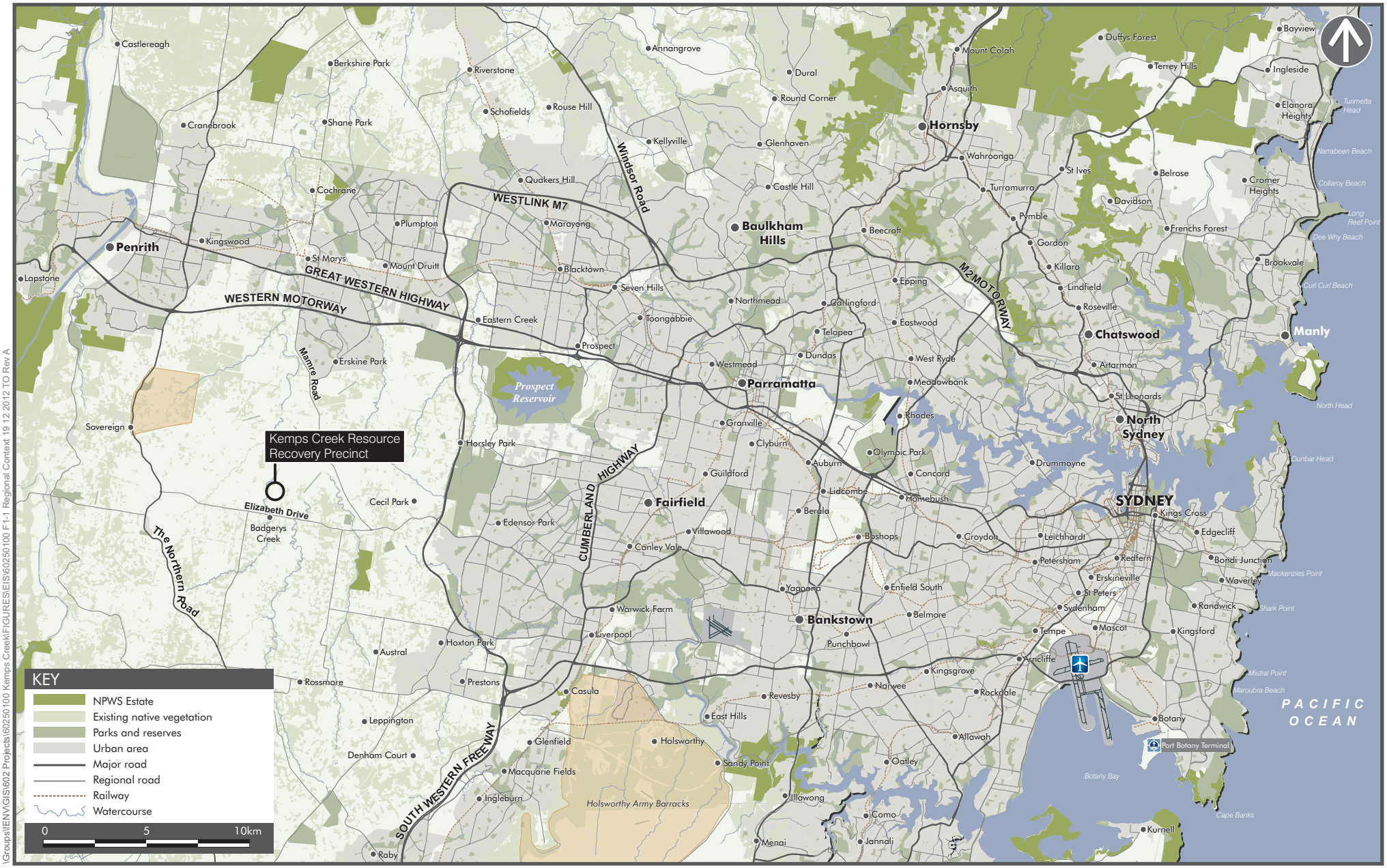
SITA's Kemps Creek Resource Recovery Precinct is currently characterised by two principal development components: the Elizabeth Drive Landfill (the landfill) and the existing SAWT facility. The area within the boundary of the existing SAWT facility, which is the location of the proposed Development, is referred to hereon as the Site. The location of the landfill and existing SAWT facility within the Resource Recovery Precinct are shown in Figure 1-2.

The landfill is currently operating under an existing development consent granted by Penrith City Council (PCC) under Part 4 of the EP&A Act on 22 October 1990 (DA number 451/89) for the continued operation and backfilling of Badgerys Creek Quarry. The development consent for the landfill has been modified with respect to staging of the final landform. The landfill has, and continues to, operate independently of the existing SAWT facility.

Major Project Approval (MP 06_0185) under Part 3A of the EP&A Act was granted in April 2008 for the construction of the existing SAWT facility on approximately eight hectares of land in the north western corner of the Resource Recovery Precinct. The intended maximum capacity of the facility was 134,400 tonnes per annum (tpa); up to 120,000 tpa of municipal solid, commercial and industrial waste, and organic waste, and up to 14,400 tpa of biosolids being accepted from sewage treatment plants.

Subsequent to receiving planning approval in 2008, SITA was awarded two contracts from Liverpool City Council (LCC) and PCC for the treatment of waste at the SAWT facility. Both contracts commenced in financial year 2009-2010, coinciding with the commencement of operation of the facility. The existing SAWT facility is currently operating at full capacity of 120,000 tpa of Municipal Solid Waste (MSW) and Source Separated Organic (SSO) materials. This is comprised of source separated food and garden organics and MSW from a range of councils including Penrith, Campbelltown, Camden, Wollondilly, Wingecarribee, Liverpool, Randwick City and City of Sydney.

Under market demand from the local government sector for waste processing, SITA now seeks approval for an increase in facility capacity to 220,000 tpa of household and organic commercial and industrial wastes. This expansion includes minor amended design elements, an extension to operating hours and inclusion of an additional enclosed composting system that links directly to the existing SAWT facility. SITA has previously considered seeking approval of these works through a modification to the original project approval, but has since determined that a fresh development application would be more appropriate, based on consultation with DP&I.



\Groups\ENVGIS\602 Projects\60250100 Kemps Creek\FIGURES\ESIS\60250100 F1-1 Regional Context 19 12 2012 TO Rev A

AECOM

LOCATION OF KEMPS CREEK RESOURCE RECOVERY PRECINCT

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 1-1



\Groups\IENVGIS\602 Projects\60250100 Kemps Creek\FIGURES\EIS\60250100 F1-2 Site Location 19 12 2012 TO Rev C

AECOM

SITE LOCATION

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 1-2

Proposed Development

The proposed Development would comprise an expansion of the existing SAWT facility including the following key changes:

- An increase in capacity of the facility to 220,000 tpa of input waste.
- Modifications to the current layout of operations at the Site and enhancements to the management of waste material (including a fully enclosed composting process) and process water.
- An increase in operating hours for indoor operations from 7 am to 11 pm Monday through Saturday to 24 hours per day, seven days a week.

Further details of the proposed Development are contained in Chapter 5 of this EIS.

1.1.1 Strategic Need and Justification for the Development

There are two key areas supporting the strategic justification for the Development:

- Need with respect to the regional waste framework and customer demand.
- Environmental benefits that would result from the Development.

There is, and has been for some time, intense pressure on the waste framework in NSW. Ageing landfill infrastructure, no new putrescible landfills being constructed in Sydney and increasing volumes of waste being generated has resulted in increasing pressure on existing facilities. The pressure is two-fold as facilities are facing pressure to increase their annual intake to meet demand they are also facing the possibility of reaching their capacity earlier than anticipated.

In addition, the Australian and State Governments have a variety of policies in place aimed at minimising waste generation and improving management, which has shaped an increased need for more sustainable waste processing technology and management from both the municipal and commercial sectors. These sectors are being increasingly driven to meet State Waste Targets identified through the NSW *Waste Avoidance and Resource Recovery Strategy 2003*, by increasing recovery and use of secondary resources and consequently reducing the need to landfill waste. Ever-increasing levels of material are required to be diverted away from landfill (66 percent for the municipal sector) in order to achieve policy outcomes for sustainable environmental management, as well as to ease pressure on ageing landfill infrastructure.

The existing SAWT facility currently diverts approximately 50 percent of the waste that would otherwise be directed to the adjacent landfill. This diversion is anticipated to rise even further with an increase in community awareness of management of household waste streams and potential changes to refuse derived fuel regulations. The current performance of the existing SAWT facility represents a significant diversion of material away from landfill and the capacity increase proposed as part of the Development could help to meet further local, regional and State objectives relating to waste management.

The existing SAWT facility is currently operating at full capacity of 120,000 tpa of MSW and SSO materials, as shown in Table 1-1 below.

Table 1-1 Waste Source and Quantities

Waste Source	Waste Type	Quantity (tpa)
Penrith City Council	SSO	30,000
Campbelltown, Camden, Wollondilly, Wingecarribee Councils	Organic material derived from MSW transferred from the Ecolibrium Organics Facility at Spring Farm for biological processing at the SAWT facility	30,000
Liverpool and Penrith Council contracts	MSW	50,000
City of Sydney and Randwick City Council contracts	MSW	10,000

The existing SAWT facility and Eastern Creek UR-3R facility are both currently operating at 100 percent capacity. The Spring Farm Advanced Resource Recovery Technology (ARRT) facility in south-west Sydney, originally approved for processing 90,000 tpa, no longer processes biological waste. As a long term solution, organic material is mechanically separated from MSW processed at the Spring farm ARRT and transported to the SAWT facility for biological processing.

The delay in development of an advanced resource recovery facility at Lucas Heights coupled with a loss of processing capacity in south-west Sydney has placed additional pressure on technically proven facilities such as the existing SAWT facility. The demand for transferring waste from SITA's other sites, as well as increasing demand from municipal councils, means that a far greater capacity is required than that of the current SAWT facility operations at Kemps Creek. An increase in capacity to 220,000 tpa proposed as part of the Development is expected to accommodate the projected demand.

The Development would also provide improved environmental outcomes. Following an extended commissioning phase, SITA would apply a number of technology advances to improve the overall environmental performance of the existing SAWT facility. The proposed design includes an enclosed leachate management system, enclosed composting operations and enhanced biofilters for the management of process air. This effectively removes the major sources of potential odour associated with the operation of the existing facility.

1.2 The Applicant

The Applicant, SITA Australia, is owned under a joint-venture by parent companies Suez Environment, a major global provider of infrastructure services in the areas of energy, water and waste, and Sembcorp Industries, a leading utilities and marine group.

The Applicant currently owns and operates a number of facilities nationally including:

- The Advanced Resource Recovery Technology (ARRT) facility in Port Stephens.
- The ARRT facility in Cairns.
- The BioWise composting facility in Perth as a joint venture with the Water Corporation of Western Australia.
- Waste recycling and transfer stations in Sydney, Melbourne and Perth.
- Neerabup ARRT facility in western Australia.
- Spring Farm ARRT facility in western Sydney.
- Open windrow composting operations in Victoria and New South Wales.
- Engineered landfills in Sydney, Melbourne and Perth.
- Numerous waste collection facilities in all mainland states serving over 800,000 households and more than 30,000 commercial/industrial clients.

In February 2011, the Applicant acquired the State Owned Corporation, WSN Environmental Solutions. This acquisition has expanded the Applicant's presence in New South Wales (NSW), with the addition of seven transfer stations, two putrescible landfills and resource recovery facilities for recycling, organics and MSW. The Applicant also has exclusive access to the Eastern Creek UR-3R Facility, which is capable of processing 220,000 tpa of waste.

1.3 Environmental Assessment Process and Approach

1.3.1 State Significant Development

The Development is considered to be State Significant Development (SSD) because it exceeds the thresholds under clause 23, Schedule 1 (waste and resource management facilities) of the *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional Development SEPP) being "development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste".

Accordingly, the Development Application (DA) for the Development will be assessed and determined as SSD by the Minister for Planning and Infrastructure, or the Minister's delegate, under Division 4.1, Part 4 of the EP&A Act.

1.3.2 Environmental Impact Statement

This EIS has been prepared to accompany the DA which will be lodged with the DP&I for the Development. It has been prepared in accordance with Part 4 of the EP&A Act and the EP&A Regulation, together with the DGRs which were issued to SITA on 16 May 2012.The DGRs issued to SITA are discussed in detail in Chapter 7 and included as Appendix A of this EIS.

1.4 Environmental Impact Statement Structure

This EIS has been structured to present the findings of the environmental assessment and consultation processes employed during this project. The structure of the EIS is shown in Table 1-2.

Table 1-2 Environmental Impact Statement Structure

Chapter	Issues Addressed
Executive Summary	Provides a summary of all the chapters of the EIS.
Chapter 1 Introduction	Provides background information on the Site, describes the role of the Applicant in the context of waste management, provides an overview of the Development, and information on the environmental impact assessment process and the structure of this EIS.
Chapter 2 Site and Context	Provides a detailed description of the Site and its history, and describes the areas surrounding the Site.
Chapter 3 Project Justification	Describes the justification and need for the Development.
Chapter 4 Assessment of Alternatives	Describes the alternatives to the Development and the consequences of not proceeding with the Development.
Chapter 5 Project Description	Provides an overview of, and a detailed description of, the proposed activities and works linked to the Development.
Chapter 6 Statutory Planning	Describes the legislative context of the Development, including the approvals required.
Chapter 7 Consultation and Issues Identification	Provides a discussion of formal procedures, proposed and/or undertaken with other agencies, as well as the consultation undertaken with the community, stakeholders, and relevant authorities as part of the approvals process. Presents the DGRs.
Chapter 8 Air Quality	Reports and details environmental issues with respect to the Development. These chapters: describes the existing environment discusses environmental implications describes environmental mitigation and management measures.
Chapter 9 Ecology	
Chapter 10 Land Use	
Chapter 11 Surface and Groundwater	
Chapter 12 Noise	
Chapter 13 Hazard and Risk	

Chapter	Issues Addressed
Chapter 14 Traffic	
Chapter 15 Geology and Soils	
Chapter 16 Landscape and Visual	
Chapter 17 Heritage	
Chapter 18 Socio Economic	
Chapter 19 Greenhouse Gas	
Chapter 20 Summary of Mitigation and Management Measures	Provides a summary of environmental mitigation, management and monitoring responsibilities in relation to the construction and operation of the Development. It also presents the environmental performance objectives and criteria for guiding development of the Site.
Chapter 21 Residual Risk Analysis	Provides an analysis of the residual environmental risk based on the likely impacts of the Development and the ability to manage those impacts to minimise harm to the environment.
Chapter 22 Justification and Conclusions	Provides justification for the Development and summaries the findings of the EIS.
Appendix A Director General's Requirements	Provides the Director-General Requirements issued by the Director-General in response to the Kemps Creek AWT Scoping Document.
Appendix B Air Quality Technical Report	Provides a detailed technical investigation, in complete report format, of pertinent environmental issues with respect to the Development.
Appendix C Noise Technical Report	
Appendix D Traffic Technical Report	
Appendix E Water Balance Technical Report	
Appendix F Ecology	Provides *Environment Protection and Biodiversity Conservation Act 1999*and *Threatened Species Conservation Act 1995* search results for Commonwealth and State listed threatened ecological communities and species, and migratory species.
Appendix G Greenhouse Gas Technical Report	Provides a detailed technical investigation, in complete report format, of greenhouse gases with respect to the Development.

2.0 Site and Context

This chapter provides a detailed description of the Site and its history, and describes the areas and land uses surrounding the Site.

2.1 Site Location

The Site is located approximately 41 kilometres west of the Sydney Central Business District (CBD). The towns of Kemps Creek and Badgerys Creek are located approximately five kilometres east and five kilometres south west of the Site, respectively. The Site is located within the Penrith Local Government Area (LGA).The regional context in which the Site is situated is illustrated in Figure 1-1.

The Site is located within the boundary of the existing Kemps Creek Resource Recovery Precinct (refer to Figure 1-2). The Site covers an area of approximately eight hectares and is located in the north western corner of the Resource Recovery Precinct. The Site currently comprises the existing SAWT facility.

Access to the Precinct is via Elizabeth Drive, which is an east-west connector road providing access from the M7 Westlink from the east, and The Northern Road from the west. The existing SAWT facility is located within a fully fenced compound at the end of a dedicated access road between the facility and the main entrance to the Resource Recovery Precinct.

2.2 Legal Description

The land to which the proposed Development is associated (the Site) forms part of the Kemps Creek Resource Recovery Precinct. The Site property description and ownership is listed in Table 2-1.

Table 2-1 Land Description and Land Ownership

Land Description	Land Ownership
Part Lot 740, DP 810111	SITA

2.3 Site History

Kemps Creek Resource Recovery Precinct within which the Site is located has a history of quarrying and landfilling of voids with waste materials. A detailed history of the Resource Recovery Precinct is provided in Table 2-2.

Table 2-2 History of Land Use on the Site

Date	History
Pre 1990	- An operational quarry known as the Badgerys Creek Quarry for extracting clay, shale, sandstone and laminate.
1990 – 2001	- In 1990 the landfill was given approval from PCC for backfilling the voids with General Solid Waste (non-putrescible), Restricted Waste, Asbestos Waste and Waste Tyres. - Continued operation of the quarry 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. - Rezoning of the landfill occurred in 2007 to allow waste treatment as a permissible site use.

Date	History
2008 – present	- The existing SAWT facility was constructed and commenced operations to separate and treat putrescible waste materials for production of saleable compost materials. - Landfill operations continue consistent with the requirements of the EPL. - Quarrying operations continue within the landfill site.

Source: Maunsell AECOM, 2007

2.4 Precinct Planning History

The following section provides an outline of the planning history for both the landfill and the existing SAWT facility. The landfill was first approved in 1990 by PCC, and the existing SAWT facility was first approved in April 2008 under Part 3A of the EP&A Act.

2.4.1 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" (Quarry). Prior to this, the Quarry had operated for a reasonably long period of time and it appeared to the then owner and operator that the most effective method of rehabilitation was the backfilling of the subsequent void with solid, non-putrescible waste materials.

The Quarry was approved subject to 79 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.

This approval has been subsequently modified on two occasions, under section 96 of EP&A Act as follows:

- Modification to the consent to reflect the need for SITA to comply with its EPL and Landfill Environmental Management Plan (LEMP). This modification included conditions specifying that the LEMP must detail: vegetative screening, erosion and sediment controls and water quality maintenance works, clean water diversion drains and that the finished landform shall have a minimum slope of five percent.
- Modification – Operation of a Non-Putrescible Waste Landfill.
- Alteration to Finished Landform and Operating Hours approved in 2009.

2.4.2 Rezoning

In 2007, the Site was rezoned to permit a waste treatment facility as a permissible use on the Site. As a result of the public exhibition period for the rezoning of the Site (displayed in June 2005), public authority comments were received from Blue Mountains City Council, Hawkesbury City Council, and Rural Fire Services. These comments were taken into account by PCC during its decision making process for the rezoning. The rezoning was approved by the then Minister for Planning and gazetted on 16 February 2007.

2.4.3 Major Project Approval MP 06-0185 – SAWT Facility

Major Project Approval (MP 06-0185) under Part 3A of the EP&A Act was granted in April 2008 for the construction of the existing SAWT facility. At full capacity, the existing SAWT facility would be 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.

The existing SAWT facility, which is now operational under Part 3A, incorporates technologies used by SITA both in Europe and at the BioWise Waste composting facility in Perth, Western Australia. The waste management process at the existing SAWT facility is generally as follows:

- receive waste in an enclosed building
- mechanically separate the putrescible and non-putrescible fractions of the waste
- recover recyclables from the waste using manual sorting and other techniques
- compost the putrescible fraction of the waste

- mature the compost
- refine the compost to remove contaminants (such as glass and plastics) and produce a range of compost and mulch products
- dispose of non-putrescible residual material at the landfill within the Resource Recovery Precinct.

Prior to submitting a Part 3A application for the existing SAWT facility, SITA applied for, and received, Director-General's Requirements (DGRs) for the application under Part 4 of the EP&A Act. The DGRs were issued in March 2004.Subsequently, SITA lodged an application under Part 4 of the EP&A Act to build the SAWT facility in 2005. The SAWT facility was considered 'designated development' as defined by Schedule 3 of the EP&A Regulation. However, on 1 August 2005, the NSW Government amended the EP&A Act by introducing a new Part 3A to deal with major projects. The DGRs for the SAWT facility were reviewed and re-issued under Part 3A on 28 December 2005. Approval for the existing SAWT facility was granted under Part 3A in April 2008.

2.4.4 Development Application for Gas to Energy Platform and Gas Collection System

SITA submitted a DA to PCC under Part 4 of the EP&A Act on 22 June 2012 for a proposed 1.4 MW generator at the Resource Recovery Precinct. It would operate on a supply of landfill gas from the adjacent landfill at a rate of 750 cubic metres per hour, providing a continuous source of power. If approved, the Development would be connected to the generator. The value of the proposed works would be up to $2 million. The application is yet to be determined by Council.

2.4.5 Application for Modification of Existing SAWT Facility

Prior to the preparation of this EIS, SITA considered seeking approval of the Development through a modification of its Project Approval MP 06_0185. The proposal was for an increase in capacity, minor amended design elements, an extension to operating hours and inclusion of an additional maturation area. However subsequent to liaison with DP&I, it was determined that a fresh DA would be more appropriate (the subject of this EIS).

2.5 Site Description

2.5.1 Kemps Creek Resource Recovery Precinct

The Resource Recovery Precinct is located at the peak of a gently raised ridgeline, and generally grades gently from east to west towards Badgerys Creek. Except for the riparian area adjacent to Badgerys Creek, most of the Precinct has been cleared of vegetation. The Precinct continues to be subject to extensive quarrying, particularly for surface clays. As a consequence, the ground surface and landform has been substantially altered over time.

Much of the Resource Recovery Precinct is currently used as a solid waste landfill, which is owned by SITA. The Precinct was used extensively for landfilling prior to the construction of the existing SAWT facility. The landfill is licensed by the NSW EPA under the *Protection of the Environment Operations Act 1997* to receive general solid waste (non-putrescible), restricted waste, asbestos waste, waste tyres and also inert residual materials from the SAWT process. The landfill receives approximately 500,000 tpa of waste materials.

While the landfill continues to operate, residual materials from the SAWT facility will continue to be disposed in the landfill with no changes to the licences necessary to accommodate the Development.

2.5.2 Existing SAWT Facility

The Site, consisting of the existing SAWT facility, currently processes MSW and SSO materials for production of saleable quality compost, consequently reducing the amount of waste going to landfill. The existing SAWT facility commenced operations in mid-2009, and can receive up to 120,000 tpa of input waste per annum, which comprises both MSW and SSO materials. The facility can also accept up to 14,000 tpa of biosolids. The SAWT process employs a combination of mechanical separation, manual sorting, and biological composting technologies. This process is classified as a Mechanical Biological Treatment (MBT) system, and comprises three key stages:

- recovering organics and recyclables through a mechanical resource recovery process
- aerobic composting of the organic waste
- on-site preparation of compost to remove any residual contaminants for sale to market.

The SAWT facility consists of:

- an access road from the main entrance to the Resource Recovery Precinct off Elizabeth Drive
- Receival Hall for receival of waste, Resource Recovery Building for removal of recyclables and contaminants, and Tunnel Composting System for composting waste materials
- Biofilters and Biofilter Plant room, housed in an adjacent structure
- administration annexe to the main building
- graded external paved areas for vehicle marshalling and for maturation pads
- Maturation Pads for the maturing of compost removed from the Tunnel Composting System
- Compost Storage Pad for finished compost (this pad is located on the landfill site and operates under the landfill EPL)
- ponds for leachate, leachate overflow and stormwater management
- ancillary infrastructure such as fire water storage tanks and electrical substations.

The existing SAWT facility layout is shown in Figure 2-1. The dedicated internal access road to the Site encircles the existing, fenced landfill from the south east. The road to the Site can only be accessed after vehicles cross the weighbridge and gate entrance, providing a connection from Elizabeth Drive.



\Groups\IENV\GIS\602 Projects\60250100 Kemps Creek\FIGURES\EIS\60250100 F2-1 Layout of the Existing SAWT Facility 19 12 2012 TO Rev C

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LAYOUT OF THE EXISTING SAWT FACILITY

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 2-1

2.6 Surrounding Land Use

The land surrounding the Resource Recovery Precinct consists primarily of rural agricultural land, residential holdings with stables for horses, and rural residential dwellings. The following section provides an outline of the land use surrounding the Precinct.

North

- Immediately adjacent to the Resource Recovery Precinct boundary is “Fleurs”, rural land owned by the University of Sydney.
- Beyond the immediate northern boundary are the properties Twin Creeks Golf and Country Club and the Twin Creeks residential estate.
- Further north of the Twin Creek Golf and Country Club is Erskine Business Park, the Sydney suburb of St Clair and the M4 Western Motorway.

West

- Badgerys Creek borders the Precinct to the west, forming part of the Hawkesbury-Lower Nepean River System. A vegetative buffer is maintained along much of its length, adjacent to the Precinct where the creek forms the property boundary.
- McGarvie-Smith Farm, owned by the University of Sydney. The property consists predominantly of clear open agricultural land with a number of dams capturing stormwater runoff.
- Further west is Luddenham Road accessed by Elizabeth Drive. Continuing west Elizabeth Drive intersects with The Northern Road.

South

- A number of rural residential properties are located immediately south of the southern boundary of the Resource Recovery Precinct consisting of vegetated and cleared lands.
- Elizabeth Drive runs east-west approximately 500 metres from the southern boundary of the Resource Recovery Precinct.
- The Australian Native Landscapes (ANL) composting operation is located on the southern side of Elizabeth Drive.
- Further to the south is the Royal Australian Air Force Telecommunications Unit located adjacent to the intersection between the Northern Road and Badgerys Creek Road.
- South-west of the Landfill Site is the rural town of Badgerys Creek.

East

- Located along the immediate eastern boundary of the Precinct are two residential holdings and South Creek.
- Further east are the Sydney suburbs of Kemps Creek and Mount Vernon, the Sydney International Shooting Centre and the Liverpool Offtake reservoir.
- Elizabeth Drive intersects with Mamre Road, providing access to the Westlink M7 Motorway.

3.0 Strategic and Project Justification

This following chapter describes the strategic need and justification for the Development as documented in the aims and objectives of relevant State policies and plans. The consistency of the Development with relevant laws, regulations and planning policies is described in Chapter 6 of this EIS.

3.1 Commonwealth and State Policies

3.1.1 National Waste Policy: Less Waste, More Resources

The *National Waste Policy: Less waste, more resources* (Department of the Environment, Water, Heritage and the Arts, 2009) (the National Waste Policy) came into effect in November 2009 and was endorsed by the Council of Australian Governments (COAG) in October 2010.

The National Waste Policy is a collaborative policy that sets the direction for waste management and resource recovery from 2010 to 2020 in Australia. The aims of the policy are to:

- avoid the generation of waste and reduce the amount of waste (including hazardous waste) for disposal
- manage waste as a resource
- ensure that waste treatment, disposal, recovery and re-use is undertaken in a safe, scientific and environmentally sound manner
- contribute to the reduction in greenhouse gas emissions, energy conservation and production, water efficiency and the productivity of the land.

Six key directions and 16 priority strategies for the first five years (2010 through 2015) were established to achieve the aims of the National Waste Policy, and are detailed in the National Waste Policy Implementation Plan. One of these key directions is to “Pursue sustainability – less waste and improved use of waste to achieve broader environmental, social and economic benefits”. At present, the priority strategies are focused on addressing emissions from landfills and other waste activities, to achieve major improvements in avoidance and re-use of the commercial and industrial waste stream, and to build on existing commitments to continue reductions in the amount of biodegradable material sent to landfill (through the development of national standards and improvements to markets).

The Development is consistent with the key direction of pursuing sustainable waste management by reducing the amount of waste sent to landfill (and the associated greenhouse gas emissions from landfill gas), and providing a product that can be beneficially used (compost).

3.1.2 NSW Waste Avoidance and Resource Recovery Act 2001 and the NSW Waste Avoidance and Resource Recovery Strategy 2007

The NSW *Waste Avoidance and Resource Recovery Act, 2001* (WARR Act) provides the State’s legislative framework for waste avoidance and resource recovery in NSW. It establishes the hierarchy for waste management to ensure that resource management options in NSW are considered against the following priorities, in the following order:

- avoidance of unnecessary resource consumption
- resource recovery (including reuse, reprocessing, recycling and energy recovery)
- disposal.

The WARR Act also aims to provide for the continual reduction in waste generation, and to encourage the re-use and recycling of waste.

The *NSW Waste Avoidance and Resource Recovery Strategy, 2007* (WARR Strategy 2007), a requirement of the WARR Act, provides guidance to focus the efforts and priorities of State agencies, local governments, industry and the broader community in waste prevention, avoidance, reuse and recovery. The WARR Strategy 2007 replaced the WARR Strategy 2003, and continues the goals and targets established in 2003 for the State in four areas (the NSW State Targets):

- **Goal 1** – preventing and avoiding waste with a target of holding the level of waste generated over a five year period (being 2003 to 2008).
- **Goal 2** – increasing recovery and use of secondary materials. To achieve this outcome, targets were set to increase the recovery and use of secondary materials in the three major waste streams by 2014 as follows:
    - municipal waste from 26 to 66 percent
    - commercial and industrial (C&I) waste from 28 to 63 percent
    - construction and demolition waste (C&D) from 65 to 76 percent.
- **Goal 3** – reducing toxicity in products and materials by phasing out priority substances in identified products by 2014, or if not possible, achieving maximum recovery for re-use.
- **Goal 4**– reducing litter and illegal dumping reported annually by regulatory agencies, using 2003 as the base year.

The WARR Strategy 2007, in combination with other initiatives, has shaped a need for more sustainable waste processing technology and management from both the municipal and commercial sectors. Producers are now under pressure to meet State Waste Targets identified through the WARR Strategy 2007 by increasing recovery and use of secondary resources (subsequently avoiding waste to landfill).

In order to achieve the NSW Government's sustainable environmental management targets, it will be necessary to divert ever increasing quantities of waste materials away from landfill. Achieving greater diversion from landfill will have the added benefit of reducing pressure on the remaining and limited capacities of landfills in NSW.

The Development is consistent with and would assist in realising the objectives of the WARR Act and the NSW State Targets by providing increased capacity to process waste generated within the Sydney metropolitan area that would otherwise be directed to landfill and in doing so, creates a resource and reduces pressure on remaining landfill capacities.

3.1.3 NSW 2012: A plan to make NSW number one

NSW 2021: A plan to make NSW number one (Department of Premier and Cabinet, 2011) (the State Plan) was released in September 2011 and is the NSW Government's strategic plan for the future. It is a 10 year plan for change in NSW, and it aims to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability and strengthen our local environment and communities.

Goal 23 of the State Plan includes the target to increase recycling to meet the NSW State targets for waste recycling, to limit the amount of space required for landfill and to turn waste into a valuable resource. Actions to achieve this target include a review of the waste levy, continuing support for local council recycling through guidance and assistance programs, and support for Community Drop-Off Centres to make recycling easier.

The Development would increase the capacity for additional diversion of waste and contribute to the realisation of the WARR Strategy 2007 targets and the State Plan. With continued pressure on local governments to increase the diversion of waste, there will be an increased pressure for additional or expanded facilities (such as the Development) to provide additional processing capacities.

3.2 Need and Justification for the Development

There are two key areas supporting the need and justification for the Development:

1) Need with respect to the remaining limited landfill capacity, NSW State Targets and customer demand.

2) Environmental benefits that would result from the Development.

3.2.1 Landfill Capacity in the Sydney Metropolitan Area

Putrescible waste generated within the Sydney metropolitan area is currently disposed of at the Eastern Creek, Woodlawn, Belrose and Lucas Heights landfills. In 2007 and 2008, more than 1,850,000 tonnes of putrescible

waste generated within the Sydney metropolitan area was sent to landfill (Wright Corporate Strategy Pty Ltd, 2009).

The *Public Review - Landfill Capacity and Demand* (Wright Corporate Strategy Pty Ltd, 2009) (the 2009 Wright Review), commissioned by the former Minister for Planning, reviewed remaining putrescible landfill capacity and demand in the Sydney metropolitan area to provide advice on future waste infrastructure needs, and to update the *Independent Public Assessment – Landfill Capacity and Demand* published in September 2000. The review covered the period of 2009 to 2024, and considered three demand scenarios involving different levels of investment in municipal waste and C&I AWT facilities servicing Sydney.

The 2009 Wright Review made the following findings and conclusions:

- Over 20 years of capacity is available for the disposal of Sydney's putrescible waste at the current rate of two million tonnes per year. However, it was noted that at the time of the 2009 Wright Review, the Eastern Creek landfill had only four to six years of active life before being closed to general putrescible waste and Belrose landfill was nearing closure.
- There is a serious, and probably chronic, shortfall between the annual amount of putrescible waste requiring disposal and the annual waste input limit placed on remaining landfills. The gap increases as a result of the scheduled waste input cap reductions at the major landfills and the progressive depletion and closure of landfills (for example, Eastern Creek and Belrose landfills).
- An aggregate waste input cap of around two million tonnes per year would be necessary to meet immediate landfill demand.
- Further reductions in the amount of putrescible waste disposed at landfill rests on increased AWT processing in the municipal and C&I sectors, increased recovery of recyclable materials in the municipal sector and increased garden waste recovery.
- The infrastructure investment that is required to deliver the three modelled scenarios is mainly required for AWT development, which substantially exceeded the rate of investment in Sydney's waste processing infrastructure (at the time of the review).
- The removal of the annual input caps as a regulatory measure would have no adverse impact on resource recovery initiatives and would not increase the volumes of putrescible waste sent to landfill.

While it was concluded that there is sufficient landfill capacity for more than 20 years to cater for Sydney's waste, these conclusions rely, in part, on increased investment in AWTs to divert greater amounts of putrescible waste in order to reduce pressure on the remaining landfill capacity.

Since the release of the 2009 Wright Review, there has been limited investment in AWT facilities for municipal waste in Sydney. In fact, the review assumed that a number of proposed or approved AWTs would be fully operational by 2018/2019. These facilities, which would have provided an additional capacity of 440,000 tpa by 2018/2019, have not been realised (to date) or are no longer proceeding[1].

The Development represents a much needed investment in AWT technology in the Sydney metropolitan area, which would result in an additional 100,000 tpa of Sydney's municipal waste being diverted from landfill. The Development has the advantage of expanding a proven facility to provide additional capacity for putrescible waste throughput. This in turn would assist in reducing pressure on Sydney's remaining landfill capacity.

3.2.2 Waste Diversion in NSW and the Sydney Metropolitan Area

In 2008 and 2009, approximately 16.3 million tonnes of waste was generated in NSW, of which 9.5 million tonnes was recycled and 6.7 million tonnes went to landfill (DECCW, 2010). For municipal waste, this constituted around 44 percent of the municipal waste being diverted away from landfill (refer to Table 3-1).

An additional 1.3 million to 1.7 million tonnes of waste would need to be recovered to meet the WARR Strategy 2007 municipal waste diversion target of increasing recovery and use to 66 percent by 2014 (DECCW, 2010).

[1] As of September 2012, the Woodlawn AWT and Lucas Heights AWT have been approved but not constructed. The Chullora AWT never proceeded to assessment and the Part 3A declaration has been revoked.

Table 3-1 Progress Towards the NSW Recycling Targets for Municipal Waste in NSW and the Sydney Metropolitan Area (SMA)

Region	Percentage of Municipal Waste Diverted from Landfill				
	2002–03	2004–05	2006–07	2008–09	2014 Target
NSW	30	33	38	44	66
Sydney Metropolitan Area	33	37	42	51	

Source: DECCW, 2010

In DECCW's review of the WARR Strategy 2007, it was concluded that waste avoidance strategies (although important in the long term) may not achieve the desired diversion target and that a greater focus would be required on increasing resource recovery. To do so, targeted education programs and "significant improvements in source separation and/or processing of household waste (including the construction of additional or enhanced AWT facilities or new technologies…)" would be needed (DECCW, 2010).

The 2009 Wright Review also recognised the need for substantial investment in further AWT capacity for both municipal and C&I sectors to enable the NSW Waste Targets to be met and maintained.

At present, there are only a limited number of AWT facilities within the Sydney metropolitan area being the existing SAWT facility, the UR-3R facility at Eastern Creek, the Earthpower facility at Camellia (which processes commercial organic waste) and the Spring Farm ARRT (formerly Jacks Gully). These provide limited capacity to further increase throughput over time, given:

- the existing SAWT facility and UR-3R facility are operating at full capacity
- the Spring Farm ARRT facility no longer provides a biological process (following a technical review of the facility by SITA in 2011) with organic material that is mechanically separated from MSW being transported to the existing SAWT facility for biological processing as a long-term solution
- approved additional AWTs at Woodlawn and Lucas Heights have not eventuated or have been delayed.

As a consequence, there has been additional pressure placed on technically proven facilities such as the existing SAWT facility at Kemps Creek.

The Development would provide an increase of 100,000 tpa of municipal waste processing capacity, which represents a significant opportunity to divert municipal waste from landfill in the Sydney metropolitan area and NSW. This would assist the NSW Government in achieving its goal of increasing recovery and use of secondary materials in NSW, and in doing so, contribute towards the achievement of the NSW State targets.

3.2.3 Capacity Constraints at the Existing SAWT facility

The existing SAWT facility currently diverts approximately 50 percent of its intake (120,000 tpa of mixed waste and SSO) from landfill. This diversion is anticipated to rise even further with the increase in community awareness of management of household waste streams and potential changes to refuse-derived fuel regulations. The current performance of the existing SAWT facility represents a significant diversion of material away from landfill and a capacity increase could help to meet further local, regional and State objectives.

As stated in Section 3.2.1 and shown in Table 3-2, the existing SAWT facility is currently operating at full capacity of 120,000 tpa of mixed waste and SSO. The facility also accepts up to 14,400 tpa of biosolids.

Table 3-2 Waste Source and Quantities

Council	Quantity (tpa)	Waste Type
Penrith City Council	30,000	SSO
Campbelltown, Camden, Wollondilly, Wingecarribee Councils	30,000	Organic material derived from MSW transferred from the Spring Farm ARRT facility for biological processing at SAWT
Liverpool and Penrith Council	50,000	MSW
City of Sydney	10,000	MSW

The demand for waste transferring from SITA's other sites, as well as increasing demand from municipal councils, means that a far greater capacity is required than that of the existing SAWT facility at Kemps Creek. The Development, which would result in a total capacity of 220,000 tpa, would accommodate around 40 percent of the projected demand of approximately 250,000 tonnes of processing from the municipal sector within the next five years.

3.2.4 Market Demand for Compost

In general, there is a demonstrable benefit from the addition of compost to soils, providing a nutrient supply and an improvement in soil physical properties, such as porosity improvement and water retention capacity.

The addition of food into a garden organics stream greatly enhances the nutrient properties of the resulting compost, opening up alternative markets. Contaminant free compost derived from SSO meets the requirements for the urban and intensive agriculture market, such as turf farms and vegetable production. The organic farming industry is growing at a rate of 10 to 15 percent annual compounded growth (BFA, 2012).

Although the markets for MSW derived compost are quite different, there is a demand for organic additives to improve soil quality for essential activities including forestry, broadacre agriculture and remediation of disturbed soils such as mine sites.

Clause 51 and Clause 51A, Part 6 of the *Protection of the Environment Operations (Waste) Regulation 2005* specifies certain requirements (the NSW General Exemption) for organic outputs derived from mixed waste. The NSW General Exemption has progressively become tighter to improve the quality of the output compost, to ensure that the standards set down by the market are maintained.

3.2.5 Operational Improvements and Environmental Benefits

In addition to providing a significant increase in waste diversion and treatment capacity in the Sydney metropolitan area, the Development would improve operations at the existing SAWT facility. This would be achieved with technology improvements and streamlined efficiency measures, providing additional environmental and social benefits. The proposed design includes an enclosed treatment system and enclosed processing areas for treating MSW and SSO materials, effectively removing the two major sources of potential odour associated with the operation of the existing facility. A summary of the key advantages of the Development, relative to existing operations, is provided below:

- material handling and composting would be enclosed and leachate would be collected in enclosed tanks, resulting in a reduction in odour emissions
- there would be no external composting or maturation of SSO or MSW material with only limited storage of completed compost occurring in open air conditions
- inclusion of new technologies that improve recovery of recyclables and removal of contaminants from compost
- greenhouse gas emissions from operations (on a per input tonne basis) would be reduced as there would be a reduction in the amount of front end loader operations, improved energy efficiency and reduction in manual handling (reduced fuel and electricity consumption).

3.3 Summary of the Need for the Development

To achieve Commonwealth and State Government policies for waste avoidance and resource recovery in Australia and NSW, there is a growing and urgent need for further investment in AWTs in the Sydney metropolitan area and NSW. The Development is needed to meet this demand and to deliver broader environmental and social benefits to the region, Sydney and NSW by:

- Diverting up to 45,000 tpa of municipal waste from landfill and easing pressure on Sydney's remaining putrescible landfill capacity.
- Providing additional AWT capacity within the Sydney metropolitan area to address the shortfall in AWT capacity that is required to meet the demands of municipal councils.
- Contributing towards the realisation of the NSW WARR Strategy 2007 and NSW State target of 66 percent diversion of municipal waste away from landfill.
- Enhancing the environmental performance of the existing SAWT facility, particularly reduced odour impact on the immediate environment.

4.0 Assessment of Alternatives

This chapter describes the process of assessing alternatives and selecting a preferred alternative to meet the need for additional waste treatment capacity in Sydney and NSW, as described in Chapter 3 of this EIS. The alternatives considered include:

- the 'do nothing' alternative which would require maintaining the status quo at the Site and not expanding the existing SAWT facility
- development of a new facility in the Sydney area or a new processing facility in the wider region
- expansion of the existing SAWT facility
- technological alternatives associated with expansion of the existing SAWT facility.

4.1 The 'Do Nothing' Alternative

The 'do nothing' alternative would require maintaining the status quo at the Site, which would mean the existing SAWT facility would continue to receive up to 120,000 tonnes per annum of MSW and SSO materials, and up to 14,400 tonnes per annum of biosolids, and the waste would be composted using existing technology.

As discussed in Chapter 3 of this EIS, the NSW State Government has a variety of policies in place aimed at minimising waste and improving management, including the NSW *Waste Avoidance and Resource Recovery Strategy, 2007* and the *NSW 2012: A plan to make NSW number one*. Specifically, the NSW Government has adopted targets to increase the recovery and use of secondary materials across the three major waste streams, being municipal waste, commercial and industrial waste, and construction and demolition waste. For municipal waste, a target of 66 percent of municipal waste diverted from landfill by 2014 has been identified in order to achieve policy outcomes for sustainable environmental management, as well as to ease pressure on ageing and limited landfill infrastructure.

To achieve the Government's policies and targets, there will be an increased demand for waste recovery and recycling facilities, such as the existing SAWT facility, to assist in further reducing the reliance on landfill disposal in NSW. Under a 'do nothing' scenario, the existing SAWT facility, which is operating at full capacity, would have no opportunity to respond to the increasing demand for waste reduction and recovery in NSW. Similarly, other existing facilities within Sydney are under similar capacity constraints or would not provide enough capacity to respond to future demand.

The 'do nothing' scenario would also not deliver technological and environmental benefits to the existing SAWT facility that would result from the Development. Enclosing both the SSO and MSW operations would improve the SAWT facility's odour and noise emissions, and also the output efficiency.

As such, the consequences of the 'do nothing' alternative are:

- A lost opportunity to provide an expanded facility to help meet the NSW Waste Avoidance and Resource Recovery Strategy, 2007 and the NSW 2012: A plan to make NSW number one.
- A lost opportunity to improve existing operations and improve the environmental performance of the facility.
- Loss of employment opportunities.
- Loss of some long term waste treatment security.

The 'do nothing' alternative was eliminated primarily on the basis that it would be a wasted opportunity to respond to the increasing demand for waste reduction and recovery in NSW and Sydney, and a lost opportunity to improve existing operations and the environmental performance of the existing SAWT facility.

4.2 New Facility or Expansion of Existing Facility

The primary initial design consideration for the Development, and a crucial consideration for SITA, was whether it was preferable to expand the existing SAWT facility or develop an entirely new facility. In order to meet the waste processing needs of the Sydney market as highlighted in Chapter 3.0 of this EIS, SITA considered the following alternatives for a new facility:

- construct a new facility in the Sydney area

- construct a holding and transfer facility within the Sydney area for transportation to a regional processing facility.
- Construction of a regional processing facility poses a number of issues as detailed below.
- The Department of Primary Industries (DPI) Guidelines on Phylloxera management restricts movement of any organic material outside the Sydney Basin, unless it has been pasteurised and meets the necessary analysis. Phylloxera is a small insect that feeds on the roots and leaves of grapevines, which can damage a grapevine's root system to the extent that it dies. Consequently, organic material containing Phylloxera presents a threat to the viticulture industry. Accordingly, to comply with DPI's Phylloxera Guidelines, a facility servicing customers with material originating from within the Sydney Basin needs to be located within the Sydney Basin.
- It is preferable for the municipal and commercial sector to deliver waste directly to processing facilities to avoid additional transport costs and associated environmental emissions.

As such, SITA determined that a processing facility located within the Sydney Basin was preferable to one located in the wider region.

SITA considered whether it would be preferable to develop a new facility in the Sydney area or expand the existing SAWT facility. Economically, expanding the existing SAWT facility and leveraging the existing technology was deemed to be preferable to developing a new facility. It is difficult to acquire appropriate land for a waste processing facility in Sydney and should appropriate land be leased or acquired, it is difficult to gain the appropriate regulatory approvals for such a facility in a timely manner. Environmentally, the concentration of effects from having one large rather than two small facilities is preferable, limiting the need for additional infrastructure. In addition, the scope for potential investment in new technology is greater for one large rather than two small facilities.

With environmental and cost considerations as the primary drivers, expansion of the existing SAWT facility was selected as the preferred alternative compared to development of a new facility.

4.3 Technological Alternatives Considered for Expansion of the Existing SAWT Facility

In deciding to proceed with an expansion to the existing SAWT facility, technological alternatives for the upgrade were assessed by SITA. This focused on:

- processing technologies
- enclosed or open composting
- composting systems
- odour control technologies
- leachate management systems.

4.3.1 Processing Technologies

The existing SAWT facility is based on an aerobic composting technology. As well as this technology, there are a number of alternative processing technologies available in the market. These include anaerobic digestion, incineration, and bio drying for mass reduction.

There are a number of examples of anaerobic digestion biological processing for the treatment of MSW materials established in the past decade in NSW. These technologies have, for the most part, not met customer expectations in terms of performance and have either been decommissioned or dismantled.

The anaerobic digestion technology is considered high risk in terms of meeting key performance indicators, and performance is strongly dependent on waste composition. The technology works best for pure organic streams such as manures. For the treatment of MSW, the capital intensive and current market prices for power generation are unsustainable in the medium term to justify such a high capital investment

Aerobic composting technology is a robust technology option with a high level of control of process and output material. Since commencing operations in 2009, the existing SAWT facility has been able to continually receive and process waste into compost. The technology is considered low risk as it is based on well understood

biological processes and is proven technology. Aerobic composting technology is also far more accepted in the marketplace for procurement of waste processing services by the local government and commercial sectors.

With technology performance and economic considerations the primary drivers, and given the existing SAWT facility uses the technology successfully, aerobic composting was selected as the preferred processing option.

4.3.2 Enclosed or Open Composting

Composting at the existing SAWT facility is a process of biological treatment in enclosed tunnels, followed by several weeks curing of the compost product outdoors on compost pads. During options selection, SITA conducted a cost benefit analysis of the additional cost of moving the composting operations indoors relative to the air quality (particularly odour) benefits of doing so. Air quality modelling results indicated that operating the entire composting process internally produced significant benefits in terms of odour emissions (refer to Chapter 8.0 of this EIS for additional information).

An enclosed operation removes susceptibility to weather, crucially rainfall, which can slow down production. An enclosed operation also provides a system with greater process control, producing a consistent quality output product and reducing leachate production. As such, SITA decided to proceed with an entirely enclosed composting system.

4.3.3 Composting Systems

Various composting systems were investigated. All the options considered were fully enclosed for odour and process control reasons, and would complement the tunnel composting process in the existing Tunnel Composting System. The options considered are detailed in Table 4-1 below.

Table 4-1 Composting System Options

System	Details
Tunnels	Large format tunnels, similar to the existing Tunnel Composting System, with a revised air-floor and recirculation air design, with material handling by front end loader.
Troughs	Compost troughs consisting of 40-metre long troughs with concrete walls. The compost is regularly turned and moved down the trough toward the discharge point by automated mobile machinery. The compost is aerated from the base of the trough by forced air fan systems.
Large-format compost "reactors"	Composting occurs in a large open-topped concrete vessel with negative aeration i.e., air is extracted from above through the compost toward the base of the vessel. The compost is regularly turned by automated systems. The turning systems also control compost flow to the refining systems. The entire composting system is enclosed in a steel framed building. Alternative technology vendors were evaluated all of which have multiple facility waste management examples internationally.

New large format tunnels were rejected as an option as no scale effect can be gained. An expanded tunnel system would require a longer composting period than other options (minimum six weeks), and as a consequence a larger footprint to meet the capacity requirements. This option also provides limited opportunity for automation.

The trough and large format compost reactor options would also require a lengthy processing time (of six weeks composting), followed by immediate refining of the matured compost. Consequently, troughs would require greater processing space, resulting in greater capital costs. The system can also give rise to mechanical problems as a result of the abrasive nature of processing the MSW, as demonstrated by other facilities within SITA's network. Mechanical breakdown would result in higher operating costs and impact operating downtime.

Large-format compost reactors are anticipated to deliver a consistent output product on a four week composting period. The system's ability to reduce odour emissions was a key factor in selecting the final composting technology, and the final decision that the entire composting process would be internal.

The Sorain Cecchini Tecno (SCT) system, one of the reactor options, was the composting technology that was chosen for the new Composting Hall. Relative to alternative systems, this option was preferable due to the smaller footprint required, the operational reliability of the system, and the comparatively less abrasive nature of the technology. It would also provide better integration with a continuous refining system, and is one of the few composting systems able to produce high quality compost from mixed waste in a fully enclosed, automated process with near continuous flow.

Because of the different end market application and compost quality standards, and to ensure that the entire composting process would be internal, it was determined that the SSO and MSW material would be processed in separate systems. A combination of a Tunnel Composting System and a fully enclosed Composting Hall with large-format compost piles would be utilised. Composting of SSO material would be conducted in the 30 existing composting tunnels and composting of MSW material would occur in the new Composting Hall, utilising the SCT system.

4.3.4 Odour Control

Two alternatives for control of odour from the enclosed composting system were considered:

- **Open biofilters.** Open biofilters similar to those used at the existing SAWT facility, use two-metre deep shredded wood biofilters to attenuate odour, with multiple units for redundancy and media change reasons. The open biofilter footprint would need to be extensive to accommodate the throughput capacity of the facility to adequately manage the re-use of the air from pre-treatment in the SCT composting system, the partial condensation of odorous components in the leachate (negative aeration) and the reduced odour generation pre-composted materials coming from the tunnels.
- **Enclosed biofilters.** Use of the same biofilter system as above, but enclosed on all sides with the treated air exhausted through stacks by forced ventilation to enhance dispersion. Various stack heights for the biofilters were considered, ranging up to 15 metres above ground level. The use of these stacks would enhance odour dispersion and as demonstrated in Chapter 8.0 of this EIS, the stack height, along with other improvements to the facility, would provide adequate dispersion of odour such that odour criteria would be met at the nearest sensitive receivers.

Use of open biofilters was eliminated on the basis that their performance in terms of odour treatment and dispersion is not as effective as enclosed biofilters with stacks. The enclosed biofilter option with stacks was selected as the preferred option as it provides the maximum possible dispersion ability.

4.3.5 Leachate Management Systems

In determining which leachate management system to adopt, the odour profile was a key determining factor in SITA's decision making. The existing SAWT facility has open leachate ponds, which have greater capacity and are more economically efficient than tanks. However, these are a greater source of odour when compared to enclosed tanks.

Given the air quality benefits of enclosed tanks, SITA elected to upgrade all the leachate ponds collecting leachate from composting systems to leachate tanks. The leachate tanks would become part of an enclosed leachate system, in which all leachate and condensate water from the facility would be captured and stored in enclosed tanks then reused in the new system.

After refining, compost would be stored on a purpose built pad for the final quality control before being shipped to market. The pad would have stormwater leachate ponds but because they would store stormwater leachate from the final compost product they are not anticipated to be a significant source of odour.

4.4 Conclusions

The 'do nothing' alternative, which would require maintaining the status quo at the Site and not expanding the existing SAWT facility, was eliminated primarily on the basis that it would be a wasted opportunity to respond to the increasing demand for waste reduction and recovery in NSW and Sydney and a lost opportunity to improve existing operations and the environmental performance of the existing SAWT facility. With environmental and cost considerations as the primary drivers, expansion of the existing SAWT facility was selected as the preferred alternative compared to development of a new facility in Sydney or the wider region. The preferred design for the expanded SAWT facility was selected on the basis that it satisfies SITA's design philosophy considerations of operability, process flows, economics and environmental performance as it:

- Provides additional throughput capacity using existing and enhanced infrastructure.
- Operates as a fully automatic and enclosed operation providing better control of the composting process, reduced susceptibility to weather conditions and reduced odour emissions.
- Upgrades the existing leachate system to an enclosed leachate system, where leachate from the composting material is captured and stored in tanks then reused in the system.

5.0 Project Description

This chapter provides an overview and detailed description of the proposed expansion of the existing SAWT facility.

5.1 Overview

SITA is seeking approval for the expansion of the existing SAWT facility (the Development) at its Kemps Creek Resource Recovery Precinct in Western Sydney. The Development would comprise an expansion of the existing SAWT facility only and would not change operations at the adjacent Elizabeth Drive landfill. The existing SAWT facility currently accepts up to 120,000 tpa of MSW and SSO materials. This is comprised of source separated food and garden organics and MSW from a range of councils including Penrith, Campbelltown, Camden, Wollondilly, Wingecarribee, Liverpool, Randwick City and City of Sydney. The facility also accepts up to 14,400 tpa of biosolids.

The waste material is processed using a combination of mechanical separation, manual sorting, and biological composting technologies to produce approximately 40,000 to 45,000 tpa of compost. The compost is used predominantly by the mining sector for land rehabilitation, but is also suitable for forestry and broadacre agricultural applications. Compost derived from SSO materials is also used on sporting fields.

The Development would result in the following key changes:

- An increase in capacity of the facility to 220,000 tpa of input waste.
- Modifications to the current layout of operations at the Site and enhancements to the management of waste material (including a fully enclosed composting process) and process water.
- An increase in operating hours for indoor operations from 7am to 11pm Monday through Saturday to 24 hours per day, seven days a week.

The Development would be entirely contained within areas which are already occupied by the existing SAWT facility and landfill.

It is anticipated that construction of the Development would commence in mid 2013 and would be completed in mid 2015. The Development would not immediately accept 220,000 tpa of waste but would accept a gradual increase in the volume of waste material over time as new contracts become available. It is anticipated that the Development would be at full operational capacity sometime in 2016.

The estimated capital investment value of the Development is $49 million. It would provide long term employment for 60 people (an additional 22 positions over current employment numbers), with peak employment during construction expected to be approximately 130 people.

5.2 Type and Source of Waste for Processing

The Development would be capable of processing up to 220,000 tpa of waste, which would include MSW and SSO materials as well as biosolids. No specific tonnage is allocated to the quantity of biosolids, but this waste stream would form part of the total 220,000 tpa of waste as a small fraction of the waste material processed. The quantity of biosolids accepted at the facility would not exceed the current 14,400 tpa threshold.

5.2.1 Source of Waste

Based on existing contracts and prospects for future contracts, it is anticipated that waste for composting would come from the sources identified in Table 5-1.

Table 5-1 Market Availability for Waste Sources

Waste Source	Waste Type	Quantity (tpa)
Liverpool City Council	MSW	40,000
City of Sydney Council	MSW	10,000
Penrith City Council	MSW	10,000
Spring Farm ARRT Facility (South West Sydney Councils)	Organic Fraction derived from MSW	30,000
Other Sydney municipal customers (Marrickville, Blue Mountains, Canada Bay and Baulkham Hills) or commercial customers expressing an interest in waste processing	MSW	100,000
MSW Total		**190,000**
Penrith City Council	SSO	30,000
Total Waste Processed		**220,000**

Any biosolids accepted at the facility would be sourced from Sydney's sewage treatment plants, such as the Wollondilly STP, and would continue to be blended with the organic waste component and immediately deposited into the Composting Hall for processing (refer to Section 5.4.2 for details).

5.2.2 Type of Waste

Based on the input feedstock of MSW from the municipal sector, it is anticipated that approximately 40 percent of the waste material accepted at the facility would be of an organic origin. This includes food, green waste and wood, and other organics. It is expected that 15 percent of incoming material would be paper and cardboard, which would also be appropriate for the composting process.

Source separated organics is by definition predominantly organic material (around 92 percent) with the remainder being contaminants such as glass and recyclable packaging which are removed through the mechanical separation processes.

The waste types (by percentage of annual throughput and quantity) that would be accepted into the Development are detailed in Table 5-2.

Table 5-2 Waste Type by Percentage of Annual Throughput and Quantity

Waste Type	Percentage (%)	Quantity (tpa)
MSW		
Organics (food, green and wood waste)	34.5	76,000
Recyclables including paper and cardboard, PET and HDPE and metals (ferrous and non ferrous)	18.1	39,900
Glass, plastic film, textiles, nappies, rigid plastics	27.6	60,800
e-waste, hazardous and other wastes, including bricks, concrete and ceramics	6.0	13,300
SSO		
Organics (food, green and wood waste)	12.5	27,600
Contaminants (glass, textiles, recyclable packaging)	1.1	2,400
Total	**100** [1]	**220,000**

[1] Percentages have been rounded up to the nearest decimal.

5.3 Compost Production and Mass Balance

The Development has been designed to divert material from landfill. Recyclable material in the MSW waste material, including glass, plastics, and paper, is removed from the material to be composted and transported to appropriate recycling facilities. Residual material, including textiles, building materials, disposable nappies and plastic film, which are considered contaminants are also removed from the compost and disposed to landfill. Depending on the quality of the input MSW waste (i.e., the quantity of recyclables and residual material contained in the waste), for every 100 tonnes of MSW waste received, approximately 30 tonnes of final compost would be produced. This equates to production of approximately 57,000 tpa of compost derived from MSW waste material.

In contrast, for every 100 tonnes of SSO material delivered to the SAWT facility, approximately 45 tonnes of compost suitable for market application would be produced. This is because SSO material generally contains less contaminants than MSW waste. The SAWT facility would produce approximately 13,500 tpa of SSO compost

5.4 Components of the Development

This section describes the key components of the Development including the Resource Recovery Building, Composting System, new Refining Building, biofilters, and Compost Storage Pad.

5.4.1 Key Development Elements

The key components of the Development are listed below:

- Upgrade of the Resource Recovery Building pre-treatment processes.
- A new enclosed Composting Hall for MSW composting.
- A new Refining Building for MSW composting, plus associated storage bunkers, and refurbishment of the existing refining plant to suit SSO composting.
- Reconfiguration of the existing biofilters at the Tunnel Composting System by enclosure and adding stacks for increased dispersion.
- Installation of new enclosed and biofilters at the MSW Composting Hall with stacks for dispersion.
- Extension of the existing SSO Compost Pad for storage of fully matured SSO and MSW compost material.
- Associated Site infrastructure upgrades:
- Access roads and car parking.
- Water storage and reuse infrastructure, including stormwater ponds, leachate tanks and leachate ponds.

The layout of the Development is shown on Figure 5.1.

A comparison between the existing SAWT facility and the Development is provided in Table 5-3.

Table 5-3 Comparison of Existing SAWT Facility and the Proposed Development

	Existing SAWT Facility	The Development
Capacity	120,000 tpa of input waste which comprises MSW andSSO.14,400 tpa of biosolids. Approximately 43,000 tpa of compost is produced.	220,000 tpa of input waste which comprises MSW, SSO materials and biosolids which may be received on an occasional basis. Any biosolids received would be within the 220,000 tpa limit on input waste but would not exceed 14,400 tpa. Approximately 70,500 tpa of compost produced.
Hours of Operation	**Outdoor Operations:** Monday to Friday from 6am to 10pm (with limited vehicle movements). **Indoor Operations**: Monday to Saturday from 7am to 11pm.	**Outdoor Operations**: Monday to Friday from 6am to 10pm (with no restriction on vehicle movements). **Indoor Operations**: 24 hours per day, seven days per week.

	Existing SAWT Facility	The Development
Management of Waste and Compost Material	MSW and SSO materials are processed as separate streams through an internal pre-treatment line within the Resource Recovery Building, prior to being transferred to enclosed composting tunnels. MSW and SSO materials are shifted to external maturation pads for final maturation for approximately eight weeks, which then undergoes final refining using fixed and mobile equipment (SSO). - MSW and SSO materials are stockpiled on separate storage pads prior to market distribution.	- MSW and SSO materials would be treated as independent streams from receival at, and until dispatch from, the facility. - MSW and SSO materials would be processed through separate upgraded pre-treatment lines, within the Resource Recovery Building. - SSO material would be fed into tunnels in the existing Tunnel Composting System for a minimum of eight weeks to undergo accelerated decomposition. - MSW material would be fed into the new Composting Hall for a minimum of four weeks. The tunnels contained within the existing Tunnel Composting System may also be used in peak periods. The hall would use proven technology to automatically turn the material and incorporates aeration systems to ensure aerobic conditions are maintained at all times. - An additional refining line would be installed for processing MSW derived material. Refining machinery would be placed adjacent to the Composting Hall in a fully-enclosed building. Material would be refined and sent to market or stored on the Compost Storage Pad. External, partially enclosed bunkers would be in place for storing refined material for movement to market or to the Compost Storage Pad on the adjacent landfill area. - Existing, fully enclosed fixed refining equipment would be refurbished and used for refining SSO derived compost material.
Leachate Management System	External leachate dams.	All active composting stage leachate would be stored in enclosed and aerated tanks before reuse in the composting systems. Runoff from the Compost Storage Pad would be stored in lined stormwater leachate ponds.
Air Treatment	Four open air biofilters	Enclosing the existing biofilters at theTunnel Composting System and installing 15-metre high (above ground level (AGL)) stacks to enhance dispersion. Installing three new enclosed biofilters to capture and treat odour from the proposed Composting Hall. The three new biofilters would be fully enclosed (each measuring 20 metres by 20 metres) and would have 15-metre high (AGL) stacks to enhance dispersion.
Access Road and Intersection	The existing access road has one lane in each direction. The existing site access connects with Elizabeth Drive at a three-arm priority intersection.	Provision of dedicated left and right turning lanes on the access road for traffic leaving the Site and turning onto Elizabeth Drive. Upgrade of the existing intersection to a 'seagull' intersection which would include an additional bay in the median of Elizabeth Drive for right turning vehicles exiting the Site.

The components of the Development are described in further detail in the following sections. The layout of the Development is shown in Figure 5-1.



\Groups\ENVGIS\602 Projects\60250100 Kemps Creek\FIGURES\EIS\60250100 F5-1 Proposed Site Layout 10 01 2013 TO Rev D

AECOM

PROPOSED SITE LAYOUT FOR THE DEVELOPMENT

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 5-1

5.4.2 Resource Recovery Building

MSW and SSO materials accepted at the SAWT facility would be transported predominantly by trucks with enclosed 'walking floor' trailers and biosolids would be transported in enclosed tanker trucks. It would be the responsibility of the waste transportation contractors to transport the waste appropriately and in accordance with applicable licences and legislative requirements. SITA would only assume responsibility for the waste once it has been accepted at the weighbridge. SITA would not accept any loads of waste that it is not licensed to accept or which contain unacceptable components such as radioactive materials.

Once accepted at the weighbridge the waste would be transported to the Resource Recovery Building which would be used to pre-treat waste prior to composting. Waste would be deposited into the Receival Hall within the Resource Recovery Building via high speed roller doors. The Resource Recovery Building would continue to operate under a fully enclosed and negative pressure environment to minimise odour emissions, with negative pressure maintained by ventilation fans and the high speed roller doors.

The pre-treatment process conducted within the Resource Recovery Building would involve the removal of recyclables and contaminants from the waste stream before the material is composted. The existing Resource Recovery Building houses two separate pre-treatment processing lines. One process line would be used for MSW and a simpler separation process would be used for SSO material.

The resource recovery system at the existing SAWT facility consists of:

- Trommel screens to separate the waste streams by size.
- Manual sorting stations to recover recyclable items and remove hazardous material such as car batteries.
- Magnetic separators to recover metals.
- Eddy current separators to recover aluminium and other non-ferrous metals.
- Shredding equipment to reduce the size of material for composting.
- Mixing equipment to prepare material for composting.
- Storage containers for recovered recyclables and process residuals.
- Leachate and dust control systems.
- Upgrades to the existing mechanical pre-treatment process as part of the Development would include:
- An additional feeder to manage inflows and increase material throughput prior to composting.
- A new air separator for improved recovery of plastics (subject to further investigation and trials) and potential use as a process engineered fuel.
- A new x-ray sorter or equivalent technology for the removal of glass and other contaminants from organic material.
- A new waste baler to facilitate storage of residual materials and to reduce landfill space consumption.
- Equipment redundancy for managing inflow peaks and during maintenance.

The upgrades would provide a waste processing throughput of 30 tonnes per hour on average.

Recovered recyclables removed during the pre-treatment process would be stored initially in bunkers and then baled for transportation off site. Process residuals such as any separated paper and plastics would also be baled for use as PEF (when such a market develops) or disposed at the landfill. The baling of recyclable and residual materials would form part of the fire management and odour management strategy for the Development. All residual materials which are removed during the pre-treatment process would be transported from the Resource Recovery Building via the high speed roller doors.

5.4.3 Composting System

Waste material which has been pre-treated in the Resource Recovery Building would be transferred via conveyor into the composting system. Under the proposed Development, SSO and MSW waste materials would be managed differently once they enter the composting system. SSO material would be directed to the existing Tunnel Composting System adjacent to the Resource Recovery Building. MSW material would be directed to the newly constructed Composting Hall. As detailed in Table 1, a proportion of the material proposed to be delivered to the facility is an organic fraction derived from MSW which would have already undergone pre-treatment at

SITA's Spring Farm ARRT Facility. Therefore, this material would be deposited directly into the composting system for MSW material. Biosolids which are received at the facility would be delivered to the Receival Hall and immediately blended with MSW material after the pre-treatment process but prior to composting. The following sections describe the different composting process for the SSO and MSW materials.

Existing Tunnel Composting System for SSO Materials

SSO materials are currently composted within the existing Tunnel Composting System and then transferred to external maturation pads for final decomposition. The existing Tunnel Composting System is located adjacent to the Resource Recovery Building and comprises 30 discreet composting tunnels, each 6 metres wide by 6 metres high and 24 metres long. Under the proposed Development, composting of SSO material would be carried out entirely within the existing Tunnel Composting System. Eliminating the outdoor maturation phase for SSO compost would reduce potential odour release and is also expected to deliver improved product consistency, refining efficiency, and moisture and temperature control since the SSO material would not be subject to adverse weather conditions such as periods of wet weather.

SSO material would continue to be loaded into and out of the tunnels using front end loaders. Each tunnel has:

- A sealable door.
- A high powered fan at the rear of the tunnel for fan-forced aeration of the compost which accelerates the composting process.
- An air extraction system which is exhausted into the biofilters for odour removal prior to discharge via stacks.
- An in-floor leachate collection system allowing for the recirculation of water into the composting system.
- Automated temperature measurement.

SSO material would be composted for a minimum of eight weeks before undergoing refinement.

Composting Hall for MSW Materials

MSW materials are currently composted within the existing Tunnel Composting System and then transferred to external maturation pads for final decomposition. Under the Development, the existing maturation pad located immediately to the north east of the Resource Recovery Building would be removed and a fully enclosed Composting Hall constructed for composting MSW materials. In peak periods for composting MSW (typically in summer), the Tunnel Composting System may also be utilised for initial composting of MSW material in addition to use of the Composting Hall.

The Composting Hall would be of similar construction to the existing Resource Recovery Building. It would consist of a standard portal frame structure with cladding sides 74 metres wide by 134 metres long and 8.5 metres in height. The roof would consist of a combination of COLORBOND® corrugated steel panels and translucent panel sheeting to maximise natural light levels within the building.

MSW material composting would be carried out by a fully automated and mechanised process, consisting of a travelling crane transporting rotating screw augers to continuously turn material and progressively move it through the Composting Hall. The Composting Hall would contain two separate parallel reactors of composting material 120 metres long and 26 metres wide. The material would be moved across the reactor at a rate of approximately one metre per day. MSW material would be composted for a minimum of four weeks before undergoing refinement.

A deluge type irrigation system would be mounted on the screw augers to control the moisture content of the composting material. Sumps installed within the floor aeration systems would collect any free water and condensate, and direct it to leachate storage tanks for reuse in the system. At the beginning of the composting process, leachate from the leachate storage tanks would be used for moisture control whereas cleaner water sourced from the stormwater ponds or stormwater leachate pond would be used towards the end of the process for compost quality reasons (refer to Section 5.4.2 for additional information).

Air supply for the Composting Hall would be via new ducting and fans extracting air from the Resource Recovery Building. This would increase the negative pressure in this building and help prevent fugitive emissions from this segment of the facility.

The new composting system would draw air through the compost via a network of pipes in a porous bed to aerate the compost, prevent anaerobic conditions developing, and to control temperature. Multiple aeration piping systems and fans would be used to allow independent control of different floor segments, and therefore

differential control of the compost as it is moved across the reactor. This would also provide a level of redundancy and ensures that aeration of the compost and overall building airflow would not be affected by possible fan breakdowns.

Air extracted from the reactor would be directed to proposed new enclosed biofilters for treatment prior to discharge through stacks. The biofilters would have an automated irrigation system for media moisture control and the biofliter floor system would be designed for rapid media change, thereby minimising the down time of individual biofilters.

5.4.4 New Refining Building

A new fully enclosed Refining Building is proposed to be constructed adjacent to the Composting Hall. Refining is required to remove oversized materials and remaining contaminants from the MSW compost. Similar to the existing operations on-site, the new Refining Building would refine the compost material to a quality suitable for sale. The new Refining Building would have dimensions of approximately 50 metres long by 16 metres wide and 9 metres in height.

As detailed below, both new and refurbished infrastructure would be used in the new Refining Building. Existing refining infrastructure would be refurbished to suit refinement of SSO compost. Refurbishment would include:

- Modifications to existing equipment required for processing SSO material.
- Improved glass removal technologies.
- Enhanced dust extraction and collection.
- Extension of conveyors directly to the refining system.
- Relocation of the existing feeder.
- New refining infrastructure would include:
- A feeder with a storage buffer suited to the output rate from the Composting Hall.
- A Bivitec screen for removal of oversized contaminants.
- Two densimetric tables for removal of heavy contaminants such as glass and stones.
- Two dust extraction and dust collector units.
- Multiple conveyors ranging from two to 20 metres in length.

Partially enclosed external bunkers would store the refined product before it is transferred by wheel loader to a truck and trailer for transport to the Compost Storage Pad for temporary storage prior to distribution off site. The bunkers would have a wall along the northern side of the bunker and a roof. The bunkers would have capacity to store up to three days of compost throughput from the Refining Building to provide some storage contingency. Residual process material from the refining stage would be disposed of at the adjacent landfill.

5.4.5 Enclosure of Existing Biofilters and New Biofilters

Four existing biofilters are located adjacent to the existing composting tunnels. They treat exhaust air from the existing Tunnel Composting System and the Resource Recovery Building. The four existing biofilters would be modified to an enclosed design. The four biofilters would continue to operate independently to allow redundancy within the system in the case of planned maintenance or unexpected failure of a biofilter.

Three new biofilters would be installed adjacent to the Composting Hall to treat air from the hall. Air would be extracted from the Composting Hall via air handler systems and directed to the new biofilters for treatment prior to discharge. The three biofilters would have a combined additional 1,200 m^2 of biofilter material to that available within the existing biofilters in order to account for the new Composting Hall air treatment requirements and the increased capacity of the expanded facility.

Irrigation spray systems would be used to apply water to the biofilter media surface to maintain a moist environment to ensure adequate treatment of air prior to discharge. The water for the existing biofilters would be sourced from the existing stormwater pond adjacent the existing carpark and water for the new biofilters would be sourced from the stormwater pond adjacent to the Composting Hall. In times of water shortfall, water would be sourced from other stormwater ponds at the Site. An average water demand of 12 kL per day is required to maintain an adequate moisture content across the biofilter material.

Leachate volumes generated by the biofilters from application of water would be monitored. It is anticipated that less than 10 percent of the water applied to the biofilters would generate leachate. The leachate from the biofilters would be directed to the leachate storage tanks and reused in the composting process.

Each of the biofilters would be fitted with 15-metre high stacks to enhance dispersion.

5.4.6 Compost Storage Pad

Refined compost ready for the market would be transferred via truck and trailer to the Compost Storage Pad for temporary storage before distribution.

The existing hardstand located in the southern portion of the Site would be extended to accommodate an additional one hectare of storage space. The pad extension would be similar to the existing pad, consisting of an engineered low permeability earthen construction to prevent migration of leachate to groundwater.

The extended pad would hold compost product derived from both MSW and SSO material within separately drained areas. The compost material would be stored in stockpiles of around 2.5 metres in height and according to batch for quality control purposes. Table 5-4 shows the storage capacity for each compost product.

Table 5-4 Storage Capacity of the Compost Storage Pad

Compost Type	Maximum Storage Capacity (tonnes)	Maximum Volume
MSW compost	7,500	7 batched piles, each 8 metres wide x 107 metres long
SSO compost	3,000	8 batched piles, each 8 metres wide x 40 metres long
Total	**10,500**	

Each stockpile area would be graded to drain stormwater as overland flow to dedicated stormwater leachate ponds. The existing stormwater pond located to the north east of the pad would capture runoff from the MSW compost storage area and a new collection pond located at the south west corner of the pad would store runoff from the SSO compost storage area. Collected stormwater would be reused if necessary on the Compost Storage Pad for dust suppression of finished compost stockpiles and used in the Composting Hall after pumping to the main leachate management system.

5.5 Site Infrastructure

This section describes the infrastructure associated with the Development, including the access roads, car park, water management systems, and power supply.

5.5.1 Access Roads and Car Park

Entry to the Site would continue to be via the existing Resource Recovery Precinct access road which connects to Elizabeth Drive. Minor works at the intersection of Elizabeth Drive and the access road would include dedicated turning lanes onto Elizabeth Drive in each direction and an upgrade of the existing intersection to a ‘seagull’ intersection which would include an additional bay in the median of Elizabeth Drive for right turning vehicles exiting the Site.

An additional sealed internal access road would be constructed to encircle the new Composting Hall as shown in Figure 5-1. The internal access road would be approximately 7 metres wide, allowing two way traffic.

The existing car park caters for up to 31 cars. As part of the Development, an additional10 spaces would be provided in a separate car park adjacent to the existing car park to accommodate the additional operational staff. The existing bus parking and turning area would be retained.

5.5.2 Water Storage and Reuse

The existing SAWT facility and the Development would generate or use several different water sources at the Site being:

- Harvested stormwater.
- Diverted stormwater.
- Process leachate.
- Stormwater leachate.
- Potable water.
- Wastewater (being sewage).
- Groundwater is not required for the Development.
- The water management design for the Development has a number of objectives to deliver improved environmental outcomes:
- Enclosure of concentrated process water (leachate) generated within the composting processes (Tunnel Composting System and Composting Hall) in leachate tanks and reuse of 100 percent of this process water.
- All composting operations would be carried out internally, minimising potential contamination of runoff and allowing effective capture of all process water.
- Limited volumes of final compost product would be stored outside, improving the quality of the stormwater leachate from the storage pads.

Water management for the Development is described in the following sections.

Harvested Stormwater

Harvested stormwater is stormwater runoff that has been collected within the existing SAWT facility boundaries (on hardstands and buildings) but has not had contact with areas where waste, organic material or compost have been handled or stored. Harvested stormwater runoff is currently directed to stormwater collection ponds and is used for operational purposes including the composting process, irrigation, dust suppression and fire fighting. The ponds are located adjacent to the SAWT facility car park and are aerated as necessary to prevent anaerobic conditions occurring.

The existing SAWT facility is a net user of water and uses harvested stormwater to reduce its reliance on potable water. Harvested stormwater is only discharged to Badgerys Creek if necessary and is released in accordance with the EPL for the Site.

As part of the Development, harvested stormwater would continue to be used for operational purposes and would be collected from the existing stormwater pond adjacent the SAWT facility car park or the new stormwater collection pond (the converted process leachate pond), located to the east of the proposed Composting Hall.

Diverted Stormwater

Stormwater that has not had contact with operational areas and is not harvested as described in the section above is currently directed to Badgerys Creek which is located approximately160 metres to the west of the Site. A vegetative buffer of at least 50 metres is maintained between the creek and the Site. This buffer provides substantial amelioration of any pollution entrained in surface water runoff as well as habitat, water flow features and stream shading.

A number of improvements are proposed to the existing SAWT facility as part of the Development, which would have benefits in terms of surface water management. Drains would be constructed on the upstream side of the existing SAWT facility in order to enable natural drainage flow around the facility and to prevent contamination.

Process Leachate

Process leachate is currently produced within the enclosed operational areas of the existing SAWT facility, primarily from the Tunnel Composting System and the biofilters, but small volumes of leachate are also generated during the cleaning of the tunnels and biofilters. As part of the Development, process leachate would also be generated within the Composting Hall and the new biofilters.

Process leachate would be produced seven days a week, with the majority of leachate volumes being generated from the Composting Hall. An estimated average of 162 kL per day of process leachate (excluding stormwater leachate) would be generated.

Leachate generation is affected by the type of airflow system used. The tunnels in the Tunnel Composting System blow air through the compost then exhaust directly through the biofilters which minimises leachate drainage from the compost. The system in the Composting Hall draws air through the compost and as a result generates larger volumes of condensate in the fan system before the air reaches the biofilters.

Process leachate (excluding stormwater leachate) is currently captured and stored in an aerated leachate pond located to the north of the maturation pad. Some leachate is recycled and used in the composting process. As part of the Development, all leachate produced within the Tunnel Composting System, Composting Hall and biofilters would be directed to, and stored in, a new aerated, 500 kL capacity above ground leachate storage tank array for reuse in the composting process. The leachate storage tanks would provide capacity for three days of storage. Bunding would be provided around the leachate storage tank array to prevent discharge of leachate from the Site in the unlikely event of failure or during maintenance.

Water is required for application to the composting material in the Composting Hall and Tunnel Composting System in order to accelerate the composting process. The objective is to produce material with a 35 percent moisture content for effective quality control. The water demand to maintain optimal composting for refining is typically 265 kL per day on the five days per week that turning operates.

Overall, the weekly demand for process leachate by the Compost Facility will exceed the volume of process leachate collected from the system. As such, the shortfall in water would be supplied from the following sources in order of preference:

1) Stormwater leachate ponds adjacent to the Compost Storage Pad.

2) Harvested stormwater pond adjacent to the car park and Composting Hall.

3) Stormwater ponds associated with the adjacent landfill.

4) Potable water.

In the event that excess process leachate is produced, tanker trucks would transfer process leachate, in accordance with EPA guidelines, to a licensed processing facility for treatment. An average of 115 tanker trucks may be required per year, spread over an average of 11 days per year.

Process leachate would be used as much as practicable on Site, however cleaner water would be required during the final stage of composting, when temperatures are in decline, to maintain product quality and plant safety certifications. This water would be sourced from the Site harvested stormwater ponds if available.

Stormwater Leachate

Stormwater leachate is generated when rain from hardstand or pavement areas has direct contact with compost material.

Under the existing operations, when stormwater comes into contact with the external maturation areas, leachate is directed to dedicated aerated leachate ponds that service these areas. Currently there are two stormwater leachate ponds servicing the maturation pads.

As part of the Development, improvements would be made to better manage leachate and reduce leachate generation rates at the Site. These improvements would be:

- Reduced rates of stormwater leachate generation by enclosing the MSW composting process in the Composting Hall and relocating the SSO composting process internally to the Tunnel Composting System.
- Conversion of the existing stormwater leachate pond to the east of the existing maturation pad to store harvested stormwater.
- Storage of all captured process leachate from the Tunnel Composting System and Composting Hall in enclosed leachate storage tanks located to the north of the Composting Hall. These enclosed tanks would discharge odorous air through biofilters for treatment prior to discharge to the air.

As described in Section 5.4.6, the extended Compost Storage Pad would be serviced by two stormwater leachate ponds drained via overland flow paths. The new pad would be graded to maintain separation between the MSW-derived compost product and the SSO-derived compost product to collect stormwater leachate within separate

leachate ponds (referred to as the MSW Compost Leachate Pond and the SSO Compost Leachate Pond). Each leachate pond would be aerated to maintain aerobic conditions.

Similar to the existing leachate ponds at the existing SAWT facility, the new stormwater leachate pond located to the south of the Compost Storage Pad would be lined with impermeable geofabric to prevent infiltration of stormwater leachate into groundwater.

Potable Water

Potable water is currently supplied to the Site by Sydney Water. Potable water is required at the administration building, is used in maintenance activities, and is used for washing down of equipment. No changes to the existing potable water system are proposed as part of the Development.

Wastewater

The Site has no connection to Sydney Water sewer mains. Wastewater is collected and treated in a septic tank system adjacent to the north western corner of the existing SAWT facility. Treated effluent is disposed of via irrigation to land within the boundary of the Resource Recovery Precinct. Contingency plans approved by the EPA are in place at the facility in the event that excess wastewater is required to be transported off site for treatment at suitably licensed facilities. It is not anticipated that any changes to the existing wastewater system would be required under the Development.

5.5.3 Power

Energy Efficiency

A number of energy efficiency measures for new operational plant and buildings would be incorporated into the Development including:

- The new Composting Hall would have translucent roof panels to increase natural light and reduce electricity use from internal lighting.
- All composting operations would be automated with variable speed drive for optimal energy usage.
- All leachate produced in the Composting Hall, Tunnel Composting System and biofilters would be directed to enclosed leachate tanks for reuse, thereby reducing the need for aeration of large leachate dams.

Energy Consumption

Average electrical usage at full load for the existing SAWT facility averages 104,500 kilowatt hours (kW-h) per week. Changes to the net energy usage as a consequence of the proposed Development are provided in Table 5-5 taking into consideration energy efficiencies that would result from the Development.

Table 5-5 Net Energy Use (Revisions to Existing Usage as a Result of the Development)

Component	Energy Use in kW-h/week
Existing SAWT facility	104,500
Pre-treatment line change	+6,000
Pre-refining (part of existing process but not necessary for the Development)	-3,000
Refining (some components relocated)	-8,000
Pond aerators (some relocated as part of the Development)	-4,000
New Composting Hall and Refining Building	+86,000
Total	**181,500**

As shown in Table 5-5, it is expected that the Development would require an additional 4.5 gigawatt-hours per annum (GW-h/annum) (an additional 77,000 kW-h/week), with a total electrical demand of approximately 9.5 GW-h per annum (at 181,500 kW-h/week).A new substation would be installed to the north of the Composting Hall.

Power Source

A separate DA has been lodged with PCC for a proposed 1.4 MW generator at the Resource Recovery Precinct. It would operate using the landfill gas from the adjacent landfill. It would operate on a supply of gas at a rate of 750 cubic metres per hour, providing a continuous source of power. If approved, the Development would be connected to the generator. However, the Development would maintain its connection to the grid through the existing substation as a contingency in the event that the on-site supply is impacted.

5.5.4 Other Operational Elements

Administration Facilities

The existing administration facilities are considered adequate to service the proposed Development. As such, no upgrade to the existing administration facilities or utilities is proposed as part of the Development.

Security and Lighting

Shaded lights or mercury vapour lamps would be directed along roads and work areas to minimise light spill. With the exception of the partially enclosed external bunkers for storing refined product, all operations requiring lighting are fully enclosed and building designs would incorporate energy efficiency measures to reduce energy consumption and potential for light spill.

Landscaping

Minor landscaping works would include providing adequate landscaping to screen proposed expanded operations from surrounding receivers. Any landscaping would use native species endemic to the area.

Water Storage (Fire Fighting)

Expansion of the existing fire fighting systems would be required, including extension of the ring main around the new plant, additional water storage tank(s), pump upgrades and ancillary equipment.

5.6 Construction

This section describes the pre-construction and construction activities associated with the Development, including the duration and staging of construction, the hours of construction, and the workforce and equipment requirements.

5.6.1 Construction Phases and Duration

During construction of the Development, the existing SAWT facility would continue operating to service incoming waste streams. Staging of the construction works would be necessary to allow for continued operation of the SAWT facility during construction of the Development. It is anticipated that construction of the Development would occur in two stages over approximately two years, with construction commencing in June 2013 and being completed in June 2015.

The peak construction period in terms of the operation of heavy equipment would occur between February and May 2014 when buildings would be constructed. The peak construction period in terms of the construction workforce would occur between June 2014 and January 2015 when plant and services would be installed. The indicative stages and timeframes for each stage of construction are shown in Table 5-6.

Table 5-6 Construction Phases and Timing

Construction Stage	Phase	Indicative Timing
Stage One	Provision of dedicated left and right turning lanes on the access road	June 2013 to July 2013
	Capping of landfill area and construction of the Compost Storage Pad and stormwater leachate pond	June 2013 to August 2013
	Decommissioning of the existing Maturation Pad for MSW compost and leachate ponds	September 2013 to October 2013
Stage Two	Site establishment and establishment of temporary facilities	November 2013 to December 2013
	Earthworks and civil infrastructure	January 2014 to February 2014
	Construction of building foundations and buildings	February 2014 to May 2014
	Plant and services installation	June 2014 to January 2015
	Internal fit-out and miscellaneous works	December 2014 to January 2015
	Commissioning	February 2015 to May 2015
	Upgrade of the existing intersection on Elizabeth Drive	Prior to commencement of operations

5.6.2 Description of Stage One Construction Works

Stage One construction works would provide the necessary infrastructure to enable the continued operation of the SAWT facility during Stage Two. Construction activities as part of Stage One would include:

- Provision of a dedicated left and right turning lanes on the access road and a construction access road.
- Capping of the landfill and construction of the expanded Compost Storage Pad and associated infrastructure.
- Decommissioning of the existing Maturation Pad for MSW compost.

Access Road Upgrade

The access road would be upgraded to provide dedicated left and right turning lanes onto Elizabeth Drive. The access road upgrade is not required to ensure the efficient movement of vehicles during construction, however, SITA have chosen to do the upgrade in order to enhance the movement of vehicles during construction as much as possible. The upgrade would require some minor earthworks, including the provision of drainage swales, kerb and gutter and additional road pavement. The works would be completed to relevant local council standards and a separate DA would be prepared for the upgrade.

A temporary construction access road would also be constructed along the eastern and northern boundary of the Resource Recovery Precinct to the Site in order to separate construction and operation traffic as much as possible. The road would have a gravel surface suitable for use by heavy vehicles.

Capping of Landfill and Construction of the Compost Storage Pad

Prior to the commencement of construction of the Composting Hall, the maturing compost material from the existing maturation pad would need to be relocated. The landfill area would need to be capped and the extended Compost Storage Pad would need to be constructed to accommodate this material temporarily. The Compost Storage Pad, along with the stormwater leachate pond located to the south of the pad, would be constructed in mid-2013.

All MSW maturing compost material would be cleared from the maturation pad and transferred temporarily to the Compost Storage Pad during construction. Relocation of the MSW maturing compost materials would be completed in conjunction with moving as much refined compost product off site as possible so as to minimise the volume stored on-site during the construction period. An existing 0.6 hectare storage pad (located adjacent to the access road to the south west of the facility) would be used to store final compost product which is ready for market. This pad would continue to operate during the construction phase but would be decommissioned once the Development is operational.

Decommissioning of Existing Maturation Pad and Leachate Ponds

The existing maturation pad for composting MSW materials and the leachate ponds to the east of the existing maturation pad would be decommissioned, ready for construction of the Composting Hall, new Refining Building and associated infrastructure. As described previously in Section 5.4.2, the leachate overflow pond would be converted to stormwater usage for the completed Development and the leachate pond would be filled before the new Refining Building and biofilters are constructed.

5.6.3 Stage Two Construction Works

Stage Two construction works would commence after completion of Stage One and forms the substantial construction stage of the Development. Construction activities as part of Stage Two would include the following works in sequence:

- Site establishment and establishment of temporary facilities for construction works (amenities, temporary electric supply, offices, staging areas, parking etc.).
- Earthworks and civil infrastructure (excluding the extension of the Composting Storage Pad and associated stormwater leachate pond), but including conversion of the leachate overflow pond to sedimentation control purposes during the construction phase.
- Construction of building foundations and buildings.
- Plant and services installation, although some activities may be conducted during construction of the footings and buildings.
- Internal fit-out of services and miscellaneous works, although some activities may be conducted during construction of the footings and buildings.
- Final commissioning of the plant and equipment.
- Access road intersection upgrade.

Details of each construction phase are described in detail in the following sections.

Site Establishment and Establishment of Temporary Facilities

Site establishment and the establishment of temporary facilities would be required prior to the commencement of Stage Two construction. These activities would include constructing a temporary car park to accommodate the peak construction workforce, provision of a construction administration site office, construction of temporary drainage and connections to power and water services.

The majority of parking for the construction workforce would be provided near the entrance to the Resource Recovery Precinct, at the site of the Waste Collection Fleet Depot which is to be relocated in the near future. The existing depot hardstand would be adequate to accommodate the peak construction workforce of approximately 130 light vehicles.

A temporary site office, including amenities (self-contained), would be located within the construction zone at the site of the decommissioned maturation pad. Construction power and water connections would be provided during site establishment. Both would be supplied from existing connections provided to the Site. Temporary generators would be used in the event that the Site electricity supply is insufficient for construction activities.

Temporary facilities that are required on-site during construction include the following:

- Pre-assembly facilities such as site sheds and crib areas.
- Laydown area(s) for:
- Storage of construction materials, plant and equipment, including appropriate spill management facilities such as bunding.
- Incoming materials/equipment inspection area(s).
- Stockpiling of earthwork materials.
- Construction waste management area(s).
- Temporary perimeter fencing, guard posts, and lighting facilities.

Earthworks and Civil Infrastructure

All construction would be undertaken in previously cleared and/or disturbed areas, and no clearing of vegetation would be required as part of this Development.

Construction activities associated with this stage of construction would include temporary drainage works, bulk earthworks, pavement construction, installation of stormwater culverts, installation of utility services and other miscellaneous civil construction activities.

Temporary drainage works would be required to protect disturbed areas during excavation. Temporary works would include:

- Clean water diversion drains to minimise the potential for clean stormwater migration onto the Site.
- Temporary sedimentation ponds/traps for capturing stormwater runoff within disturbed areas of the Site during earthworks until disturbed areas are re-established.
- Silt fences or other equivalent methods to prevent the migration of sediments off site into nearby water bodies, particularly Badgerys Creek.

Temporary works would be installed and regularly inspected in line with the Soil and Water Management Plan (SWMP) that would be prepared for the Development.

Earthworks required for the Development would include excavation of materials for constructing pavements, the car park, building pads, and trenching of services corridors. Design levels would be located above the 1 in 100 year Average Recurrence Interval (ARI) flood level, consistent with the building pad levels of the existing SAWT facility. Earthworks would require filling to achieve designed finished levels. Where possible, fill quantities would be optimised to reduce the requirement to import fill. The requirements for imported fill would include materials for pavements, building pads and bulk earthworks to obtain finished design levels.

Permanent drainage works would include stormwater infrastructure, leachate collection devices, and stormwater leachate ponds. A network of trenches would need to be constructed to accommodate the leachate conveyance system connecting to the leachate storage tanks. Details of these facilities are provided in Section 5.5.2.

Construction of Building Foundations and Buildings

Once earthworks have been completed, reinforced concrete slabs would be laid to support building structures and plant for the Development. This would include reinforced concrete slabs for the Refining Building, Composting Hall, new biofilters including the plant room, main electrical room and enclosed leachate storage tanks.

Materials required for construction of buildings associated with the Development would include concrete reinforced by steel reinforcing bar/cages, fabricated steel for construction of portal frame structures, wall and roof cladding, block work for retaining walls and other structural elements required to support internal plant and equipment. Concrete would be mixed off site and delivered to the Site. Material quantities and types are detailed further in Section 5.6.4. All materials delivered to Site would be inspected and stored appropriately in specified laydown areas prior to construction.

Once formwork and reinforcement has been erected, concrete would be poured for each building slab. After each reinforced concrete slab cures, structural steelwork would be erected on-site using appropriate techniques and equipment such as cranes. Similarly, cladding would be fitted to the building frames once each portal structure is completed.

Plant and Services Installation

Once the construction of buildings has been completed plant installation would commence. This would be coordinated with erection of portal frames to ensure large plant such as refining plant and the biofilters is installed prior to the finalisation of each building where required.

Installation of supplementary power services would be necessary to supply the Development, including the installation of a new substation. As discussed in Section 5.5.3, a 1.4 MW generator would be installed on the Site subject to a separate planning approval. The generator would operate using the landfill gas from the adjacent landfill.

Other existing services such as the septic tank system and potable water would be sufficient for the Development. No augmentation to the existing septic tanks or trunk water mains is anticipated.

Internal Fit-Out and Miscellaneous Works

The fit-out of the Development would include the installation of internal building services such as mechanical services, electrical services, hydraulic services and ventilation systems for the Composting Hall, Refining Building and new biofilters. Additional works would be necessary in the Resource Recovery Building for ventilation.

Commissioning

The Development would be commissioned upon completion of building and plant installation. Commissioning would involve two phases, both mechanical/electrical and process commissioning.

Mechanical/electrical equipment commissioning would consist of starting and running process equipment, as individual items and then as a combined facility. This would be performed to ensure that the equipment operates with no waste load, to minimise any potential down time once waste is brought into the facility.

Once all equipment has been verified as working correctly the wet commission would commence. This would involve introducing a limited quantity of waste into the process and monitoring that equipment works to deliver necessary material outputs as intended. This stage would involve minor modifications to equipment as required to ensure that the process works smoothly.

Commissioning of the Resource Recovery Building would occur prior to commissioning the Composting Hall to facilitate ongoing waste separation and composting operations. During the Composting Hall commissioning period, the facility would operate under existing conditions as the Tunnel Composting System would continue to be available for the enclosed composting phase.

Access Road Intersection Upgrade

The intersection of the Resource Recovery Precinct access road with Elizabeth Drive would be upgraded to facilitate operation of the Development. The intersection would be upgraded to a 'seagull' intersection which would include an additional bay in the median of Elizabeth Drive for right turning vehicles exiting the Site. The upgrade would require some minor earthworks, including the provision of drainage swales, kerb and gutter and additional road pavement. Typical road furniture, signage and line marking would be installed to delineate the carriageway and would be completed to relevant AUSTROADS, Roads and Maritime Services (RMS) and local council standards. A separate DA would be prepared for the intersection upgrade.

5.6.4 Bulk Construction Materials and Mobilisation to Site

Bulk materials would be preferentially sourced from suppliers within the local region and recycled materials would be used wherever possible. An indicative list of bulk construction materials is provided in Table 5-7.

Table 5-7 Indicative Bulk Construction Material Types and Quantities

Material	Indicative Quantity
Road Subgrade - DGS20	1,500 m^3
Road Base - DGB20	5,200 m^3
Asphalt	400 m^3
Concrete	4,400 m^3
Reinforcement - bar	100 tonnes
Reinforcement - mesh	15,300 m^2
Concrete blocks	33,000
Structural Steel	350 tonnes
Steel Purlins	17,800 m
Roof Sheeting	11,700 m^2

5.6.5 Construction Power

Temporary generators would be required to service power requirements during construction until new electricity infrastructure is commissioned. Temporary generators would be located and maintained within the construction zone, separate to existing operations.

5.6.6 Workforce and Hours of Construction

The construction workforce required for the Development would fluctuate throughout the construction period depending on construction activities. The Stage One construction works would be conducted by existing staff. At the commencement of Stage Two construction in November 2013, approximately 15 people would be employed. The construction workforce would peak at approximately 130 workers between June 2014 and January 2015 during installation of plant and services and internal fit-out.

Construction of the Development would be carried out over a single 10-hour shift per day. Construction hours would be between:

- 6 am to 6 pm Monday to Friday (extended to 10 pm in extenuating circumstances for testing and commissioning)
- 7 am to 4 pm on Saturday.

No construction work would be carried out on Sundays or public holidays. Further details relating to noise management and mitigation are provided in Chapter 9.

Temporary flood lighting would be utilised at the Site to allow construction under limited natural lighting conditions. This would typically only be required during the winter months in the early morning hours and evening periods of low light.

5.6.7 Construction Vehicle Movements

Off site Vehicle Movements

The number of vehicle movements to and from the Site would vary throughout the construction period. Peak traffic numbers during construction have been considered for the purpose of this assessment where construction of the Development and existing SAWT operations are being carried out concurrently.

The Stage One construction works would be conducted by existing staff and therefore would not generate additional traffic. Table 5-8 outlines the vehicle movements and parking requirements associated with the construction personnel required for Stage Two of construction of the Development. Further information on traffic movements and transport routes is presented in Chapter 14 of this EIS.

Table 5-8 Construction Personnel Vehicle Movements and Parking Requirements

Activity	Timeframe	Vehicles per Day and Minimum Car Parking Requirements[1]	Vehicle Movements
Site establishment and establishment of temporary facilities	November2013 to December2013	15	30
Earthworks and civil Infrastructure	January2014 to February2014	50	100
Construction of building foundations and buildings	February2014 to May 2014	85	170
Plant and services installation	June 2014 to January 2015	130	260
Internal fit out and miscellaneous works	December 2014 to January 2015		
Commissioning	February 2015 to May 2015	58	116

[1]A ratio of one construction personnel per vehicle has been assumed for car parking requirements and vehicles travelling to and from the Site.

It is estimated that at the peak of construction up to 260 light vehicle movements would be generated in a typical day with the need for up to 130 on-site parking spaces (provision for car parking during construction is addressed in Section 5.5.1). It is anticipated that construction personnel would generally arrive at the Site between 5.30 am and 6 am and exit the Site between 4 pm and 5 pm on weekdays, assuming a 10 hour working day. On Saturdays, construction personnel entry and exit times would be between 6.30 am to 7 am and 3 pm to 4 pm, respectively. It is anticipated that approximately 80 percent of light construction vehicles would leave the Site in an easterly direction, with the remaining traveling west.

Table 5-9 summarises the expected number of heavy vehicle movements to be generated during the construction period. At peak times between February and May 2014,such as when deliveries of construction materials would occur, it is anticipated that there would be up to 30 heavy vehicles (60 heavy vehicle movements) generated per day (in addition to operational traffic from the Resource Recovery Precinct). There would also be a total of 10 oversized heavy vehicles (20 heavy vehicle movements) generated throughout the entire construction period. Heavy construction traffic movements would commence only after 7am.

Table 5-9 Construction Heavy Vehicle Movements

Activity	Time Period	Type of Vehicle Deliveries	Maximum Number of Heavy Vehicles per Day
Average deliveries for the whole of construction period	November 2013 to June 2015	Couriers, steel and equipment except concrete trucks	20
Additional vehicles during peak construction period	February 2014 to March 2014	Concrete Trucks	10

Around 80 percent of materials transported to the Site would come from the east (the Liverpool area including Prestons, Wetherill Park and Erskine Park). Delivery trucks would travel to the Site via the WestlinkM7 motorway, then along Elizabeth Drive. The remaining 20 percent of vehicles would access the Site from the west.

Internal Vehicle Movements

The existing access roads on the Resource Recovery Precinct would be suitable for all construction traffic. Some construction traffic (heavy equipment and delivery vehicles) would be directed around the eastern and northern perimeter of the Resource Recovery Precinct on a temporary construction access road in order to segregate construction and operation vehicles. This would minimise disruption to operational vehicles delivering waste to the SAWT facility during construction. Construction personnel would use the existing access road to the SAWT facility and a shuttle bus would be used to transport personnel from the car park to the construction area.

Table 5-10 provides an overview of internal operational vehicle movements during construction.

Table 5-10 Internal Light and Heavy Vehicle Internal Movements during Construction (Daily)

Vehicle type	Purpose	Vehicle Movements
Heavy Vehicles	Delivering material to MSW maturation pad	32
	Landfill delivery of construction waste	4
Light Vehicles	Staff movements	20

5.6.8 Construction Equipment and Vehicles

The Stage One construction activities would have the same civil engineering requirements as the landfilling and quarrying operations occurring at the adjacent landfill. The Stage One construction activities would be conducted by SITA using existing on-site equipment. No external equipment would be brought onto the Site for these construction activities

Construction equipment and vehicles that would be required for Stage Two would include transport trucks and trailers, in addition to excavation earthmoving equipment such as excavators, bob cats, dump trucks, compactors, pad foot rollers, smooth drum rollers, graders, and heavy lifting cranes including concrete trucks. Construction vehicles and equipment would be mobilised to and from the Site at various times throughout the Stage Two construction period. However, where possible and cost effective, vehicles and equipment would remain on the Site for the duration of construction.

An indicative construction vehicle and equipment list is provided in Table 5-11.

Table 5-11 Construction Equipment

Activity	Equipment	Number
Stage One Construction		
Access road upgrades, construction of Compost Storage Pad and stormwater leachate pond, decommissioning of the MSW maturation pad and leachate ponds	30 tonne excavators	2
	Trucks (truck and dog or 30 tonne dump trucks)	4
	20kL water cart	1
	10 tonne roller	1
	D6 bull dozer	1
	Franna type crane	3
Stage Two Construction		
Site establishment and establishment of temporary facilities	Franna type crane	3
Earthworks and civil infrastructure	30 tonne excavators	2
	Trucks (truck and dog or 30tonne dump trucks)	4
	20kL water cart	1
	10 tonne roller	1
	D6 bull dozer	1
	Franna type crane	3
Construction of building foundations and buildings	Concrete pump truck	1
	Over-sized trucks	10 (total of 10 deliveries throughout the construction period)
	Scissor or boom lift	4
	50 to 100 tonne crane (heavy lift)	1
	Franna type crane	3
Plant and services installation	5 tonne excavator	1
	Trucks (truck and dog or 30 tonne dump truck)	2
	5 tonne excavator	1
	Trucks (truck and dog or 30 tonne dump truck)	2
	Concrete pump truck	1
	Scissor or boom lift	4
	Franna type crane	3
Internal fit out and miscellaneous Works	Scissor or boom lift	4
Commissioning	Nil	Nil

5.6.9 Temporary Operations During Stage Two

Through appropriate staging of construction, operation of the SAWT facility would continue as much as is practicable. This would require a combination of segregation of the construction zone and temporary relocation of composting operations.

Where feasible, MSW and SSO materials would continue to be received and processed through the Receival Hall and the Resource Recovery Building. During modifications to existing plant within the Resource Recovery Building, a simplified interim pre-treatment process would be reconfigured using existing mechanical separation equipment for recovery of recyclable materials and removal of contaminants. External composting and refining using existing mobile equipment would be undertaken on the Compost Storage Pad until the Composting Hall is commissioned and operational. Interim operations that are undertaken in the external areas of the SAWT facility would be managed and minimised where possible to streamline composting processes throughout the construction phase and to minimise noise and odour impacts to surrounding receivers.

An existing 0.6 hectare storage pad (located adjacent to the access road to the south west of the facility) would be used to store final compost product which is ready for market. All compost material produced during the construction stage would be required to meet the appropriate standards for use in the market.

Should the need arise, SITA also has the flexibility to move material which is currently processed at the SAWT facility across its network of facilities during the construction stage.

5.7 Operation

This section describes operation of the Development, including the hours of operation, and the workforce and equipment requirements.

5.7.1 Operational Workforce

At present, 38 full time equivalent (FTE) personnel are employed at the existing SAWT facility and work across two shifts, five days per week. The Development would increase the operational workforce by 22 FTE positions to a total operational workforce of 60 FTE positions.

5.7.2 Hours of Operation

The hours of operation for the Development would differ for indoor and outdoor activities.

Indoor Operations

The existing SAWT facility has approval to undertake indoor operations between the hours of 7 am and 11 pm, Monday to Saturday. As part of the Development, indoor operations would be extended to 24 hours per day, 7 days per week, including public holidays.

The internal operations would include:

- Processing material through the Resource Recovery Building.
- Processing material through the Tunnel Composting System and Composting Hall.
- Cleaning and maintenance of internal plant.

The composting process itself operates on a continuous basis. The proposed 24 hour operations would provide the option to carry out additional indoor activities during peak operational periods and in the event of plant downtime (planned or unplanned). However, the night time shift would be predominantly used for cleaning and maintenance.

The Refining Plant would operate up to 18 hours per day, 5 days per week in line with processing operations.

Outdoor Operations

Outdoor operations would include the management of stored compost product, and the loading of materials for delivery to landfill or off site.

The outdoor operating hours for the Development would be 6am to 10 pm. Waste receival and compost and recyclables dispatch would not occur after 6 pm. Residual material from the Development would only be dispatched to the landfill before 6 pm.

Due to the nature of these operations waste continues to be collected on public holidays. As a consequence, public holidays would be considered as normal operating days in terms of waste deliveries and operation of the Development.

Table 5-12 Hours of Operation

Period	Hours	Operational Activity
Morning shoulder	6 am to 7 am	all operational activities associated with the Development truck deliveries mobile plant associated with compost storage truck dispatch of compost to Compost Storage pad truck dispatch of residual material to landfill mobile plant and fans[1] associated with Composting Operations
Daytime	7 am to 6 pm	all operational activities associated with the Development truck deliveries truck dispatch of processed/recovered material off site truck dispatch of residual material to landfill truck dispatch of compost to Compost Storage Pad mobile plant and fans associated with Composting Operations
Evening	6 pm to 10 pm	all operational activities associated with the Development mobile plant associated with Compost Storage Pad truck dispatch of compost from the new Refining Building to Compost Storage Pad mobile plant and fans associated with Composting Operations
Night	10 pm to 6 am	night time operational activities would be undertaken in the Resource Recovery Building and pre-refining areas (internal) cleaning, maintenance and control room operations (internal) mobile plant and fans associated with Composting Operations

[1] Mobile plant and fans associated with the composting operations run continuously, 24 hours, seven days per week.

5.7.3 Operational Vehicle Movements

Off-site Vehicle Movements

During operations, there would be an increase of both light and heavy vehicles travelling to and from the Resource Recovery Precinct as a result of the Development. However, this increase would be offset by relocation of the Waste Collection Fleet Depot to an off site location in the near future.

At the peak of operations at the Resource Recovery Precinct (with operation of the Development and the landfill), approximately 372 vehicle movements per day would be generated, comprising 188 light vehicle movements and 184 heavy vehicle movements. This represents an additional 10 light vehicle and 36 heavy vehicle movements per day over current operations. A breakdown of the movements associated with the Resource Recovery Precinct without and with the Development is provided in Table 5-13 and Table 5-14, respectively.

It is anticipated that 80 percent of materials transported to the Resource Recovery Precinct would come from the east from the M7, along Elizabeth Drive and 20 percent would come from the west along Elizabeth Drive.

Table 5-13 Operational Staff Numbers and External Light Vehicle Movements at the Resource Recovery Precinct (Daily)

Operations	Existing Staff Numbers	Changes in Staff Numbers due to the Development	Staff Numbers with the Development	Existing Light Vehicle Movements	Light Vehicle Movements with the Development
Waste Collections Fleet Depot	24	-24	0	48	0
Landfill operations	27	0	27	54	54
SAWT Staff	38	22	60	76	120
Additional Admin, Couriers and Maintenance	-	-	-	-	14
Total	**89**	**-2**	**87**	**178**	**188**

Table 5-14 External Operational Heavy Vehicle Movements at the Resource Recovery Precinct (Daily)

Waste Type	Existing Movements	Additional Vehicles	Total Vehicles
Waste Collections Fleet Depot	38	-38	0
Council delivered tonnes	102	34	164
Transfer trailer tonnes		28	
Recovered Steel/Aluminium	8	2	20
Compost Sales		10	
Total	**148**	**36**	**184**

Chapter 10 of the EIS provides further details on light and heavy traffic movements.

Internal Vehicle Movements

Internal vehicle movements within the Site are shown in Table 5-15.

Table 5-15 Internal Vehicle Movements (Daily)

Vehicle type	Purpose	Vehicle Movements
Heavy Vehicles	Delivering product to Compost Storage Pad	40
	Landfill delivery of residuals from Development	70
Light Vehicles	Staff movements	10

5.7.4 Operation Equipment and Vehicles

The equipment required for operation is provided in Table 5-16.

Table 5-16 Operation Equipment

Equipment	Number
Forklift	2
Truck and dog	1
Wheel loader	2

5.8 Environmental Management and Monitoring

5.8.1 Construction Environment Management Plan

Construction of the Development would be undertaken in accordance with a Construction Environment Management Plan (CEMP) to manage actual and potential environmental impacts. The mitigation measures proposed in this EIS, and summarised in Chapter 21,form part of the proposed activities and would be implemented to avoid, minimise and mitigate any potential impacts of the activities. The CEMP would be prepared for the Development prior to the commencement of construction.

Additionally, a number of supplementary plans for specific construction activities would be implemented to ensure the safety of personnel and limit impacts to the surrounding environment. These would include:

- Construction Traffic Management Plan (CTMP)
- Soil and Water Management Plan (SWMP)
- Erosion and Sediment Control Plan (ESCP)
- Construction Waste Management Plan (CWMP)
- Simultaneous Operations Plan (SIMOPS)
- Safety Management Plan.

5.8.2 Operation Environment Management Plan

Operational and maintenance activities would be undertaken in accordance with the existing Operational Environmental Management Plan (OEMP) for the SAWT, which would be updated to manage actual and potential environmental impacts arising from expanded operations associated with the Development.

Mitigation measures for each element of operation is summarised in Chapter 21 of this EIS and would be implemented to avoid, minimise and mitigate any potential impacts. All work activities would continue to be planned and executed with regard to the safety of operation and environmental considerations including monitoring and control activities.

Prior to the commencement of commissioning and start up activities, personnel would complete a Safety and Risk Assessment in accordance with the on-site Environment Health Safety Management System (EHSMS) standards and prepare a Safety and Environment Management Plan to cover the planned commissioning activities.

Additionally, a number of supplementary plans which form part of the existing OEMP would be updated to incorporate upgraded operations as part of the Development. These supplementary plans include:

- Waste Management Plan (WMP)
- Fire Management Plan (FMP)
- Noise Monitoring Program
- Quality Assurance Quality Control (QAQC) Plan
- Computerised Maintenance Management System (CMMS)
- Occupational Health and Safety Plan (OHSP)
- Emergency Response Plan (ERP).

The existing Vegetation Management Plan (including weed management) and existing water quality monitoring program would be continued as part of the Development. The OEMP would be updated prior to the commissioning of operations constructed as part of the Development.

5.9 Quality control

5.9.1 Quality Management System

SITA's Quality Management System (QMS) for the existing SAWT facility would be updated, taking into account the upgraded facilities that form part of the Development. This would ensure that all activities undertaken on-site are completed in accordance with current best practice measures and that they comply with any applicable standards and regulations.

Under the QMS, the Quality Assurance Quality Control (QAQC) Plan which establishes the facility's framework for the planning, implementation and assessment of quality management on-site, would also be updated. The QAQC Plan includes:

- Policies, objectives and plans for Quality Assurance and Quality Control.
- Identification of the appropriate on site authority.
- Identification of specific roles and responsibilities of employees at all levels.
- Quality management procedures and practices to be undertaken on site.
- Measures to support the implementation of other on site health and safety, and environment policies.

5.9.2 Quality Control Processes

Quality control processes are currently undertaken at the existing SAWT facility and would be updated to accommodate the Development. Quality control processes that would be undertaken at each stage of processing are briefly described below.

Weighbridge

- Accurate recording of all waste movements into and out of the Site would be conducted for recording customer data and associated taxes and levies.

Receival Hall

- Regular formal audits of incoming materials would be conducted and visual inspection of loads occurs continuously.

Pre-Treatment Plant

- Additional contaminants would be removed at the pre-treatment plant, for example, batteries, metals and other incompatible material. These materials would be effectively separated and directed to either the landfill or appropriate recycling businesses.

Tunnel Composting System

- Loading records would be maintained on a daily basis, and all movements from composting tunnel to tunnel would be tracked.
- Temperatures would be automatically monitored, along with applied airflow.
- Occasional physical testing of inputs and outputs would occur (pH, moisture and density).
- Occasional audits of incoming materials (after pre-treatment) would be conducted.

Composting Hall

- The SCT system would automatically record applied water, airflow rates, and duct temperatures which can be correlated back to compost temperatures.
- Compost movement across the reactor would be tracked via the turning system operation.

Refining Plant

- Screens would remove oversize contaminants, and density sorting (densimetric tables) would be undertaken to remove glass and stones etc. These materials would be sorted and recorded for subsequent disposal to landfill.
- Occasional physical testing of inputs and outputs would occur (pH, moisture and density).

Sampling and Analysis

- Australian Standard (AS) 4454 specifies the sampling frequencies and locations required for compost material appropriate for the urban amenity market.
- NATA certified laboratories would be used for analysis – testing would occur at the frequency specified by the general exemption under clause 51 and clause 51A, Part 6 of the *Protection of the Environment Operations (Waste) Regulation 2005* (the NSW Exemption) for organic outputs derived from mixed waste, and would cover the parameters specified.

- MSW derived products would only be released for land application when testing indicates that the NSW Mixed Waste General Exemption requirements have been met.
- SSO derived products would only be released for sale after testing and compliance to internal quality standards.
- Land application details would be maintained, as required by the NSW Mixed Waste General Exemption.

5.9.3 Roles and Responsibilities

The administration and implementation of the QMS is the responsibility of the Plant Manager who is responsible for:

- Planning and implementing of the QAQC Plan.
- Reviewing vendors' design products.
- Ensuring communication with vendors and the provision of accurate and adequate design information.

5.9.4 Control of Non-Conformance and Corrective Action

Any non-conformance with the QMS would be reported to Plant Manager who would control non-conformances and the appropriate corrective action as set out in the QAQC Plan.

5.9.5 Documentation and Communication Procedures

The QMS includes a system to ensure that operational documents including drawings, specifications, reports and procedures are kept up to date as per current revisions and would be communicated and distributed to staff as required. Quality control documents and procedures would be reviewed and updated on a regular basis.

5.10 Emergency Response and Incident Management

SITA's existing Emergency Response Plan (ERP) outlines all necessary information to enable an effective and coordinated response to any emergencies that may arise in the functioning or operation of the existing SAWT facility. This covers emergency situations such as fire and explosion, major facility shutdown, bomb threat, spill and accident or injury. Roles and responsibilities and all SITA policies and procedures are detailed in this document. The ERP would be updated for the expanded facility as appropriate.

Emergency response training currently and would continue to be undertaken by the SITA Operations Team. Training would cover all emergency response scenarios and each employee, through structured training, would become conversant with all emergency response plans and procedures.

There are also a number of Standard Operating Procedures (SOPs) in place for the existing SAWT facility which relate to incident management, including a SOP for spill response, emergency response preparation and plan which include six-monthly emergency evacuation drills, and external training for first aid, the use of fire extinguishers and fire wardens. The SOPs would be revised as appropriate for the Development.

Permanent staff are required to undertake training in all aspects of managing an incident on-site. Temporary staff and contractors occasioning the facility would undertake a site induction and would be briefed on their responsibilities during an emergency situation. For example, they may be required to evacuate the Site immediately and proceed to the designated assembly area under the instruction of the SITA Operations Team.

All high risk work on-site proceeds on the basis of a Work Permit system. Permits are issued following completion of Site inductions and risk assessments.

6.0 Statutory Planning

6.1 Permissibility

The Site is zoned RU 2 – Rural Landscape and E2 – Environmental Conservation under the *Penrith Local Environmental Plan 2010* (Penrith LEP 2010).Development for the purpose of waste management facilities is an innominate prohibited use in both zones.

Clause 121(1) of *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) provides that development for the purpose of a waste or resource management facility (other than development for the purpose of a waste or resource transfer station) may be carried out by any person with consent on land in a prescribed zone.

Clause 120 of the Infrastructure SEPP defines, for the purposes of clause 121 of that policy, the following:

- the prescribed zone, which includes RU 2 – Rural Landscape
- a resource recovery facility, which *means* "a facility for the recovery of resources from waste, including such works or activities as separating and sorting, processing or treating the waste, composting, temporary storage, transfer or sale of recovered resources, energy generation from waste gases and water treatment, but not including re-manufacture of material or goods or disposal of the material by landfill or incineration*".*

As the Development is classified as a resource recovery facility and the majority of the Site is located on land zoned RU 2 – Rural Landscape under the Penrith LEP 2010, the Development is partly permissible with development consent. The relatively small portion of the Development proposed within the E2 zone (and therefore considered to be a prohibited component of the total Development) would affect land already the subject of development associated with the existing SAWT facility.

Notwithstanding, section 89E of the EP&A Act enables development consent to be granted for partly prohibited development, should it be SSD.

6.2 State Significant Development

Clause 8 of the State and Regional Development SEPP states that development is declared to be SSD for the purposes of section 89C of the EP&A Act if:

a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the EP&A Act; and

b) is specified in Schedule 1 or 2 of the State and Regional Development SEPP.

The Development is SSD as it falls within the thresholds of clause 23, Schedule 1 (waste and resource management facilities) of the SEPP as it is "development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste".

Accordingly, the Development is declared to be SSD and is subject to Division 4.1, Part 4 of the EP&A Act.

6.3 Consent Authority

The Minister for Planning and Infrastructure, or his delegate, is the consent authority for SSD under Division 4.1, Part 4 of the EP&A Act. As such, the Minister, or his delegate, is the consent authority for the Development.

6.4 Environmental Planning Instruments

6.4.1 State Environmental Planning Policies

The following State Environmental Planning Policies apply to the Site:

- the Infrastructure SEPP
- *State Environmental Planning Policy No. 33 – Offensive and Hazardous Development*
- *State Environmental Planning Policy No. 55 – Remediation of Land*
- *Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (No.2 1997)*, a deemed SEPP

Infrastructure SEPP

Clause 123 of the Infrastructure SEPPrequires the consent authority, when assessing and determining a development application, to consult with Roads and Maritime Services (RMS) if it falls within the criteria specified in clause 123 of that policy.

Clause 123 applies to an enlargement or extension of existing landfills, recycling facilities and waste transfer stations of any size or capacity, if it has a direct vehicular or pedestrian access to any road (which includes private roads). 'Recycling facilities' is not defined by the Infrastructure SEPP or by the Standard Instrument. However, as a degree of recyclable materials are recovered from the Development, clause 123 could be taken to apply to this type of development. As such, DP&I is required to refer a copy of the EIS to RMS.

State Environmental Planning Policy No. 33 – Offensive and Hazardous Development (SEPP 33)

SEPP 33 provides requirements for the planning and assessment of proposals for potentially hazardous and offensive storage establishments or industrial developments. Hazardous and offensive developments are not permissible land uses within the RU2 – Rural Landscape and E2 – Environmental Conservation zones under the Penrith LEP 2010.SEPP 33 defines hazardous industry and offensive industry as follows:

"hazardous industry means a development for the purposes of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would pose a significant risk in relation to the locality:

(a) to human health, life or property, or

(b) to the biophysical environment.

offensive industry means a development for the purposes of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would emit a polluting discharge (including, for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land in the locality."

Applying SEPP 33 (Department of Planning, 2011), and supporting Hazardous Industry Planning Advisory Papers published by the then Department of Planning, provide guidance to determine if a proposal is potentially hazardous or offensive (and therefore if SEPP 33 applies).

As demonstrated in Chapter 13 of this EIS, it has been determined that the Development is not hazardous or offensive and therefore does not require further assessment under the provisions of SEPP 33.

Applying SEPP 33 (Department of Planning, 2011) states that if the EPA considers that its requirements can be met and that a proposal can be licensed, then the proposal is unlikely to be an offensive industry. The existing SAWT facility is currently licensed by the EPA under the *Protection of the Environment Operations Act 1997* (POEO Act). As demonstrated within this EIS, a number of mitigation and management measures are proposed to ensure that the Development does not have a significant adverse impact on the locality or on the existing or likely future development on land in the locality. Consequently, the Development is not considered to be an offensive industry and can be licensed by the EPA.

State Environmental Planning Policy No. 55 - Remediation of Land (SEPP 55)

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) requires a consent authority, when assessing and determining a development application, to consider whether the land the subject of the development is contaminated and if so, whether the land requires remediation before the intended land use can proceed.

In addition to other considerations, the Site was originally selected for the existing SAWT facility as it had not been previously landfilled. The majority of the Development would remain within this area. As discussed in Chapter 11, monitoring conducted in accordance with the EPL demonstrates that there is no impact to groundwater from either the existing SAWT facility or the landfill. As such, the risk of contamination within the Site is low.

However, the extended Compost Storage Pad is an area that has been previously landfilled with solid waste within lined cells. This area will be capped prior to being reconfigured. The Compost Storage Pad (and associated drainage infrastructure) would be constructed and operated in a manner that does not compromise the capped landfill cell. Remediation is not considered necessary in this area to enable this use. Further, the Site would be rehabilitated as may be required following the completion of the activity as open space, sympathetic to the local environment.

Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (No.2 1997) (SREP 20) a deemed SEPP

SREP 20, a deemed State Environmental Planning Policy, is intended to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.

Clause 5 and clause 6 of SREP 20 outline general planning considerations, specific planning policies and recommended strategies that should be considered in the assessment of a development application. Matters identified in clause 5 and 6 have been considered in the Development, specifically:

- the impacts of the Development on soil, water quality, water catchment, scenic values, ecology and heritage have been considered in this EIS. Where required, mitigation or management measures have been proposed
- alternatives to the Development have been considered and are detailed in Chapter 4 of the EIS.

6.4.2 Local Environmental Plans

The Penrith LEP 2010 is the only LEP that applies to the Site by virtue of clause 1.8(2) of the Penrith LEP 2010. There are no exhibited draft LEPs that apply to the Site.

Penrith LEP 2010

The Site is zoned as RU2 – Rural Landscape and E2 – Environmental Conservation under the Penrith LEP 2010 and the Development would ordinarily be a prohibited use in both zones (but is a permissibly use in the RU2 zone by virtue of the operation of the Infrastructure SEPP, as outlined in Section 6.1). Consideration of the zone objectives is provided in Table 6-1.

Table 6-1 Objectives of RU2 – Rural Landscape

Objective	Consideration
RU2 – Rural Landscape	
To encourage sustainable primary industry production by maintaining and enhancing the natural resource base	The Site has been significantly disturbed and does not have any primary production value. The Development would not extend into areas that have not been previously disturbed.
To maintain the rural landscape character of the land	The Site has been significantly modified as a result of filling and current waste management activities. Nonetheless, the potential impacts on the rural landscape have been considered in Chapter 15 of this EIS.
To provide for a range of compatible land uses, including extensive agriculture	The Development is an expansion of an existing facility. Nonetheless, the potential impacts on land use have been considered in Chapter 14 of this EIS. Mitigation and management measures would be implemented as part of the Development to minimise off-site impacts on adjoining land uses.
To minimise conflict between land uses within the zone and land uses within adjoining zones	Part of the Site is zoned E2 – Environmental Conservation. This largely corresponds to the riparian area along Badgerys Creek which would not be subject to any direct impacts as part of the Development. Indirect impacts of the Development on the ecological values of this area have been considered in Chapter 16 of this EIS. Where the operational areas of the Site encroach into the E2 zone, these areas have limited environmental conservation value and are generally devoid of vegetation with the exception of landscaping and perimeter vegetation.
To preserve and improve natural resources through appropriate land management practices	The Site has been cleared and has been developed for the purpose of the existing SAWT facility. Mitigation and management measures would be implemented to minimise off-site impacts on water, soil and vegetation during construction and operation.
To ensure development is compatible with the environmental capabilities of the land and does not unreasonably increase the demand for public services or public facilities	The Development is compatible with the environmental capabilities of the Site. The Development would create additional employment opportunities at the site, but this is not anticipated to increase demand for public facilities or public services in the surrounding region.
E2 – Environmental Conservation	
To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.	Areas of ecological value, being the riparian area and the Cumberland Plain Woodland offset area would not be subject to direct impacts. Indirect impacts would be minimised and managed during construction and operation.
To prevent development that could destroy, damage or otherwise have an adverse effect on those values.	

Objective	Consideration
To protect, manage, restore and enhance the ecology, hydrology and scenic values of riparian corridors and waterways, wetlands, groundwater resources, biodiversity corridors, areas of remnant indigenous vegetation and dependent ecosystems	Areas zoned as E2 on the Site that would be impacted are existing operational areas and have limited ecological values which are restricted to the perimeter of the interface of the existing SAWT facility and riparian areas. Perimeter vegetation would be protected and retained as part of the Development.
To allow for low impact passive recreational and ancillary land uses that are consistent with the retention of the natural ecological significance.	

The following clauses of the LEP also apply to the Site:

- clause 6.3 (Flood planning). Part of the Site has been mapped as a 'flood planning area', which corresponds to the stormwater pond on the western boundary of the Site. The Development does not propose any works or changes within this area.
- clause 6.14 (Development of land in the flight paths of the site reserved for the proposed Second Sydney Airport). The Site would be within the Australian Noise Exposure Forecast (ANEF) contour of 20 or greater (being within the 25 to 40 ANEF contours). Given the nature of the Development, it would not be adversely affected by aircraft noise and would not hinder the operation of any future airport. Further, it is noted that Australian Standard AS2021—2000 *Acoustics—Aircraft noise intrusion—Building siting and construction,* which only relates to internal noise, does not specify any internal noise level criteria for industrial development (other than light industrial).

6.5 Development Control Plans

By virtue of clause 11 of the State and Regional Development SEPP, *Penrith Development Control Plan 2010* does not apply to the Development.

6.6 Other NSW Environmental Approvals

Sections 89J and 89K of the EP&A Act list separate environmental approvals that would not be required for the Development or are to be consistently applied with the planning approval granted for the Development. Notwithstanding, the potential impact associated with matters addressed by each of the approvals will still need to be considered regardless of the need for the approval. The other environmental approvals that are applicable to the Development and a brief discussion of their relevance is outlined in Table 6-2.

Table 6-2 Other NSW Environmental Approvals

Approval	Applicability to the Development	Comment
Approvals required to be issued consistently under section 89K		
An environment protection licence under Chapter 3 of the POEO Act	Applicable	The Development would fall within clause34 (Resource Recovery), of Schedule 1 of the POEO Act and would be a scheduled activity as it would involve having on site at any one time more than 2,500 tonnes or 2,500 cubic metres, whichever is the lesser, of waste. The existing SAWT facility is licensed under the POEO Act. Accordingly, a variation to the existing EPL would be required for the Development.
A consent under section 138 of the *Roads Act 1993*	Applicable	The Development involves an upgrade of the intersection of the access road for the Resource Recovery Facility and Elizabeth Drive. Accordingly, consent under section 138 of the *Roads Act 1993* would be required for the Development.

6.7 Proposed Modification to Project Approval 06-0185

As detailed in Chapter 2 of this EIS, the Site has an existing approval under Part 3A of the EP&A Act. The Development, as proposed, would require consequential amendments to that approval.

On 1 October 2011, Part 3A of the EP&A Act was repealed. At the same time, savings and transitional arrangements were put in place for projects that are classified as 'transitional Part 3A projects'. A transitional Part 3A project is defined in clause 2 of Schedule 6A of the EP&A Act, which includes projects what were approved prior to the repeal of Part 3A of the EP&A Act. For these types of projects, Part 3A of the EP&A Act (as in force immediately before the repeal of that Part and as modified under Schedule 6A after that repeal) continues to apply.

The facility (as approved) is defined as a transitional Part 3A project as it was approved prior to the repeal of that Part of the EP&A Act. As such, any modification to the approval is to be considered under section 75W of the EP&A Act.

Under section 75W of the EP&A Act, a Proponent may request that the Minister modify the project approval if the project, as modified, would not be consistent with the project as approved.

To be consistent with the Development, the following modifications to the Part 3A approval would be required:

- deletion of Condition 5, Schedule 2 of the approval to remove the sunset clause of the development, which currently limits operations to 20 years from the commencement of operations
- modification to Condition 1, Schedule 3 of the approval to reflect the proposed increase in capacity and the removal of the biosolids limit
- modification to Condition 12, Schedule 3 of the approval to reflect the modified hours of operation.

As these amendments would not be consistent with the existing approval, a modification is being sought in conjunction with the DA for the Development. The assessment of the modification has been incorporated into the assessment presented within this EIS.

6.8 Commonwealth Environmental Approvals

6.8.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires approval from the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities where an action has or will have a significant impact on a matter of National Environmental Significance (NES).

A search of the EPBC Protected Matters database has been conducted for the area surrounding the Development to identify potential matters of NES that may trigger the need for a referral of the action to the Department of Sustainability, Environment, Water, Population and Communities. The results of the database search are presented in Table 6-3.

It is unlikely that the Development would impact on any matters of NES. Although a number of listed threatened species, or their habitat have previously been recorded within the study area, it is unlikely that the Development would result in any impact on these species as the Development would be contained within the existing footprint of the Site. As such, an EPBC Act referral has not been made for the Development.

Table 6-3 Matters of National Environmental Significance

Matters of NES	Matters within the immediate vicinity of the Development
World heritage properties	Nil The closest World Heritage properties to the study area are the Greater Blue Mountains, which is located approximately 15kilometres west, and the Australian Convict Sites which is a property made up on 11 sites across Sydney. The closest Australian Convict Site to the Development is the Old Government House and Domain located at Parramatta a distance of more than 20kilometres north east of the Site.
National heritage places	Nil The closest National Heritage place to the Development is the Old Government House and Government Domain at Parramatta, which is located more than 20kilometres north east of the Site.
Wetlands of international importance	Nil The closest wetland of international importance to the Development 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	One listed threatened ecological community has been recorded in the area surrounding the Development – Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. Twenty-four listed threatened species have either been recorded, or their potential habitat has been recorded, within the area. As the Site itself has low ecological value and direct impacts on the adjoining riparian areas would not occur, the development would not have an impact on Commonwealth listed threatened species and ecological communities.
Commonwealth listed migratory species	Fourteen listed migratory species have either been recorded, or their potential habitat has been recorded, within the area surrounding the development. As the Site itself has low ecological value and direct impacts on the adjoining riparian areas would not occur, the development would not have an impact on Commonwealth listed migratory species.
Nuclear action	The Development would not result in any nuclear action nor would any nuclear activity need to be undertaken.
Great Barrier Reef Marine Park	The Development would not result in any impact on the Great Barrier Reef Marine Park.
Commonwealth marine areas	Nil The Development is located approximately 40 kilometres from the coastline and would not result in impact on any Commonwealth marine areas proximate to the study area.

7.0 Consultation and Issues Identification

This chapter presents the DGRs received from DP&I on the 16 May 2012 and the sections of the EIS within which the DGRs have been addressed. This chapter also describes the Government agency and community consultation processes undertaken during design of the Development and preparation of this EIS.

7.1 Summary of Director General' Requirements

This EIS has been prepared in accordance with Division 4.1, Part 4 of the EP&A Act, as the proposed Development is classified as SSD. In preparing the EIS, the DGRs have been addressed as required by the EP&A Act. The matters raised by the DGRs for consideration in the EIS are detailed in Table 7-1 below. A full copy of the DGRs for the EIS is provided in Appendix A.

Table 7-1 Director General's Requirements and Reference in the EIS

Director General's Requirements	Reference in EIS
General Requirements	
The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in Clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000.*	
A detailed description of the site, and existing and approved operations.	**Chapters 1, 2 and 5**
A detailed description of the development, including: Need for the proposed development having particular regard to the aims, objectives, and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2007*, *DECC's Guidelines for Solid Waste Landfills* and *Composting and Related Organics Processing Facilities*; Alternatives considered; Justification for the proposed development taking into consideration its location, any environmental impacts of the development, the suitability of the site and whether the development is in the public interest; Likely staging of the development - including construction, operational stage/s and rehabilitation; Likely interactions between the development and existing, approved and proposed operations in the vicinity of the site; and Plans of any proposed building works.	**Chapters 3, 4, 5 and 7**
Consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments: i.e. the aims, objectives, and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2007* and *DECC's Guidelines for Solid Waste Landfills* and *Composting and Related Organics Processing Facilities.*	**Chapter 6**
Risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment.	**Chapter 22**

Detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: A description of the existing environment, using sufficient baseline data; An assessment of the potential impacts of all stages of the development, Including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and A description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment.	**Chapter 7 onwards**
Consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS.	**Chapters 21 and 23**
Key Issues	
Strategic Land Use Planning Including: Demonstrate that the proposal is generally consistent with the relevant transport and infrastructure objectives of *Metropolitan Plan for Sydney 2036*, *NSW 2021* and the *draft Northwest Subregional Strategy*; and Justify any inconsistencies between the proposed development and these plans.	**Chapter 14**
Waste Management Including: Identify, classify and quantify the likely waste streams that would be handled/stored/disposed of at the facility; Describe how this waste would be stored and handled on site, and transported to and from the site; Describe the SAWT technology and outputs, and the quality control measures that would be implemented; and Detail the potential impacts associated with treating, storing, using and disposing of this waste and waste products.	**Chapter 5**

Air Quality and Odour Including: A quantitative assessment of the potential air quality and odour impacts of the project and the effectiveness of the proposed air quality /odour control measures; Details of management and monitoring measures for preventing and/or minimising both point and fugitive emissions; Detailed specifications of the odour scrubbing technology and associated equipment to be installed, including performance, location, height and dimensions; Details of how potential odour from any runoff (leachate and stormwater) would be mitigated; Details of how negative pressure would be maintained in the processing buildings (i.e. quick shut roller doors etc.) to minimise odour emissions and evidence of contingency plans if negative pressure cannot be maintained (i.e. roller doors break etc.); Details of any waste that is proposed to be stored outside of a negatively pressured building (including pre-stabilised or stabilised garden waste, food waste, dry recyclables etc.); proposed locations for storage of that waste, the quantities of that waste, the period of time that waste is stored outside and any mitigation measures to ensure the waste does not generate dust or odour emissions; and Details of proposed length of time that the municipal solid waste and the source separated food waste would undergo "maturation" with consideration to odour generation.	**Chapters 5 and 8**
Greenhouse Gas Including: A quantitative assessment of the potential scope 1, 2 and 3 greenhouse gas emissions of the project, and a qualitative assessment of the potential impacts of these emissions on the environment; and A detailed description of the measure that would be implemented on site to ensure that the project is energy efficient.	**Chapter 19**
Traffic Including: A detailed traffic impact study of the project on the safety and performance of the surrounding road network; including impact on the nearby intersections; A description of the measures that would be implemented to upgrade and/or maintain this network over time; and Detailed plans of the proposed layout of the internal road network and parking on site in accordance with the relevant Australian standards.	**Chapter 10**
Soil and Water Including: A detailed water balance for the project, outlining the measures that would be implemented to minimise the use of water on site; Wastewater predictions, and the measures that would be implemented to treat, reuse and/or dispose of this water; The proposed erosion and sediment controls during construction; The proposed stormwater management system; and Consideration of the potential salinity, contamination, flooding and acid sulfate soil impacts of the project.	**Chapters 5 and 11**
Noise Including a quantitative assessment of the potential: Construction, operational and transport noise impacts; Offsite road noise impacts; and Details of the proposed management and monitoring measures.	**Chapter 9**

Hazards Including a Preliminary Hazard Analysis (PHA) of the project, and an assessment of the potential fire risks of the project.	**Chapter 13**[1]
Visual Including: An assessment of the potential visual impacts of the project on the amenity of the surrounding area; and A detailed description of the measures that would be implemented to minimise the visual impacts of the project, including the design features, landscaping and measures to minimise the lighting and signage impacts of the project.	**Chapter 15**
Heritage Including the potential Aboriginal and non-Aboriginal heritage impacts of the project.	**Chapter 17**
Flora and Fauna Including an assessment of the potential impacts of the project on threatened species and endangered ecological communities.	**Chapter 16**
Socio-Economic Including a comprehensive assessment of the economic and social impacts of the project, demonstrating that it would have a net benefit for the community, paying particular attention to the potential impacts of the project on waste minimisation and resource recovery in the region.	**Chapter 18**
Plans and Documents	
The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. These documents should be included as part of the EIS rather than as separate documents.	**Various chapters and appendices**
Consultation[2]	
During the preparation of the Environmental Impact Statement, you should consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups or affected landowners. In particular you must consult with the: Commonwealth Department of Sustainability, Environment, Water, Population and Communities; Environmental Protection Authority; Office of Environment and Heritage (including the Heritage Branch); NSW Office of Water; NSW Roads and Maritime Services; Penrith Council; Liverpool Council; and The local community and stakeholders. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.	**Chapter 7**

[1] Subsequent to the DRG's being issued, DP&I advised that a full PHA would not be required. DP&I advised that a risk analysis be prepared in accordance with SEPP 33, the *Multi-Level Risk Assessment Guideline, Hazardous Industry Planning Advisory Paper No. 3: Risk Assessment* and *Hazardous Industry Planning Advisory Paper No. 6: Guidelines for Hazard Analysis*.

[2] Subsequent to the DGRs being issued, it was agreed with DP&I on 24 August 2012 that consultation with the Department of Sustainability, Environment, Water Population and Communities would not be necessary, on the basis that no Matters of National Environmental Significance would be impacted by the Development. It was also agreed with DP&I on 24 August that consultation with the Office of Environment and Heritage would not be necessary, given the disturbed nature of the Site no issues of concern would be impacted by the Development.

7.2 Consultation with Relevant Authorities

As part of the formal process of preparing the DGRs, DP&I requested environmental assessment requirements from relevant statutory authorities and service providers. In addition to this process, consultation was undertaken with relevant authorities during the preparation of the EIS to further discuss pertinent issues and the approach of the environmental impact assessment. The statutory authority consultation in relation to the DGRs, and the outcomes of consultation with relevant authorities are described in the following two sections.

7.2.1 Statutory Authority Consultation in Relation to the DGRs

The NSW Environment Protection Authority (EPA), NSW Roads and Maritime Services (RMS), Sydney Water and Penrith City Council (PCC) provided submissions for consideration by DP&I for inclusion in the DGRs. Table 7-2 provides a summary of the assessment requirements and expectations of each relevant authority, together with the chapter of the EIS which addresses the matter. The submissions provided to DP&I are included in Appendix A.

Table 7-2 Statutory Authority Consultation and Reference in the EIS

Authority	Requirements	Reference in EIS
Penrith City Council (PCC)	Clarify SAWT facility hours of operation (24 hours per day) and whether 24-hour operation of the SAWT would result in extended hours of operation at the adjacent landfill. Clarify hours when outdoor operations at the SAWT facility would occur. Analyse how the increased volume of waste processed by the SAWT facility would impact operation of the adjacent landfill. Assess light and noise impacts of night time operations. Do not support lifting the sunset clause for the SAWT facility which states that waste operations may only take place for 20 years from the commencement of operations on-site.	**Chapters 5, 6, 9 and 15**[2]
Sydney Water	Prepare an integrated water management plan. Prepare an infrastructure management plan.	**Chapters 5 and 11**

[2] Subsequent to providing the submission to DP&I, PCC advised SITA that it agrees to lifting the sunset clause pertaining to the existing development given the changing nature of the surrounding land uses in the future.

Authority	Requirements	Reference in EIS
NSW Environment Protection Authority	Consider installation of an on-site meteorological station. Detail the current quantity of material on the maturation mads (including storage and management details). Detail the decommissioning plan for maturation pads and leachate ponds. Conduct a water balance assessment. Justify the need to remove the processing limit for biosolids and state how potential odour from biosolids will be mitigated. Detail which Sewage Treatment Plants biosolids will be sourced from, who will be transporting them and how odour will be mitigated during transportation. Describe and assess the existing and proposed biofilters and stacks. Conduct odour modelling that considers cumulative impact from the SAWT facility and the landfill at residential and industrial receivers around the Site. Provide details of the Composting Hall, including the process (how material would be turned etc.). Provide details of the Refining Building including the number of access points. State whether the quantity of SSO materials on the maturation pad is proposed to increase, and detail odour, dust and runoff management and mitigation. Consider the installation of enclosed leachate holding tanks.	**Chapters 5, 8 and 11**
NSW Roads and Maritime Services	Consider, and ensure the Development contributes to the achievement of, transport objectives contained in NSW Government strategies when designing and conducting infrastructure, landscaping and subdivision works. Consider daily and peak traffic movements (and associated impacts) likely to be generated by Development. Detail proposed accesses and required parking provisions (including the number of spaces). Detail the number of service vehicle movements. Assess the implications for non-car travel modes, and consider implementing a sustainable travel plan. Assess the likely toxicity levels of loads transported on arterial and local roads. Prepare a traffic management plan for all demolition/construction activities.	**Chapters 5, 10 and 13**

7.2.2 Statutory Authority Consultation During EIS Preparation[3]

Consultation was undertaken with relevant statutory authorities during the preparation of the EIS. The following statutory authorities were consulted in relation to the methodology and preliminary findings of the environmental assessment:

- The Department of Planning and Infrastructure (DP&I)
- NSW Environmental Protection Authority (EPA)
- Roads and Maritime Services (RMS).

The following statutory authorities were consulted more generally in relation to the Development and the environmental assessment:

- Penrith City Council (PCC)
- Liverpool City Council (LCC)
- NSW Office of Water (NOW).

The outcome of consultation with the above listed statutory authorities is provided below.

Department of Planning and Infrastructure

Consultation with DP&I was undertaken on 27 June 2012 in relation to the methodology for the noise assessment. DP&I advised it they would defer to the EPA with regard to the appropriate methodology for monitoring and assessing noise. DP&I commented that future operation of the expanded SAWT facility would be unlikely to have significant noise impacts given that only indoor operations would occur at night-time.

NSW Environment Protection Authority

Consultation was undertaken with the EPA on 20 June 2012 in relation to the methodology for the air quality assessment. The key outcomes of the consultation were that a cumulative quantitative odour impact assessment (expanded SAWT facility and Elizabeth Drive landfill) was appropriate. EPA concurred with the approach of taking odour samples from the existing SAWT facility and Elizabeth Drive landfill in order to generate a model of existing conditions and then use that model as a basis for assessing the potential impacts of the expanded SAWT facility and existing landfill. EPA agreed that use of the CALPUFF model is appropriate.

Consultation was undertaken with the EPA on 8 August 2012 to discuss the preliminary findings of the odour component of the air quality assessment and modifications to the design of the Development. SITA outlined to the EPA that the preliminary results of the odour modelling indicated that the concept design would have a higher than desired potential to generate odour. Consequently, modifications to the original concept design were made in order to reduce odour emissions and the total odour impact. Thus, the EPA expressed satisfaction with the proposed changes to the design.

Consultation was undertaken with the EPA on 2 July and 10 July 2012 in relation to the methodology for the noise assessment. The key outcome of the consultation was that the noise assessment for the SAWT facility should be undertaken in combination with operation of the Elizabeth Drive landfill (i.e. the SAWT facility and landfill treated as one facility). The preliminary results of the noise assessment were discussed with the EPA on 11 December 2012.

NSW Roads and Maritime Services

Consultation was undertaken with RMS on 27 June 2012 to discuss the methodology for the traffic assessment. Given the relatively small amount of additional traffic as a result of the Development, RMS agreed that the scope of the traffic assessment would only require the assessment of three key intersections. RMS agreed that a realistic worst case in terms of traffic movements in the AM and PM peaks should be modelled for these intersections. The intersections RMS agreed should be modelled are:

- Elizabeth Drive/access to SAWT facility

[3]Subsequent to the DGRs being issued, it was agreed with DP&I on 24 August 2012 that consultation with the Department of Sustainability, Environment, Water Population and Communities would not be necessary, on the basis that no Matters of National Environmental Significance would be impacted by the Development. It was also agreed with DP&I on 24 August that consultation with the Office of Environment and Heritage would not be necessary, given the disturbed nature of the Site no issues of concern would be impacted by the Development.

- Elizabeth Drive/The Northern Road
- Elizabeth Drive/Mamre Road.

RMS provided traffic modelling data for a number of future years that projected traffic growth rates along Elizabeth Drive.

Further consultation was undertaken with RMS on 24 September 2012 to discuss the preliminary findings of the traffic assessment. The discussion concerned the most appropriate intersection treatment for the intersection between the Resource Recovery Precinct access road and Elizabeth Drive, in light of the initial preliminary assessment findings. RMS expressed a preference for the intersection to be upgraded to a 'seagull' intersection (which includes an additional bay in the median of Elizabeth Drive for right turning vehicles exiting the Site), and agreed that the design and subsequent traffic assessment would be adjusted accordingly.

Penrith City Council

Consultation was undertaken with PCC on 15 August and 28 September, 2012. The key outcomes from the meetings were:

- PCC would like the environmental modelling (particularly noise and air) to address the 24 hour operation of the expanded SAWT facility.
- PCC noted that the proponent of the Orchard Hills waste and resource management facility development was required to change the design of the facility in light of visual impacts. Council would like to see a visual assessment conducted in a similar manner to that which was done for the Orchard Hills development.
- The EIS ought to provide detailed information about the relationship between the SAWT facility and the life of the Elizabeth Drive landfill.
- PCC agreed to lift the existing sunset clause pertaining to the existing development given the changing nature of the surrounding land uses in the future.

Liverpool City Council

Consultation was undertaken with LCC on 20 August 2012 to provide LCC with an overview of the Development. LCC expressed interest in the implications the Development would have for its contract to access the existing facility for waste management as it currently does. Additionally, LCC would like the EIS to include:

- An analysis of any potential traffic implications resulting from the Development that could impact rural residents residing to the south of Elizabeth Drive or the Liverpool City Council component of Elizabeth Drive.
- The origin of traffic entering the facility discussed further in this EIS.
- An odour analysis for the Development and a description of effective mitigation and management measures.
- LCC requested to be notified when the EIS is on public exhibition.

NSW Office of Water

Consultation was undertaken with NOW on 6 December 2012 to provide NOW with an overview of the Development. NOW's written response to the consultation is available in Appendix A. The key issues discussed with the NOW in relation to the Development and this EIS were as follows:

- Compliance with rules in any Water Sharing Plan and legislation. Any extraction of groundwater or surface water and licensing requirements should be clearly identified, including extraction volumes.
- Adequate mitigating and monitoring requirements to address impacts to surface water and groundwater sources and dependent ecosystems. NOW would like assurance that monitoring would continue as at present.
- An assessment of the impact of the Development on watercourses and riparian areas, groundwater sources and groundwater dependent ecosystems. NOW would like assurance that there is no groundwater extraction proposed as part of the Development.
- NOW supports the 50-metre riparian zone buffer. NOW would like to see a scaled map of the Development in the EIS in the context of the riparian area and Badgerys Creek. Further, the EIS ought to identify any asset protection zones and riparian vegetation.

7.3 Community and Stakeholder Consultation

SITA considers meaningful and engaging community consultation an essential component of the Development. Accordingly, community and stakeholder consultation was undertaken prior to, and during, the EIS preparation process, and is planned to continue should the Development receive approval to proceed. Community and stakeholder consultation was carried out during preparation of the EIS in order to identify and address issues of concern raised by local residents and other key stakeholders. The primary purpose of this consultation was to:

- provide an overview of the Development to relevant stakeholders and the community
- seek local knowledge to assist with the assessment process
- seek input into matters stakeholders would like to see addressed in the EIS
- ensure any ongoing matters are addressed during the operation of the Development.
- The following section provides an overview of:
- community consultation that is undertaken as part of the existing SAWT facility's normal operations, irrespective of the Development
- the relevant stakeholders engaged prior to and during preparation of the EIS
- the consultation strategy for the proposed Development
- planned future community consultation assuming the Development receives approval to proceed.

7.3.1 Ongoing Community Consultation

As part of the ongoing commitment to engagement with the local community, SITA coordinates a community forum called the Kemps Creek Community Reference Group (CRG). The group is made up of members of the community who are interested in SITA's facilities and operations, and PCC and EPA representatives. The group was first established in September 2011.

SITA hosted a Kemps Creek CRG meeting on 9 February 2012, at which attendees were provided with an overview of operations at both the SAWT facility and the landfill, and had an opportunity to discuss the proposed expansion of the facility. At the time of the meeting, the application for modification to the original project approval was still relevant, so the discussion was based on the concept design that was subsequently superseded. The group raised concerns about:

- the type of waste the facility would be processing
- transparency around operations
- odour fence and its efficacy
- odour complaints and monitoring
- noise concerns (particularly truck beeping and movement of bins).
- At a meeting held on 27 September 2012, SITA presented the revised Concept Plan to the group and the preliminary environmental impacts. The group raised specific concerns:
- whether the new design has addressed weather vulnerability, given that high volumes of rainfall have had an impact on existing operations
- the source of the waste and whether it linked in with the closure of Eastern Creek Landfill
- traffic impacts on Elizabeth Drive.

At the most recent meeting held on 29 November 2012, the points of discussion were unchanged from the meeting on the 9 February 2012.

SITA distributes important community information via email to the Kemps Creek CRG, such as alerts when there is unusual operational activity that could potentially cause adverse amenity effects. The Kemps Creek CRG would continue to operate as an ongoing mechanism for SITA to engage with the community.

7.3.2 Consultation Strategy for the Development

Community involvement has been an integral component of the Development. At each stage, SITA has engaged with the community and stakeholders with the aim of increasing public understanding of, and participation in, the Development. The Development has benefited from the input of local knowledge and priorities, which has helped to identify issues, potential mitigation strategies and opportunities to improve outcomes.

Relevant Stakeholders

During preparation of the EIS, SITA engaged with the community through a number of channels to share plans on the Development and elicit feedback. The relevant stakeholders that were identified as having the potential be directly or indirectly impacted by the Development were:

Local businesses

- owners and operators of service stations and other high-traffic retail businesses on Elizabeth Drive
- neighbouring farms and other businesses adjacent to the Site boundary.

Residents and Community Groups

- Kemps Creek
- Kemps Creek working man's club (on Elizabeth Drive)
- Badgerys Creek
- Twin Creeks
- Kemps Creek CRG members.

Schools

- Kemps Creek Public School
- Heritage College (Christadelphian School)
- Mamre Anglican School
- Trinity Catholic Primary School
- Emmaus Catholic High School
- Badgerys Creek Public School
- Luddenham Public School
- Holy Family Primary School (Luddenham)
- Blackwell Public School
- Banks Public School
- St Clair Public School
- Kindilan Preschool
- Clairgate Public School (St Clair)
- Erskine Park High School
- St Clair High School.

Consultation Prior to EIS Preparation

Consultation with community members, including neighbouring property owners, PCC and Members of Parliament, was undertaken in 2011 as part of the application for modification to the original project approval, prior to the preparation of this EIS. This consultation involved:

- Issuing 200 invitations to residents and businesses in close proximity to the existing SAWT facility to attend a community information session. The community information session was held at the SAWT facility on the evening of 15 September 2011 and was attended by seven members of the local community. The community voiced concerns relating to odour and noise during the information session.

- Individual meetings with neighbouring property owners to communicate plans for expansion of the existing SAWT facility.
- Individual meetings with local school leaders.
- Briefings with PCC executives and elected Councillors.
- Briefings with the local elected state Members of Parliament.

Concerns raised by the local community in relation to noise and odour contributed to SITA altering the original concept design to minimise external operations (waste handling and processing) at the Site and eliminate the use of reversing beepers on both landfill and SAWT heavy equipment. Community concern also led to a decision to relocate the Waste Collection Fleet Depot to an alternative site due noise impacts, particularly in the early morning. The Waste Collection Fleet Depot is not part of SAWT facility operations.

Consultation During EIS Preparation

Table 7-3 provides summary of the activities undertaken as part of the community and stakeholder consultation strategy during preparation of the EIS.

Table 7-3 Consultation Undertaken During EIS Preparation

Activity Undertaken	Date	Details
Community Presentations	July 2012 and September 2012	Community presentations were held at community meetings convened by the EPA in July 2012 and September 2012 regarding odour concerns from a number of landfill and waste treatment facilities in the St Clair and Erskine Park residential areas. SITA included the Development as a key strategy to address potential odour sources at its Site.
Industry Information Session	October 2012	An Industry Information Session was held in October 2012. At the session, 65 representatives from the waste industry and local councils attended a briefing on the SAWT Facility which included coverage of the Development.
Website	11 November, 2012	A page was developed on SITA's website to support the production of a leaflet (see below) with more detailed information. The web page went live on 11 November 2012, and provided diagrams of the Development and frequently asked questions on the Development.
Leaflet	13 November, 2012	Prepared and distributed a leaflet on the proposal to expand the existing SAWT facility. Ten thousand copies of the leaflet were letterbox dropped in the communities of St Clair, Erskine Park, Badgerys Creek, Kemps Creek and Twin Creeks on 13 November 2012. The leaflets were also issued via email to local schools and community clubs as listed in Section 7.3.2), the EPA and members of the Kemp Creek CRG. The information in the leaflet included an explanation of what the existing SAWT facility is and what it does and reasons for the Development.
Newspaper Advertisements	13 to 14 November and 20 to 21 November 2012	SITA advertised the Development plans in the St Marys Mt Druitt Star and South Western Advertiser on 13 to 14 November and 20 to 21 November 2012. The advertisements provided details on the Community Open Day and the Development, and provided SITA contact details.
Public displays	Commenced 15 November 2012	Public displays with feedback forms and leaflets available at St Clair Library and Penrith City Library from 15 November 2012 to 31 December 2012. The displays were also exhibited at SITA's Kemps Creek Resource Recovery Precinct.
Community Open Day	25 November 2012	SITA held an "open house" style Community Open Day for residents at the Kemps Creek Resource Recovery Precinct from 10 am to 2 pm on 25 November, 2012. The session was organised as "drop in anytime" style event, at which several information stations were arranged around the Education Centre, each staffed by a SITA representative. Printed material to take home was provided at each information station throughout the Site, and a tour of the Site was offered.

Activity Undertaken	Date	Details
Community Enquires	Ongoing	SITA established and maintained direct channels through which stakeholders could receive answers to any enquiries about the facility or the proposed expansion. One SITA representative was delegated as the main point of contact for all community enquiries.
One-on-one Engagement	Ongoing	One-on-one engagement with immediate neighbours and key community leaders was undertaken by SITA. These meetings were undertaken to discuss the proposed expansion and seek feedback on any existing community attitudes regarding the facility. One-on-one consultation was undertaken with: With an adjacent landowner. The General Manager of Twin Creeks Golf and Country Club on 27 June 2012. During the meeting SITA provided an overview of the Development.

7.4 Issues Prioritisation

This section provides a summary of the prioritisation process undertaken to identify key environmental issues associated with the site and proposed concept.

7.4.1 Issue Identification

The key environmental issues identified by AECOM through the Scoping Document process (which was undertaken to support the request for DGRs), identified in the DGRs and through agency and community consultation are:

- air quality
- noise
- traffic
- surface and groundwater
- geology and soils
- hazard and risk
- landscape and visual

7.4.2 Prioritisation of Issues

The prioritisation of issues was based on the need to recognise that a higher degree of assessment would be required for the issues with the highest severity and greatest possible consequences. Table 7-4 shows the issues prioritisation matrix used to identify priorities. Each issue was given a ranking between one and three for likelihood, and between one and three for consequence of the unmanaged effect. These two numbers were then multiplied to give a numerical ranking for the issue, which was used to categorise each issue into very high, high, medium, minor, low or very low priority.

Table 7-4 Issues Prioritisation Matrix

Likelihood of effect	**Consequence of unmanaged effect**		
	Minor(1)	**Moderate**(2)	**Major**(3)
Improbable(1)	Very low (1)	Low (2)	Moderate(3)
Possible(2)	Low (2)	Medium (4)	High (6)
Probable(3)	Moderate(3)	High (6)	Very high (9)

The ranking of issues aims to prioritise the issues for assessment and does not consider the application of mitigation measures to manage the environmental effects. In all cases, appropriate and proven mitigation measures would be used to minimise potential impacts. These mitigation measures are discussed in Chapter 21.

The allocation of risk is based on upon the following considerations:

Likelihood of effect

1. Improbable: imperceptible or short term cumulative impacts.
2. Possible: modest or medium term cumulative impacts.
3. Probable: serious or long term cumulative impacts.

Consequences of unmanaged effect

1. Minor: minor environmental change.
2. Moderate: moderate adverse environmental change.
3. Major: important adverse environmental change.

The prioritisation of environmental issues related to the Development is shown in Table 7-5.

Table 7-5 Prioritisation of Environmental Issues

Issue	Likelihood	Consequence	Priority
Air Quality			
Dust emissions during construction	Possible	Minor	**Low**
Dust emissions during operation	Possible	Minor	**Low**
Odour emissions during operation	Probable	Moderate	**High**
Noise			
Temporary construction noise including earthworks, erection of structures, installation of plant, internal fit-out and temporary processing of waste external to buildings	Probable	Moderate	**High**
Operational noise including indoor and outdoor operations, and increased traffic flows	Probable	Minor	**Moderate**
Traffic			
Temporary increase in traffic during construction	Probable	Moderate	**High**
Increase in traffic during operation	Possible	Moderate	**Medium**
Surface and Groundwater			
Surface water quality impacts during construction	Improbable	Moderate	**Low**
Surface water quality impacts during operation	Possible	Moderate	**Medium**
Impacts to groundwater during construction	Improbable	Moderate	**Low**
Impacts to groundwater during operation (leachate ingress)	Improbable	Moderate	**Low**
Geology and Soils			
Erosion and sedimentation during construction	Possible	Moderate	**Medium**
Erosion and sedimentation during operation	Improbable	Moderate	**Low**

Issue	Likelihood	Consequence	Priority
Hazard and Risk			
Exposure of employees and future surrounding land uses and sensitive receivers to hazards and risks associated with operation	Possible	Moderate	**Medium**
Land Use			
Construction impacts to adjacent and nearby land uses	Improbable	Minor	**Very low**
Operation impacts to adjacent and nearby land uses	Possible	Moderate	**Medium**
Landscape and Visual			
Construction-related visual amenity impacts	Possible	Minor	**Low**
Impacts related to visual amenity of the expanded facility	Possible	Minor	**Low**
Ecology			
Impact on flora and fauna on-site, particularly the Roughbark Angophora on the northern border of Site	Improbable	Minor	**Very low**
Impact on flora and fauna off site	Possible	Minor	**Low**
Heritage			
Impacts to indigenous and non-indigenous heritage items	Improbable	Minor	**Very low**
Socioeconomic			
Generation of employment opportunities	Probable	Minor	**Moderate (Positive impact)**
Impact on amenity of nearby residential land uses (i.e. noise, air quality)	Possible	Moderate	**Medium**
Demand for community resources and impact on the community	Improbable	Minor	**Very low**
Benefits to the Penrith City Council economy	Probable	Positive impact	**Positive impact**
Greenhouse Gas			
Greenhouse gas emissions due to operations	Probable	Minor	**Moderate**

Based on the preliminary risk screening, key environmental issues that may be associated with the Development are:

- Air quality emissions and amenity impacts during operation, particularly associated with odour
- Noise and amenity impacts during construction and operation
- Traffic during construction and operation
- Surface and groundwater, particularly surface water impacts during operation
- Erosion and sedimentation during construction
- Hazard and risks during operation
- Greenhouse gas emissions.

8.0 Air Quality

This chapter assesses the potential impacts of the Development on air quality.

8.1 Existing Environment

Land use in the study area is predominantly rural residential. Other land uses in the study area include a golf course, piggeries, poultry farms, ANL composting facility, brick making facility, the landfill, and the existing AWT facility. These land uses are potential sources of dust and odour emissions. The Site is surrounded by the existing landfill, rural residential properties and commercial/industrial properties, the closest of which is located 800 metres to the east-southeast of the Site.

8.1.1 Background Air Quality

Based on the nature of the existing and future activities, odour and particulate matter are the primary pollutants of interest and are discussed further in this chapter.

Odour

The perception of odour is highly individual and varies between individuals based on sensitivity, the acuteness of their sense of smell and their prior history with different odours. Offensive odours can adversely affect people's quality of life, and exposure can result in stress and other physical symptoms.

The EPA specifies impact assessment criteria for odour within *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (NSW Department of Environment and Conservation (DEC), 2005). The criteria have been designed to take into account the range of sensitivity to odours within the community based on a statistical approach relating to population size. That is, as the population density increases, the proportion of sensitive individuals is also likely to increase, thereby requiring a more stringent criterion.

The impact assessment criteria ranges from 2 odour units (OU) to 7 OU, with 7 OU considered the maximum level of odour to which a residence should be exposed. Based on the density of the residential population that could potentially be affected by odour from the Resource Recovery Precinct (which is estimated at 100), the relevant criterion for this assessment is 4 OU.

Odour is the key air quality issue of concern for the existing SAWT and landfill. As discussed earlier in this report, the existing SAWT facility involves a number of odour-generating activities with the key potential sources being:

- the external MSW maturation pad and stockpile pad
- the external SSO maturation pad and stockpile pad
- the leachate ponds
- a semi-enclosed biofilter with no stack
- an external trommel used for the refining of material
- fugitive emissions.

The main sources of odour at the landfill are the tipping faces for general and restricted waste, the latter consisting of contaminated soil products. As the remaining sections of the landfill are capped and fitted with a methane capture system, these areas are not expected to be a major existing source of odour.

As described earlier, there are a number of potential odour-producing sources within proximity to the Site. However, it should be noted that:

- unlike other air quality pollutants and particulates, odours from different sources have different characteristics and do not typically combine to create a larger odour impact
- odours with different characteristics may also be perceived differently by the receptor.
- odours from different sources can combine in different ways – while similar odours may add synergistically, other odours may cancel each other out, or may mask another odour.

The only local odour source that is considered to be of similar character to that likely to be emitted by the existing SAWT facility is the ANL composting facility at Badgerys Creek. The ANL composting facility is located approximately 2.2 kilometres south of the Site. Given the distance between the Site and this facility, and most of the sensitive receivers are located in between the two sources, it is unlikely that the receivers would be affected by odours from both sources at the same time.

A number of odour complaints associated with the Resource Recovery Precinct have been received by SITA over the past few years. Complaints have been primarily received from residential properties located to the south of the Site off Elizabeth Drive. The source of the odour was generally not directly linked back to a specific activity at the Resource Recovery Precinct. However, the compost stockpiles and leachate ponds were discussed as a possible source. Further, it is acknowledged that degraded operating conditions linked to an extended commissioning period and unfavourable weather conditions in 2012 (which resulted in several months to bring the maturation pads back to normal operating conditions), probably led to the generation of odours with an impact on the local community. This has been highlighted by a number of complaints received during these three years of operations.

In August 2012, NSW EPA engaged The Odour Unit Pty Ltd to conduct a baseline regional odour assessment covering the Eastern Creek, Erskine Park and Kemps Creek precincts of Western Sydney. The request for this assessment was in response to community odour complaints and concerns in recent times regarding the level of odours originating from the activities undertaken at ten waste management and composting facilities (the facilities) within these precincts, including the Resource Recovery Precinct.

During the surveys there were multiple occasions where the existing SAWT facility odours were detected beyond the Resource Recovery Precinct boundary. These impacts were generally near the boundary, with one occasion extending to the Erskine Park Precinct. The odours detected were generally classified as weak to distinct with MSW/garbage/cheesy, green waste/herbaceous and organic growth medium/dry compost odour characters.

Feedback from the experience since inception of the existing SAWT facility has obviously significantly contributed to the definition of the design of the Development as highlighted in the earlier chapters of this EIS.

Particulates

Particulate matter can be emitted from natural sources (for example, bushfires) or as a result of human activity (for example, motor vehicle emissions or excavation works). Exposure to particulates has been linked to a variety of health effects, such as respiratory problems.

There are three categories of particulate matter, which are differentiated by size. These are:

- total suspended particulates (TSP). TSP is a measurement of the total of particles suspended in the air with a diameter less than or equal to 50 micrometres (µm), of which PM_{10} is a subset. TSP primarily cause aesthetic impacts associated with coarse particles settling on surfaces, which also causes soiling and discolouration. These large particles, however, can cause some irritation of mucosal membranes and can increase health risks from ingestion if contaminated
- PM_{10} are particles less than or equal to 10 µm and tend to remain suspended in the air for longer periods of time compared to larger particles and can penetrate into human lungs
- dust deposition. Dust deposition refers to any dust that falls out of suspension in the atmosphere and is a measurement of the weight of dust falling on a given area over time.

The EPA specifies ground-level concentration criteria for these pollutants within *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (NSW Department of Environment and Conservation (DEC), 2005). These are listed in Table 8-1.

Table 8-1 Impact Assessment Criteria for PM_{10}, TSP and Deposited Dust

Pollutant	Averaging period	Criteria	
PM_{10}	24 hours	50 µg/m^3	
	Annual	30 µg/m^3	
Total Suspended Solids	Annual	90 µg/m^3	
Deposited Dust	Annual	2 g/m^2/month (maximum increase)	4 g/m^2/month (maximum total)

Source: DEC, 2005

Ambient air quality in the vicinity of the Site is monitored by the EPA and SITA. The closest monitoring stations operated by the EPA that monitors PM_{10} concentrations are located at St Marys (approximately seven kilometres north of the Site) and Bringelly (located approximately five kilometres south of the Site).

The closest EPA monitoring station that has recorded TSP concentrations is located at Earlwood, approximately 35 kilometres to the east of the Site. As TSP was last measured at the Earlwood monitoring station in 2004, the ratio of PM_{10} to TSP was calculated and applied to the 2011 annual average PM_{10} concentration recorded at St Marys to derive a more representative ambient concentration for the purposes of this assessment.

Deposited dust has been measured by SITA at seven monitoring stations along the boundary of the Resource Recovery Precinct between 2007 and 2011.

A review of the available EPA and SITA data shows that:

- there were exceedances of the PM_{10} maximum 24 hour average concentration criterion of 50 µg/m^3 at St Marys (2010 and 2011) and Bringelly (2011 only) monitoring stations (refer to Table 8-2 below)
- the annual average PM_{10} concentrations met the EPA criterion of 30 µg/m^3 at both St Marys and Bringelly monitoring stations
- using a ratio approach described above, the annual average TSP concentration from the St Marys data was calculated to be 34 µg/m^3, which is below the criterion of 90 µg/m^3
- the EPA criterion of 4 g/m^2/month was exceeded at most monitoring locations along the boundary of the Resource Recovery Precinct in the past five years. The highest deposition levels were recorded at monitoring location D8, which is located on the northern boundary of the Resource Recovery Precinct (shown in Figure 3 of the Air Quality Impact Assessment report found in Appendix B).The deposition results at the Resource Recovery Precinct monitoring locations may have been impacted by a few extraordinary events occurring during the monitoring period. During 2008, the construction of the existing SAWT facility was at its peak. During 2010, the excavation of landfill cell C5 at the Landfill was occurring, and there was also some limited transportation of fill to an adjacent property.

Table 8-2 Background PM_{10} levels at Bringelly and St Marys monitoring stations (2010 and 2011)

Year	Location	Criteria PM10 (µg/m^3)	Maximum 24 Hour Average PM_{10} (µg/m^3)	Annual Average PM_{10} (µg/m^3)
2010	Bringelly	50	41	15
	St Marys		**52**	15
2011	Bringelly		**86**	16
	St Marys		**74**	15

Note: Exceedances are shown in **bold**.

SITA has made efforts to aid in the reduction of dust emissions from the Resource Recovery Precinct in recent years. This includes the capping of eight hectares of land in the last 12 months, improved incorporation of moisture in the compost windrows during turning and the reduction of compost kept on site.

8.1.2 Climatic Conditions

The closest metrological monitoring station is located at Badgerys Creek, approximately four kilometres south west of the Resource Recovery Precinct. Data from this station is available from 1995 to 2010. Based on this data, the following characteristics are noted:

- the warmest temperatures occur in summer, with the highest average maximum temperature occurring in January (30 degrees). July is the coldest month, with a recorded average minimum temperature of 4 degrees
- February is the wettest month, while winter months are typically the driest
- humidity is typically higher in the morning compared to the afternoon
- the predominant wind direction in the morning is south west, with calm conditions very common in the morning

- winds occur from all directions in the afternoon, with a predominant direction clockwise from the north west to south east
- wind speeds are higher in the afternoon compared to the morning, with the highest average wind speeds occurring in October (20 kilometres per hour).

8.2 Methodology

The operational impact assessment has been undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2005). To assess the potential impacts of the Development during operations:

- an emissions inventory of the Development was developed for use in the dispersion modelling. This was generated using operational information supplied by SITA and emission factors developed through site-specific sampling
- dispersion modelling was undertaken to predict potential impacts at the closest receivers as a result of the Development, as well as the cumulative impacts of the Development and the existing landfill.

The dispersion modelling was completed using the TAPM and CALMET metrological processers, and the CALPUFF dispersion model. The CALPUFF dispersion model inputs include meteorology, source characteristics, modelling scenarios and pollutant emissions data. Given the area surrounding the Development experiences a high degree of calm and low wind speed conditions, CALPUFF was selected as the most appropriate dispersion model for the impact assessment.

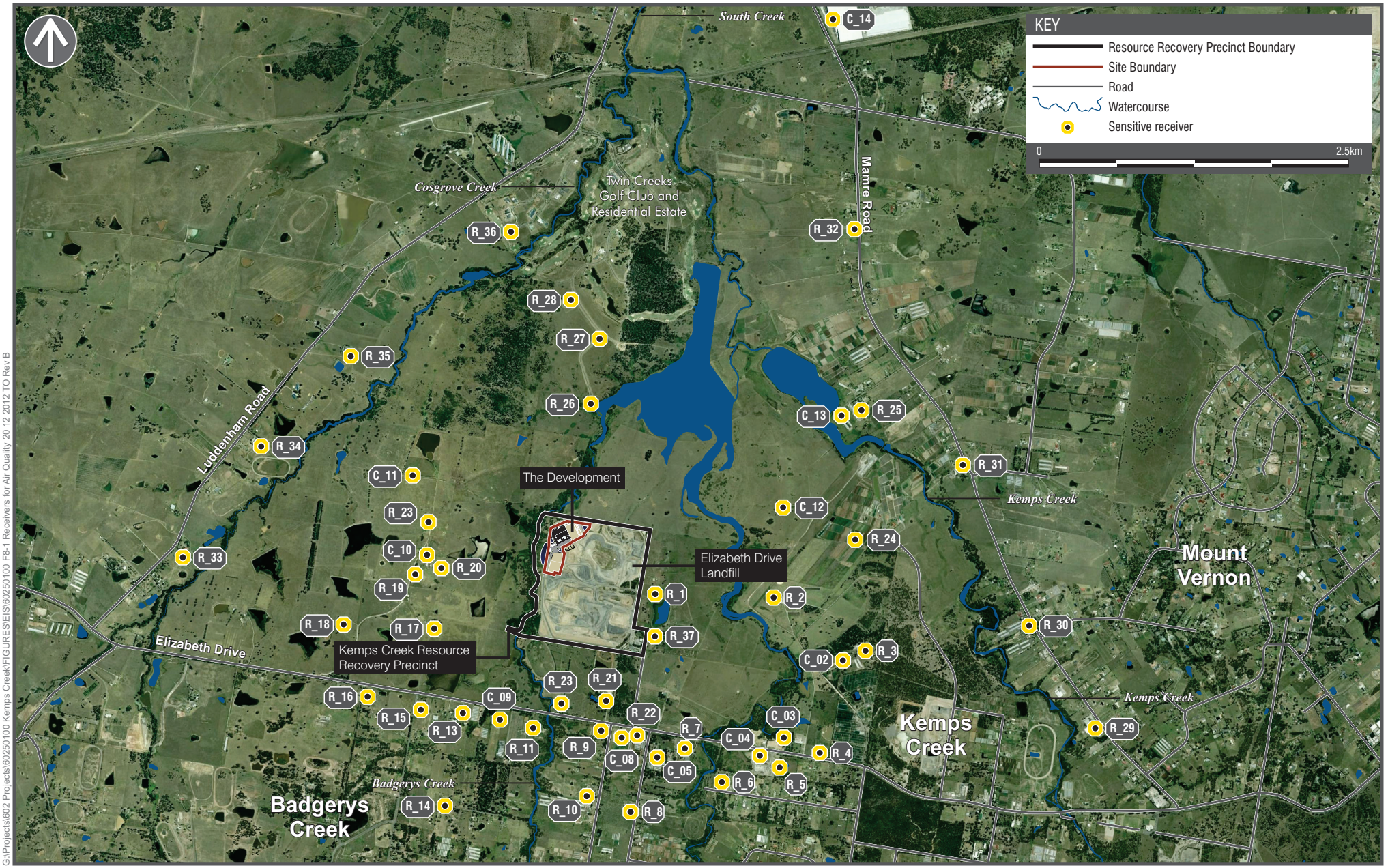
The methodology was developed in consultation with the EPA, and was discussed at a meeting held on 20 June 2012. At this meeting, the following was noted:

- that a cumulative quantitative odour impact assessment of the Resource Recovery Precinct was appropriate as the most conservative approach
- that the EPA agreed with the proposed approach for generating a model of existing conditions, using odour samples collected from the Resource Recovery Precinct, that would be used as a basis for assessing potential impacts of the Development
- that the assessment must consider the impacts of the Development as operating at full capacity
- it was agreed that the impact assessment would use the CALPUFF dispersion model, given its capability for handling calm conditions.

8.2.1 Sensitive Receivers

The impact assessment for operational impacts focused on the sensitive receivers located within the likely zone of affectation of the Development. These receivers are located:

- directly adjacent to the east of the Site
- along a private road located to the west of the Site
- on both sides of Elizabeth Drive to the south of the Site
- at the southern extent of the Twin Peaks residential estate on Humewood Place.
- The EPA requested that a number of additional receivers be considered, such as residences along Mamre Road, St Clair and Twin Creeks residential estate, and the Erskine Park Industrial Estate (as shown on Table 8-1).



G:\Projects\602 Projects\60250100 Kemps Creek\FIGURES\EIS\60250100 F8-1 Receivers for Air Quality 20 12 2012 TO Rev B

AECOM

SENSITIVE RECEIVERS FOR AIR QUALITY

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 8-1

8.3 Assessment of Potential Impacts

8.3.1 Construction

Activities undertaken during the construction phase that have the potential to result in dust or other pollutant emissions including the following:

- earthmoving during site preparation
- excavation of stormwater ponds and building foundations
- handling and stockpiling of excavated material and construction materials
- dust emissions from the movement of vehicles
- construction vehicles and equipment exhaust emissions.

Emissions from fuel combustion from vehicles and equipment would largely be diesel engine based and depend on the grade and composition of the fuel and the status of equipment maintenance. The fuel combustion emission of concern is particulate matter (primarily PM_{10}).

Impacts on air quality as a result of the construction activities would be short term and localised to the area surrounding the construction. Mitigation measures would be used to minimise the potential for emissions of particulate matter during construction. It is not anticipated that construction activities would have long term adverse impacts on the surrounding area.

8.3.2 Operation

Odour

There are also a number of improvements proposed to the existing facility as part of the Development that would aim to reduce odour emissions, which were factored into the odour model. The most significant of which are as follows:

- all stages of MSW composting would be undertaken within negatively pressurised buildings
- enclosure of the refining operations within a new building (Refining Building)
- the addition of three biofilters to treat the odour collected from the additional Composting Hall and Refining Building
- the venting of currently exposed biofilters and the proposed biofilters through 15-metre stacks to increase the dispersion of emissions into the atmosphere
- collection of MSW compost leachate into enclosed storage tanks, removing the need for external MSW compost storage ponds.

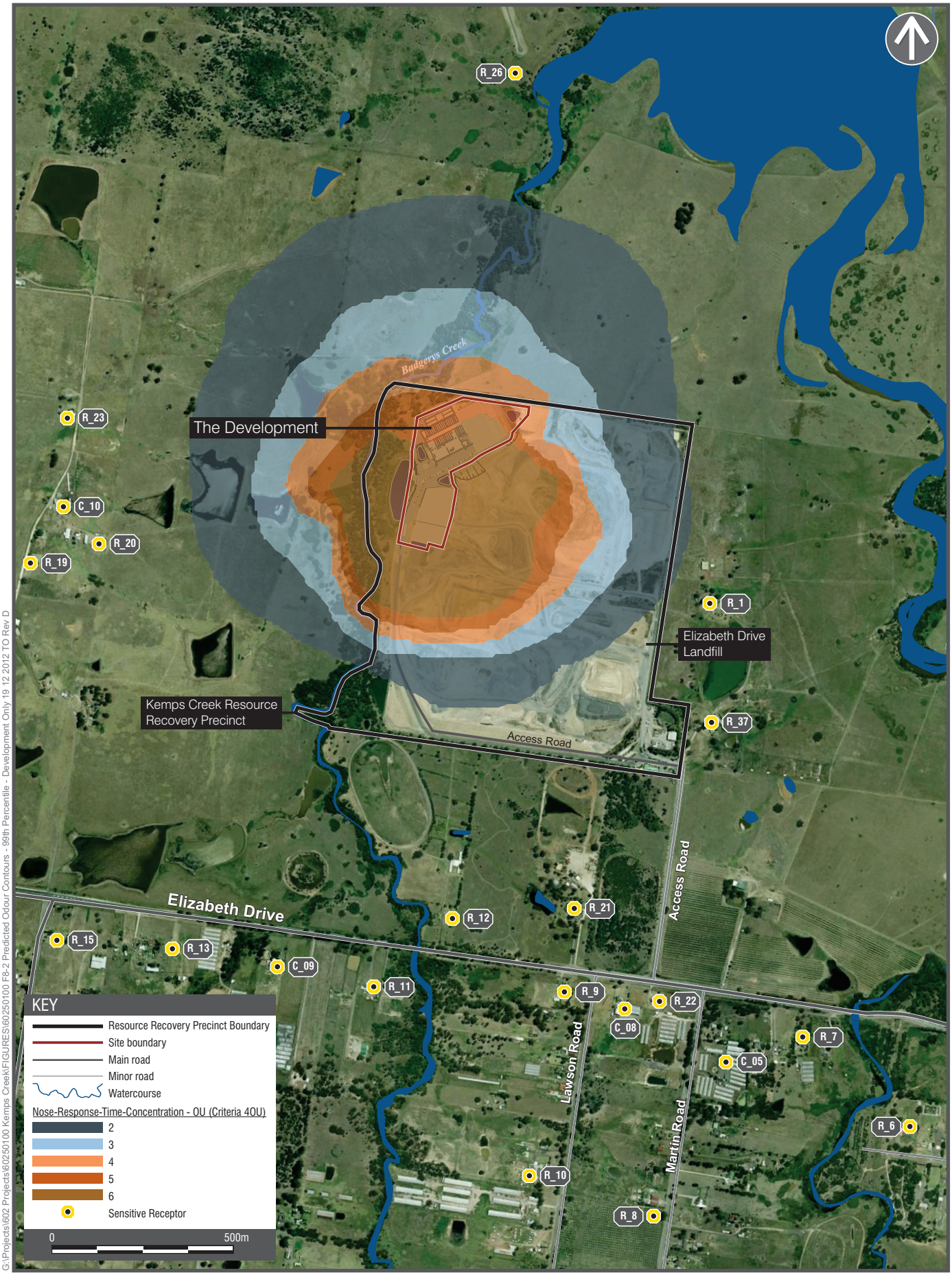
The maximum 99th percentile odour concentrations predicted at the sensitive receiver locations as a result of the Development alone, and the cumulative impacts as a result of the Development and the landfill are shown in Table 8-3 and illustrated in Figure 8-2 and Figure 8-3.

As shown within this table, the highest predicted odour concentration attributable solely to the Development at a sensitive receiver is 1.6 OU, which is below the 4 OU assessment criterion. For the cumulative impact of the Development and the Landfill, the majority of the sensitive receivers are predicted to be below the 4 OU criterion. However, odour concentrations between 4 and 5.1 OU are predicted at two receivers located adjacent to the eastern boundary of the Resource Recovery Precinct (R1 and R37).

Given that fact that the cumulative impact is dominated by the landfill and not the Development, that the contribution of the Development to the cumulative impacts are relatively minor, and that the Development would improve the performance of the existing SAWT facility in terms of odour emissions, this level of impact is not considered to be significantly adverse.

Table 8-3 Odour concentration (odour units) at the closest sensitive receivers as a result of the Development (alone) and for the Resource Recovery Precinct

Receiver ID	Odour Ground Level Concentration (OU)	
	Development	Development and Landfill
R_1	1.6	**5.1**
R_6	0.3	0.5
R_7	0.4	0.9
R_8	0.3	0.7
R_9	0.6	1.7
R_10	0.4	0.9
R_11	0.6	1.3
R_12	0.8	2.2
R_13	0.5	1.2
R_15	0.4	0.9
R_19	0.9	1.6
R_20	1.3	2.2
R_21	0.8	2.5
R_22	0.6	1.4
R_23	1.2	2.0
R_26	1.2	1.5
R_37	1.1	**4.5**
C_05	0.4	1.0
C_08	0.5	1.4
C_09	0.5	1.1
C_10	1.1	1.9



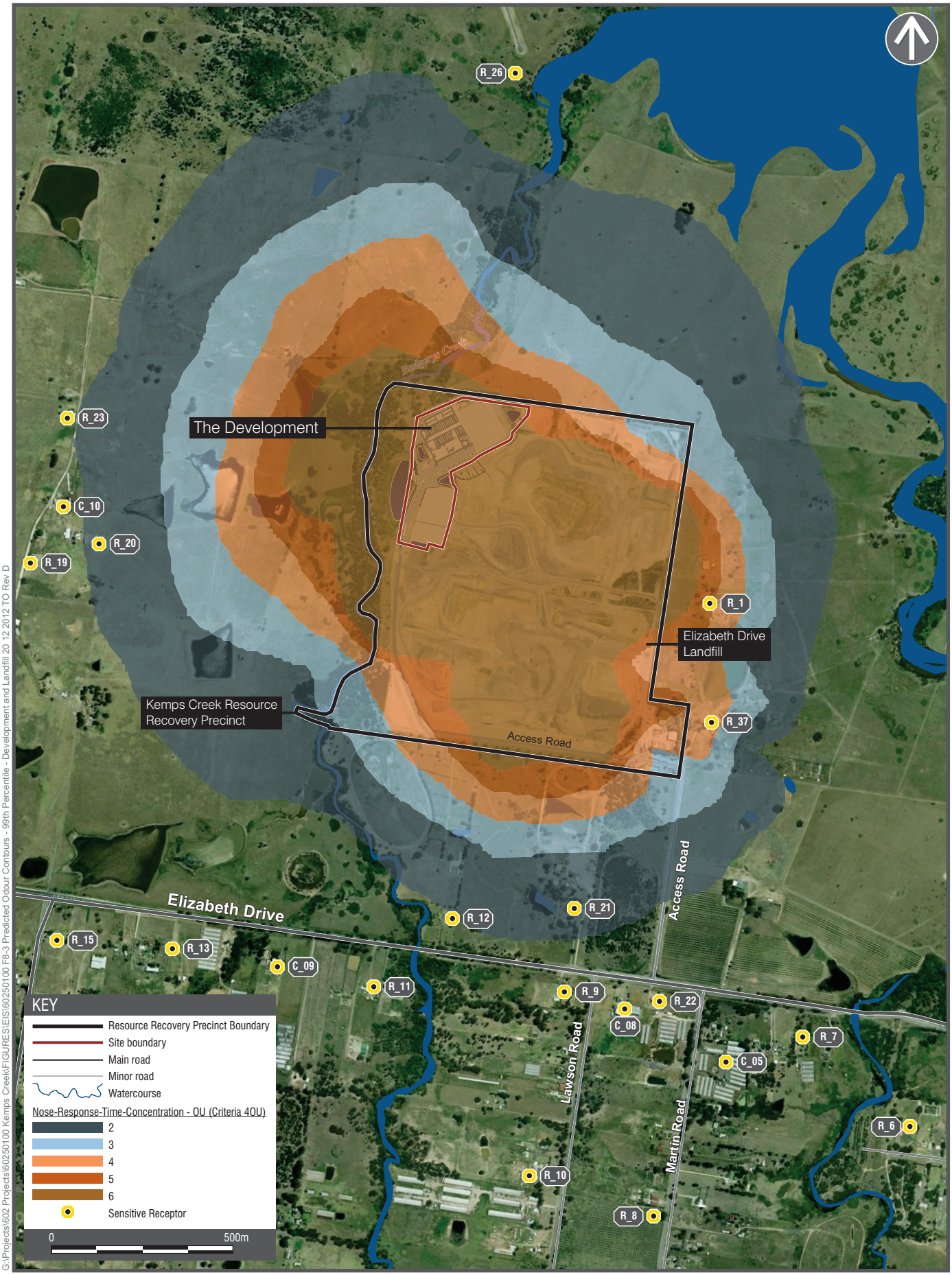
G:\Projects\602 Projects\60250100 Kemps Creek\FIGURES\60250100 F8-2 Predicted Odour Contours - 99th Percentile - Development Only 19 12 2012 TO Rev D

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PREDICTED ODOUR CONCENTRATIONS (99th PERCENTILE) - DEVELOPMENT ONLY

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FIGURE 8-2



G:\Projects\602 Projects\60250100 Kemps Creek\FIGURES\EIS\60250100 F8-3 Predicted Odour Contours - 99th Percentile - Development and Landfill 20 12 2012 TO Rev D

AECOM

PREDICTED ODOUR CONCENTRATIONS (99th PERCENTILE) - DEVELOPMENT AND LANDFILL

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 8-3

Particulates

The internalisation of the composting activities as part of the Development would lead to improvements to air quality at the Site. Key activities that would continue to present risks to air quality due to particulate emissions include:

- the unloading and loading of compost
- front-end loaders tending to compost stockpiles
- front-end loaders driving on unsealed roads
- wind erosion from the MSW and SSO Compost Storage Pad.

Predicted emissions of particulates from operation of the proposed Development and cumulative concentrations of particulates (using background ambient criteria) are presented in Table 8-4 and illustrated in Figure 8-4, Figure 8-5, and Figure 8-6. The table presents the maximum result at any of the modelled receptors, in that the assessment has applied the maximum predicted ground level impacts from operation of the Development to either:

- the maximum EPA monitoring data from the St Marys monitoring station for PM_{10} and TSP
- the 2011 annual average dust deposition rate recorded at the nearest dust gauge along the Resource Recovery Precinct boundary to the modelled sensitive receiver.

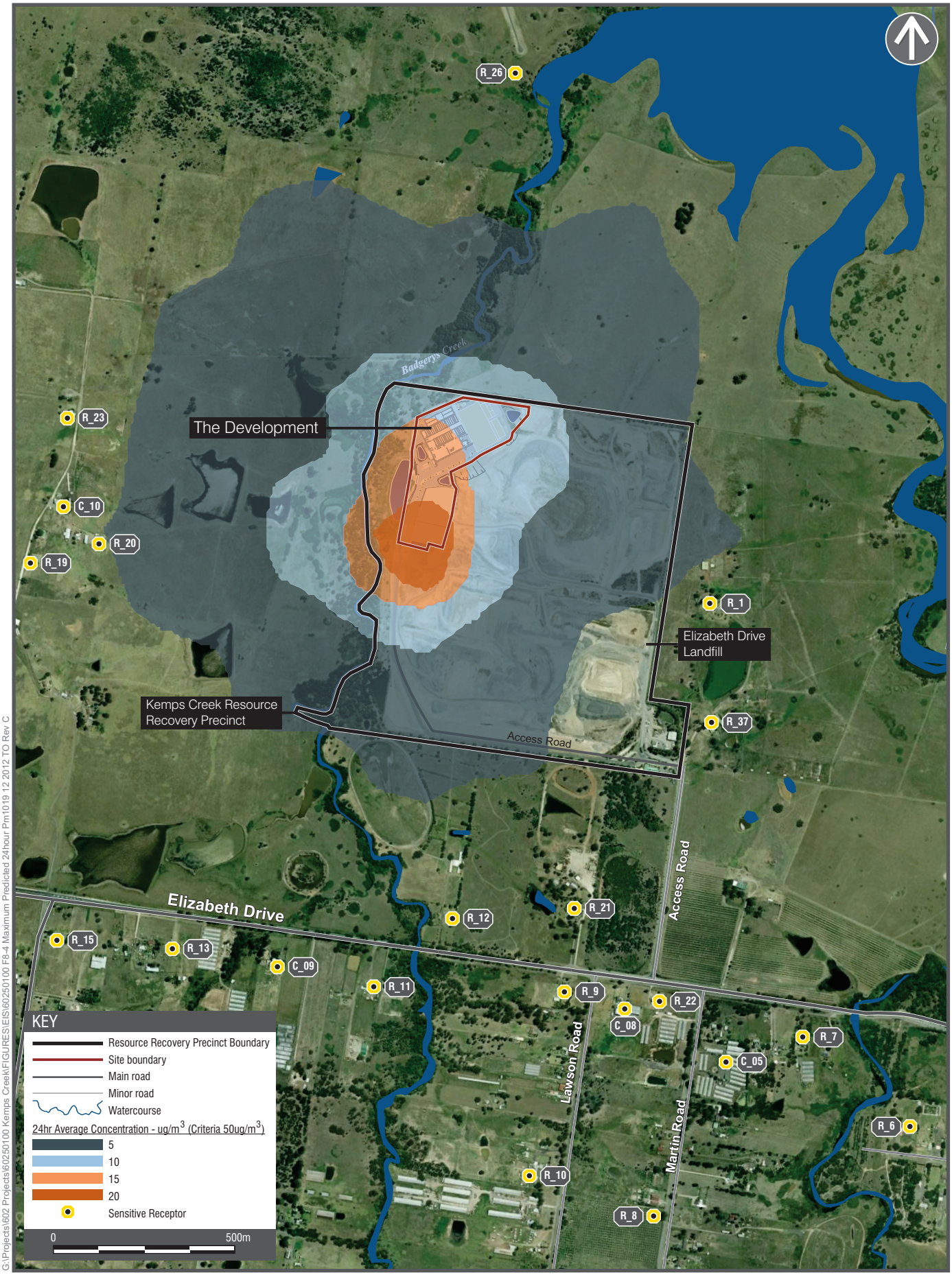
Table 8-4 Predicted Maximum Receiver Development and Cumulative Ground Level Particulate Concentrations

Pollutant	Averaging Period	Ground Level Concentration/Deposition Rate			Criteria	Units
		Development	Background	Cumulative		
PM_{10}	24 hour	5.3	**73.9**	**79.2**	50	$\mu g/m^3$
	Annual	0.5	14.7	15.2	30	$\mu g/m^3$
TSP	Annual	0.3	34	34.3	90	$\mu g/m^3$
Deposited Dust	Annual	0.045	**5.5**	**5.55**	4	g/m^2.month

Note: Exceedences of the EPA criteria are denoted in **bold**.

As shown in Table 8-4, the predicted levels of particulate emissions at surrounding receivers from operation of the Development are well below the EPA impact assessment criteria for each pollutant and the averaging period assessed. The cumulative concentrations of annual PM_{10} and TSP at sensitive receivers are also below the impact assessment criteria. However, it is acknowledged that both the existing background and predicted cumulative emissions of 24 hour PM_{10} and deposited dust exceed the impact assessment criteria. The major contributor to the cumulative impacts for both 24 hour PM_{10} and deposited dust is the background value. For both 24 hour PM_{10} and deposited dust, the additional maximum increases at any receiver of 5.3 $\mu g/m^3$and 0.045 g/m^2.month respectively as a result of the Development are not considered to represent substantial increases over the existing background levels.

Further analysis of the results was conducted to determine the percentage of the contribution or impact of the Development when compared to the criteria, background concentrations and cumulative impacts. As shown in Table 8-5, the Development is likely to be a minor contributor to the cumulative impacts, specifically for annual PM_{10}, TSP and dust deposition, with contributions of less than two percent of the criteria and four percent of the cumulative value. While the 24 hour PM_{10} shows a greater contribution, representing just less than 11 percent of the criteria and a little more than seven percent of the cumulative value, it is still not considered a substantial increase over the existing background levels.



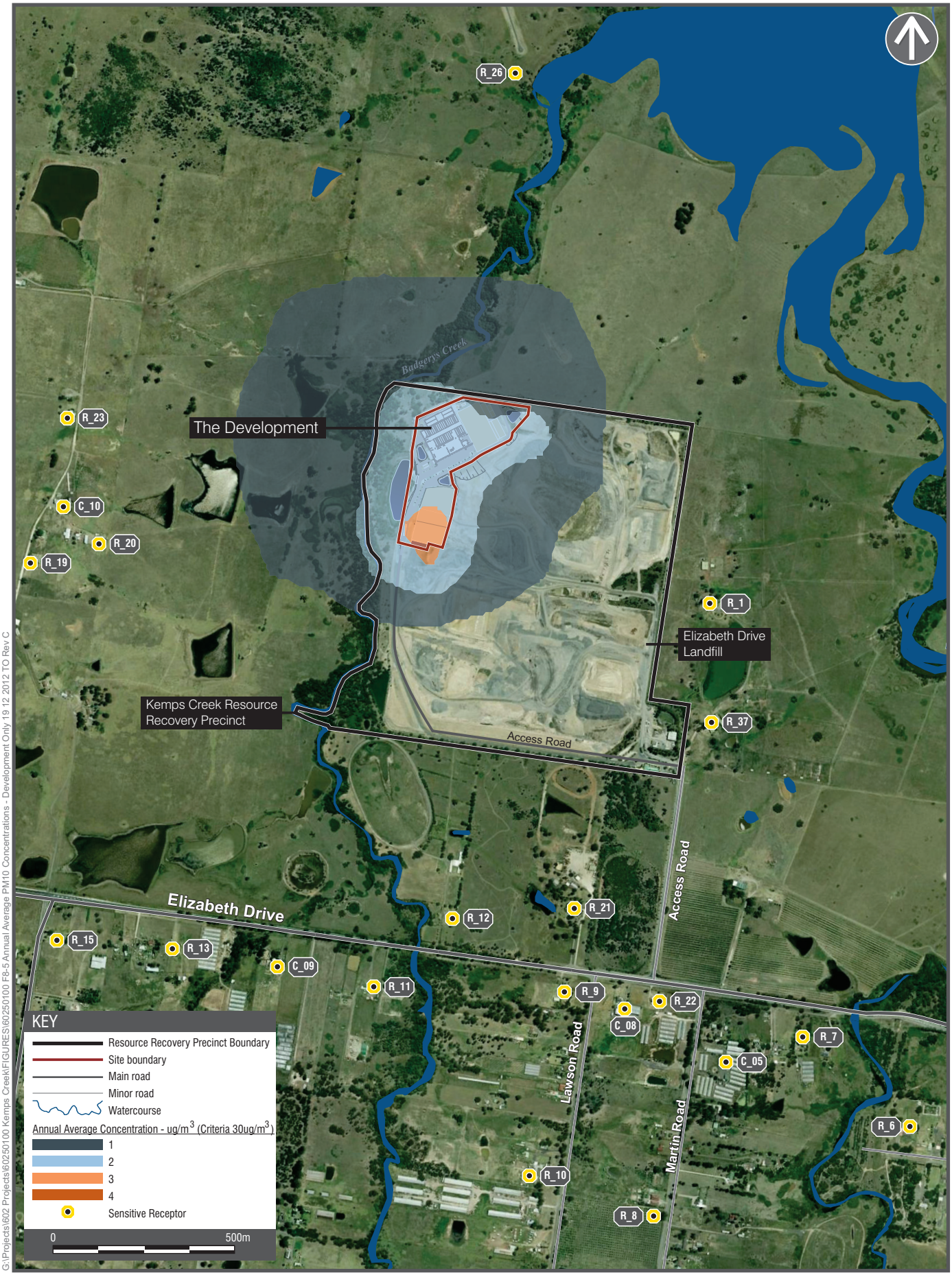
G:\Projects\602 Projects\60250100 Kemps Creek\FIGURES\EIS\60250100 F8-4 Maximum Predicted 24hour Pm1019 12 2012 TO Rev C

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MAXIMUM PREDICTED 24 HOUR PM_{10} - DEVELOPMENT ONLY

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 8-4



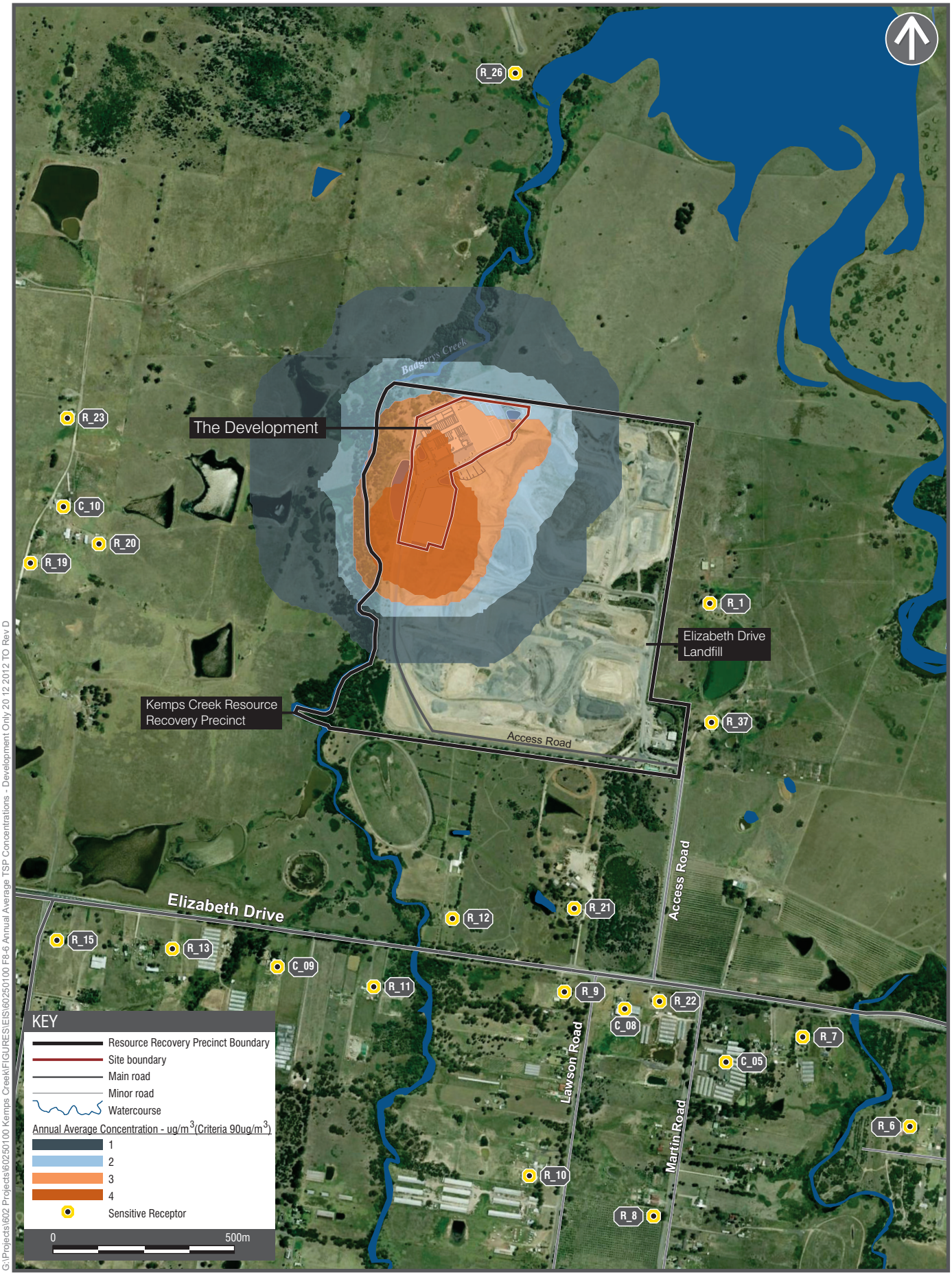
G:\Projects\602 Projects\60250100 Kemps Creek\FIGURES\60250100 F8-5 Annual Average PM10 Concentrations - Development Only 19 12 2012 TO Rev C

AECOM

PREDICTED ANNUAL AVERAGE PM_{10} - DEVELOPMENT ONLY

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 8-5



G:\Projects\602 Projects\60250100 Kemps Creek\FIGURES\EIS\60250100 F8-6 Annual Average TSP Concentrations - Development Only 20 12 2012 TO Rev D

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PREDICTED ANNUAL AVERAGE TSP CONCENTRATIONS - DEVELOPMENT ONLY

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 8-6

Table 8-5 Predicted Particulate Concentrations from the Development as a Percentage of the Criteria, Background and Cumulative Concentrations

Pollutant	Averaging Period	Predicted Concentration as Percentage		
		Of Criterion	Of Background Concentration	Of Cumulative Concentration
PM_{10}	24 hour	10.6	7.2	6.7
	Annual	1.7	3.4	3.3
TSP	Annual	0.3	0.9	0.9
Dust deposition	Annual	1.1	0.8	0.8

8.4 Mitigation and Management Measures

8.4.1 Construction

Mitigation of impacts relating to construction works is essentially a management exercise. For a long term construction activity, the focus should be on implementing a strict dust management regime supplemented by the use of ambient pollutant monitoring where appropriate. Monitoring enables the assessment (in particular) of health impacts and the effectiveness of management measures.

Consequently, mitigation and management measures would be detailed within the Construction Environmental Management Plan (CEMP) that would be prepared prior to the commencement of construction works. This would include the following measures:

- Stabilise all disturbed areas as soon as practicable to prevent or minimise wind-blown dust
- Water unsealed roads and sealing of roads where possible, with unsealed trafficable areas kept sufficiently damp during working hours to minimise wind-blown or traffic generated dust emissions
- Control truck speed and movements onsite and restrict trucks to designated roadways.
- Regular inspections of public roads to remove and dispose of any dust, soil or mud deposited on public roads by construction vehicles
- Modify or stop construction activities during periods of high wind, if necessary
- Maintain stockpiles and handling areas in a condition that minimises windblown or traffic generated dust
- Use of water sprays, sprinklers and water carts if needed to adequately dampen stockpiles, work areas and exposed soils to prevent the emission of dust from the site
- Regular inspection and maintaining erosion control structures to ensure silt does not become a source of dust
- Maintain all equipment for dust control to keep it in good operating condition. The equipment would be operable at all times with the exception of shutdowns required for maintenance.

8.4.2 Operation

The Development itself includes a number of enhancements that would improve odour management at the facility, including the use of enclosed leachate tanks and conducting all composting internally. As demonstrated by the results of the odour assessment, the design of the Development is such that the highest predicted odour concentration attributable solely to the Development at a sensitive receiver is 1.6 OU, which is below the 4 OU assessment criterion. The Development also includes the use of water sprays at the Compost Storage Pad to suppress dust emissions and the use of wind breaks to reduce the windblown dust and limit the movement of particulates off site.

To further reduce the potential for dust and odour emissions from the Development, the following measures would be detailed within an OEMP:

- measures to modify or suspend dust-generating activities during periods of high wind speeds or when dust plumes from the Development are visible
- sealing regularly trafficked surfaces as soon as possible after construction and limiting speed limits
- regularly maintain, modify or tune equipment, plant and machinery to minimise visible smoke and emissions
- ensure that the negative pressure of the building and performance of the biofilters is maintained
- the roller doors at buildings are closed whenever practicable.

Dust deposition monitoring at the Resource Recovery Precinct would continue throughout operations. The existing complaints management system would also apply to the Development and would be maintained throughout the future operations.

The measures detailed in the OEMP would be reviewed on a regular basis to identify improvements or additional reasonable and feasible mitigation strategies to manage odour and dust emissions from the Site.

While the Development does contain a number of improvements to how odour and dust emissions are managed at the Site, exceedances of the odour criteria as a result of the Development and the landfill combined are acknowledged. To respond to these exceedances, SITA continues to discuss approaches to manage cumulative odour impacts on two sensitive receivers with the affected landowner.

8.5 Conclusion

Construction activities are not expected to have a significant impact on sensitive receivers, and any impact would be short term given the nature of the construction activity. The works would be undertaken with standard construction equipment and the emissions would be managed using best practice construction management and mitigation processes. These measures would be detailed in the Construction Environmental Management Plan.

SITA has proposed a number of design changes to improve how operational odour and particulates are managed at the Site as part of the Development. Key improvements include the internalisation of composting activities and the use of tanks to store process leachate. The assessment of the odour and particulate emissions from the Development suggest that the Development alone would comply with the EPA criteria for odour, and would be a low contributor when compared to the current background levels of particulates. However, it is acknowledged that the cumulative impact of the Development and the landfill would exceed the relevant EPA air quality criteria Odour levels at two sensitive receivers would be above the criteria of 4 OU as a result of the Development and the Landfill.

In response to these exceedances, SITA continues to discuss approaches to manage cumulative odour impacts with the affected landowner. This has included site-based solutions, such as adequately filtered air conditioners or planting of floral vegetation at the property boundary. Regular reviews into operational management practices at the Site, and at the Landfill, would also occur to identify reasonable and feasible improvements or new technologies that could be implemented to further reduce odour and dust emissions.

9.0 Noise

The following chapter provides a summary of the Noise Assessment Report, which is provided in Appendix C.

9.1 Existing environment

The study area is characterised by rural agricultural land and rural residential dwellings. Background noise levels in the study area are affected predominately by traffic along Elizabeth Drive and the existing land uses, such as the Resource Recovery Precinct

Noise contributions from the existing Precinct originate from the existing SAWT facility, the landfill and the depot, located in the south-east corner of the Precinct. These are discussed separately below.

Existing SAWT facility

The current operations of the existing SAWT facility are undertaken in both external and enclosed areas. Noise sources from the existing SAWT facility include:

- Mobile plant equipment, such as a forklift, wheel loaders, excavator, a hooklift truck and mobile refining line at the SSO maturation pad
- Windrow turners at the MSW maturation pad
- Pre-refining outdoor trommel
- Fans associated with biofilters and tunnels
- Heavy vehicle movements, with an average of 51 heavy vehicles per day that deliver material to the existing SAWT facility or transport material to other areas within the Site or Precinct.

The existing SAWT facility approval restricts activities to certain hours of operation, with:

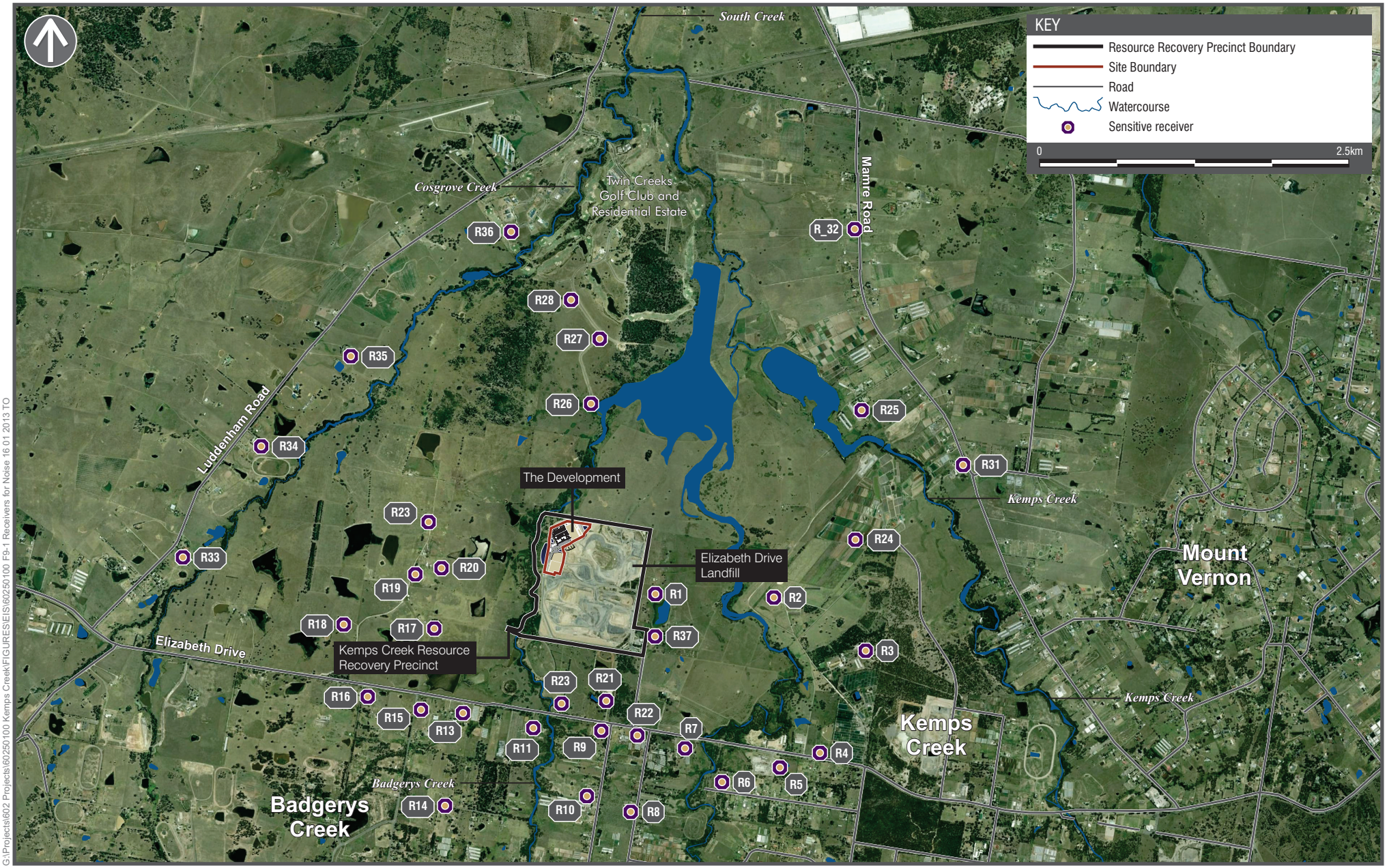
- indoor activities restricted to 7 am and 11 pm Monday to Saturday
- waste receipt and product dispatch restricted to 6am to 6pm Monday to Friday, 8am to 5pm Saturdays and 8am to 4pm Sundays
- outdoor activities restricted to 6 am to 10 pm Monday to Friday (subject to restrictions on the number of mobile plant movements) and 7 am to 4 pm on Public Holidays.

However, fans associated with the biofilters and tunnels operate 24 hours.

The conditions of approval and the EPL (#12889) for the existing SAWT facility set noise criteria for the current operations, which are provided in Table 1-1. The location of these receivers is shown in Figure 9-1.

Table 9-1 Noise Limits in current Project Approval and EPL (dB(A))

Receiver	Day (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)		Shoulder (6am to 7am)
	$L_{Aeq,15min}$	$L_{Aeq,15min}$	$L_{Aeq,15min}$	L_{max}	$L_{Aeq,15min}$
R1 (1669A Elizabeth Drive)	38	38	35	n/a	38
R20 (McGarvie Smith Farm)	42	39	35	n/a	39
R21 (1745 Elizabeth Drive)	41	40	37	47	40
R37 (Caretakers Residence 1669A Elizabeth Drive)	42	42	38	53	42



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AECOM

SENSITIVE RECEIVERS FOR NOISE

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 9-1

Landfill

The landfill is restricted to operating between 6am and 6pm Monday to Friday. Noise contributions from the landfill are associated with:

- the delivery of waste into landfill cells (ongoing)
- excavation of new cells (which occurs for approximately six months a year)
- removal of excavated shale sold to other sites (which occurs on a campaign basis, and can be up to four months per year)
- capping of the final landform (once cells are filled) occurs for around two months of every two years.

Equipment used at the landfill includes excavators, dozers, dump trucks, compactors, watercarts, gas engines and hasse blowers. Around 405 heavy vehicles movements are associated with the landfill operations per day, of which around 90 are internal movements only.

Under a worst case scenario, there is potential for the first three activities listed above to occur simultaneously. Given the infrequency of the capping activity, it is not considered to be representative of the typical 'worst case' for the landfill operations. Noise levels at the landfill are conditioned by an EPL. These limits are discussed further in Appendix C of this EIS.

Depot

Waste collection trucks are parked overnight on site near the maintenance workshop in the southeast corner of the Precinct. Those trucks depart from the depot between 5 am and 5.30 am and return between 1 pm and 4 pm Monday to Friday. The depot is moving off-site in 2013, and therefore noise contributions from this activity have not been considered further in this assessment.

Road Traffic Noise

Elizabeth Drive is the closest public road to the Precinct, which provides regional road access to the Precinct via the Precinct access road. For the purpose of the *NSW Road Noise Policy* (DECCW, 2011), Elizabeth Drive is classified as an existing freeway/arterial/sub-arterial road. Background noise monitoring, conducted in June 2011 indicates that the traffic noise during the daytime (7 am to 10 pm) and night time period (10 pm to 7 am) are significantly above the recommended noise traffic assessment thresholds at the closest residence (being 20 metres from the road) (refer to Section 9.2 of this EIS).

9.2 Methodology

9.2.1 Methodology

To assess the potential impacts of the Development during construction and during operation, three scenarios were modelled using the Environmental Noise Model (ENM) to predict noise levels at nearby sensitive receivers. Inputs to the model included noise monitoring conducted in 2009 and 2012, 2011 meteorological data generated by the CALMET model, sound power levels for external plant equipment and vehicles, and topographic information (including the future landform of the landfill) supplied by SITA.

The three assessment scenarios for the Development are:

the current operations, as in existence during the year 2012 to calibrate the noise model

the construction stage, with 2014 selected as the representative year. This includes current SAWT operations and construction activities associated with the Development, given that the activities would be occurring concurrently

the operational stage, with 2016 selected as the representative year.

In addition to the above scenarios, a cumulative assessment was undertaken which combined the Development with the landfill operations in year 2016.

All modelled years were assessed during the worst typical 15-minute period within the day (7 am to 6 pm), evening (6 pm to 10 pm) and night time (10 pm to 7 am) assessment periods under calm and adverse meteorological conditions. A morning shoulder period was also assessed (6 am to 7 am). The worst typical 15-minute period for the Development and the landfill were largely dictated by peak periods for heavy and light vehicle movements.

9.2.2 Assessment Criteria

Construction

For the construction stage of the Development, the existing noise limits provided in Table 9-1. This is because operations would continue while the expansion is being constructed over approximately two years and sensitive receivers may not be able to distinguish noise generated by the separate activities.

To enable comparison to current construction noise policy in NSW, the recommended construction noise management levels set by the *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) have also been identified for completeness (refer to Table 9-2). Except for morning shoulder period at sensitive receivers R20, R21 and R37, and the evening period for sensitive receiver R37, the noise limits set by the existing approval is equal to or more stringent that the recommended noise management levels set by the ICNG. These exceptions will be considered in Section 9.3.1 of this EIS.

Table 9-2 ICNG Construction Noise Criteria

Receiver	During Recommended Standard Hours	Outside Recommended Standard Hours			Highly Noise Affected Level (dBA)
		Day (Weekend, 7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)	
	$L_{Aeq,15min}$	$L_{Aeq,15min}$	$L_{Aeq,15min}$	$L_{Aeq,15min}$	$L_{Aeq,15min}$
R1	47	42	41	38	75
R20	47	42	41	38	75
R21	52	47	44	38	75
R37	47	42	41	38	75

Operation

To assess the potential operational noise impacts of the Development, the following assessment criteria were identified as applying to the Development or the Precinct:

- the existing SAWT facility noise limits as established by the existing conditions of approval and EPL for four sensitive receivers
- the landfill EPL noise limits
- Intrusiveness, amenity and sleep disturbance assessment criteria set in the *NSW Industrial Noise Policy* (INP) (EPA, 2000).

The existing SAWT facility noise limits as established by the existing conditions of approval and EPL are provided in Table 9-3). These criteria have been identified as the Development is an extension of the existing facility. This assessment will consider the four sensitive receivers identified in the project approval and EPL.

The landfill EPL noise limits. The landfill is the main industrial noise contributor that potentially contributes most of the noise impacts on nearby sensitive receivers. As such, any cumulative assessment will consider compliance with the following noise limits regulating this component of the Precinct:

- an $L_{A10(15\ minute)}$ noise impact criterion of 50 dB(A) during the day (7 am to 10 pm);

- an $L_{A10(15\ minute)}$ noise impact criterion of 45 dB(A) during the night (10 pm to 7 am).

As the EPL noise limits are expressed as $L_{A10(15\ minute)}$, the noise limits have been assumed to be directly comparable to the industrial $L_{Aeq,15min}$ noise levels. This assessment will also broaden the assessment to consider the 37 sensitive receivers (as identified on
Figure 9-1) as more receivers are anticipated to be impacted by the cumulative activities at the Precinct.

The intrusiveness, amenity and sleep disturbance assessment criteria set in the INP represent the current noise policy for industrial development proposals in NSW. This has been applied for the assessment of the Development with and without the landfill. This assessment will consider the 37 sensitive receivers surrounding the Precinct. For the purposes of providing a direct comparison to the four sensitive receivers identified in the existing SAWT facility approval, the criteria for those sensitive receivers are provided in Table 9-4. Criteria for all 37 receivers can be found in Appendix C.

Table 9-3 Noise Limits in current Project Approval and EPL (dB(A))

Receiver	Day (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)		Shoulder (6am to 7am)
	$L_{Aeq,15min}$	$L_{Aeq,15min}$	$L_{Aeq,15min}$	L_{max}	$L_{Aeq,15min}$
R1	38	38	35	n/a	38
R20	42	39	35	n/a	39
R21	41	40	37	47	40
R37	42	42	38	53	42

Table 9-4 Intrusiveness, amenity and sleep disturbance INP criteria

Receiver	Intrusiveness			Amenity			Sleep Disturbance
	Day (7am–6pm)	Evening (6pm–10pm)	Night time (10pm–7am)	Day (7am – 6pm)	Evening (6pm–10pm)	Night time (10pm–7am)	Night time (10pm–7am)
		$L_{Aeq,15min}$			L_{Aeq}		L_{Amax}
R1	42	41	38	50	45	40	48
R20	42	41	38				48
R21	47	44	38				48
R37	42	41	38				48

Road Traffic Noise Criteria

The *NSW Road Noise Policy* (RNP) (DECCW, 2011) sets noise criteria for the assessment of impacts on sensitive receivers as a result of increased traffic noise associated with land use change. Under the RNP, the "Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use development" assessment thresholds would be applicable to the assessment of the Development. As such, the applicable noise assessment thresholds for sensitive receivers along Elizabeth Drive for the purposes of this assessment are as follows:

$L_{Aeq,15hr}$ 60 dB(A) during the daytime (7 am to10 pm)

$L_{Aeq,9hr}$ 55 dB(A) during the night time period (10 pm to 7 am).

These assessment thresholds were applied to two assessment scenarios, being

- The peak of construction associated with the expanded SAWT facility. This scenario would account for all traffic associated with the landfill operations, the existing SAWT operations and construction activities.
- The expanded SAWT facility operating at full capacity. This scenario would account for all traffic associated with the landfill operations and the expanded SAWT operations.

The RNP also recommends relative increase criteria addressing any increase in the total traffic noise level due to land use developments. The total traffic noise level with the additional traffic should not exceed the existing traffic $L_{Aeq,15hr}$ + 12 dB(A) during the daytime and the existing traffic $L_{Aeq,9hr}$ + 12 dB(A) during the night time period. Where the above road noise assessment thresholds are already exceeded, the RNP states that in all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB(A).

It is noted that vehicles moving along the Precinct access road from Elizabeth Drive (used almost entirely by SITA) are considered as industrial noise sources and have been included in the ENM noise model for on-site activities.

9.3 Impact Assessment

9.3.1 Construction

Bulk earthworks, the use of construction equipment and increased traffic movements associated with construction are the key sources of noise during construction stage of the Development. Combined with the continued operations at the existing SAWT facility and the landfill, these additional noise sources could lead elevated noise emissions from the Precinct, resulting in adverse impacts at nearby sensitive receivers.

Construction activities for the Development would be undertaken during the following hours:

- 6 am to 6 pm Monday to Friday (extended to 10.00 pm in extraneous circumstances for testing and commissioning)
- 7 am to 4 pm on Saturday
- No construction work would be carried out on Sundays or public holidays.

Heavy vehicle movements associated with the Development would primarily occur during the daytime period and after 7 am. Construction workers would generally arrive at the Site between 5.30 am to 6 am and exit the Site between 4 pm to 5 pm on weekdays. On Saturdays, construction personnel entry and exit times would be between 6.30 am to 7 am and 3 pm to 4 pm, respectively.

The bulk earthworks stage of construction is considered to be the likely nosiest activity as it potentially involves the largest number of plant items operating simultaneously. Therefore, this stage has been assessed for the purposes of this EIS. Key plant and equipment operating during this stage is likely to include two 30-tonne excavators, four trucks (truck and dog or 30-tonne dump truck), a water cart, a 10-tonne roller and a D6 dozer.

Table 9-5 summaries the predicted $L_{Aeq,15min}$ noise levels during construction. As discussed earlier in Section 9.2.2, the noise limits for the existing SAWT have been applied instead of the ICNG criteria. Predicted noise levels and exceedances of the criteria are shown in bold in Table 9-5. The results indicate that:

During the daytime period and under adverse meteorological conditions, a 1 dB(A) exceedance would occur at sensitive receiver R1. This is considered to be a negligible impact.

At sensitive receiver R20, exceedances of 1 to 3 dB(A) are predicted during the day, evening and shoulder periods. A 1 to 2 dB(A) exceedance is generally considered to be a negligible impact. The 3 dB(A) exeedance would occur during adverse meteorological conditions.

During the night time period and under adverse meteorological conditions, a 1 dB(A) exceedance would occur at sensitive receiver R37. This is associated with the arrival of construction staff to the Site and is considered to be a negligible impact.

The predicted exceedances represent the bulk earthworks stage, which is expected to have a duration of approximately one year. Noise levels during other stages of construction would be expected to be less than these impacts.

When compared to the ICNG criteria, exceedances of up to 4 dB(A) are predicted at R20 and levels up to 2 dB(A) at sensitive receiver R21 are predicted during the shoulder period.

Table 9-5 Predicted Construction Noise Levels (2014) during calm and adverse meteorological conditions

Receiver	Day (7am to 6pm)		Evening (6pm to 10pm)		Night (10am to 7am)		Shoulder (6am to 7am)	
	Calm	Adverse	Calm	Adverse	Calm	Adverse	Calm	Adverse
	$L_{Aeq,15min}$		$L_{Aeq,15min}$		$L_{Aeq,15min}$		$L_{Aeq,15min}$	
R1	38	**39**	28	34	28	33	32	36
R20	41	**43**	37	**40**	32	35	**41**	**42**
R21	39	40	29	37	35	37	36	40
R37	40	41	26	30	37	**39**	35	37

Note – numbers shown in bold font identify exceedances in the criteria provided in **Table 9-1**.

Road Traffic Noise

During the peak of construction activities, the Development would increase the existing $L_{Aeq,15hr}$ traffic noise level of 64 dB(A) by 1dB(A) and the existing $L_{Aeq,9hr}$ traffic noise level of 60 dB(A) by 1 dB(A). If an increase is less than 2 dB(A), there is no further need for assessment in accordance with the RNP. Consequently, while the Development contributes further to the road noise levels that are above the recommended assessment thresholds, this criterion has been shown to be met in for both assessment periods.

9.3.2 Operation

As a result of the Development, there would be a reduction in external plant and equipment due to the internalisation of composting activities, an increase in biofilters fans, a change in the hours of operation, an increase in light vehicles, and an increase in heavy vehicle movements associated with the delivery and dispatch of material.

Indoor operations at the Development are proposed 24 hours a day, seven days per week (including Public Holidays). Outdoor operations are proposed between 6 am and 10 pm Monday to Friday (with no restriction on vehicle movements).

In undertaking the impact assessment of the Development, an iterative process was applied to identify noise mitigation measures to minimise noise contributions. These measures have been factored into the assessment model and are as follows:

- introduction of noise mitigation to the wheel loaders to ensure maximum sound power level of 108 dB(A) or introducing new loaders with a sound power level less than 108 dB(A)
- attenuation of all seven biofilter extraction fan ducting systems such that noise emanated from the top of each stack is reduced by 10 dB(A). The most appropriate and effective noise mitigation for controlling the noise generated by the fans would be to introduce a silencer between the biofilter extraction fans and the stack outlets
- the cessation of wheel loader outdoor operations after 10 pm
- the erection of an 8.5-metre high and 30-metre long wall of sufficient density along the northern side of the external refining bunkers to reduce noise generated by mobile plant at the northern receptors. The bunkers area would also be roofed at the same height as the refining building
- use of quackers (broadband reversing alarms) instead of tonal reversing alarms on all mobile plant.

As outlined in Section 9.2 of this EIS, the operational impact assessment considers both the Development with and without against the existing noise limits and INP criteria. The results are discussed separately below.

Existing Noise Limits

Table 9-6 summaries the results of the model for the predicted $L_{Aeq,15min}$ noise levels associated with the Development only. When compared to the existing noise limits, no exceedances are predicted at all four sensitive receivers during calm or adverse meteorological conditions.

The L_{Amax} is not expected to change between 2012, 2014 and 2016 as, unlike L_{eq} levels, L_{Amax} levels are only a function of distance and not number of events. R21 and R37 are exposed to truck passbys on the SAWT facility

access road and, assuming the same trucks will be used for all years, the L_{Amax} generated by each passby will stay the same. Thus, as L_{Amax} levels at sensitive receivers R21 and R37 are not anticipated to change between 2012, 2014 and 2016, compliance with the relevant L_{Amax} noise limits can be assumed in 2016.

Table 9-6 Predicted Noise Levels ($L_{Aeq,15min}$) for the Development only – Operations (2016)

Receiver	Day (7am to 6pm)		Evening (6pm to 10pm)		Night (10am to 7am)		Shoulder (6am to 7am)	
	Calm	Adverse	Calm	Adverse	Calm	Adverse	Calm	Adverse
	$L_{Aeq,15min}$		$L_{Aeq,15min}$		$L_{Aeq,15min}$		$L_{Aeq,15min}$	
R1	34	37	25	30	31	25	20	36
R20	34	37	32	35	33	27	25	35
R21	38	38	25	28	35	28	27	36
R37	40	41	27	29	37	31	29	39

Table 9-6 summaries the results of the model for the predicted $L_{Aeq,15min}$ noise levels associated with the cumulative impacts of the Development and the landfill for selected sensitive receivers. The sensitive receivers presented in Table 9-6 were selected based on the sensitive receivers identified in the existing SAWT approval, the closest sensitive receivers surrounding the Precinct and predicted noise levels. The results for all 37 sensitive receivers can be found in Appendix C of this EIS.

As stated in Section 9.2 of this EIS, the cumulative impact has been assessed against the EPL criteria for the landfill. The EPL criterion for the landfill is 50dB(A) during the day and evening period, and 45 dB(A) for the night time period. The results of the cumulative assessment indicate that the predicted noise levels at all 37 sensitive receivers would be within the relevant landfill EPL $L_{Aeq,15min}$ noise limits under adverse and calm weather conditions.

Table 9-7 Predicted Noise Levels ($L_{Aeq,15min}$) for the Development and landfill – Cumulative Operations (2016)

Sensitive Receiver*	Day (7am to 6pm)		Evening (6pm to 10pm)		Night (10am to 7am)	
	Calm	Adverse	Calm	Adverse	Calm	Adverse
	$L_{Aeq,15min}$		$L_{Aeq,15min}$		$L_{Aeq,15min}$	
R1	48	50	25	30	37	41
R2	33	40	21	33	27	35
R9	38	39	23	30	37	39
R12	35	38	24	34	32	38
R17	37	39	31	34	33	35
R19	36	42	30	34	31	34
R20	38	43	32	35	33	35
R21	42	42	25	28	41	41
R22	45	45	28	30	45	45
R23	38	44	33	38	33	38
R24	30	39	20	30	22	32
R26	34	40	29	37	29	37
R37	44	45	27	29	43	45

* All 37 receivers were assessed for the cumulative assessment and can be found in Appendix C.

INP Noise Limits

As assessment against the INP intrusiveness ($L_{Aeq,15min}$) and amenity criteria ($L_{Aeq,period}$) at 37 sensitive receivers was undertaken for the Development with and without the landfill.

As the intrusiveness criteria are the more stringent of the two approaches at all modelled sensitive receivers, and compliance with all amenity criteria was found as a result of the impact assessment, this chapter of the EIS only presents the results of the intrusiveness assessment. The full results of this assessment can be found in Chapter 10 of Appendix C of this EIS.

For the intrusiveness assessment, the results for selected receivers can be found in Table 9-8 (development only) and Table 9-9 (cumulative). Based on these results, the Development satisfies the applicable criteria at all 37 receivers during all assessment periods, except in the following circumstances:

- under adverse weather conditions, predicted noise levels are expected to exceed the INP intrusiveness criterion at three sensitive receivers (R22, R26 and R37) during the night time period. At these locations, 1-2 dB(A) exceedances are anticipated.
- during calm weather conditions, predicted noise levels are expected to exceed the INP intrusiveness criterion during the night time period at one sensitive receiver (R22). At this location, a 1 dB(A) exceedance is anticipated.

These exceedances are shown in bold in Table 9-8.

For the Development and the landfill (refer to Table 9-9), it is noted that the applicable INP intrusiveness criteria are satisfied at the majority of the 37 sensitive receivers during all assessment periods. The exceedances (shown in bold in Table 9-9) are predicted to occur at nine sensitive receivers, being R1, R9, R20, R21, R22, R23, R24, R26 and R37. In summary, the exceedances would occur in the following circumstances:

under adverse weather conditions and during the daytime period, exceedances are expected to occur at up to six receivers (R1, R20, R23, R24, R26 and R37), ranging from 1-8 dB(A) above the applicable criteria.

- under calm weather conditions and during the daytime period, exceedances are expected to occur at two receivers (R1 and R37) ranging from 2-6 dB(A) above the applicable criteria.
- under adverse weather conditions and during the night time period, exceedances are expected to occur at up to six receivers (R1, R9, R21, R22, R26 and R37), ranging from 1-7 dBA above the applicable criteria.
- under calm weather conditions and during the night time period, exceedances are expected to occur at up to three receivers (R21, R22 and R37), ranging from 3-7 dB(A) above the relevant intrusiveness criteria.

By comparing the results of the Development with and without the landfill, it is demonstrated that the biggest contributor to the noise environment at sensitive receivers is the existing landfill. This is especially true for the sensitive receivers with the highest predicted exceedances. However, it is noted that noise mitigation strategies that are considered to be reasonable and feasible have already been factored into the Development in order to reduce noise contributions as much as possible. Any further measures to reduce noise contributions from the Development are unlikely to be reasonable or feasible, given the minor exceedances resulting from the Development. Any strategies to respond to the predicted contributions by the landfill are beyond the scope of this development application and EIS.

Table 9-8 Predicted Noise Levels (Intrusiveness) for the Development Only (2016) during Calm and Adverse Meteorological Conditions for Selected Receivers

Sensitive Receiver[1]	Day (7 am to 6 pm) $L_{Aeq,15min}$			Evening (6 pm to 10 pm) $L_{Aeq,15min}$			Night (10 am to 7 am) $L_{Aeq,15min}$		
	Criteria	Calm	Adverse	Criteria	Calm	Adverse	Criteria	Calm	Adverse
R1	42	34	37	41	25	30	38	31	36
R2	42	25	31	41	21	33	38	24	33
R9	47	35	36	44	23	29	38	32	35
R12	47	32	36	44	24	34	38	30	37
R17	42	34	36	41	30	34	38	33	35
R19	42	31	35	41	30	33	38	31	34
R20	42	34	37	41	32	35	38	33	35
R21	47	38	38	44	25	28	38	35	36
R22	47	42	42	44	28	30	38	**39**	**39**
R23	42	33	39	41	32	38	38	33	38
R24	38	21	29	38	20	30	35	21	31
R26	38	29	34	38	28	37	35	29	**37**
R37	42	40	41	41	27	29	38	37	**39**

[1] All sensitive receivers that have predicted exceedances are shown in the above table. All 37 receivers were assessed for the cumulative assessment and can be found in Appendix C.

Table 9-9 Predicted Noise Levels (Intrusiveness) for the Development Only (2016) during Calm and Adverse Meteorological Conditions for Selected Receivers

Sensitive Receiver[1]	Day (7 am to 6 pm) $L_{Aeq,15min}$			Evening (6 pm to 10 pm) $L_{Aeq,15min}$			Night (10 am to 7 am) $L_{Aeq,15min}$		
	Criteria	Calm	Adverse	Criteria	Calm	Adverse	Criteria	Calm	Adverse
R1	42	**48**	**50**	41	25	30	38	37	**41**
R2	42	33	40	41	21	33	38	27	35
R9	47	38	39	44	23	30	38	37	**39**
R12	47	35	38	44	24	34	38	32	38
R17	42	37	39	41	31	34	38	33	35
R19	42	36	42	41	30	34	38	31	34
R20	42	38	**43**	41	32	35	38	33	35
R21	47	42	42	44	25	28	38	**41**	**41**
R22	47	45	45	44	28	30	38	**45**	**45**
R23	42	38	**44**	41	33	38	38	33	38
R24	38	30	**39**	38	20	30	35	22	32
R26	38	34	**40**	38	29	37	35	29	**37**
R37	42	44	45	41	27	29	38	43	**45**

[1] All sensitive receivers that have predicted exceedances are shown in the above table. All 37 receivers were assessed for the cumulative assessment and can be found in Appendix C.

Sleep Disturbance

Trucks associated with waste deliveries to the Development and the landfill during the morning shoulder period were identified as the potential source for sleep arousal. The assessment considered the potential impacts for sensitive receivers: R7, R9, R21, R22 and R37, due to the proximity to the Precinct access road and the intersection of the Precinct access road with Elizabeth Drive. All other receivers are considered too far to be potentially disturbed by waste deliveries.

To assess these potential impacts, the maximum noise level from a truck passby was predicted at the five sensitive receivers (refer to Table 9-10). This found that early morning waste deliveries comply with the relevant L_{Amax} noise limits at sensitive receivers R7, R9 and R21. However, exceedances ranging from 5 dB(A) to 12 dB(A) are expected at sensitive receivers R37 and R22, respectively.

Table 9-10 Sleep Disturbance Assessment

Sensitive Receiver	Criteria (L_{Amax})	Predicted L_{Amax} noise level dB(A)
R7	48	47
R9	48	47
R21	48	47
R22	48	**60**
R37	48	**53**

According to the RNP, research on sleep disturbance to date has shown that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep. Internal noise levels with windows open are expected to be approximately 50 dB(A) at sensitive receiver R22 and 43 dB(A) at sensitive receiver R37. It is noted that sensitive receiver R22 is exposed to non-Project related traffic on Elizabeth Drive and that no noise complaints have been lodged in the past from sensitive receivers R22 and R37.

Road Traffic Noise

The Development, when operating at full capacity, would increase the existing $L_{Aeq,15hr}$ traffic noise level of 64 dB(A) by 2 dB(A), and the existing $L_{Aeq,9hr}$ traffic noise level of 60 dB(A) by 1 dB(A). While the Development contributes further to the road noise levels that are above the recommended assessment thresholds, the RNP states that in all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB(A) (which is met for both assessment periods). It is also noted that the RNP indicates that reasonable and feasible measures should be implemented to reduce noise levels to achieve the criteria. Mitigation measures for road traffic noise include road design and traffic management, quiet pavement surfaces, noise barriers or at property treatments. This is discussed later in Section 9.4.2.

9.4 Mitigation and Management Measures

9.4.1 Construction

Construction noise is expected to have negligible impacts on the majority of surrounding sensitive receivers during the peak construction period. However, as some exceedances are predicted at nearby sensitive recievers, it is proposed that a Construction Noise Management Plan be put in place to implement reasonable and feasible approaches to ensure amenity is proactively protected. This would include (but not be limited to) the following:

- Noise intensive construction works would be carried out during standard construction hours wherever practicable.
- Appropriate plant would be selected for each task, to minimise the noise impact.
- Non-tonal reversing alarms would be fitted on all construction equipment where possible.
- Noisy equipment would be oriented away from residential sensitive receivers.
- A complaints handing procedure for construction noise complaints.
- Induction for construction workers concerning noise management strategies, particularly in regards to early staff arrivals and works during the morning shoulder period (being 6am to 7am).

9.4.2 Operation

No additional mitigation measures are proposed to be incorporated into the design of the Development over and above the following measures (which have been factored into the noise impact assessment):

introduction of noise mitigation to the wheel loaders to ensure maximum sound power level of 108 dB(A) or introducing new loaders with a sound power level less than 108 dB(A)

attenuation of all seven biofilter extraction fan ducting systems such that noise emanated from the top of each stack is reduced by 10 dB(A). The most appropriate and effective noise mitigation for controlling the noise generated by the fans would be to introduce a silencer between the biofilter extraction fans and the stack outlets

the cessation of wheel loader outdoor operations after 10 pm

the erection of an 8.5-metre high and 30-metre long wall of sufficient density along the northern side of the external refining bunkers to reduce noise generated by mobile plant at the northern receptors. The bunkers area would also be roofed at the same height as the refining building

use of quackers (broadband reversing alarms) instead of tonal reversing alarms on all mobile plant.

Nonetheless, operational noise mitigation and management strategies would be incorporated into an Operational Noise Management Plan, which would include (but not be limited to) the following:

- procedures for plant and mobile equipment to be regularly maintained in good working order
- induction and training for operational staff on the nature of permitted activities during the hours of operation, for example, when external activities are to cease.

It is also proposed that a quarterly attended noise monitoring regime for both the Development and the landfill be implemented at the Precinct to assess compliance with the set noise limits. This would be detailed within the Operational Noise Management Plan. On-site operational observations at the Development and the landfill would also be undertaken concurrently. This would support the noise monitoring program and enable the distinction between noise levels generated by the Development and the landfill. Noise monitoring would be conducted at 12 locations, namely at the following sensitive receivers: R1, R2, R9, R12, R17, R20, R21, R22, R23, R24, R26 and R37. The results of the monitoring would be reviewed by SITA, and should exceedances be identified, any potential reasonable and feasible improvements at the Development would be explored to further reduce emissions.

Road Traffic Noise

Traffic arising from the development complies with the relevant RNP noise criteria. While the existing traffic noise level exceeds the RNP daytime and night time base criteria, the Development would generate a very small proportion of the total traffic noise on Elizabeth Drive. As such, the provision of architectural treatment or noise barriers on land which is not owned by SITA is unlikely to be practicable or necessary.

9.5 Conclusion

Construction noise is expected to have negligible impacts on the majority of surrounding sensitive receivers during the peak construction period. Nonetheless, mitigation and management measures would be implemented to manage noise emissions during construction.

As discussed in Section 9.3 of this EIS, a number of reasonable and feasible noise mitigation measures have been factored into the Development to reduce the operational noise contributions of the Development. As a result, the Development is within the noise limits set for the existing SAWT facility in the conditions of approval and EPL. Further, when assessed against more contemporary INP assessment criteria, any predicted exceedances are in the order of 1-2 dB(A). Such exceedances are considered to be minor. Any further reductions are not considered reasonable or feasible.

For cumulative noise emissions that would occur as a result of the Development and the landfill, compliance with the EPL noise limits for the landfill has been demonstrated in Section 9.3 of this EIS. It is acknowledged that exceedances of the INP assessment criteria are predicted, including noise contributions up to 8 dB(A) over the criterion at one sensitive receiver during the daytime period and during adverse meteorological conditions. However, the landfill is the more significant contributor to the total noise emissions of the two assessed operations. As noise mitigation strategies for the Development are considered to be reasonable and feasible, any

further reductions by the Development are not considered appropriate. Further, strategies to respond to the predicted contributions by the landfill are beyond the scope of this DA and EIS. Ongoing monitoring would be undertaken, in conjunction with onsite observations, to ascertain compliance and to feed into future performance reviews of the Precinct.

10.0 Traffic

This chapter provides an assessment of the potential impact of the Development on traffic.

10.1 Existing Environment

10.1.1 Road Network

Access to the Kemps Creek Resource Recovery Precinct and the Site is via an existing access road off Elizabeth Drive, midway between Mamre Road and Luddenham Road. Elizabeth Drive is a major east-west arterial road connecting The Northern Road and the Westlink M7. Traffic flow gradually increases from the west to the east as it approaches the Westlink M7. The road network surrounding the Site is shown in Figure 10-1.

Westlink M7

Westlink M7 is an urban motorway that forms part of the Sydney Orbital Network. It connects three Metroads: M5 at Prestons, M4 at Eastern Creek and M2 at Baulkham Hills. It is a high standard four-lane two-way toll road with a posted speed of 100 kilometres per hour (km/h).

Elizabeth Drive

Elizabeth Drive is an arterial road connecting the Westlink M7 and The Northern Road. It is predominantly a two-lane road with an upgraded section to four lanes east of the M7. The posted speed limit on the road is 80 km/h from The Northern Road to Westlink M7 and 70 km/h to the east of Westlink M7. Access to the Site is via Elizabeth Drive.

The Northern Road

The Northern Road is a major arterial road to the west of Sydney. It runs parallel to the Westlink M7 as an outer ring road connecting the south-west and north-west regions. It connects to Elizabeth Drive via a two-lane roundabout approximately six kilometres west of the Site. The posted speed limit on The Northern Road is 80 km/h.

Mamre Road

Mamre Road is an arterial road linking the M4 Motorway and Elizabeth Drive. It is a two-lane road with a posted speed limit of 80 km/h. It connects to Elizabeth Drive via a two-lane roundabout approximately four kilometres east of the Site.

Luddenham Road

Luddenham Road is a sub-arterial road linking the M4 motorway to the western section of Elizabeth Drive. It is a two-lane road with a posted speed limit of 80 km/h. Luddenham Road connects to Elizabeth Drive via a priority intersection four kilometres west of the Site.

10.1.2 Traffic Volumes

Several RMS permanent vehicle counting stations are located on the road network in the vicinity of the Site (refer to Figure 10-1). RMS Annual Average Daily Traffic (AADT) data is shown in Table 10-1 and provides a summary of traffic volumes recorded at these stations between 1996 and 2005. More recent AADT data is not available from the RMS. Traffic volumes and trends indicate that:

- Traffic flow on Elizabeth Drive gradually increases from the west to the east as it approaches the Westlink M7.
- AADT on Elizabeth Drive near the entrance to the Resource Recovery Precinct Access Road (Station no. 64.037) increased by approximately 2.2 percent per annum between 1996 and 2005.
- AADT on Elizabeth Drive, west of Luddenham Road (Station no. 64.032) experienced an annual growth rate of approximately 2.5 percent between 1996 and 2005, while AADT on Elizabeth Drive between Cecil Park and Wallgrove Road remained constant over the 10 year period between 1996 and 2005.

Table 10-1: Average Annual Daily Traffic (AADT) on Adjacent Road Network

Station Number	Station Location	AADT Volumes - Year				Annual Growth Rate (1996 – 2005)
		1996	1999	2002	2005	
64.037	Elizabeth Drive at South Creek Bridge	8,041	9,117	9,098	9,757	2.2%
64.032	Elizabeth Drive between The Northern Road and Luddenham Road	5,879	6,753	6,592	7,311	2.5%
64.033	Elizabeth Drive between Cecil Park and Wallgrove Road	17,274	19,180	17,910	17,311	0.0%
86.044	Mamre Road between Bakers Lane and Erskine Park	10,859	12,153	12,446	14,074	2.9%

Source: RMS Traffic Volume Data 2005 Sydney Region Volume 1.

10.1.3 Peak Hour Traffic Volumes

To provide a better understanding of peak hour traffic conditions, a classified intersection traffic count was conducted by AECOM on 19 June 2012 for the following three intersections:

- Elizabeth Drive / The Northern Road
- Elizabeth Drive / Resource Recovery Precinct Access Road
- Elizabeth Drive / Mamre Road

The survey was conducted for two hours in the AM peak (7:00 to 9:00 am) and the PM peak (4:30 to 6:30 pm) at the three intersections above. The survey identifies network peak hours of 7:30 to 8:30 am and 4:45 to 5:45 pm in the AM and PM, respectively with PM peak hour traffic volumes approximately nine percent higher than the AM peak hour volumes.

10.1.4 Existing Intersection Performance

The existing performance of the three intersections has been evaluated using SIDRA Intersection 5.1, a computer based modelling package designed for calculating isolated intersection performance. The main performance indicators for SIDRA 5.1 include:

- Degree of Saturation (DoS) – a 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 range between 0.7 to 0.8 or less;
- Average Delay – duration, in seconds, of the average vehicle waiting at an intersection; and
- Level of Service (LoS) – a measure of the overall performance of the intersection (this is explained further in Table 10-2).

Table 10-2: Performance Criteria for Intersection Assessment

Level of Service (LoS)	Average Delay (secs/veh)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Less than 14	Good Operation	Good Operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays	At capacity; requires other control mode
F	>70	Roundabouts require other control mode	At capacity; requires other control mode

Source: Guide to Traffic Generating Developments, RMS, 2002

Table 10-3 shows that The Northern Road / Elizabeth Drive and the Mamre Road / Elizabeth Drive roundabouts operate with minimal queuing under existing traffic flows (LoS B) during both the AM peak (7:30 to 8:30am) and PM peak (4:45 to 5:45pm) hour periods. The Elizabeth Drive / Resource Recovery Precinct Access Road intersection currently operates at LoS F during the AM Peak period. This is due to the high average delay caused by Heavy Goods Vehicles (HGVs) seeking to exit the Resource Recovery Precinct during peak hour traffic flows on Elizabeth Drive. The traffic flows along Elizabeth Drive make it difficult for HGVs to exit, particularly in a westbound direction. The Elizabeth Drive / Resource Recovery Precinct Access Road intersection currently operates at LoS B during the PM Peak period.

Table 10-3: 2012 Base Case Intersection Performance

Intersection	AM Peak				PM Peak			
	Peak hour volume	DoS	Average Delay	LoS	Peak hour volume	DoS	Average Delay	LoS
The Northern Road / Elizabeth Drive	1,463	0.256	16.7	B	1,633	0.246	16.9	B
Elizabeth Drive / Resource Recovery Precinct Access Road	941	0.370	156.7	F	994	0.390	25.5	B
Elizabeth Drive / Mamre Road	2,101	0.376	19.8	B	2,289	0.667	20.8	B

Source: AECOM, 2013

10.1.5 Future Intersection Performance

This section reviews the likely impacts of forecast background traffic growth on the surrounding transport network for the future assessment years without the proposed Development. The future assessment years are:

- 2014 - Peak construction period (including background traffic growth).
- 2016 - Opening of the fully operational Development (including background traffic growth).
- 2026 - Ten years post opening of the Development with 10 additional years of background traffic growth.

The peak hour traffic volumes provided by RMS (contained in the EMME model) have been used to determine forecast background traffic growth rates along Elizabeth Drive by measuring traffic growth between the years 2011, 2016 and 2026. The growth rates generated were then used to factor up the survey data collected at three key intersections in 2012. The resulting data was then modelled in SIDRA 5.1 as part of 2014, 2016 and 2026 future year assessments.

It was found during analysis that growth rates varied considerably within the study area. The most sensitive location on the local road network is Elizabeth Drive in the vicinity of the Resource Recovery Precinct Access Road, which demonstrates a traffic growth rate of 6.9 percent per annum to 2016 (Elizabeth Drive eastbound in the PM Peak). In order to reflect this high forecast growth rate, it was deemed appropriate to calculate the traffic growth rate for each of the eight movements (intersection approaches) on an individual basis. This provided a higher level of accuracy compared to the application of a single traffic growth rate. The growth rates used are detailed in the Traffic Impact Assessment report provided as Appendix D to this EIS.

Based on consultation with RMS, it is understood that no major road upgrades are proposed for Elizabeth Drive during the assessment years of 2014 and 2016. According to the forecast traffic volumes, Elizabeth Drive may need to be widened to four lanes after 2021. However, no upgrade strategy including intersection layouts for Elizabeth Drive have been determined by the RMS at this time. Therefore, it was agreed with the RMS that the intersections would be assessed using existing layouts, with appropriate upgrades recommended if required.

Elizabeth Drive / The Northern Road

As shown in Table 10-4, The Northern Road / Elizabeth Drive roundabout continues to operate satisfactorily with minimal delays and queuing through to 2026, with the intersection operating at LoS B in all assessment years during both the AM peak and PM peak hour periods.

Table 10-4: Intersection Performance for the Northern Road / Elizabeth Drive Roundabout - Without Development

Year	AM Peak				PM Peak			
	Peak hour volume	DoS	Average Delay	LOS	Peak hour volume	DoS	Average Delay	LOS
2014	1,578	0.277	16.7	B	1,774	0.276	17.0	B
2016	1,710	0.309	16.8	B	1,877	0.288	17.2	B
2026	1,990	0.409	16.8	B	2,086	0.338	17.6	B

Source: AECOM, 2013

Elizabeth Drive / Resource Recovery Precinct Access Road

As shown in Table 10-5, the Elizabeth Drive / Resource Recovery Precinct Access Road intersection continues to operate at LoS F in 2014, 2016 and 2026 in the AM peak with the existing intersection layout. This is due to the high average delay caused by HGVs seeking to exit the Precinct and the level of background growth on Elizabeth Drive. This level of service is not considered satisfactory, indicating that the intersection is in need of an upgrade. In the PM peak, operation of the intersection deteriorates from a LoS B to a LoS C in 2014 and 2016, and LoS E in 2026.

Table 10-5: Intersection Performance for the Elizabeth Drive / Resource Recovery Precinct Access Road Intersection - Without Development

Year	AM Peak				PM Peak			
	Peak hour volume	DoS	Average Delay	LOS	Peak hour volume	DoS	Average Delay	LOS
2014	1,030	0.403	225.9	F	1,121	0.440	31.5	C
2016	1,125	0.440	351.5	F	1,265	0.495	40.9	C
2026	1,373	0.729	2,118.6	F	1,514	0.573	68.6	E

Source: AECOM, 2013

Elizabeth Drive / Mamre Road

As shown in Table 10-6, The Northern Road / Mamre Road roundabout continues to operate satisfactorily with minimal delays and queuing through to 2026. The intersection operates at LoS B in all assessment years during both the AM peak and PM peak hour periods.

Table 10-6: Intersection Performance for the Elizabeth Drive / Mamre Road Roundabout - Without Development

Year	AM Peak				PM Peak			
	Peak hour volume	DoS	Average Delay	LOS	Peak hour volume	DoS	Average Delay	LOS
2014	2,234	0.439	20.1	B	2,541	0.691	20.8	B
2016	2,415	0.522	20.5	B	2,607	0.713	20.8	B
2026	3,158	0.797	26.2	B	3,291	0.894	24.7	B

Source: AECOM, 2013

Overall, the analysis indicates that the Northern Road / Elizabeth Drive and Mamre Road / Elizabeth Drive roundabouts would continue to operate effectively through 2026 with their existing layouts and the expected forecast background traffic growth.

The Elizabeth Drive / Resource Recovery Precinct Access Road intersection is currently operating at LoS F in the AM peak period and continues to do so with background traffic growth. In the PM Peak, the intersection continues to operate satisfactorily in 2014 and 2016 (LoS C), however in 2026 background traffic growth causes the intersection to operate at LoS E.

Through consultation with the RMS, it was acknowledged that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection requires an upgrade to cater for any additional background traffic growth. However, the RMS currently has no plan to upgrade this intersection. Therefore, SITA has considered appropriate upgrades at this intersection that can be undertaken as part of the Development to improve the safety and capacity of this intersection. This is further discussed in Section 10.2.2.

10.2 Assessment of Potential Impacts

10.2.1 Construction

Traffic Generation

Light vehicle movements associated with construction personnel is provided in Table 10-7. A ratio of 1.0 construction personnel per vehicle has been assumed for car parking requirements and vehicles travelling to and from the Site.

Table 10-7: Light Vehicle Movements and Parking Requirements

Activity	Timeframe	Vehicles per Day and Minimum Car Parking Requirements	Vehicle Movements
Site establishment and establishment of temporary facilities	November 2013 to December2013	15	30
Earthworks and civil Infrastructure	January 2014 to February2014	50	100
Construction of building foundations and buildings	February 2014 to May 2014	85	170
Plant and services installation	June 2014 to January 2015	130	260
Internal fit out and miscellaneous works	December 2014 to January 2015		
Commissioning	February 2015 to May 2015	58	116

Construction personnel would require on-site parking for the duration of the construction program, with the greatest number of parking spaces required between June 2014 and January 2015 during plant and services installation and internal fit out. During the peak, it is estimated that up to approximately 260 light vehicle movements would be generated in a typical day, with the need for up to 130 on-site parking spaces. It should be noted that existing operations would continue during the construction period, and as such, car parking for the construction workforce would be provided in addition to those existing car parks allocated to operational personnel.

Construction heavy vehicles would also be generated on a regular basis to support the construction activities. At peak times for heavy vehicle movements between February and March 2014, it is expected there would be up to 30 heavy vehicles (60 heavy vehicle movements) generated per day.

It is assumed that 80 percent of construction traffic would travel to and from the east and the remaining 20 percent would do so from the west.

Impact of Construction Traffic

The construction impact assessment has been undertaken during a morning period of 5 to 6 am and an afternoon period of 4 to 5 pm to reflect the time when the majority of construction vehicle movements are expected to enter and leave the Site. Table 10-8 summarises the performance of the three assessed intersections during 2014 at the peak of the construction period.

Table 10-8: Intersection Performance During Construction (2014)

Intersection	AM Peak (5 to 6 am)				PM Peak (4 to 5 pm)			
	Peak hour volume	DoS	Average Delay	LOS	Peak hour volume	DoS	Average Delay	LOS
The Northern Road / Elizabeth Drive	874	0.149	10.9	B	1,774	0.276	17.0	B
Elizabeth Drive / Resource Recovery Precinct Access Road	676	0.218	2.4	A	1,154	0.440	29.0	C
Elizabeth Drive / Mamre Road	1,303	0.208	10.4	B	2,541	0.691	20.8	B

Source: AECOM, 2013

Due to the lower level of traffic along Elizabeth Drive between 5 to 6 am and 4 to 5 pm (compared to the traffic peak hours of 7:30 to 8:30 am and 4:45 to 5:45 pm) the Elizabeth Drive / Resource Recovery Precinct Access Road intersection is expected to operate at LoS A between 5 to 6 am. The results also demonstrate that additional light vehicle traffic associated with the construction staff does not impact the level of service during the PM Peak period, with the LoS being comparable to the LoS in 2014 without the Development. The LoS of The Northern Road / Elizabeth Drive and Elizabeth Drive / Mamre Road intersections would be the same in 2014 with or without the Development. It can therefore be concluded that there is minimal impact to the road network as a result of construction traffic generated by the proposed Development.

10.2.2 Operation

Traffic Generation

During operations, there would be an increase of both light and heavy vehicles due to the Development. At the peak of operation of the expanded facility, it is anticipated that an additional 46 vehicle movements per day would be generated, of which 10 are light vehicle movements generated by operation staff and 36 are heavy vehicle movements generated by waste deliveries and compost sales. A breakdown of existing and future staff numbers and existing and future light and heavy vehicle movements as a result of the proposed Development is provided in Table 10-9 and Table 10-10.

Table 10-9: Operation Staff Numbers and Light Vehicle Movements (Daily)

Operations	Existing Staff Numbers	Changes due to Modification	Staff Numbers Post-modification	Existing Light Vehicle Movements	Post-modification Light Vehicle Movements
Collections	24	-24	0	48	0
Landfill Operations	27	0	27	54	54
SAWT Staff	38	22	60	76	120
Additional Admin, Couriers and Maintenance	-	-	-	-	14
Total	**89**	**-2**	**87**	**178**	**188**

Table 10-10: Operational Heavy Vehicle Movements (Daily)

Waste Type	Existing Daily Vehicles	Additional Daily Vehicles	Total Daily Vehicles	Existing Daily Movements	Additional Daily Vehicles	Total Daily Vehicles
Collections	19	-19	0	38	-38	0
Council delivered tonnes	51	17	82	102	34	164
Transfer trailer tonnes		14			28	
Recovered Steel/Aluminium	4	1	10	8	2	20
Compost Sales		5			10	
Total	**74**	**18**	**92**	**148**	**36**	**184**

Based on existing vehicle movements, information provided by SITA, and forecast traffic growth, it is assumed that 80 percent of the operation traffic would travel to and from the east and the remaining 20 percent from the west.

Elizabeth Drive/Resource Recovery Precinct Access Road Intersection Upgrade

The assessment has shown that there are currently delays experienced at the Elizabeth Drive/Resource Recovery Precinct Access Road intersection during the AM peak hour. Background traffic growth on Elizabeth Drive necessitates that this intersection is upgraded prior to full operation of the Development to improve capacity and safety for vehicles exiting the Resource Recovery Precinct Access Road.

Consultation was undertaken with RMS on 24 September 2012 to discuss the most appropriate intersection treatment for the intersection between the Resource Recovery Precinct Access Road and Elizabeth Drive. RMS expressed a preference for the intersection to be upgraded to a 'seagull' intersection and agreed that the traffic assessment ought to assume that the intersection is upgraded to a 'seagull' intersection. The 'seagull' intersection would include a waiting bay for westbound vehicles exiting the Resource Recovery Precinct. This would be located in the median of the major intersection arm. In this instance a waiting bay would be provided in the median of Elizabeth Drive immediately to the west of the Resource Recovery Precinct Access Road. Westbound vehicles leaving the Site turn into this bay before merging with other westbound traffic. Although the detailed design is yet to be undertaken, this type of intersection layout ensures that vehicles do not need to cross two lanes of traffic in a single manoeuver, improving the operation of the intersection.

Impacts of Operation Traffic

In order to assess the impact of future Site traffic, the additional traffic movements were applied to the 2016 and 2026 traffic flows and assessed with SIDRA 5.1. The assessment includes an upgraded Elizabeth Drive/Resource Recovery Precinct Access Road Intersection as described in the section above. Table 10-11 to Table 10-13 show the potential traffic impacts at full operation of the Development for the future years 2016 and 2026 (including background traffic growth).

Table 10-11: Intersection Performance, Elizabeth Drive / The Northern Road - With Development

Year	AM Peak (7-8 am)				PM Peak (4:45-5:45 pm)			
	Peak hour volume	DoS	Average Delay	LOS	Peak hour volume	DoS	Average Delay	LOS
2016	1,710	0.309	16.8	B	1,877	0.288	17.2	B
2026	1,990	0.409	16.8	B	2,086	0.338	17.6	B

Source: AECOM, 2013

Table 10-12: Intersection Performance, Elizabeth Drive / Resource Recovery Precinct Access Road - With Development

Year	AM Peak (7-8 am)				PM Peak (4:45-5:45 pm)			
	Peak hour volume	DoS	Average Delay	LOS	Peak hour volume	DoS	Average Delay	LOS
2016	1,125	0.440	57.1	E	1,265	0.495	16.8	B
2026	1,397	0.481	68.7	E	1,514	0.573	22.9	B

Source: AECOM, 2013

Table 10-13: Intersection Performance, Elizabeth Drive / Mamre Road Roundabout - With Development

Year	AM Peak (7-8 am)				PM Peak (4:45-5:45 pm)			
	Peak hour volume	DoS	Average Delay	LOS	Peak hour volume	DoS	Average Delay	LOS
2016	2,415	0.522	20.5	B	2,607	0.713	20.8	B
2026	3,158	0.797	26.2	B	3,291	0.894	24.7	B

Source: AECOM

The future year assessment for 2016 and 2026 shows that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection operates at LoS E during the AM Peak (with the proposed intersection upgrade). This is considered acceptable given that it is an improvement compared to the existing situation and the likelihood of further upgrades to this intersection as part of the overall strategy for the upgrade of Elizabeth Drive post-2021. In 2026 it can be expected that HGVs departing the Site may still experience some delays when turning to the west despite the upgrade (due to the increasing eastbound traffic volume on Elizabeth Drive during the AM Peak). Other movements at the intersection show improved performance, particularly as eastbound vehicles departing the Site are no longer required to wait behind westbound vehicles. The Elizabeth Drive / The Northern Road and Elizabeth Drive / Mamre Road intersections continue to operate at LoS B during both the AM and PM peak hours in 2016 and 2026.

10.3 Mitigation and Management Measures

10.3.1 Construction

Although construction traffic is expected to have negligible impacts on the surrounding road network during the peak construction period, it is however, recommended that a CTMP be put in place to manage traffic generated during construction in order to ensure that the minimal impacts predicted in the Traffic Impact Assessment are achieved in reality. The CTMP would detail vehicle routes, the number of construction vehicles, hours of operation, access arrangements and traffic control measures. Traffic control measures in the CTMP would include, but not be limited to:

- Implementing appropriate signage to warn road users of the presence of construction vehicles
- Ensuring heavy vehicles meet the Australian Road Rules and RMS standards so that road safety is not compromised
- Installing safety signs in the event of a road closure

- Notifying the local community by means of public notifications and advertisements on the progress of the works and the scheduling of works so as to inform the local community of any additional vehicles added to the local road network
- Transporting oversized equipment and machinery in accordance with the RMS guidelines for oversized movements
- Providing parking for employees and construction vehicles on-site
- Encouraging employees to travel to the Site by car-pool where possible.

10.3.2 Operation

The intersection between the Resource Recovery Precinct Access Road and Elizabeth Drive is to be upgraded as described in Section 10.2.2. No further mitigation is required for operation.

10.4 Conclusion

Construction activities would generate a maximum of 30 heavy vehicles per day or approximately 60 heavy vehicle movements per day. Construction would also generate approximately 130 construction light vehicles or 260 light vehicle movements during the peak construction period. The majority of construction vehicle movements are expected to enter and leave the Site between 5 and 6 am and between 4 and 5 pm. The Elizabeth Drive / Resource Recovery Precinct Access Road intersection is expected to operate at LoS A during the 5 to 6 am construction peak. The results also demonstrate that the level of service of this intersection during the PM Peak period would not be impacted by construction, with the LoS being comparable to the LoS in 2014 without the Development. The LoS of The Northern Road / Elizabeth Drive and Elizabeth Drive / Mamre Road intersections would be the same in 2014 with or without the Development. It can therefore be concluded that there is minimal impact to the road network as a result of construction traffic generated by the proposed Development. Nevertheless, it is recommended that a CTMP be put in place to manage the traffic generated during construction.

Background traffic growth on Elizabeth Drive is the major traffic issue for The Development, with high volumes of additional traffic forecast to use the road in future years. This growth necessitates that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection be upgraded to a 'seagull' intersection prior to the commencement of peak operations.

During operation, there would be an increase of both light and heavy vehicles. At the peak of operation of the Development, it is anticipated that an additional 46 vehicle movements per day would be generated, of which 10 are light vehicle movements generated by operations staff and 36 are heavy vehicle movements generated by waste deliveries and compost sales. Factoring in the intersection upgrade, the future year assessment of operation of the Development in 2016 and 2026 shows that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection operates at LoS E during the AM Peak. This is a considerable improvement on the existing situation, however, HGVs departing the Site may still experience some delays when turning to the west. Other movements at the intersection, namely eastbound traffic exiting the Site, show improved performance as they are no longer required to wait behind westbound vehicles. The Elizabeth Drive / The Northern Road and Elizabeth Drive / Mamre Road intersections continue to operate at LoS B during both the AM and PM peak hours in 2016 and 2026 and therefore are not impacted by the proposed Development.

11.0 Surface and Groundwater

This chapter provides an assessment of the potential impact of the Development on surface and groundwater.

11.1 Existing environment

11.1.1 Surface Water

Topography

Topography surrounding the Resource Recovery Precinct is gently undulating, with the facility located at the peak of a gently raised ridgeline. The landform of the Resource Recovery Precinct has been substantially modified over time as a result of quarrying and infilling of voids with waste. Reduced levels across the landfill will continue to change with time as operation of the landfill and quarrying continues.

The Site slopes gently from the south east to the north west and is predominantly flat over the north west portion. A large proportion of the Site has been filled to achieve a Reduced Level (RL) of 44 metres AHD. On the western boundary of the Site, near Badgerys Creek, the ground surface falls two to three metres to approximately RL 40 metres AHD. These topographic features dictate the overall drainage network of the Site. Stormwater that is not captured for use at the Site drains to the west into Badgerys Creek.

Surface Water Management

The type of surface water and management arrangements that are currently in place at the existing SAWT facility are described in Table 11-1.

The existing SAWT facility includes one harvested stormwater pond, and three leachate ponds, one acting as an overflow pond. The ponds are used to collect surface water for reuse on-site and to reduce reliance on potable water. There is no extraction of water from Badgerys Creek or groundwater aquifers to supply the operational requirements of the existing SAWT facility.

Table 11-1 Surface Water Types and Management Responses for the Existing SAWT Facility

Surface Water Type	Description and management responses
Diverted stormwater	Diverted stormwater is discharged into Badgerys Creek, a tributary of South Creek and the Hawkesbury-Nepean River, located approximately160 metres to the west of the Site. A vegetative buffer of at least 50 metres provides amelioration of any pollution entrained in surface stormwater runoff. Badgerys Creek is also the receiving environment for surface water runoff from the Resource Recovery Precinct.
Harvested stormwater	Harvested stormwater runoff is currently directed to one stormwater collection pond, which is used for operational purposes including the composting process, irrigation, dust suppression and fire fighting. This pond is located adjacent to the SAWT facility car park and is aerated as necessary to prevent anaerobic conditions occurring. Harvested stormwater is only discharged to Badgerys Creek if necessary and is released in accordance with the EPL for the Site. In the event of poor quality water entering the pond, the pond outlet can be closed and management measures enacted as appropriate. If the water is non compliant for discharge, the water can be recirculated into the leachate management system. The larger pond, which is also located adjacent to the car park of the existing SAWT facility, does not collect stormwater from the Site. It is noted that this pond would not have an overflow function as part of the proposed Development in order to reduce the volume of water that would need to be transported offsite in the event of pollutants entering this pond. As such, the pond has been excised from the Site for the purposes of this assessment.
Leachate	Leachate is produced at the Site within the external and enclosed areas of the existing SAWT facility. The majority of leachate from enclosed areas being generated by the Tunnel Composting System and biofilters, with small volumes of leachate are generated during the cleaning of the tunnels and biofilters. Leachate produced at external areas is generated when stormwater comes in contact with external maturation areas. Leachate is currently captured and stored in two leachate ponds (referred to as the MSW Compost Leachate Pond and the SSO Compost Leachate Pond) and one leachate overflow pond (MSW Compost Leachate Overflow Pond). The overflow pond provides a level of redundancy within the leachate collection system during periods of high rainfall or excess leachate generation. Some leachate is recycled and used in the composting process. However, peak product demand and therefore leachate generation is generally greatest within the warmer months of the year, with volumes subsiding in the winter months. Current Site operations use tanker trucks to withdraw leachate from the leachate collection ponds to prevent them from overtopping during high rainfall events. These tanker trucks transfer excess leachate to a licensed off-site treatment plant for treatment and disposal.

Surface Water Quality Monitoring

Surface water quality monitoring is currently conducted on a quarterly basis in three locations along Badgerys Creek (refer to Figure 11-1), and following high rainfall events if a surface water catchment dam overflows (refer to Table 11-2).

The monitoring is completed as part of the environmental monitoring program for the Resource Recovery Precinct (SITA, 2011), and is analysed for the following parameters by a third party NATA accredited laboratory:

- biochemical oxygen demand (BOD)
- conductivity
- nitrogen (ammonia)
- suspended solids (SS)
- total organic carbon (TOC)
- pH.

Annual reporting carried out by a third party has demonstrated to date that Badgerys Creek typically maintains acceptable water quality levels for suspended solids, turbidity and biochemical oxygen demand (GHD, 2011) and has been within acceptable limits since monitoring commenced in 2000 (GHD, 2011). However, in the first quarter of 2011, an exceedance of the Australia New Zealand Environment Conservation Council (ANZECC) assessment criterion for suspended solids was detected in Badgerys Creek at the discharge point. This was a result of an isolated flooding situation following high rainfall. Continual subsequent monitoring of Badgerys Creek showed no impact

Table 11-2 Surface Water Quality Monitoring Locations

EPA ID No.	SITA Reference	Description of Location
Badgerys Creek Monitoring Locations[1]		
23	S1	Badgerys Creek upstream, south west of the Resource Recovery Precinct
24	S2	Badgerys Creek midstream, east of the Resource Recovery Precinct
25	S3	Badgerys Creek downstream, north west of the Resource Recovery Precinct
Wet Weather Overflow Point Monitoring Locations		
13	ADP002	Overflow location from Dam No. 1 (eastern side of the Resource Recovery Precinct)
15	ADP003	Overflow location from Dam No. 3 (south western side of the Resource Recovery Precinct)
34	S19 overflow	Immediately downstream of the wetland area adjacent to the Main Water Supply Holding Pond on the western perimeter of the Resource Recovery Precinct
35	ADP001	Wet weather discharge point (located on the northern perimeter of the Resource Recovery Precinct)

[1] Refer to Figure 11-1 for the monitoring locations.

11.1.2 Flooding

As detailed in Section 11.1.1, the Site gently slopes south east to the north west and is predominantly flat over the north west portion. The 1 in 100 year Average Recurrence Interval (ARI) flood level of the adjacent Badgerys Creek has been reported as being approximately equal to RL 42 metres AHD (Maunsell AECOM, 2007). This coincides with the western boundary of the Site and encroaches into the large stormwater pond located south west of the car park area (outside the Site). Flood immunity is provided to the existing SAWT facility from the 1 in 100 year ARI storm event as defined by PCC, with a majority of the Site located above RL 43 metres AHD.



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GROUNDWATER AND SURFACE WATER MONITORING LOCATIONS

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 11-1

11.1.3 Groundwater

Hydrogeology

Groundwater in the region is intercepted at approximately 47 metres AHD to the south west of the Resource Recovery Precinct, and at approximately 39 metres AHD in the low lying floodplain areas to the west/north west of the Resource Recovery Precinct in the Badgerys Creek region (GHD, 2011). According to the groundwater vulnerability map (DLWC and NSW LPI, 2001), the Site is within an area of low groundwater vulnerability.

The 2011 Annual Environmental Monitoring Report (GHD, 2011) for the landfill noted the following concerning groundwater at the Resource Recovery Precinct:

- regional water quality within this aquifer is brackish to saline, with elevated levels of iron and ammonia also known to occur. The moderate to high salinity is believed to be a natural occurrence caused by the presence of saline Wianamatta Shales
- quarterly groundwater monitoring undertaken since November 1999 indicates that standing water levels (SWLs) range from 26.74 metres AHD at the western boundary of the Resource Recovery Precinct to 47.96 metres AHD at the south eastern corner of the Resource Recovery Precinct
- groundwater is thought to flow in a west to north west direction towards Badgerys Creek. However, flow directions are likely influenced by excavation, landfilling, landfill lining systems and subsoil drainage systems associated with the landfill. As such, it is expected that groundwater would be diverted around the lined landfill cells along higher permeability flow-paths towards Badgerys Creek.

The claystones, siltstones and sandstones encountered within the Study Area are rocks of negligible primary porosity and permeability. As a result, they are highly resistant to the movement of groundwater (Maunsell AECOM, 2007). Groundwater recharge at the Site is minimal because of surface clays, buildings and hardstand areas, which form a capping layer and restrict rainfall infiltration to the subsurface. The existing MSW and SSO leachate ponds at the existing SAWT facility are lined with HDPE to prevent infiltration of leachate to the subsurface.

Groundwater Use

A search of the NSW Water Information database (DNR, 2012) identified 26 registered bores within a five kilometre radius of the Resource Recovery Precinct excluding those eight bores directly related to the Resource Recovery Precinct.

Registered bores were installed to a maximum depth of 366 metres, with the majority of bores installed to a depth between 12 and 78 metres. Reported groundwater yields were not reported at depths less than 39 metres and were generally less than 1.1 litres per second at depths between 36 and 210 metres. The highest bore yield was 6.0 litres per second at a depth of 231 to 317 metres. Groundwater was reported to be of moderate to high salinity in the water bearing zones of the registered bores. The authorised use of the bores includes 19 monitoring, three industrial, two domestic stock, one groundwater exploration and a test groundwater bore.

While it is recognised that not all existing bores may not be registered, the database gives an indication of groundwater use in the area. Overall, it is concluded that the importance and reliance on groundwater by local landowners and residents is limited in the vicinity of the Site with bores predominantly aligned with groundwater quality and yield monitoring purposes.

Groundwater Quality Monitoring

The EPL for the Resource Recovery Precinct requires that groundwater is monitored in seven bore locations surrounding the Site. Groundwater levels and quality from these monitoring bores is tested and recorded on a quarterly basis and reported in an Environmental Monitoring Annual Report to both PCC and the EPA. Both groundwater levels and quality have been monitored during the entire period of operation of the Resource Recovery Precinct, including the existing SAWT facility.

There are seven groundwater monitoring boreholes located along the perimeter of the Resource Recovery Precinct, as detailed in Table 11-3. SITA reference groundwater bores G3a, G4a and G5 are located closest to the Site.

Similar to surface water quality, no increase or decrease in groundwater quality or levels has been reported for the Site through monitoring to date, indicating that the Resource Recovery Precinct has negligible impact on the groundwater environment. Results to date taken down-gradient of the Resource Recovery Precinct show that there is no impact to groundwater when compared with up-gradient groundwater chemistry (GHD, 2011).

Table 11-3 Groundwater Monitoring Bore Locations

EPA ID No.	SITA Reference	Description of Location[1]
16	G1a	Eastern boundary of Resource Recovery Precinct
17	G3a	Western boundary of the Resource Recovery Precinct
18	G4a	North western corner of Resource Recovery Precinct
19	G5	Northern boundary of Resource Recovery Precinct
20	G6	South western side of Resource Recovery Precinct
21	G7	South eastern corner of Resource Recovery Precinct
22	G9	Western boundary of Resource Recovery Precinct

[1] Refer to Figure 11-1 for the monitoring locations.

11.1.4 Methodology

Water Quality

An assessment of the potential water quality impacts of the Development has been prepared based on:

- existing surface water and groundwater environment using existing monitoring data available as part of environmental monitoring for the landfill
- an assessment of the potential environmental impacts of construction and operation of the Development on surface water and groundwater
- identifying appropriate water quality management and mitigation measures in accordance with the latest version of *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004)
- identifying any residual risk.

Site Water Balance

A site water balance has been prepared which identifies the source of all water collected or stored at the Site, including stormwater and leachate, and identifies all water use on the Site, including any discharges. The water balance report can be found in Appendix L. The Site water balance has been prepared to ensure that the design of the Development addresses surface water management adequately.

A 123-year historical rainfall record has been used as an input to determine potential future system behaviour with respect to catchment volumes. Specifically, the objectives of the Site water balance model were to:

- assess the likelihood of the proposed leachate collection ponds exceeding capacity
- investigate leachate management options
- report on probable potable water savings through on Site reuse of collected stormwater
- investigate the likely shortfall of collected stormwater with respect to the Site water demands.

11.2 Impact Assessment

11.2.1 Construction

Construction of the Development, particularly during Site preparation and earthwork activities, has the potential to result in erosion of disturbed areas or construction material stockpiles. Fine particles from eroding soils could be generated from unprotected surfaces and mobilised during construction, including earthworks for building pads, access roads, stormwater drainage networks and services infrastructure. Without the implementation of appropriate control measures, erosion and mobilisation of sediments could result in degradation of water quality within the construction area and in Badgerys Creek. This would potentially result in an increased sediment load in

runoff generated from the Site. Should excess sediment reach Badgerys Creek it may have a detrimental impact on that waterway. There is also the potential for other pollutants such as oil and grease from construction equipment to contaminate runoff.

Vehicle and plant movements during construction would also have the potential to impact on surface and groundwater quality within the construction area and in Badgerys Creek. Potential pollutants in road runoff include combustion products of hydrocarbons, fuels, corrosion of vehicle parts and lubricants. Particulate contaminants originating from vehicles and vehicle related activities include carbon, rubber, plastics, grit, rust and metal particulates. Water quality impacts could occur through the increased load of pollutants such as hydrocarbons, heavy metals and particulates deposited on roads and taken up by stormwater runoff during rainfall.

11.2.2 Operation

Surface Water

The Development would continue to manage stormwater and leachate at the Site in a similar manner, except for the following proposed improvements which would reduce potential risks to surface water:

- conversion of the MSW Compost Leachate Pond to a Diverted Stormwater Pond to capture stormwater runoff from the Composting Hall roof and surrounding hardstand areas for reuse in operations. In the event that this pond reaches capacity, the pond would spill to Badgerys Creek
- process leachate would be collected and stored in an enclosed leachate tank array, as opposed to the current arrangement of external pond storage. The leachate stored within the tanks would be collected from internal operations and re-circulated into the composting process.
- water required for processing would be sourced in the order of preference as follows: MSW Compost Leachate Pond, SSO Compost Leachate Pond, Harvested Stormwater Ponds within the Site, harvested stormwater ponds at the landfill, and potable water
- internalisation of compositing activities with only the external storage of finished product on the Compost Storage Pad, which would be supported by SSO and MSW Compost Leachate Ponds. The leachate at the pad would be of higher quality than what is generated by the current external maturation pads
- the leachate from the SSO Compost Leachate Pond would be pumped to the MSW Compost Leachate Pond, on the basis that leachate in the MSW Compost Leachate Pond would be used as the first preference to supplementing internal compositing water demand. By preferentially transferring from storage areas containing the poorest quality of water for reuse on Site, the risk of spilling the poorer quality water from the collection ponds is reduced.

As a result of these improvements, the greatest potential impacts on hydrology and water quality during operation of the Development would result from:

- an increase in the volume of stormwater drainage runoff generated from an increase in impervious areas such as hardstand areas and buildings
- the management of excess compost leachate generated as a result of the Development
- overflows from the MSW Compost Leachate Pond to the Harvested Stormwater Pond located adjacent to the car park in the event of a leachate management failure, which could lead to discharges of leachate to Badgerys Creek
- spills and leaks resulting in discharge of contaminated stormwater during operation.

An increase in impervious areas without proper infrastructure and management could lead to increased flow discharges, increased erosion potential and increased discharge velocities. As the majority of stormwater collected within the operational areas is harvested from hardstand areas and stored on Site for reuse, the risk to water quality within Badgerys Creek as a result of an increase in impervious areas would be minimised. Further, the vegetative buffer located between the Site and Badgerys Creek would be preserved to ensure an adequate buffer zone exists to provide an additional level of water quality protection to Badgerys Creek.

The increase in throughput would increase the amount of leachate generated at the Site by the Development. Around 2,700 kL per year of excess leachate would be generated by the Development. This would require 115 truck movements per year to transport the excess leachate off site for treatment and disposal. Without this, a total of 11 spills or overflow events could be expected to occur based on the Site water balance, and at least eight of these spills events have been identified as likely to exceed current EPL quantity criteria. Mitigation and

management options to reduce the reliance on the off-site disposal of excess leachate and the risk of overflows are provided in Section 11.3 of this EIS.

Failure of part of the surface water management system, including the leachate management system, could result in uncontrolled discharge of contaminated water within the Site to Badgerys Creek. Spills or leaks from plant or vehicles could also lead to a reduction in water quality in Badgerys Creek, if discharged from the Site. The stormwater infrastructure at the Site would minimise the potential for any spills from entering Badgerys Creek. Maintenance of the surface water management system would assist in minimising any risk of system failure.

For water supply, the capture of stormwater within the Site and the use of leachate would reduce demands on potable water. Nonetheless, around 5 ML per year of potable water on average would be required to support the Development, This would be sourced directly from the Sydney Water potable water supply and would not require water to be extracted from Badgerys Creek or local groundwater aquifers.

Groundwater

Waste would continue to be received within the Receival Building, where all waste materials will be handled and stored on impermeable, reinforced concrete surfaces eliminating the risk of leachate migrating to the subsurface. Further, the storage of leachate would be either within HDPE lined leachate ponds or within enclosed leachate collection tanks for reuse within operations on Site. There would be an increase in impermeable surfaces, however, groundwater recharge at the Site is already considered to be minimal due to the presence of the existing SAWT facility and surface clays which form a capping layer and restrict rainfall infiltration to the subsurface. As a consequence, it is unlikely that the Development would significantly change groundwater hydrology or quality.

11.2.3 Flooding

Flood modelling for the Development has not been completed as design levels for new infrastructure are all located above the approximate 1 in 100 year ARI level of 42 metres AHD. Finished floor levels for new buildings would be designed to tie into existing finished floor levels. As there would be no new proposed structures within the 1 in 100 year ARI flood level planning area, it is anticipated that there would not be any additional potential impacts of flooding to the Site or local flooding regimes as a result of the Development.

Flooding has the potential to damage Site infrastructure and equipment, as well as pose a risk to the health and safety of Site personnel. There is also the potential for entraining contaminants into floodwaters discharging into Badgerys Creek. As the Development would be located above the 1 in 100 year ARI flood level to match existing design levels of the existing SAWT facility, there is negligible potential for disruption to the normal patterns of minor flood flows in Badgerys Creek as a result of the Development. However, there is the potential for a 1 in 100 year ARI to inundate the larger pond located to the west of the SAWT facility access road. However, this does not form part of the Development, nor would it be used to cater for overflow events at leachate storage ponds within the Site.

11.3 Mitigation and Management Measures

11.3.1 Construction

Construction works would be undertaken in accordance with the Construction Environmental Management Plan (CEMP), which would include a Soil and Water Management Plan (SWMP). Work method statements would be prepared for construction activities carried out across the Site with respect to managing surface and groundwater quality.

Temporary earthworks would be carried out to protect disturbed areas during construction. Temporary works would be installed and regularly inspected in-line with the CEMP. Temporary works would include:

- constructing clean stormwater diversion drains to reduce clean stormwater migration onto the Site
- installing temporary sedimentation ponds/traps for capturing sediments contained within stormwater runoff within disturbed areas of the Site during earthworks until disturbed areas are re-established
- installing silt fences or other equivalent methods to prevent the migration of sediments off-site into surrounding water bodies
- removing of temporary soil and water management structures only after areas have been stabilised
- completing regular visual inspections of stockpiles, drainage lines and construction areas to assess the effectiveness of mitigation and management measures.

These mitigation measures are relatively standard on construction projects and would reduce the potential for erosion and sedimentation impacts on water quality.

Plant and machinery would be operated in a responsible manner by experienced drivers to ensure that spills of construction materials are minimised. All plant and machinery would be regularly maintained to ensure good working order, to minimise the risk of fuel and oil leaks. In the unlikely event of a spill or leak, the use of spill kits and emergency containment would minimise the impacts on surface and / or groundwater.

A water quality monitoring program would be developed, in consultation with PCC and EPA, and implemented during construction, to ensure that water quality within Badgerys Creek is not adversely impacted. The water quality monitoring program that would be developed as part of the SWMP contained within the CEMP would include:

- identifying relevant monitoring parameters
- identifying representative sampling locations and the frequency of sampling
- completing water quality testing by a NATA accredited laboratory
- an outline of the framework and format for reporting of monitoring results.

11.3.2 Operation

As discussed in Section 11.2.2 of this EIS, excess leachate would be transported off site to manage the risks to surface water. In addition to the removal of excess leach by trucks, a number of additional options to manage leachate were considered as part of the Site water balance. This identified the potential supplementary mitigation option of increasing the size of the SSO Compost Leachate Pond.

Increasing the size of the SSO Compost Leachate Pond would minimise the potential for leachate overflows. The reduction in excess leachate and number of overflow events would depend on the size of the SSO Compost Leachate Pond. For example, should the pond have capacity for 4,000kL, around eight overflow events are predicted to occur per annum, requiring 68 tank truck movements per year (compared to 115 truck movements if current practices are continued).

The removal of excess leachate offsite remains as the preferred leachate management measure. Further consideration to the potential expansion of the SSO Compost Leachate Pond is required during detailed design. This is to ensure that the benefits associated with reducing the reliance of off-site disposal is balanced against other potential costs (design, installation and management), Site constraints (in terms of space availability) and potential implications to operational flexibility.

In the event that leachate overflows into the Harvested Stormwater Pond adjacent to the car park, the re-use of water from that pond would be suspended. Depending on the resultant water quality, all water would be pumped to tankers for treatment at an off-site location if not suitable for re-use at the Site. Stormwater discharges to Badgerys Creek would continue as currently permitted by the conditions of the existing EPL.

Other mitigation and management measures that would be implemented, or would continue to be implemented, are:

- general site maintenance would also ensure that infrastructure remains in good-working order
- provision of spill kits to ensure appropriate response to spills that may pose a risk to surface water runoff
- use of HDPE for new leachate ponds
- surface and groundwater monitoring would continue to be completed and reported in accordance with the EPL and Environmental Monitoring Manual (SITA, 2011). All surface water sample analysis would be undertaken by a NATA-endorsed analytical laboratory and reported to PCC and EPA.

11.4 Conclusion

Construction and operation activities associated with the Development have the potential to impact on surface and groundwater quality and flow if not managed appropriately. Impacts to surface and groundwater associated with the Development would be minimised by implementing the mitigation control measures within the CEMP as detailed in Section 11.3 and monitored with reference to the Environmental Monitoring Manual (SITA, 2011).

With the implementation of the appropriate management measures across the Site, it is concluded that the Development during operation is unlikely to have significant impacts on surface and groundwater environments, or flooding behaviour. Additional mitigation measures, particularly with respect to leachate management, would ensure appropriate management of surface water at the Site.

12.0 Geology and Soils

This chapter provides an assessment of the potential impact of the Development on soils and geology.

12.1 Existing Environment

12.1.1 Soils and Geology

The Site is underlain by the Blacktown Soil Landscape comprising residual textured red, brown and yellow podsolic soils derived by in-situ weathering of the Bringelly Shale. Soils underlying the floodplain of Badgerys Creek consist of the Wianamatta Group shales comprising of, in stratigraphic order, the Bringelly Shale Group, the Minchinbury Sandstone Group and the Ashfield Shale Group.

The Site predominantly consists of metasediments including claystone, siltstone, laminate, sandstone, coal and highly carbonaceous claystone and tuff. The Site also contains engineered fill upon which the structures for the existing SAWT facility were constructed. Soils and shale that occupied most of the adjacent landfill have been, and continue to be, quarried for commercial sale. The original soils located within the floodplain of Badgerys Creek remain relatively undisturbed.

Subsurface conditions encountered at the Site are typically of low porosity, are highly resistant to the movement of groundwater and are therefore of low permeability (Maunsell AECOM, 2007). Soils in the vicinity of Badgerys Creek have a high potential for salinity and may be dispersible if left disturbed for a long period of time (DIPNR, 2003). The remaining portion of the Site is reported as having moderate potential for salinity (DIPNR, 2003) with infilling utilising imported fill overlying natural soils to achieve finished surface levels.

12.1.2 Landform

Topography surrounding the Resource Recovery Precinct (and the Site) is gently undulating, with the Resource Recovery Precinct located at the peak of a gently raised ridgeline. The landform of the Resource Recovery Precinct has been substantially modified over time as a result of quarrying and infilling of voids with waste both as an uncontrolled landfill prior to 1990, and a controlled landfill after 1990. Reduced levels across the landfill will continue to change with time as operation of the landfill continues. In general, the landfill site grades gently from east to west towards Badgerys Creek.

The Site of the existing SAWT facility has also been filled to achieve finished surface levels for construction of the facility. This included filling the north western portion of the Site to achieve building pad levels above the documented 1 in 100 year flood level of approximately Reduced Level (RL) 42 metres Australian Height Datum (AHD). This provides an approximate freeboard to existing building finished floor levels of two metres. The finished surface level of the Site is relatively flat. The majority of the existing SAWT facility lies above RL 44 metres AHD. On the western boundary, near Badgerys Creek, the ground surface falls two to three metres to approximately RL 40metres AHD.

The lowest point of the Resource Recovery Precinct is RL 22metres AHD at the base of a waste cell located in the area of the landfill to the south of the existing SAWT facility.

12.1.3 Contamination

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) requires a consent authority, when assessing and determining a development application, to consider whether the land the subject of the development is contaminated and if so, whether the land requires remediation before the intended land use can proceed.

In addition to other considerations, the Site was originally selected for the existing SAWT facility as it had not been previously landfilled. The majority of the Development would remain within this area. As discussed in Chapter 11, monitoring conducted in accordance with the EPL demonstrates that there is no impact to groundwater from either the existing SAWT facility or the landfill. As such, the risk of contamination within the Site is low.

However, the extended Compost Storage Pad is an area that has been previously landfilled with solid waste within lined cells. The existing pad currently consists of a 400 mm stabilised cement layer of low permeability overlying a modified subgrade layer and natural clay lay resulting in a very low chance of contamination of subsoils. The area where the pad would be extended would be capped prior to being reconfigured with a similar

pavement buildup. The Compost Storage Pad (and associated drainage infrastructure) would be constructed and operated in a manner that does not compromise the capped landfill cell.

12.1.4 Acid Sulfate Soils

Potential acid sulfate soils (ASS) are waterlogged soil layers rich in iron sulphide, primarily pyrite. They generally occur in low lying areas. When excavation or drainage brings these soils into contact with oxygen, the pyrite is oxidised to form sulphuric acid. If the amount of acid exceeds the neutralising capacity of the soil, and the pH falls below 4, the soils are known as actual ASS.

Due to the fact that the Site was filled to raise the existing SAWT facility above the 1 in 100 year ARI flood level, there is low potential for ASS. No potential ASS were identified during previous excavations connected with the existing landfill or construction of the existing SAWT facility. ASS mapping for the Site also doesn't indicate any presence of ASS within the Development footprint (CSIRO, 2012). Consequently, the presence of ASS is considered unlikely.

12.2 Impact Assessment

12.2.1 Construction

Construction activities would result in disturbance of underlying soils and have the potential to result in erosion of soils. Construction activities associated with the Development that may give rise to soil erosion include:

- stockpiling of construction fill materials and excavated soil
- excavation of, and preparation of, sub-grade for construction of foundations for buildings, hardstands, car park, access road and water storage infrastructure such as leachate tanks and ponds
- placement of fill materials for buildings, hardstands, car park and access road
- trenching for additional services infrastructure
- movement of construction equipment within the Site
- movement of construction equipment and delivery vehicles along the temporary construction access road which would consist of a gravel surface.

If not properly managed, erosion could have a detrimental impact on nearby Badgerys Creek and associated riparian area, as well as stormwater infrastructure on-site.

Although lined with appropriate HDPE liners, decommissioning of the existing leachate collection pond adjacent to the maturation pad would require appropriate excavation, management and disposal of materials lining the leachate pond as materials may contain residual contamination as a result of prolonged retention of leachate, although the pond was cleaned out in 2012. These excavated materials would be characterised with reference to the *Waste Classification Guidelines* (DECCW, 2009) to determine whether they could be reused in construction of the Development. If deemed unsuitable for reuse, the materials would be removed from the Site and disposed of at an appropriately licensed waste facility.

Since the Site was not identified as containing ASS, there would be no potential impacts associated with the disturbance of ASS. Similarly, the Site has low potential for salinity in the area which would be disturbed as a result of the construction activities and therefore there would be no potential impacts associated with salinity.

12.2.2 Operation

The majority of the Site would be covered with buildings and sealed surfaces such as hardstand areas, car parking areas, and access roads which would not give rise to erosion. Any areas not covered by buildings or sealed surfaces would be minimal (e.g. drains), and would be surfaced or landscaped so that they would not be susceptible to erosion. Therefore, there would be little to no potential for erosion to occur during operation.

As part of the Development, all waste processing and composting activities would be conducted within enclosed buildings thereby eliminating the potential for contamination. Process leachate from the Composting Hall and Composting Tunnel System would be collected in bunded leachate tanks to the north of the Composting Hall rather than leachate collection ponds, thereby reducing the potential for leachate to migrate to the subsurface (refer to Chapter 11 of this EIS for further detail). The new leachate pond adjacent to the Compost Storage Pad would be lined with an impermeable geofabric to prevent the migration of leachate, as well as maintaining the existing HDPE lined compost leachate pond to the north of the Compost Storage Pad. Compost leachate

collected in both ponds would be of higher quality than that collected for the existing SAWT facility. Stormwater coming into contact with materials stored on the Compost Storage Pad under the Development would be of higher quality because the pad would store final compost product rather than materials which are still decomposing.

All chemicals used at the Site would continue to be stored in sealed containers and indoors. Therefore, there would be little to no potential for contaminants associated with operations to enter underlying soils and migrate from the Site.

The areas subject to the Development are located in parts of the Site that have been previously infilled with imported fill to achieve finished surface levels and therefore of low salinity potential. Salinity risks at the Site would be reduced due to Site drainage arrangements (to reduce the likelihood of waterlogging), no removal of vegetation, minimal irrigation of water at the Site (associated with landscaped areas only) and protection of the riparian area associated with Badgerys Creek (which is identified as having a high potential for salinity). Ongoing issues with respect to soil salinity are not expected as imported fill would provide a clean capping layer between natural underlying soil and the base of building slabs.

12.3 Mitigation and Management Measures

12.3.1 Construction

An Erosion and Sediment Control Plan (ESCP) would be prepared for the Site to manage soil erosion during construction. The plan would be consistent with the *Managing Urban Stormwater Soils and Construction (the Blue Book)* (Landcom, 2004) and would be maintained for the duration of the construction works. The ESCP would form part of the CEMP. The mitigation measures included in the ESCP to manage potential impacts during construction would include:

- minimise the duration that areas are disturbed such that surfaces are stabilised or landscaped immediately after the completion of works in a specific area, where practicable
- locate temporary stockpiles of construction materials away from drainage lines and stabilising stockpiles to prevent migration of soils
- minimise the size and duration of materials stockpiles during construction
- install check dams or other energy dissipation devices to control stormwater velocities in temporary construction drainage channels to minimise the potential for migration of sediments away from the Site
- construct diversion drainage channels to reduce the amount of stormwater passing as overland flow across disturbed soil areas
- install geofabric sediment fences down slope of disturbed areas where there is the potential for runoff to enter Badgerys Creek
- regularly inspect the Site during construction to ensure that the ESCP is properly implemented.

12.3.2 Operation

There are no operational geology and soils mitigation measures required.

12.4 Conclusion

The main potential for impacts to soils and geology would occur during construction. Construction activities have the potential to cause soil erosion, however, the potential for erosion would be minimised by implementing the erosion control measures detailed in Section 12.3. When fully operational, the majority of the Site would consist of hardstand areas and buildings which would not give rise to erosion.

There is little risk of encountering contamination during construction given the Site was filled prior to construction of the existing SAWT facility, waste is composted and stored within buildings or on sealed/hardstand surfaces, leachate ponds at the Site are lined with impermeable geofabric, and there has never been an incident involving a chemical spill at the facility. There is little to no potential for contaminants associated with operation of the Development to enter underlying soils and migrate from the Site since all waste processing and composting activities would be conducted within enclosed buildings, leachate tanks or lined leachate ponds would be installed, and chemicals would continue to be stored indoors in sealed containers.

Since the Site is not identified as containing ASS, there would be no potential impacts associated with the disturbance of ASS. Since underlying soils consist predominantly of imported fill, the potential for salinity impacts to be encountered during construction of the Development is low.

13.0 Hazard and Risk

This chapter assesses the potential hazards and risks associated with the Development.

13.1 Existing Environment

The Site is occupied by the existing SAWT facility which processes MSW and SSO for production of saleable quality compost and extraction of recyclable materials. A combination of mechanical separation, manual sorting, and biological composting technologies are used at the facility. There are a number of potential hazards and risks associated with operations currently conducted at the existing SAWT facility including:

- equipment failure and subsequent release of odorous gases to the environment from the Receival Hall, Resource Recovery Building, Composting System Tunnels and the external Maturation Pads
- fire within the Receival Hall, Resource Recovery Building, Composting System Tunnels, the Refining Building and the general surrounds
- dust release to the environment from the Refining Building and the external Maturation Pads
- contamination of surface and groundwater as a result of surface water runoff in areas where waste is stored, contamination from process and compost leachate, and wastewater generated by personnel
- storage of small quantities of maintenance products and laboratory chemicals including small quantities of acetylene (2 G gas cylinder), paint (3 litres), solvent cement (125 millilitres), motor sealant (50 millilitres), dutrion powder (20 kilograms), Loctite 641 RC (1 litre), silkaflex (310 millilitres), WD-40 bulk liquid (20 litres), zinc IT (350 grams), acetone (1 litre), hydrogen peroxide (1.5 litres), mercuric chloride (1 litre), nitric acid (1 litre), potassium chloride (1 litre), potassium permanganate (1 litre) and stannous chloride (1 litre)
- storage of biodiesel in a fully bunded facility, in a 10,000L storage tank.

Potential hazards and risks associated with the management of odour, dust and water at the existing SAWT facility are discussed in detail in Chapters 8 and 11 of this EIS.

A number of safeguards are used to mitigate hazards and risks associated with operation of the existing SAWT facility including:

- maintaining a negative pressure environment within the Receival Hall and Resource Recovery Building to prevent odour release to the environment
- use of semi-enclosed biofilters to treat odorous air from the Composting System Tunnels prior to discharge to the environment
- installation of odour fences along the perimeter of the MSW Maturation Pad to minimise the impact of odour emissions
- use of aradioactive material alarm at the incoming weighbridge to prevent medical waste and other material types entering the facility
- mechanical sorting prior to composting to remove hazardous materials such as lead acid batteries and gas bottles that could potentially pose a compost contamination and safety risk to operations
- wetting materials stored on the Maturation Pads to prevent dust emissions
- use of appropriate controls such as stormwater management and lined leachate ponds to prevent contamination of surface and groundwater
- appropriate storage of recovered hazardous materials including LPG gas bottles, paint, vehicle batteries
- appropriate storage of chemicals in an area separate to the facility and a Standard Operating Procedure (SOP) which details procedures to be followed in the event of a spill.
- management systems (including manuals and SOP's) addressing hazards and risks, and recurrent training of staff to ensure that the systems in place are met.

The existing SAWT facility has been operating since 2009 and, with the exception of odour issues, which would be addressed by the Development (refer to Chapter 8 of this EIS for further information), there has not been an incident (such as a fire, explosion or serious injury) at the facility.

Further information on the safeguards currently used at the existing SAWT facility are provided in Chapter 5 of this EIS.

13.2 Methodology

The DP&I Multi-Level Risk Assessment approach, supported by *Hazardous Industry Planning Advisory Paper (HIPAP) No. 3 Risk Assessment*(DP&I, 2011),*HIPAP No.6 Guidelines for Hazard Analysis* (DP&I, 2011), and the *Hazardous and Offensive Development Guidelines Applying SEPP 33(Applying SEPP 33)* (DP&I, 2011) were used to determine the methodology for the hazard and risk assessment for the Development.

The Multi-Level Risk Assessment approach, *HIPAP No.3 Risk Assessment* and *HIPAP No.6 Guidelines for Hazard Analysis* assist industry, consultants and consent authorities in carrying out hazard and risk assessments and evaluating risk at an appropriate level for the facility being studied. The Multi-Level Risk Assessment approach recommends three levels of hazard and risk assessment, depending on the outcome of preliminary screening. These are described below and shown in Figure 13-1.

- **Level 1** – **Qualitative Analysis**. Primarily based on the hazard identification techniques and qualitative risk assessment of consequences, frequency and risk
- **Level 2** – **Partially Quantitative Analysis**. Using hazard identification and the focused quantification of key potential off-site risks
- **Level 3** – **Quantitative Risk Analysis**. Based on the full detailed quantification of risks, consistent with *HIPAP No.6 Guidelines for Hazard Analysis*.

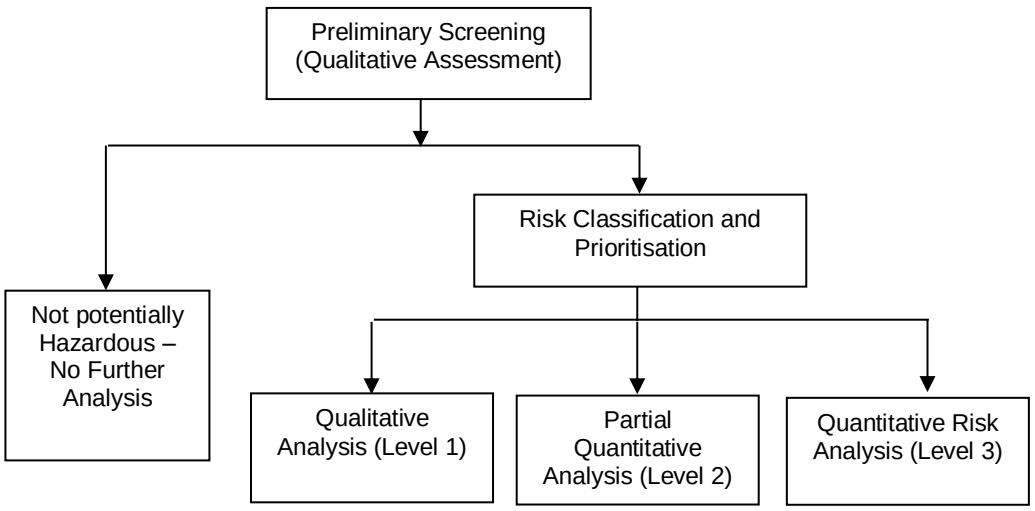


Figure 13-1 The Multi-Level Risk Assessment Approach

*Applying SEPP 33*is also used to assist in selection of the appropriate level of hazard and risk assessment. This guideline states the following:

"It is considered that a qualitative PHA [Preliminary Hazard Analysis] may be sufficient in the following circumstances:

- Where materials are relatively non-hazardous (for example corrosive substances and some classes of flammables)
- Where the quantity of materials used are relatively small
- Where the technical and management safeguards are self-evident and readily implemented
- Where the surrounding land uses are relatively non-sensitive.

In these cases, it may be appropriate for a PHA to be relatively simple. Such a PHA should:

- Identify the types and quantities of all dangerous goods to be stored and used
- Describe the storage/processing activities that will involve these materials
- Identify accident scenarios and hazardous incidents that could occur (in some cases, it would also be appropriate to include consequence distances for hazardous events)
- Consider surrounding land uses (identify any nearby uses of particular sensitivity)
- Identify safeguards that can be adopted (including technical, operational and organisational), and assess their adequacy (having regards to the above matters)."

Consistent with the Multi-Level Risk Assessment approach and *Applying SEPP 33*, the Development was considered in the context of its location, the quantity and type (i.e. hazardous nature) of dangerous goods likely to be stored and used, and the technical and safety management controls to be implemented in order to determine the appropriate level of hazard and risk assessment required. It was determined that a qualitative analysis would be appropriate for the Development given that:

- it involves expansion of the existing SAWT facility which currently stores, and would continue to store, small quantities of chemicals
- the majority of hazards would arise from potential equipment failure, and fire risks within the facility and the immediate surrounds, and that the facility would continue to employ appropriate measures to mitigate hazards and risks associated with operations..

The DP&I requested in the DGRs that a PHA be prepared for the Development. However, subsequent to the DRGs being issued, DP&I advised that a full PHA would not be required. DP&I advised that a qualitative risk analysis be prepared in accordance with SEPP 33, the Multi-Level Risk Assessment approach, *HIPAP No. 3: Risk Assessment* and *HIPAP No.6 Guidelines for Hazard Analysis*.

13.3 Impact Assessment

13.3.1 Hazard Analysis

The potential for hazard impacts may result from activities associated with the following aspects of the Development.

Receival Hall and Pre-Treatment

Ventilation Systems Failure

There is the potential for the release of odour and bioaerosols in the event of a ventilation systems failure in the Recieval Hall and Resource Recovery Building. Bioaerosols are natural or artificial particles of biological (microbial, plant, or animal) origin suspended in the air. Bioaerosols may consist of bacteria, fungi (and spores and cell fragments of fungi), viruses, microbial toxins, pollen, and plant fibres. Bioaerosols can pose a risk to human health.

The pre-treatment systems associated with the Development would be placed in the same location as the existing SAWT facility. The air extraction rate for the receival/pre-treatment area would be increased by the Development, with additional fresh air being required by the new Composting Hall. This air would be transferred by in-duct fans, then extracted by the new aeration fans in the Composting Hall, followed by exhaust via the new biofilter.

The net effect of the Development would be a higher air flow through the receival/pre-treatment area, and an increased level of redundancy. This would mitigate odour and bioaerosol release. Personnel that may potentially

be exposed to bioaerosols currently, and would continue to, work in air conditioned equipment cabins which reduces the risk of exposure.

The number and type of receival doors would remain the same as the existing SAWT facility. The doors are hi-speed roller doors, with a less than 15 second open-close cycle, to minimise odour release. Manual operation of the roller doors is possible but is only undertaken in the rare event of a mechanical failure and where the remaining roller doors cannot be used. The existing roller doors are adequate for the proposed Development.

Systems failure (composting systems and biofilters) which extract air from the receival/pre-treatment area are addressed in subsequent sections.

Hazardous Materials

MSW, and to a lesser extent, SSO materials sometimes contain materials that have the potential to affect the health of staff, present a fire/explosion risk, or adversely affect the quality of the final compost products. These materials include asbestos, lead acid batteries, paint cans and gas bottles, and radioactive materials.

The existing SAWT facility has pre-treatment systems designed to isolate and remove hazardous materials. These systems would continue to operate as part of the proposed Development. Specific materials of concern are currently, and would continue to be, handled as follows:

- Asbestos
    - Mechanical screening is not always possible since asbestos may arrive in the form of loose material or in a wrapped format.
    - Waste is visually inspected at the initial stage of the process to identify material such as building insulation or floor tiles that could potentially contain asbestos. SITA staff are specifically trained in the identification and handling of asbestos. It is important to note that no asbestos materials have been received at the existing SAWT facility to date.
    - Settled dust within the facility has been tested for evidence of asbestos. It is important to note that tests for asbestos at the existing SAWT facility have been negative to date.
- Lead acid batteries
    - Waste is visually inspected at receival and any lead acid batteries are removed manually.
    - Waste is then screened to remove any batteries that may have been overlooked during visual inspection. The material which is screened out is then visually inspected and if batteries are positively identified they are removed manually.
    - Batteries are temporarily stored prior to being on-sold or disposed of within existing commercial systems. Batteries are collected and transported off-site by suitably qualified contractors. The NSW Mixed Waste Exemption reporting requirements for lead acid batteries are complied with.
- Paint Cans and Gas Bottles
    - Paint cans and gas bottles are removed using the same method as described above for batteries.
    - Paint can and gas bottles are temporarily stored outside the facility in a designated storage area prior to being on-sold for recycling.
- Radioactive Materials
    - A radioactivity detector is located at the incoming weighbridge to prevent radioactive materials entering the facility. It is important to note that no radioactive materials have been received at the existing SAWT facility to date.
    - If radioactive materials are detected at the weighbridge the waste collection vehicle is isolated and managed according to established landfill procedures.

SITA is continually researching more effective technologies for waste separation, and when such technologies are proven they would be incorporated into the facility. Several technologies are currently under review by SITA include the use of impact screens and bounce conveyers which sort wastes using ballistic effects, and x-ray and air sorters.

Final compost product is currently and would continue to be tested for contaminants according to Australian Standard (AS) 4454 and the "Exemption" (see below), depending on the source material. Testing would occur at the frequency specified by the general exemption under clause 51 and clause 51A, Part 6 of the *Protection of the Environment Operations (Waste) Regulation, 2005* (the NSW Mixed Waste General Exemption) for organic outputs derived from mixed waste. NATA certified laboratories are, and would continue to be used for sample analysis. Any spikes in the sample results and long term trends are monitored and causal factors investigated. Compost product is only released for land application when testing indicates that the NSW Mixed Waste General Exemption requirements have been met.

Fire

Material build-up on electric motors of the pre-treatment lines has the potential to result in fire. This potential risk is managed by daily cleaning to clear away any debris on mechanical and electrical components of the pre-treatment system.

Residual materials from pre-treatment are currently compressed in dedicated packer units, then immediately transported to landfill, with compression lessening the risk of fire. The proposed Development would include modified residuals management, with high density balers used in place of the current packer units. Use of highly compressed bales would further reduce the risk of fire in the residual materials. Typically no residual materials would remain in the Receival Hall or Resource Recovery Building at the end of processing each day.

To date, there have not been any fires in the pre-treatment system. Fire extinguishers are kept in the Receival Hall and Resource Recovery Building for use in the unlikely event of a fire. Fire detection systems are currently being upgraded.

Since the operational controls and procedures used at the existing SAWT facility are adequate in managing potential hazards associated with release of odour, bioaerosols, hazardous materials, and fire, and because these controls and procedures would be maintained and in some cases enhanced as part of the Development, the above hazards have not been carried forward for further assessment.

Tunnel Composting System and Composting Hall

Ventilation Systems and Biofilters Failure

The risks associated with failure of the ventilation systems and biofilters relate to an uncontrolled release of odour from the Tunnel Composting System and Composting Hall.

Three new biofilters would be installed for treatment of the air extracted from the Composting Hall before emission to the environment. There are four existing open biofilters for treatment of air extracted for the Tunnel Composting System. The new and existing biofilters would be designed for peak loads and would also have redundancy within the system, which means that when the media is changed in a biofilter, or if a biofilter fails or is shut down for maintenance, the other biofilters would be able to adequately treat the air prior to emission. The new biofilters would have enclosed sides to prevent the release of fugitive emissions. The existing biofilters would be retrofitted with enclosed sides. Emissions from the biofilters to the atmosphere would occur via 15-metre high stacks to enhance dispersion.

The three new biofilters would be supplied with air from the Composting Hall via two ventilation fan systems. The ventilation fans and the biofilters apply negative pressure to the Composting Hall to prevent the likelihood of odours being released from the Composting Hall itself. As per the Composting Hall, the ventilation system in the Tunnel Composting System maintains negative air pressure in the tunnels and the Resource Recovery Building. The ventilation systems in both the Composting Hall and Tunnel Composting System have redundancy in the event a fan is shut down for maintenance or fails.

Operation of the biofilters and ventilation fans would be centrally monitored and controlled by a specialised process control system and alarms would be sent to the facility operators if system faults occur. System faults are infrequent because the components that form the biofilter and ventilation systems (such as the ducts, high volume fans, humidifiers, and irrigation systems) are inherently reliable and not prone to failure. In addition, a Computerised Maintenance Management System (CMMS) for preventive maintenance would be in place to minimise unexpected breakdowns of the equipment. Critical spare parts, such as fan motors, are maintained on-site to ensure that equipment is repaired and brought back online as quickly as possible.

Given that the biofliters and ventilation fans are inherently reliable and have redundancy within the system, that operation of the system in centrally monitored and controlled, and that preventative maintenance is conducted,

the probability that there would be an uncontrolled release of odour is very low, therefore this hazard has not been carried forward for further assessment.

Compost Ignition/Fire

The Tunnel Composting System and Composting Hall would process pre-treated SSO and MSW materials, respectively via aerobic composting. Composting is an exothermic process, and the potential for auto-ignition of compost may exist under dry conditions where heat is allowed to build up.

The potential for auto-ignition to occur would be reduced by keeping the compost moist and constantly turning the compost. The moisture content of the compost is monitored and is controlled in the Tunnel Composting System by sprinklers mounted in the ceiling of the tunnels and in the Composting Hall by an overhead deluge type sprinkler system which is mounted on the screw augers. A moisture content of 50 to 55 percent at the start of the composting process is optimal. The constant movement and turning of the compost in the tunnels by front end loader and in the Composting Hall via the screw augers homogenises the compost and allows heat to dissipate from the compost, thereby preventing temperature build-ups that may lead to auto-ignition. Aeration systems operate 24 hours per day to control the temperature of the compost in the desirable range of 45 to 60^{0}C. The temperature is continually monitored to ensure heat within the compost does not reach auto-ignition levels.

Due to the temperature and moisture monitoring and the constant motion of the windrows, it is unlikely that elevated temperatures within the compost would occur. In the unlikely event of a fire, the only source of fuel is the compost itself which is enclosed within the Composting Tunnels and Composting Hall. Further, the nature of the compost fire is such that the fire would be localised and would not be intense, resulting in smouldering and localised flame around the ignition area. The Tunnel Composting System is constructed from non-flammable materials (concrete floors, walls and roof and metal cladding door). The Composting Hall would be constructed from non-flammable materials (concrete, metal structure and cladding).

Given that the current operating procedures ought to be sufficient to prevent a fire from occurring, and in the unlikely event that a fire does occur, it would be localised and contained within the Tunnel Composting System and Composting Hall, this hazard has not been carried forward for further assessment.

Enclosed Space and Engulfment

When the tunnel doors within the Tunnel Composting System are closed and composting is occurring the tunnels are an enclosed space and high levels of CO_2 may occur which is a risk to the safety of personnel. There is also a risk to personnel from engulfment by unstable compost piles. These potential hazards are managed by limited staff access to the tunnels, prohibition of entry to the tunnels while composting operations are occurring, a notification system and mandatory use of radio communication when staff are in the tunnels, and regular training in these procedures. This hazard has not been carried forward for further assessment.

Refining Building

After the composting process, refining is required to remove small-sized residuals and contaminants, including plastics, stones and glass. Specialised vibrating screens and air-sorting is used to refine the SSO and MSW composts which have a lower moisture content at this stage in the process. Refining generates dust, which if not controlled, could build up on the components of the refining system and pose a potential explosion and/or fire risk. This potential risk would be managed by daily cleaning of dust extraction and collection systems to remove dust from the mechanical and electrical components of the refining system. This hazard has not been carried forward for further assessment.

Facility-wide Issues

Vermin/Pest control

Vermin/pest control is an issue at any waste handling or processing facility. Rapid processing of waste, minimal waste storage over-night, thermophillic composting of organics (>45^{0}C), and other control strategies are well developed at the existing SAWT facility and would continue to maintain low levels of pests and vermin. SITA uses contractors to manage vermin and pests. To date, no problems have been identified and no complaints have been received. No change is expected with the Development and therefore this hazard has not been carried forward for further assessment.

Fire in External Surrounds

There have not been any fire events in the surrounds of the existing SAWT facility. Fire risk in the external areas of the facility are currently managed as follows:

- Very little vegetation is present near the working zones of the facility and regular mowing of grass and litter collection occurs.
- Water hydrants are available in most locations, including the main facility ring main and irrigation hydrants on the compost storage pads. Irrigation of stockpiles occurs in adverse weather, for both dust and potential fire suppression purposes.
- Compost is stored in distinct piles for quality control reasons, and a potential fire in one stockpile could be contained without spread.
- A strict no smoking policy is enforced at the Facility, with a dedicated smoking area located 50 metres from the entrance to the administration building. The area is screened from operations and is cleaned and maintained on a daily basis.

The above listed existing policies and procedures would be maintained for the Development and are considered adequate to reduce the risk of fire in the external areas of the facility. Under the Development, it is proposed to expand the existing fire fighting systems, including extension of the ring main around the new plant, additional water storage tank(s), pump upgrades and ancillary equipment. This hazard has not been carried forward for further assessment.

Chemical Handling and Storage

Small quantities of chemicals would continue to be used and stored at the facility. The potential for chemical spills to occur would continue to be managed by:

- storing chemicals in a segregated, dedicated area
- using specialist contractors to manage the transportation of chemicals to and from the Site
- using appropriate spill response procedures (in accordance with the SOP for spill response) in the unlikely event of a spill
- bunding of fuel storage
- training staff in appropriate handling and spill management procedures.

13.3.2 Risk Analysis

Through the use of existing and enhanced systems, controls and processes presented in Section13.3.1, and implementation of the mitigation measures detailed in Section 13.4, the hazards associated with the proposed Development would be appropriately managed. Therefore, it has been determined that the Development is not hazardous or offensive and therefore does not require further assessment under the provisions of SEPP 33.

13.4 Mitigation and Management Measures

Notwithstanding the conclusion that the Development is not considered hazardous or offensive, a number of mitigation and management measures are required in addition to those already implemented:

- In the unlikely event that a fire was to occur within the Composting Hall, and that it does not remain localised within the compost material, it has the potential to spread to surrounding buildings (Refining Building, Resource Recovery Building and Tunnel Composting System) and therefore a fire rated wall should be installed in the composting areas.
- In the unlikely event that a fire was to break out, a large amount of smoke would be produced. If the ventilation fans are operating during a fire, smoke would pass through the biofilters potentially damaging the fans or, depending on the smoke generated from the fire, a smoky release may occur from the biofilters. Consequently, a shutdown procedure should be developed in case of a fire in the composting areas.
- The existing emergency response plan should be updated as appropriate to include evacuation and response procedures for the Composting Hall and new Refining Building in the event a fire does occur.
- The existing SOP for spill response should be updated as appropriate for the proposed Development.

13.5 Conclusion

Through the use of existing and enhanced systems, controls and processes for the existing SAWT facility and the proposed Development, and implementation of the recommended mitigation and management measures, the

hazards associated with the proposed Development would be appropriately managed. Therefore, it has been determined that the Development is not hazardous or offensive and therefore does not require further assessment under the provisions of SEPP 33.

14.0 Strategic Land Use Planning and Property

This chapter provides an assessment of the potential land use impacts of the Development.

14.1 Existing Environment

14.1.1 Current, Approved and Proposed Land Use

The Development is located in Kemps Creek, in the Penrith LGA and the North West Subregion of metropolitan Sydney.

The Resource Recovery Precinct is predominately surrounded by a combination of agricultural (for example, market gardens and rural industries), research and rural residential properties. However, approximately one kilometre to the north of the site is the Twin Creeks Golf and Country Club and the Twin Creeks residential estate, and around four kilometres to the north west is the Western Sydney Employment Area (WSEA). Vegetation is largely restricted to riparian areas along Badgerys Creek, South Creek, Cosgrove Creek and Kemps Creek. Kemps Creek Nature Reserve is located to the south east of the Site.

Based on a search of the databases of the DP&I, the Joint Regional Planning Panels (JRPP) and PCC, the following observations can be made regarding current, approved and proposed land use:

- other than the existing SAWT facility, no regionally or State significant developments have been proposed or approved in the immediate vicinity of the Site with recent approvals and developments occurring in the WSEA. Other significant projects include:
    - a waste and resource management facility at Orchard Hills was approved by the NSW Land and Environment Court, and is located over five kilometres to the north of the Site
    - approval has been granted for the continuation of a quarry and brick works in Badgerys Creek, located around 2.5 kilometres to the south of the Site
    - a building waste recovery and re-use facility which is SSD has been proposed at Mamre Road, Kemps Creek and has been issued with DGRs
    - a proposed alteration to the existing animal welfare establishment on Elizabeth Drive, which has been deferred for decision by the JRPP
    - a proposed lawn cemetery and crematorium on Elizabeth Drive, Luddenham, which has been deferred for decision by the JRPP
- approvals or proposals in the vicinity of the Site within the jurisdiction of PCC have predominately been additions, alterations or changes of use for existing buildings, rural buildings, approvals for dwellings, services, community facilities and/or subdivisions at the Twin Creeks residential estate, and mixed use developments along Elizabeth Drive (east of South Creek). As noted in Chapter 5 of this EIS, SITA also has a DA lodged for a small-scale landfill gas power generating unit.

It is also noted that at the time of the assessment of the existing SAWT facility, a rezoning proposal and concept plan by the Badgerys Creek Consortium for employment uses was being pursued for land surrounding the Site. This rezoning proposal has not proceeded.

14.1.2 Strategic Land Use Policies and Plans

The themes of the strategic land use issues that are relevant to the Site and the Development can be grouped as follows:

- waste recovery and sustainability – encourage recycling and resource recovery to meet the objectives and targets of the WARR Strategy, and to encourage sustainability in the growth of Sydney
- employment – encourage employment in Western Sydney and provide for future employment lands for Sydney
- land use conflicts – minimise land use conflicts, specifically with rural land uses
- natural environment – protect natural environment in terms of biodiversity, water quality, air quality and heritage
- transport – to reduce kilometres travelled by private vehicles and encouraging public transport use and 'active transport' options to achieve sustainability objectives.

The State Plan

As discussed in Chapter 3 of this EIS, the State Plan was released in September 2011 and is the NSW Government's strategic plan for the future. It is a 10 year plan for change in NSW, and it aims to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability and strengthen our local environment and communities.

Goal 23 of the State Plan includes the target to increase recycling to meet the NSW State targets for waste recycling, to limit the amount of space required for landfill and to turn waste into a valuable resource. Actions to achieve this target include a review of the waste levy, continuing support for local council recycling through guidance and assistance programs, and support for Community Drop-Off Centres to make recycling easier.

Other relevant goals are:

- Goal 1 of the State Plan includes the target to grow employment by an average 1.25 percent per year by 2020
- Goal 8 – grow patronage on public transport by making it more attractive choice, specifically to increase walking and cycling and to increase the proportion of total journeys to work by public transport.

Metropolitan Plan for Sydney 2036

The Metropolitan Plan for Sydney 2036 (NSW Government, 2010) (the Metropolitan Plan)was launched in late 2010 by the previous NSW Government and provides a long-term planning framework to sustainably manage Sydney's growth to 2036. The vision for metropolitan Sydney is to create a city that is sustainable, affordable, liveable, equitable and networked. To guide the delivery of this vision, the Metropolitan Plan sets a number of objectives and actions across a number of areas, such as the environment, housing, transport and the economy.

Strategic Direction C – Transport for a connected city

One element of this Strategic Direction is to reduce kilometres travelled by private vehicles and encourage public transport use to achieve traffic congestion, environmental and health benefits. To achieve this, a number of actions are identified including the improvements to public transport, integrated land use planning, the use of work place travel plans and encouraging 'active' transport (that is, walking and cycling).

Strategic Direction E – Growing Sydney's economy

Growing Sydney's economy is a key strategic direction of the Metropolitan Plan, which seeks to grow the economy by 30 percent by 2020. A number of objectives and actions to achieve this Strategic Direction are identified. Those relevant to the Development are as follows:

- Objective E1 – To ensure adequate land supply for economic activity, investment and jobs in the right locations. This objective includes the action to ensure the orderly development of Employment Lands and the establishment of an Employment Lands Task Force (Action E1.2).
- Objective E3 – To provide employment lands to support the economy's freight and industry needs. This includes the action to plan for new employment lands (Action E3.1), which includes the Western Sydney Employment Area (Expansion).
- Objective E5 – To increase and diversity the jobs and skills base of Western Sydney. The Metropolitan Plan aims to achieve 1,105,000 jobs in Western Sydney by 2036 to address inequities in job distribution and accessibility. Actions include the development of greenfield employment lands (Action E5.1) and the preparation of a structure plan for the WSEA (Action E5.5). The structure plan will take into account the desired employment types and numbers, infrastructure needs, development staging and appropriate governance and resourcing.

The Site is located within the area identified for the expansion of the WSEA. In September 2012, DP&I announced that a draft structure plan would be placed on public exhibition in the first quarter of 2013, with the aim finalising the plan in late 2013. The structure plan would not rezone land, but would identify possible land uses and infrastructure requirements to inform staging and infrastructure delivery. Any rezoning of land would be subject to a separate process.

Strategic Direction F – Balancing land uses on the city fringe

This Strategic Direction aims to contain Sydney's urban footprint and to balance land uses for urban development with the region's other land uses. This Direction mostly focuses on urban renewal and growth centres, but identifies the need to maintain and protect agricultural activities and resource lands (Objective F2). The majority of Kemps Creek and surrounding suburbs are identified as rural and resource lands.

Strategic Direction G – Tackling climate change and protecting Sydney's natural environment

Tackling climate change and protecting the environment is one of the key strategic directions of the Metropolitan Plan and a key component of this is diverting waste streams from landfill. A specific objective within this key strategic direction is to minimise and recycle waste (Objective G9), with the WARR Strategy 2007 providing the framework and the 2014 recycling targets to achieve this objective.

As part of the Objective G9, a specific action is made to *identify strategically appropriate locations for new waste management technologies in Subregional Strategies*. To achieve this action, the EPA (the former Department of Environment and Climate Change) and the DP&I (the former Department of Planning) will continue working with the private sector to promote resource recovery facilities and sustainable waste infrastructure. The Metropolitan Plan notes the existence of three existing AWTs in Sydney (which includes the existing SAWT facility). The draft subregional strategies have not been revised to identify these locations.

Also under the Strategic Direction G is a specific action to include climate change adaptation into renewal plans for existing centres. The intent for renewing existing centres is to encourage a compact city that aims to preserve our natural environmental and minimise our ecological footprint. This action recognises that a growing population is intrinsically linked to an increasing ecological footprint and in turn the generation of increased waste.

The draft North West Subregional Strategy

The draft North West Subregional Strategy (NSW Government, 2007) (the draft Subregional Strategy) applies to the Penrith local government area. It was prepared to translate the objectives of the *Metropolitan Strategy – City of Cities* (NSW Government, 2005) to a regional level, and sets regional level objectives and actions to guide local councils, the then Department of Planning and other relevant Government agencies in achieving the objectives of the Metropolitan Strategy. The draft Subregional Strategy has not been updated since its release in 2005.

Key objectives and actions that have relevance to the Site and the Resource Recovery Precinct are:

- environment, heritage and resources. This identifies broad objectives and actions to protect the natural environment (biodiversity, riparian area, heritage and air), to minimise and recycle waste, and to protect agricultural land
- employment. This identifies a range of objectives and actions to protect existing and future employment lands to achieve an additional 130,000 jobs by 2031. Most of this growth is identified in centres, industrial areas around the Westlink M7 Motorway and the WSEA
- transport. This identifies the need to improve the self-containment of employment and other activities in the subregion to help reduce pressure on transport networks. One action to achieve this is to influence travel choices to encourage more sustainable travel (for example, walking or cycling).

The Site is not specifically identified within the draft Subregional Strategy, and the surrounding area is not identified for future employment uses. However, the draft Subregional Strategy does identify the following:

- the release of the *Employment Lands for Sydney – Action Plan* (NSW Government, 2007). The action plan identifies the need to release more employment lands and for the Department of Planning and Infrastructure to investigate the medium-long term need for the Western Sydney Employment Lands Investigation Area (now referred to as the Western Sydney Employment Area (Expansion))
- for the Environment Protection Authority to regularly update the WARR Strategy to increase efforts in resource recovery and recycling. This would contribute towards the minimisation of environmental harm from waste disposal, as well as the conservation and efficient use of our resources
- councils should ensure that development does not encroach on waste management facilities and that land use conflicts are minimised through appropriate planning controls.

South West Growth Centre

At Kemps Creek, the northern boundary of the South West Growth Centre is Elizabeth Drive. The Site is not covered by *State Environmental Planning Policy (Sydney Region Growth Centres) 2006*, however, it is noted that areas immediately south of the Site are anticipated to be released for industrial and low density residential uses. The 'future industrial precinct' and the 'Kemps Creek precinct' have not been released for precinct planning at the time of writing this EIS.

Local Plans

The Penrith LEP 2010 applies to the Site and areas north of Elizabeth Drive. To the south of Elizabeth Drive, the Liverpool LEP 2008 applies. The land uses (as described earlier within this Chapter) largely correspond to the zones of each of the LEPs, which are RU1 – Primary Production (Liverpool only), RU 2 – Rural Landscape, RU 4-Primary Production Small Lots and E4 – Environmental Living. Minimum lot sizes vary with the zones, however, the RU1 and RU2 zones have a minimum lot size of 40 hectares. The remainder range from 0.4 hectares to 10 hectares.

Areas of E2 – Environmental Conservation largely correspond to the Kemps Creek Nature Reserve, Badgerys Creek, South Creek, Cosgrove Creek and Kemps Creek.

The objectives of the RU2 – Rural Landscape and E2 – Environmental Conservation (which apply to the Site) have been discussed in Chapter 6.

14.1.3 *Environmental Guidelines – Compositing and Related Organics Processing Facilities* (DEC, 2004)

The *Environmental Guidelines – Composting and Related Organics Processing Facilities* (DEC, 2004) referenced in the DGRs provides guidance for the design and environmental management of composting facilities. As such, these have limited relevance to strategic land use considerations with the exception of the site locational criteria provided in Appendix A of the guideline. Environmental issues, design responses and mitigation strategies are detailed in Chapter 5, the applicable impact assessment chapters and Chapter 21 of this EIS.

Appendix A of the guideline provides guidance on what matters should be considered when selecting a site for development. It is noted that this has limited application to the Site given it already has an operational facility. The criteria are discussed further within this chapter.

14.2 Methodology

The DGRs for the Development required consideration of strategic land use planning, and specifically required consideration of the consistency of the Development with the relevant transport and infrastructure objectives of the following State strategic policies and guidelines:

- the State Plan
- the Metropolitan Plan
- the draft Subregional Strategy.

Given these policies also have relevance to other aspects of the Development, the assessment has extended to consider other objectives such as waste recovery, sustainability, employment and the natural environment.

The DGRs also stipulated the need to identify and justify any inconsistencies with *Environmental Guidelines – Compositing and Related Organics Processing Facilities* (DEC, 2004) and *Environmental Guidelines – Solid Waste Landfills* (EPA, 1996). These guidelines provide guidance on the potential environmental impacts and management approaches for these two types of facilities.

Although co-located with a landfill within the Resource Recovery Precinct, the *Environmental Guidelines – Solid Waste Landfills* (EPA, 1996) has no relevance to the Development. It has not been considered further.

Environmental Guidelines – Composting and Related Organics Processing Facilities (DEC, 2004) has only been considered in this chapter where relevant to the locational criteria specified in Appendix A of that guideline.

A search of the databases of the DP&I, the JRPP and PCC was also conducted on 4 September 2012, 6 September 2012 and 7 December 2012 to identify current and recently approved developments in the region. Liverpool City Council did not have a database available to conduct a search at the time of writing this EIS, and the review was restricted to recently advertised developments.

14.3 Impact Assessment

14.3.1 Waste Recovery and Sustainability

The Development would increase the capacity for additional diversion of waste and contribute to the realisation of the WARR Strategy 2007 targets, the State Plan, Metropolitan Plan and the draft Subregional Strategy. With continued pressure on local governments to increase the diversion of waste, there will be an increased pressure for additional or expanded facilities (such as the Development) to provide additional processing capacities.

Diversion of waste from landfill through an expansion of the existing SAWT facility would assist in reducing the requirement for land to be dedicated to the establishment of new landfills in the future.

The Development would make an important contribution towards waste recovery and sustainable growth of Sydney for the next few decades and beyond. As such, the Development is consistent with these strategies and plans.

Further discussion on the justification and need for the Development is provided in Chapter 3 of this EIS.

14.3.2 Employment

The Development is consistent with the State Plan, Metropolitan Plan and draft Subregional Plan as it would generate employment opportunities within the north-west subregion through the creation of an additional 22 FTE employment positions.

The Development is located within an area that has been identified as the possible extension to the WSEA, which would lead to a significant change from a rural to an industrial landscape (should it eventuate). However, given the status of this strategic land use investigation, there is no available information on the land capability, the type of future uses, the location of these uses, or the timing for when the employment lands could be zoned, serviced and released for development. However, if looking to the types of uses permitted within the WSEA, future uses could include depots, freight transport facilities, general industry, transport depots, truck depots, warehouses and distribution centres.

Given the industrial nature of the Development, it is unlikely that it would be significantly inconsistent with the NSW Government's future vision for employment uses (should it be similar to WSEA land uses) and is unlikely to constrain the realisation of the WSEA expansion (in isolation).

Design responses and mitigation measures (primarily relating to odour, noise and traffic) have been proposed to minimise land use conflicts with existing land uses, which could possibly apply to future employment uses. However, there is no certainty on the type and timing for the employment uses to conclusively make this determination, and it would not be appropriate for SITA to consider mitigation responses for land that does not currently have this development potential. Nonetheless, being an existing facility, there would be a need to consider the existence of the Development during further strategic investigations. SITA would participate in the future strategic land use investigations, where appropriate, concerning future land uses and the Resource Recovery Precinct.

14.3.3 Land Use Conflicts

The draft Subregional Strategy and the Metropolitan Plan identify the need to protect rural land uses from incompatible uses to maintain the ongoing viability of agricultural production. The draft Subregional Strategy aims to ensure that these areas are utilised productively and are not preserved as 'urban land in waiting' or impacted by encroaching sensitive land uses (that is, urban and rural-residential land uses). Conversely, both strategic planning documents identify the need for future employment lands in the area and, in case of the Subregional Strategy, the need to ensure strategic planning for waste management facilities (including planning controls to minimise conflict).

As discussed in Chapter 6 of this EIS, under the existing approval, the existing SAWT facility is required to be closed and rehabilitated once landfilling operations cease, which is anticipated to occur in 2028 (being 20 years from the 2008 approval of the existing SAWT facility). PCC had considered that the sunset clause provided certainty to the local community in terms of potential land use conflicts with future development. PCC has since advised, during the preparation of the EIS, that it would agree to the removal of the restriction given the changes to the surrounding land use in the future (refer to Chapter 7 of this EIS). For the Development, odour, noise and traffic is considered to be the potential impact that is most likely to cause land use conflicts with surrounding rural areas.

SITA has carriage of the Resource Recovery Precinct and its environmental management for 30 years beyond the closure of the landfill. The landfill would be rehabilitated for passive recreational uses, and SITA continues to investigate what future land uses, including other waste management technologies, could be deployed at the Precinct. Given SITA's continued presence at the Resource Recovery Precinct, SITA wishes to maintain this asset beyond the life of the landfill and are seeking to remove this restriction as part of this Development.

The forced closure of the existing SAWT facility (and the Development, if approved) would be contrary to Commonwealth and State Government policies given the continued pressure for additional waste resource recovery facilities in Sydney and the need to ease pressure on remaining landfill capacities in the Sydney metropolitan area. By removing this restriction, it would provide the opportunity for SITA to maintain its ability to respond to this demand. It would also provide greater certainty for negotiating longer term contracts with councils.

To minimise the potential conflicts that the Development could have with surrounding rural and rural-residential properties, a number of design improvements and management measures have been proposed to minimise and manage odour emissions from the Site. These include:

- the removal of external maturation of MSW with the construction of the Composting Hall
- the removal of external composting of SSO, with composting to occur within the Tunnel Composting System
- the upgrade of the existing biofilters and the construction of three new biofilters
- the enclosed leachate tanks
- a reduction in the amount of refined compost product stored at the Development at any one time.

There is limited potential for significant increases to the residential population, given the current rural land use zones, with the exception of the Twin Creeks residential estate. The predicted odour levels as a result of the Development and the landfill at the estate satisfies the relevant odour criterion set by the EPA (refer to Chapter 8).

However, it is acknowledged that odour levels at two sensitive receivers would be above the 4 OU criteria when considering the cumulative impacts of the Resource Recovery Precinct. As discussed in Chapter 8, the exceedance at these receivers is attributable to the landfill operations, which are anticipated to cease in 2028. To address the predicted odour levels, SITA continues to engage in discussions with these landowners to discuss measures that could be incorporated at the properties as well as ongoing consideration of additional reasonable and feasible measures that could be applied at the odour source.

14.3.4 Natural Environment

The Development is not inconsistent with the objectives and actions of the Metropolitan Plan or Subregional Strategy. The Site is not a greenfield site and has been significantly altered as a result of previous activities. To avoid, mitigate and manage the potential environmental impacts (particularly relating to odour, noise and traffic), design responses have been incorporated into the Development (refer to Chapter 4 of this EIS) or mitigation and management measures have been proposed (refer to Chapter 21 of this EIS). These measures, in turn, would also assist in minimising impacts on nearby properties. A more detailed assessment of the potential environmental impacts is provided in Chapters 8 to 20 of this EIS.

In reference to the *Environmental Guidelines – Composting and Related Organics Processing Facilities* (DEC, 2004), the Development is an expansion of an existing facility. As such, the locational criteria suggested in Appendix A of the guidelines are not strictly relevant to the Development. Nonetheless, the criteria have been considered in Table 14-1.

Table 14-1 Location Criteria Specific in Appendix A of *Environmental Guidelines – Composting and Related Organics Processing Facilities*

Locational Guidance	Response
A site located within an area of significant environmental or conservation value identified under relevant legislation or a planning instrument; including: - National Parks - historic and heritage areas, buildings or sites - any reserves for environmental protection - Wilderness areas identified or declared under the *Wilderness Act 1987* - Other areas protected under the *National Parks and Wildlife Act 1974* - World Heritage Areas - Areas on the Register of the National Estate - SEPP 14 wetlands, REP 20 wetlands and SEPP 26 Littoral Rainforests - Areas zoned under an LEP or REP for environmental protection purposes, for example, high scenic, scientific, cultural or natural heritage.	The Site is not located in these areas, with the exception of areas of the Site that have been zoned as E2 – Environmental Conservation. Where the operational areas of the Site encroach into the E2 zone, these areas are already impacted by the existing SAWT facility, have limited environmental conservation value and are generally devoid of vegetation with the exception of landscaping and perimeter vegetation.
Sites within an identified drinking water catchment (surface water or groundwater) for example, any lands nominated as “Special or Protected Areas’ by local water supply authorities or in the vicinity of a groundwater bore used as drinking water.	The Development is not located within Sydney’s drinking water catchment. Impacts on bores located in the vicinity of the Site have been considered in Chapter 11 of this EIS.
Sites located in an area overlying an aquifer that contains drinking water quality groundwater that is vulnerable to pollution.	The Site is an area that has been identified by the former DLWC and NSW LPI as having low groundwater vulnerability. The risk to groundwater underlying the Site is considered to unlikely change as a result of the Development given the nature of the proposed development and mitigation measures to prevent the migrating of pollutants associated with leachate through the soil profile (refer to Chapter 11 of this EIS).
Sites where the substrata are prone to landslip or subsidence.	The finished surface level of the Site is relatively flat, with a gentle slope towards Badgerys Creek to the west. The Site is not located in a subsidence district, and was originally selected as it was not located on areas previously subject to landfilling. The expansion of the Compost Storage Pad would be located on areas previously subject to landfilling, but would be constructed and operated in a manner that does not compromise the capped landfill cell or the storage pad.
Sites on floodplains that may be subject to washout during major flood events.	The existing SAWT facility footprint has been filled to achieve finished surface levels for the construction of the facility. This has included filling of the north-western portion of the Site to achieve building pad levels above the documented approximate 1 in 100 year flood level of RL 42 metres AHD. Similar finished levels would be achieved for areas of new structures in the north western portion of the Site.

Source: DEC, 2004

14.3.5 Transport

The Site is not well serviced by public transport, with one bus route (Badgerys Creek to Liverpool) passing in proximity to the Resource Recovery Precinct access road with a combined total of six daily services during morning and evening peak. Given the low level of public transport service, the rural nature of the surrounding area and the distance to nearby centres, the likelihood or opportunity for employees to travel to and from the Site via public transport, by walking or by cycling is low. However, as the region develops further, the public transport, cycling or walking options may increase.

Chapter 10 of this EIS provides an assessment of the potential impacts on the road network as a result of the Development.

14.4 Mitigation and Management Measures

No specific land use mitigation and management measures are considered necessary for the Development. The recommended mitigation and management measures summarised in Chapter 21 of this EIS would assist in mitigating and managing potential land use conflicts with existing land uses surrounding the Site.

14.5 Conclusion

The Development is not inconsistent with the objectives of the State Plan, the Metropolitan Plan or the Subregional Strategy. As discussed in Chapter 3 of this EIS, the Development provides for a significant increase in the capacity within the Sydney metropolitan area to divert waste away from landfill and provides a product that can be beneficially used. The removal of the sunset clause on the existing SAWT facility (and the Development, if approved) must be considered within the context of these benefits, the growing need for such facilities, and the National and State policies on waste avoidance, recovery and reuse.

The Development incorporates a number of design improvements and mitigation measures to manage odour emissions, noise and traffic. As a result, the Development is not considered to have an unacceptable impact on existing adjoining land uses. However, SITA continues to discuss approaches to manage cumulative odour impacts on two sensitive receivers with the affected landowners. It is acknowledged that the nature of the area may change in the future from a rural to an industrial landscape. However, given the status of the strategic investigations into the expansion of the WSEA, it is not appropriate for the Development to have further consideration to this issue.

15.0 Landscape and Visual

This chapter provides an assessment of the potential visual impact of the Development on the surrounding amenity and sensitive receivers.

15.1 Existing Environment

The existing SAWT facility comprises an enclosed building of standard portal frame structure and cladding, approximately 60 by 65 metres in dimension and 10.5 metres in height (refer to Figure 15-1). It is located in the north western corner of the Resource Recovery Precinct. In addition to the building structure, the existing SAWT facility also includes stormwater and leachate ponds, fire fighting water storage tanks, external composting pads and external compost storage pads. Compost material is typically stored up to 2.5 metres in height. Lighting at the Site is limited to security lighting at the car park and at accessible areas. This is similar to street lighting in terms of illumination. Beyond the Site, there is no lighting along the access road or within the landfill areas of the Resource Recovery Precinct during normal operations. During emergency situations, floodlights would be used.



Figure 15-1 View of the Existing SAWT Facility from the South West

The Resource Recovery Precinct is situated in a relatively open rural landscape. To the west of the Resource Recovery Precinct is Badgerys Creek and to the east is South Creek (refer to Figure 2-2). Kemps Creek is located to the east of South Creek. Existing vegetation is mainly associated with the riparian corridors of Badgerys Creek and South Creek. Other areas of existing vegetation are located:

- to the north of the Precinct around the newly developing Twin Creeks Residential Estate
- just south of the south eastern corner of the Precinct
- at rural residential properties in the form of scattered trees and vegetation.

Badgerys Creek is a heavily vegetated riparian corridor, which makes up the western boundary of the Resource Recovery Precinct and joins with South Creek to the north of the Precinct. South Creek remains largely unvegetated across its length to the north west of the Precinct, however, becomes more vegetated as it traverses to the east of the Site. Landscape planting exists along the northern, eastern and southern fence lines of the Resource Recovery Precinct.

The surrounding topography is gently undulating, with the Resource Recovery Precinct located at the peak of a gently raised ridgeline, which extends south of Elizabeth Drive. This southern ridge line tapers gently to areas of lower elevation to the west, north and east to the riparian corridors of Badgerys Creek and South Creek. To the west of Badgerys Creek, the elevation gently rises up again to form a western ridgeline. Site elevation also rises from the low point at the confluence of Badgerys, South and Kemps Creeks to the north of the Resource Recovery Precinct, to a high point north west of Mamre Road. Site topography is shown in Figure 15-2.

Surrounding land use comprises mainly rural properties, several Sydney University owned facilities (research), small business (such as market gardens and chicken farms), the Twin Creeks Golf and Country Club and the associated developing residential estate to the north of the Precinct. Nearest sensitive receivers to the Site are identified in Table 14-1 and shown on Figure 15-2. Figure 15-3 through to Figure 15-6 provide a view of the Resource Recovery Precinct from Mamre Road, the Twin Creeks Residential Estate and Elizabeth Drive.



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AECOM

SENSITIVE RECEIVERS FOR VISUAL ASSESSMENT

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 15-2

Table 15-1 Nearest Sensitive Receivers

ID	Receiver	Location and Description	Approximate Distance from Resource Recovery Precinct	Approximate Distance from the Existing SAWT Facility and Development
A	1669A Elizabeth Drive	Rural residential property located directly to the east of the Resource Recovery Precinct.	0.1 km	0.8 km
B	Caretaker's Cottage for 1669A Elizabeth Drive	Rural residential property located near the south east corner of the Resource Recovery Precinct.	0.07 km	1.1 km
C	South East Dwelling	Rural residential property located to the south east of the Resource Recovery Precinct.	0.4 km	1.4 km
D	1745 Elizabeth Drive	Rural residential property located to the south of the Resource Recovery Precinct.	0.3 km	1.3 km
E	2140 Elizabeth Drive	Rural residential property located to the south of the Resource Recovery Precinct.	0.5 km	1.3 km
F	Rural residential properties on the southern side of Elizabeth Drive	Representative rural residential property located along the southern side of Elizabeth Drive.	0.6 km	1.6 km
G	McGarvie Smith Farm	Agricultural research facility owned by Sydney University bounding the Resource Recovery Precinct to the west. Closest building associated with the research facility located on the western side of Badgerys Creek.	0.8 km	1 km
H	Twin Creeks Residential Estate	Closest street on the partially developed residential estate to the north of the Resource Recovery Precinct.	1 km	1 km
I	Twin Creek Golf and Country Club	Golf Club located to the north of the Twin Creeks Residential Estate.	2 km	2 km
J	Rural residential properties along Mamre Road	Representative rural residential property located to the north east of the Resource Recovery Precinct along Mamre Road.	2.3 km	2.9 km
K	Small business along Mamre Road	Chicken farm and market garden businesses located to the north east of the Resource Recovery Precinct.	1.9 km	2.3 km

ID	Receiver	Location and Description	Approximate Distance from Resource Recovery Precinct	Approximate Distance from the Existing SAWT Facility and Development
L	Rural residential property to the north east	Rural residential property located on open agricultural land to the north east of the Resource Recovery Precinct, east of South Creek.	1 km	1.6 km
M	Residential properties on Clifton Avenue	Rural residential properties located at the northern end of Clifton Avenue.	1.2 km	1.7 km



Figure 15-3 View Towards the Resource Recovery Precinct from Mamre Road



Figure 15-4 View Towards the Resource Recovery Precinct from the Twin Creeks Residential Estate



Figure 15-5 View Towards the Resource Recovery Precinct from Twin Creeks Residential Estate



Figure 15-6 View Towards the Resource Recovery Precinct from Elizabeth Drive

15.2 Methodology

To assess the potential visual impact of the Development on surrounding amenity and sensitive receivers, a comparison of the visibility and appearance of the existing SAWT facility with the Development at the nearest sensitive receivers was undertaken following a review of topographical information and a site visit. The assessment also considered potential changes to the visibility of the Development in the future, following the eventual closure and rehabilitation of the landfill.

15.3 Impact Assessment

15.3.1 Construction

As described in Chapter 16, the Development would not require clearing of vegetation with perimeter vegetation and the remaining single Roughbark Angophora retained. This would retain some screening of the construction activity over the approximately two year construction period. However, there would be temporary changes to the visual appearance of the Site as construction works progress. Specifically:

- presence of up to four cranes at the Site during the civil works, building construction and plant installation phases of Stage 2 of construction
- temporary lighting of the construction zone.

The cranes, when the booms are fully extended, would be around 22 metres in height in the case of the three Franna cranes, and around 50 to 55 metres in height for the 100 tonne crane (on the assumption that no extension of the boom is required). Based on the indicative construction schedule for Stage 2, it is anticipated that the smaller Franna cranes may be on Site for around one year, with the 100 tonne crane brought to the Site intermittently when required. Although temporary, the booms (when fully extended) may be visible from surrounding sensitive receivers. However, given the mobility and transient presence of the cranes at the Site, the distance to sensitive receivers and the presence of earth moving machinery at the Resource Recovery Precinct as part of the landfill operations, the presence of cranes at the Site are unlikely to generate significant visual amenity impacts at the nearby sensitive receivers.

Temporary flood lighting would be utilised at the Site to allow construction under limited natural lighting conditions. This would typically only be required during the winter months in the early morning hours and evening periods of low light. This may temporarily increase light spill from the Site.

15.3.2 Operation

The Development would involve a number of modifications to the existing facility which would have an effect on its overall footprint (refer to Figures 2-1 and 5-1). These include:

- modification of the four existing biofilters located within the facility to an enclosed stack design, resulting in four 15-metre high stacks (AGL). The stacks would rise above the existing facility height by approximately 6.5 metres
- conversion of existing external maturation pads located directly to the east of the facility, into a fully enclosed Composting Hall, with dimensions of 74 metres by 134 metres and 8.5 metres in height and similar construction to the existing facility. The new Composting Hall would include three 15-metre stacks (AGL) to service the biofilters associated with the new hall
- addition of a new refining building adjacent to the new Composting Hall, with dimensions of approximately 50 metres by 16 metres and 9 metres in height and similar construction to the existing facility
- installation of a new bunded 500 kL above ground tank array for leachate storage. The tank array would be approximately eight metres high
- extension of the existing 0.9 hectare compost pad located in the southern portion of the Site to accommodate an additional one hectare of storage space. Compost would continue to be stored at the extended compost pad up to the maximum stockpile heights of approximately 2.5 metres as per current operations.

The new additions would increase the overall footprint of the existing facility, however would remain within the existing facility height, with the exception of the seven discrete stack structures for the biofilters, which would rise above the existing roof height by approximately 4.5 metres. The height of the Development would therefore remain at the height of the existing facility (at approximately 54.5 metres AHD) with the exceptions of the stacks which would rise to approximately 59 metres AHD.

Additional lighting would also be required as part of the additional building structures. This would consist of shaded lights or mercury vapour lamps directed along roads and work areas to minimise light spill.

No modifications are proposed to the landfill as part of this Development. As approved under its development consent, the landfill site would continue to be quarried for clay, shale, sandstone and laminate and the voids created progressively backfilled with solid, non-putrescible waste and progressively rehabilitated to a final vegetated (grassed) landform. Currently the southern part of the landfill has been backfilled and rehabilitated to its

final height and extraction and landfill operations are centred on the northern two-thirds of the site. The resource extraction plan for the remainder of the landfill involves extraction and backfilling progressively from the south towards the centre of the site.



15.3.2.1 Impacts at Sensitive Receivers

This assessment has considered the areas generally bounded by the ridgelines to the west (west of Badgerys Creek), the north east (around Mamre Road), and the south (around Elizabeth Drive), to be a representative view catchment of the Resource Recovery Precinct, including the Development. It is considered that views of the Resource Recovery Precinct from receivers located beyond these ridgelines (to the west, east and south, respectively) would be obscured by the interference of higher elevation ridgelines and, consequently would not be visually affected by the Site.

The potential for visual impacts to surrounding receivers has been assessed on the basis of site terrain, vegetation and structures, and the final landform of the landfill. The likely visual impacts of the Development on surrounding receivers are summarised in Table 15-2 below.

However, in summary, the visual impacts of the Development on surrounding receivers are generally considered not to be significantly adverse, due to the relative distance of all surrounding receivers, screening provided by intervening vegetation and the future mitigative effects of the final landform levels of the landfill. In particular, the distance of nearest receivers to the Development means that the change in dimension and height of the Development from the existing facility would not be significantly noticeable or pose significant additional intrusive impacts compared to the existing situation.

Table 15-2 Impact to Nearest Sensitive Receivers

ID	Nature of Views	Visual Impact
A	This receiver is located at an elevation of approximately 52 metres AHD. At this elevation the top of the existing SAWT facility would already be visible to this receiver and the Development, including the stacks for the biofilters, would be visible. The views of the facility are across the expanse of the landfill and at times would be partially obscured by ongoing operations at the landfill – principally by the stockpiles of extracted material. As extraction and rehabilitation of the landfill progresses, a final landform height of 60 to65 metres along the majority of the eastern boundary of the landfill would obscure the majority of north westerly views of the Development from this receiver. However, the north eastern corner of the Development would likely continue to remain visible at this receiver, as the final landform height along the northern part of the landfill is proposed to taper down to an elevation of approximately 50 to 60 metres and is unlikely to fully obscure views of the facility from this receiver. Nevertheless, it is considered that existing landscape planting along the eastern boundary of the Resource Recovery Precinct would help soften views of the Development both now and in the future (as the vegetation continues to mature). Given the distance of this receiver from the development (>800 metres) it is considered that the increase in scale of the SAWT facility would be noticeable but not intrusive at this receiver.	Medium
B	This receiver is located at an elevation of approximately 54 metres AHD and would be subject to similar views of the existing facility and Development as Receiver A, with similar potential for obscuring of views by ongoing operations at the landfill (by the stockpiles of extracted material) and some softening of views by existing landscape planting along the eastern boundary of the Resource Recovery Precinct. However, in contrast to Receiver A, it is expected that upon final rehabilitation, the final landform height of the south eastern to central portion of the landfill (60 to 75 metres) would fully obscure north westerly views of the Development from this receiver. In the interim period, the distance of this receiver from the facility would ensure that any view of the facility and stacks are not intrusive.	Low to Medium

ID	Nature of Views	Visual Impact
C	This receiver is located at a higher elevation along the southern ridgeline (at approximately 58 metres AHD) and is likely to have largely unobscured views of the SAWT facility and Development across the landfill. Although the southern portion of the landfill has already been built up to its final landform level (60 to 70 metres AHD), the main site line of this receiver towards the Development is in a north westerly direction, to the east of this built up portion. Therefore, views of the Development would not be obscured by this portion of the landfill. However, views of the facility and Development have the potential to at times be obscured by ongoing operations at the landfill by extracted material stockpiles. Furthermore as with Receiver B, upon final rehabilitation, the final landform height of the south eastern to central portion of the landfill (60 to 75 metres) is likely to fully obscure north westerly views of the Development from this receiver. In the interim period, the views of this receiver would be dominated by the landfill, with the existing facility and Development seen at a distance in the background. The change in the scale of the facility and addition of stacks are considered unlikely to significantly add to the extent or intrusiveness of visual impacts for this receiver in the context of existing views and intervening distance.	Low to Medium
D-F	These receivers are located at elevations of between 52 and 62 metres AHD. Views of the existing SAWT facility and Development are likely to be almost entirely obscured from this direction by the southern portion of the landfill, which has already been built up to its final landform level (55 to 65 metres AHD). Landscape planting along the southern boundary of the Resource Recovery Precinct also provides additional screening. The rehabilitation of the remainder of the landfill would not materially change the visibility of the Development at these receivers or the associated visual impact.	Low
G	The buildings associated with the Sydney University agricultural research facility are located along the western ridgeline and are at elevations of 64 to 70 metres AHD, at which the SAWT facility and Development, including stacks would be visible. However, the heavily vegetated riparian corridor of Badgerys Creek along the western boundary of the Resource Recovery Precinct provides extensive screening and would largely obscure any views. Further, given the distance of the Development from these receivers, it is considered that any view of the facility and stacks would not be intrusive. Site views are unlikely to change substantially upon the final rehabilitation of the landfill.	Low to Medium
H	The Twin Creeks Residential Estate is located at an elevation of approximately 55metres AHD and residential receivers at this location are likely to have largely clear, downhill views of the Development, although some screening is likely to be provided by the riparian corridor of Badgerys Creek and landscape planting along the northern boundary of the Resource Recovery Precinct. Nevertheless, given the distance of the Development from these receivers, it is considered that any view of the facility and stacks would not be intrusive. The final rehabilitation of the landfill may improve views slightly by helping the Development to blend better with its environment and not appear immediately recognisable against a backdrop of disturbed land.	Low to Medium
I	The Twin Creeks Golf Course is located downhill of the Twin Creeks Residential Estate (approximately 40 metres AHD), to the north. Views of the existing SAWT facility and Development from the golf course would be obscured by intervening dwellings at the estate located at a higher elevation and vegetation along the riparian corridor of Badgerys Creek. Further, the large intervening distance between the golf course and the landfill would ensure that any views of the Development would be background views rather than intrusive. In addition, any views from the golf course would be intermittent in nature (given its recreational function) in comparison to more continuous views from dwellings and would therefore constitute a less sensitive receiver with respect to visual impact. In the long term the final rehabilitation of the landfill may improve views slightly by helping the Development to blend better with its environment and not appear immediately recognisable against a backdrop of disturbed land.	Low

ID	Nature of Views	Visual Impact
J	Rural residential properties along Mamre Road are located in areas of higher elevation (approximately 50 metres AHD) climbing up to the north eastern ridgeline and would have clear sight lines of the Resource Recovery Precinct, including the existing SAWT facility and Development. These receivers would have clear downhill views towards the south west across open agricultural land. Nevertheless, given the distance of the receivers from the Development, it is unlikely that the change in scale, dimension and height of the Development compared to the existing SAWT facility would be noticeable or intrusive to these receivers. The final rehabilitation of the landfill may improve views slightly by assisting the Development to blend better with its environment and not appear immediately recognisable against a backdrop of disturbed land.	Low to Medium
K	Small businesses (market gardens and chicken farms) along Mamre Road are likely to have similar site lines of the landfill and SAWT facility (including the Development) as Receiver J. However, visual impacts are likely to be less at these receivers given the lower sensitivity to impact of these receivers (being a place of work rather than residence) and their distance from the facility, which would minimise the intrusiveness of impacts. Whilst some of these businesses appear to include residential dwellings on-site, these appear to be located to the east of (or behind) on-site sheds/ chicken sheds, which would obscure south westerly views towards the Development. The final rehabilitation of the landfill may improve views slightly by helping the Development to blend better with its environment and not appear immediately recognisable against a backdrop of disturbed land.	Low to Medium
L	This residential receiver is located at an elevation of 40 metres AHD and would have views of the existing facility and Development across generally open rural land and across the landfill. Given the angle of sight from this receiver, the future rehabilitation of the landfill to final landform levels is likely to have little effect in obscuring views of the Development from this receiver, although may improve views slightly by helping the Development to blend better with its environment. Nevertheless, given the distance of this receiver from the landfill, it is unlikely that views of the expanded facility would be intrusive at this receiver. Existing landscape plantings along the northern and eastern boundaries of the landfill are likely to soften views from this receiver, at present and in the future.	Low to Medium
M	Rural residential properties located at the northern end of Clifton Avenue are located at an elevation of approximately 45 metres AHD. Similarly to Receiver L, residential receivers would have views of the existing facility and Development across generally open rural land and across the landfill. Future rehabilitation of the landfill to final landform levels is likely to have little effect in obscuring views of the SAWT facility from these receivers. Given the distance of these receivers from the landfill, it is considered unlikely that views of the Development would be intrusive. Existing landscape planting along the northern and eastern boundaries of the Resource Recovery Precinct are likely to soften views from these receivers, at present and in the future.	Medium

15.4 Mitigation and Management Measures

15.4.1 Construction

Given the distance to the nearest sensitive receiver, the nature of the construction activity and the disturbed nature of the Resource Recovery Precinct as part of landfilling activities, the retention of perimeter vegetation is considered sufficient to minimise any temporary change in the visual appearance of the Site as construction is underway. Additional lighting, if required for construction activity, would be positioned to minimise the extent of light spill during these morning and evening periods, and directed away from residences located to the north and north east of the Site.

15.4.2 Operation

The following measures would be implemented to minimise the visual impacts of the Development on surrounding receivers and the landscape:

- construct all new buildings and structures (including the stacks for the biofilters) with materials and colours that are consistent with the existing facility so as to remain sympathetic with the surrounding semi-rural landscape, including the use of earthen tones and minimising the use of reflective surfaces as far as practicable
- design lighting to minimise light spill as far as possible on surrounding receivers
- maintain and supplement, where possible, existing screen vegetation along the boundaries of the Resource Recovery Precinct, particularly along the northern boundary of the Resource Recovery Precinct.

15.5 Conclusion

The visual impacts of the Development on surrounding receivers are generally considered not to be significantly adverse, due to the relative distance of all surrounding receivers, screening provided by intervening vegetation and the future mitigative effects of the final landform levels of the landfill. In particular, the distance of nearest receivers to the Development means that the change in dimension and height of the Development from the existing facility would not be significantly noticeable or pose significant additional intrusive impacts compared to the existing situation.

The Development would not significantly change the scale or look of the existing facility and all operations would remain consistent with that currently being undertaken on-site. This includes the façade of all new buildings which would be constructed consistent with existing construction materials and colours, the height of compost stockpiles at the expanded storage areas which would not exceed the maximum height of existing stock piles and the extent of night lighting which would be designed and operated to minimise intrusive impacts consistent with existing operations.

The Development would have minimal impact on surrounding landscape amenity, as the Development would be confined within the footprint of the Resource Recovery Precinct, which has been an existing land use in the area for over 20 years. Further, the proposed additions to the facility (including the new stacks for the biofilters) would pose minimal intrusion to the landscape in the context of the existing SAWT facility.

The final land form of the landfill upon rehabilitation would improve views of the Development in the future by physically obscuring and reducing the visibility of the facility at some receivers. The rehabilitation of the landfill would help the facility to blend better with its environment and to not appear immediately recognisable against a backdrop of disturbed land.

It is considered that with appropriate mitigation, the visual impacts of the Development can be managed so as to not result in unacceptable intrusive impacts on surrounding receivers or the landscape.

16.0 Ecology

This chapter provides an assessment of the potential impact of the Development on flora and fauna.

16.1 Existing Environment

A flora and fauna assessment (including survey and eight-part tests) was completed in 2004 and updated in 2007 prior to the construction of the existing SAWT facility (the 2007 assessment). The assessment found that the Site was "extensively disturbed due to the landfill…[and] there remain[ed] only small pockets of highly degraded Eucalyptus species and virtually no natural understorey"(Maunsell AECOM, 2007).

No field investigations were undertaken for this EIS, given the Development would be restricted to areas that have previously been disturbed and/or were cleared of vegetation during the construction and operation of the existing SAWT facility. However, to supplement the previous assessment, searches of the OEH's Atlas of NSW Wildlife database and the SEWPaC's Protected Matters Search Tool were undertaken on 10 August 2012 for the study area to identify species or species habitat that may occur within a five kilometre radius of the Site.

A description of the existing environment, based on previous assessments and recent database searches, is discussed below.

16.1.1 Endangered Ecological Communities

The 2007 assessment reported that two Endangered Ecological Communities (EEC) were found within the Site and the adjoining riparian area, being a small remnant of Cumberland Plain Woodland and a larger area of River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (River-flat Eucalypt Forest) with the riparian area.

The Cumberland Plain Woodland is listed as an EEC under the *Threatened Species Conservation Act 1995* (TSC Act) and the EPBC Act 1999. It is noted that in 2009, the Commonwealth listing for Cumberland Plain Woodland was re-assessed, with the conservation status revised to a critically endangered ecological community. It is also now named as Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. However, the TSC Act still separately lists these communities as Cumberland Plain Woodland in the Sydney bioregion and Shale-Gravel Transition Forest in the Sydney Basin Bioregion.

The Cumberland Plain Woodland EEC within the Site was found to be isolated from nearby or contiguous woodlands in the locality, and had low species diversity. This was despite the fact that the Site had been mapped as an area of 'support to core habitat' by the former National Parks and Wildlife Service.

The River-flat Eucalypt Forest, an Endangered Ecological Community (EEC) under the TSC Act, within the adjoining riparian area was considered to be in moderate to good condition. The riparian area was also defined as 'core habitat' and 'support to core habitat'. Support for core habitat areas are considered valuable as they provide corridor connections between areas of remnant native vegetation for movement of fauna, buffering edge effects and fostering the growth of remnant native vegetation.

No works were proposed or approved within the riparian area. However, the approval of the existing SAWT facility permitted the clearance of around 0.81 hectares of Cumberland Plain Woodland, subject to the provision of offsets within the adjoining riparian area (condition 27).

The offset area, which involves revegetation and regeneration of around 3.5 hectares, is identified in Figure 16-1, with offset works focused on both Cumberland Plain Woodland and the River-flat Eucalypt Forest EEC. A Vegetation Management Plan (VMP) was prepared in accordance with condition 27 of the existing SAWT facility approval, which details a 10 year program for the provision of offsets in addition to other works to enhance the condition of the Badgerys Creek riparian area. An assessment of the VMP is due to be conducted in 2016 to assess its success and incorporate new objectives and targets. Revegetation and rehabilitation works are ongoing within the designated offset area (as shown in Figure 16-1), which provide a buffer of around 50 metres between the Site and Badgerys Creek.

A search of the OEH's Atlas of NSW Wildlife database and the SEWPaC's Protected Matters Search Tool in 2012 revealed several ecological communities listed under State or Commonwealth legislation that may potentially occur or potentially have suitable habitat in the study area. Of the ecological communities, Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest is listed as a critically endangered under the EPBC Act. A full list of the communities is provided in Appendix F of this EIS.

16.1.2 Fauna and Flora

The 2007 assessment concluded that it was unlikely that flora species listed under the TSC Act or EPBC Act would occur within the areas of the Site that were to be directly impacted. Due to the lack of native vegetation, the Site was also recorded as having low fauna habitat value, and the assessment concluded that the Site was not expected to impact on any critical habitat or threatened fauna under the TSC Act and EPBC Act. This conclusion was based on the lack of sightings or evidence of species within the areas to be disturbed, the degraded and modified state of the Site, and unlikely severance of wildlife movement corridors or increased fragmentation of fauna habitat.

The riparian area, together with perimeter vegetation, was considered to potentially support threatened flora and fauna. It is also noted that the only threatened fauna species detected during the 2004 survey was the Cumberland Land Snail (*Meridolumcorneovirens*), which was within the riparian area. However, the assessment concluded that impacts to these areas would not be expected (subject to implementation of the recommended management measures).

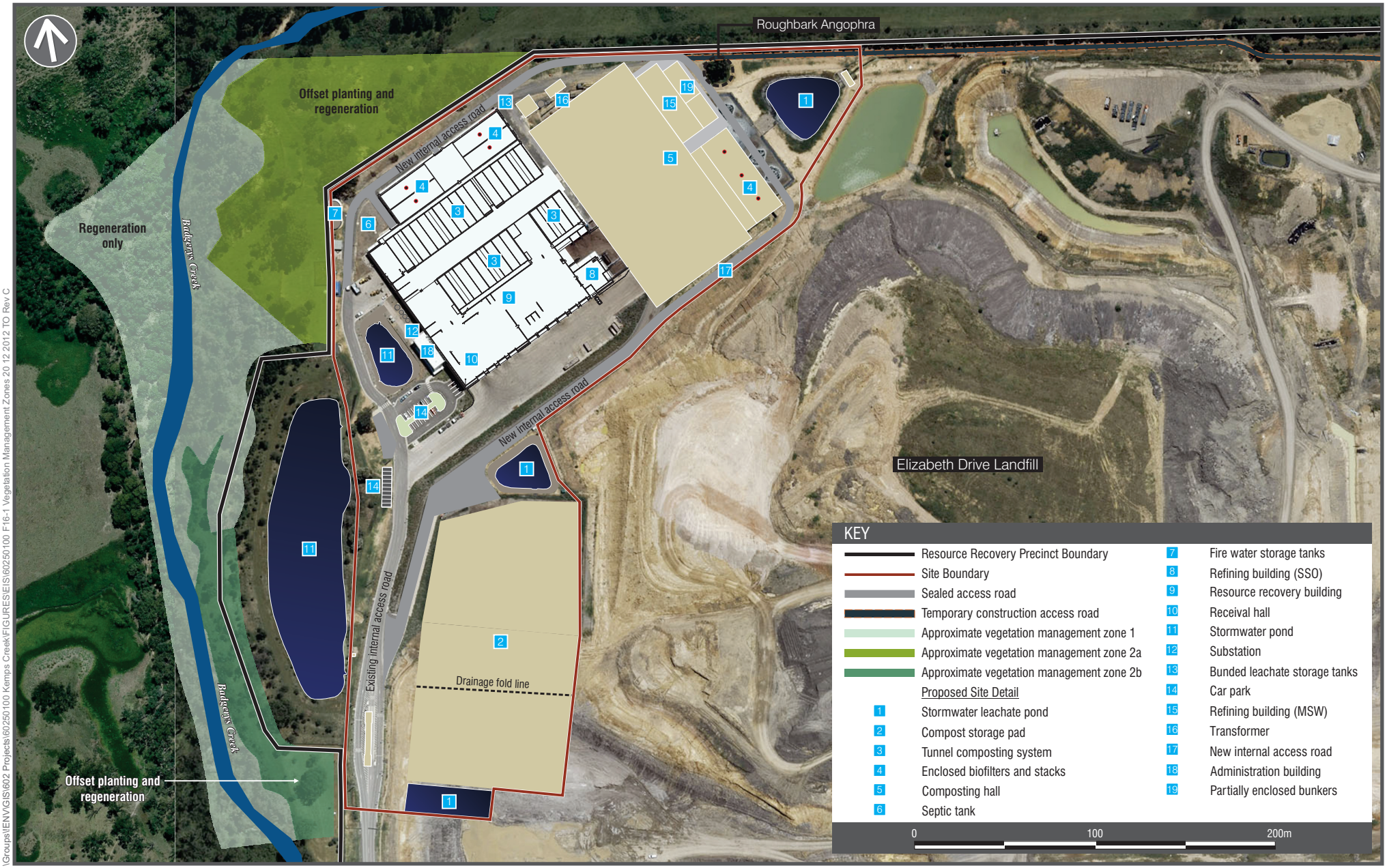
The single Roughbark Angophora (*Angophora floribunda)* located on the northern border of the Site was preserved as part of the development of the existing SAWT facility (refer to Figure 16-1).

A search of the OEH's Atlas of NSW Wildlife database and the SEWPaC's Protected Matters Search Tool in 2012 revealed 29 fauna species, 18 flora species and 14 migratory species listed under State or Commonwealth legislation that may potentially occur or potentially have suitable habitat in the study area. A full list of the species is provided in Appendix F of this EIS.

Field investigations conducted for the 2007 assessment also revealed a number of noxious weeds on the Site, including Inkweed (*Phytolaccaoctandra*), Deadly Nightshade (*Solanum nigrum*), Fleabane (*Conyzaalbida*), Blackberry (*Rubus*spp), Mothvine (*Araujiahortorum*), Fireweed (*Seneciomadagascarensis*) and Paspalum (*Paspalum dialatatum*). A weed management plan for the Site has been implemented in accordance with condition 27 of the approval granted for the existing SAWT facility.

16.1.3 Conservation Reserves

There are no nature conservation reserves adjacent, or in close proximity, to the Site. The nearest conservation areas include Kemps Creek Nature Reserve, Prospect Nature Reserve, Castlereagh Nature Reserve, Wianamatta Nature Reserve, William Howe Regional Park, Leacock Regional Park, Wianamatta Regional Park, Western Sydney Parklands, Gandanqara State Conservation Area and Bents Basin State Conservation Area. There are no areas protected by *State Environmental Planning Policy No.14 – Coastal Wetlands* or *State Environmental Planning Policy No.18 –Bushland in Urban Areas* in proximity to the Site.



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AECOM

VEGETATION MANAGEMENT ZONES

Environmental Impact Statement - Expansion of the Advanced Waste Treatment Facility, Kemps Creek Resource Recovery Precinct

FIGURE 16-1

16.2 Impact Assessment

The Development would not require clearing of vegetation, with perimeter vegetation and the remaining single Roughbark Angophora retained. Based on the habitat attributes of the Site, it is unlikely that protected species or potential habitat for protected species is present on the Site due to the highly disturbed nature and the significant lack of vegetation. Fauna that do use the Site are likely to do so because of its disturbed nature, such as Australian magpies which are attracted to the open grasslands to forage, and microbats which may be attracted to nocturnal invertebrates attracted to lights on the Site.

Protected flora or fauna species may be present within the adjoining riparian area or within the Cumberland Woodland revegetation area, which are considered to be more likely to contain suitable habitat for these species than the Site. By avoiding direct impacts on these areas, the Development is unlikely to impact on fauna movements along the Badgerys Creek riparian corridor, and would not increase the fragmentation of the potential habitat and EECs contained within this corridor.

Works on the access road along the northern boundary of the Site would occur within close proximity to the Cumberland Woodland revegetation area and the riparian area. As such, indirect impacts (for example, increased nutrient runoff and weed infestation) could occur. These works would also occur in close proximity to the single Roughbark Angophora which is present on the northern boundary of the Site. However, subject to the implementation of the recommended mitigation and management measures, it is not expected that the Development would lead to any direct impacts to the Roughbark Angophora or any indirect impacts to the Cumberland Woodland revegetation area and the riparian area that could be detrimental to the ecological values of these adjoining areas. Maintaining the 50 metre buffer between the Site and Badgerys Creek would also ensure that fish habitat within the creek (if present) would not be adversely impacted by the Development.

There is an inherent risk with any food waste disposal facility of attracting feral animals such as foxes, cats, dogs, mice and rats, and native animals such as seagulls and ibis. The potential implication of attracting these animals is a combination of spreading disease, causing a nuisance and predation/competition with native species. Entirely enclosing both the SSO and MSW composting processes as part of the Development would minimise the potential impact from pest species. In addition, the Site is securely fenced to prevent access by dogs and foxes.

16.3 Mitigation and Management Measures

There would not be any clearance of vegetation as part of the Development as it would be located on a previously disturbed area. The 50 metre buffer area between the Site and Badgerys Creek would be maintained and not directly impacted. To manage potential indirect impacts during construction, the following mitigation and management measures would be implemented:

- maintain the restriction of access to the Badgerys Creek riparian area and Cumberland Woodland revegetation area for SITA staff and construction contractors
- ensure that native vegetation within the Site, the single Roughbark Angophora, is fenced off prior to the commencement of construction activities in the vicinity
- implement an ESCP to minimise and manage soil and water impacts (refer to Chapter 12 of this EIS for details)
- seal or landscape disturbed areas as construction is completed
- ensure that locally indigenous species are used for any landscaping or additional perimeter plantings.

During operations, indirect impacts would be managed through the continuation of the Vegetation Management Plan (including weed management) and existing water quality monitoring program. Permanent fencing and access restrictions would remain to separate and protect the areas of native vegetation from the operational activities. Stormwater and leachate management improvements would also assist in reducing any potential risk for indirect impacts to Badgerys Creek and the associated riparian area (refer to Chapter 11 of this EIS for additional information). Pest management at the Site would continue to be managed by SITA under its existing policies. An independent Commercial Pest Specialist is contracted by SITA to manage pests on-site, specifically rodents, spiders, cockroaches, ants, silverfish, pigeons and flying insects.

16.4 Conclusion

The Site has been extensively cleared and disturbed, and has low ecological value. Direct impacts on the adjoining riparian areas, which contain two EEC's and potential species habitat, would not occur as part of the Development. The single Roughbark Angophora which is present at the Site would not be impacted by the Development. As such, the Development is not anticipated to have any direct or indirect impacts on ecology subject to the implementation of the recommended mitigation and management measures.

17.0 Heritage

This chapter assesses the potential impact of the Development on aboriginal and historic heritage.

17.1 Existing Environment

The original landscape of the Resource Recovery Precinct (which includes the Site) has been significantly modified as a result of past and current quarrying and waste activities. Topsoils and extensive areas of underlying clays have been stripped from the Site, substantially modifying the original ground surface. With the exception of a strip of riparian vegetation along Badgerys Creek, which flows along the western boundary of the Site, all original vegetation has been cleared from the Resource Recovery Precinct. South Creek is located approximately one kilometre to the east of the Site.

17.1.1 Aboriginal Heritage

A review of available topographic data and historic aerial photographs suggests that, prior to impacts from waste and quarrying activities, the Site was characterised by heavy and sandy clayey soils on gently undulating low rises, flats and the floodplain associated with Badgerys and South Creeks (Bannerman *et al.,*1990*)*. Prior to clearing, Cumberland Plain Woodland most likely covered the Site, providing suitable habitat for a variety of fauna. With the warm and temperate prevailing climate of the area, it is possible that the physical environment of the Site and surrounds was sufficient to support repeated occupation by Aboriginal people. However, landscape disturbances resulting from use of the Site as a quarry and a landfill are likely to have disturbed and/or destroyed any evidence of Aboriginal occupation.

Archaeological Context

Regional Archaeology

A large number of archaeological assessments have been undertaken within the Cumberland Plain, with the vast majority occurring as part of larger environmental impact assessments associated with urban development in the region. Together these have generated a rich and diverse body of archaeological data concerning prehistoric Aboriginal occupation and use of the Cumberland Plain and its resources, with thousands of sites now recorded (for example McDonald (1997); Smith, (1989)). Although most of these sites remain undated, available radiocarbon dates indicate a steady increase in the use of sites over the course of the Holocene with a peak in the second millennium before present (BP). At present, the earliest secure date for Aboriginal occupation of the Cumberland Plain stands at 30,735±407 BP. This date was obtained on charcoal derived from an artefact-bearing Pleistocene sand body on the Parramatta River(McDonald, 2005).

There are a number of useful models for prehistoric Aboriginal land use and site location across the Cumberland Plain (for example, Baker (2000); Dallas & Witter (1983); Haglund (1980); Kohen (1986); McDonald (1997)). These models highlight that key determinants for Aboriginal site distribution on the Cumberland Plain have been linked to a variety of environmental factors, including proximity to water, stream order, landform and geology (including proximity to known stone sources).

Local Archaeology

A number of Aboriginal archaeological investigations have been undertaken within and around the Site since the late 1970s, including an archaeological assessment of the Site itself as part of the its original construction of the Resource Recovery Precinct (see Kohen (1991)). A summary of relevant previous assessments is presented in Table 17-1.

Key observations that can be drawn from this review, relevant to the Site and its surrounds, are:

- artefact scatters and isolated finds comprising stone artefacts are the most common site types in the local area
- scarred trees and grinding groove sites are also present in the local area but are rare
- artefacts occur at higher densities with proximity to watercourses
- no Aboriginal sites were identified during Kohen's original survey for construction of the Resource Recovery Precinct. However, Kohen identified one artefact scatter (KC/1 – 45-5-2367) directly adjacent to the western boundary of the Resource Recovery Precinct. KC/1 consisted of 22 stone artefacts exposed over an area 35 metres long and 20 metres wide, and lying within 40 metres of Badgerys Creek.

Table 17-1 Previous Archaeological Assessments

Author	Assessment Type	Project	Results
Haglund (1978)	Archaeological Assessment and Survey	Second Sydney Airport	Three sites comprising two artefact scatters and a grinding groove site were recorded north of Elizabeth Drive, approximately 1,600 metres east of the Site.
Lance & Hughes (1984)	Archaeological Assessment and Survey	Second Sydney Airport Aboriginal Archaeological Study	One recorded artefact scatter consisting of five silcrete flakes and flaked pieces was recorded at least 1,400 metres south of the site. It was argued that the low occurrence of sites identified during the survey was due to extensive disturbance from land use practices. The banks of Badgerys Creek were a noted exception to this conclusion, which were assessed as being relatively undisturbed.
Kohen (1991)	Archaeological Assessment and Survey	Landfill development at Elizabeth Drive (now referred to as the Resource Recovery Precinct)	No archaeological sites within the proposed boundary of the landfill were identified. However one artefact scatter (KC/1) adjacent to the site's western boundary was identified. KC/1 consisted of 22 stone artefacts exposed over an area 35metres long and 20metres wide, and lying within 40metres of Badgerys Creek, approximately 50 metres from the Site boundary, outside the Precinct. It was concluded the artefact scatter would not be impacted from the construction of the landfill but recommended care be taken when constructing the landfill's western fence line.
Brayshaw (1995)	Archaeological Assessment and Survey	Elizabeth Drive Upgrade Environmental Impact Statement	Two artefact scatters and several Potential Archaeological Deposit (PADs) were recorded north of Elizabeth Drive, and a site comprising eight artefacts was identified near a small drainage line south of Elizabeth Drive and east of Mamre Road. A review of the assessment indicates that the closest site is an artefact scatter approximately 400 metres south of the Resource Recovery Precinct and 1,200 metres south of the Site.
Navin Officer (1997)	Archaeological Assessment and Survey	Aboriginal Cultural Heritage: Proposal for a Second Sydney Airport	A total of 110 archaeological sites were recorded, including 58 artefact scatters, eight scarred trees, 44 isolated finds, and one PAD. Artefact scatters were primarily low density, having between three and five artefacts. Of the scarred trees, five were interpreted as possible, two as probable, and one as likely being of Aboriginal origin. Secondary and minor fluvial corridors consisting of alluvial flats, valley floors, and adjacent basal slope topographies were identified as the most archaeologically sensitive within the area being investigated, which was the study area for Sydney's second airport, south of the Proposal site.

Australian Heritage Information Management System Search

A search of the Australian Heritage Information Management System (AHIMS) database on 17 August 2012 identified four registered Aboriginal archaeological sites within a 2.5 kilometre radius of the Resource Recovery Precinct. A review of the location of the sites indicated none of these occur within the Proposal site, with the closest, artefact scatter 45-5-0528 occurring approximately 260 metres to the north. Artefact scatter KC/1 (45-5-2367) identified by Kohen (1991) as being located adjacent to the western boundary of the Resource Recovery Precinct, was not identified during the search.

17.1.2 Historic Heritage

A search of the following historic registers was undertaken for items within a one kilometre radius of the Resource Recovery Precinct:

- Register of the National Estate
- National Heritage List
- Commonwealth Heritage List
- NSW State Heritage Register
- National Trust of Australia
- Penrith LEP 2010.

This search identified one item listed on the Penrith LEP 2010, being the Fluers Radio Telescope site. This site is located on Lot 21 DP 258414, which covers an area to the north and north-east of the Site. It is understood that the telescope occupied the land between South Creek and Kemps Creek (CSIRO, date unknown), which is over one kilometre to the east of the Site.

The Fluers Radio Telescope site was used from 1954 until 1988 for astronomical research (Davies, P., 2007). Between 1954 and 1963, the CSIRO erected three cross-type radio telescopes, the Mills Cross, Shain Cross and the Chris Cross. In the 1950s, it was considered to be one of the world's leading radio astronomy field stations.

17.2 Impact Assessment

17.2.1 Aboriginal Heritage

As a result of significant ground surface impacts from past and present activities at the Site, it is considered highly unlikely that the Site retains surface or subsurface Aboriginal archaeological materials. The one previously recorded site (KC/1 (45-5-2367)) is adjacent to the western boundary of the Resource Recovery Precinct and outside the Site. Consequently, it would not be impacted by the Development.

As it is unlikely that Aboriginal cultural heritage values occur at the Site, and with reference to the *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DECCW, 2005), it has been determined that no further investigations or assessment is required to support the DA.

17.2.2 Historic Heritage

With the exception of the Fluers Radio Telescope site, no historic heritage items have been identified within or within close proximity to the Site. While the exact locations of the telescope remains and associated structures are not known, impacts to Fluers Radio Telescope site are not anticipated given the distance from the Development. Therefore, no impacts to historic heritage items are anticipated as a result of the Development.

17.3 Mitigation and Management Measures

The Development is not anticipated to have any direct or indirect impacts on sites of Aboriginal or historic heritage. The riparian area of the Site would remain fenced, which would ensure that disturbance to the previously recorded artefact scatter KC/1 is avoided.

All construction activity associated with the Development would occur on previously disturbed areas, however, in the event that Aboriginal objects are uncovered during the proposed works:

- Cease all works in the vicinity immediately to prevent any further impacts and bring a qualified archaeologist to site to make an assessment. Management options for any newly identified objects would be dependent on the nature and significance of these objects.
- Notify OEH as soon as possible of the object's location if an Aboriginal object is found and the object is not already recorded with AHIMS.

In the event that human remains are located during the construction activities:

- Cease all works in the area immediately, and the NSW Police and OEH would be notified. The area would be secured to prevent any unauthorised access and further impacts to the find or finds.
- Notify OEH and do not resume in the designated area until approval in writing is provided by OEH if the remains are found to be of Aboriginal origin and the NSW Police consider the site not an investigation site for criminal activities. In the event that a criminal investigation ensues, works would not resume in the designated area until approval in writing from the NSW Police is obtained.

17.4 Conclusion

Given the past activities at the Site and the location of the Development on previously disturbed areas, the Development is not anticipated to have any direct or indirect impacts on sites of Aboriginal or historic heritage. In the event that Aboriginal objects or human remains are uncovered at the Site, management responses as outlined in Section 17.3 would be implemented.

18.0 Socioeconomic

The following chapter provides an assessment of the potential social and economic benefits and impacts of the Development.

18.1 Existing Environment

The Development would be located in the Penrith LGA. While the Resource Recovery Precinct provides services to Sydney's western suburbs, the potential impacts from the facility are limited to the Development and area surrounding the Site as described in Chapter 14 of this EIS. To a lesser extent, impacts are experienced by residents of Kemps Creek and the surrounding suburbs of Badgerys Creek and Mount Vernon as a result of traffic movements related to waste transportation to and from the Resource Recovery Precinct.

The suburb of Kemps Creek is a rural residential area supporting both light and rural industries and research facilities. This includes a combination of agricultural (for example, market gardens and rural industries), research and rural residential properties. Approximately one kilometre to the north of the Site is the Twin Creek Golf and Country Club and a residential estate, and around four kilometres to the north west is the WSEA. Other significant projects within the vicinity of the Development include:

- a waste and resource management facility at Orchard Hills was approved by the NSW Land and Environment Court, and is located over five kilometres to the north
- approval has been granted for the continuation of a quarry and brick works at Badgerys Creek, located around 2.5 kilometres to the south
- a building waste recovery and re-use facility (SSD) has been proposed at Mamre Road, Kemps Creek and has been issued with DGRs
- a proposed alteration to the existing animal welfare establishment on Elizabeth Drive, the determination of which was deferred by the JRPP at the time of writing this EIS
- a proposed lawn cemetery and crematorium on Elizabeth Drive, Luddenham, which has been deferred for decision by the JRPP.

The total population of the Penrith LGA was 178,467 at the 2011 Australian census (refer to Table 18-1). This represents 0.02 percent of NSW's total population (of 7.21 million), and 0.008 percent of Australia's total population of 21,507,717. Aboriginal and Torres Strait Islander people made up three percent of the Penrith population. Penrith has one of the lowest median ages in NSW, at 34 years (ABS, 2012).

Table 18-1 2011 Demographics

Total population	People		Age Profile		
	Male	Female	0-4 pre-school (people (%))	65+ older population/ retirees (people (%))	Median Age
178,467	88,089	90,378	13,559 (7.6%)	17,155 (9.6%)	34

Source: ABS, 2012

In 2011, 8.7 percent of residents from the Penrith LGA had attended a technical or further education institution, compared with 7.3 percent in Australia. On the other hand, 9.8 percent of residents had attended a university or tertiary institution, compared with 14.3 percent for Australia. The most common ancestries in the Penrith LGA were Australian at 29.1 percent, English at 25.2 percent, Irish at 6.8 percent, Scottish at 5.3 percent and Maltese at three percent.

The nature of the Penrith LGA is expected to undergo significant demographic change in the coming years, with "25,000 new dwellings and 40,000 new jobs" needed in the next 25 years to meet the growing needs of the community (PCC, undated). The Metropolitan Plan for Sydney 2036 (NSW Government, 2010), has set an employment target of 28,000 additional jobs by 2031 in the Penrith LGA, flagging it as a significant growth centre.

The existing SAWT facility employs 38 FTE personnel across two shifts, five days per week. It currently produces up to 43,000 tonnes of compost material. Under its current contract with PCC, contaminant free compost material produced from Council's own source separated organic feedstock is returned to Council for application on its parks and sporting fields.

18.1.1 Socio- Economic Indexes for Areas

The Australian Bureau of Statistics (ABS) Socio-Economic Indexes for Areas (SEIFA) index of disadvantage is derived from attributes such as low income, low educational attainment, high unemployment. Areas with a low index value correspond to relatively disadvantaged areas. Table 18-2 shows Penrith's SEIFA index of disadvantage statistic alongside the highest and lowest LGA in the Sydney Statistical Division for 2006. Penrith's SIEFA index is 1006.0, indicating that it is less disadvantaged than 13 of Sydney LGAs, and more disadvantaged than 29 of Sydney's LGAs.

Table 18-2 SEIFA Index of Disadvantage Statistics for Sydney LGA's

LGA	2006 SEIFA Index of Disadvantage
Fairfield	876.1
Penrith	1006.0
Ku-ring-gai	1143.3

Source: SEIFA, 2006

As shown in Table 18-3 below, the median weekly income for the Penrith LGA was significantly higher than the Australian median for categories investigated as part of this EIS. Median weekly personal income for Penrith was $623, which is 12.5 percent higher than the Australian median weekly income of $577.

Table 18-3 2011 Median Weekly Incomes

	Penrith ($)	Australia ($)
Personal	623	577
Family	1,582	1,481
Household	1,398	1,234

Source: ABS, 2012

Table 18-4 shows that, of occupied private dwellings in the Penrith LGA, 26.8 percent were owned outright,43.8 percent were owned with a mortgage and 26.7 percent were rented. There were a greater number of private occupied dwellings in Penrith than Australia, however, a far greater number of Penrith residents had a mortgage than the Australian figure of 34.9 percent. The occupied dwellings rate in Penrith is linked to the fact that the LGA is predominantly residential.

Table 18-4 Occupied Private Dwellings Statistics

	Occupied private dwellings (%)	Owned Outright (%)	Owned with mortgage (%)	Rented (%)
Penrith	94.8	26.8	43.8	26.7
Australia	89.3	32.1	34.9	29.6

Source: ABS, 2012

18.1.2 Community Contributions and Support

Education Centres and WastEd Program

SITA recognises the importance of keeping the local community and stakeholders informed of the operations at the Resource Recovery Precinct, and the existing SAWT facility. SITA is committed to increasing awareness of sustainable waste management practices by providing education facilities accessible to schools, community groups and businesses. The education facilities provide information about recycling, resource recovery and sustainable environment practices. The Kemps Creek Education Centre is located on site at the Resource Recovery Precinct, and is open to the public for guided tours.

In NSW, schools have access to the SITA's WastEd Time education program, which provides information on 'the what, where and why of recycling and waste'. Teachers, students and parents across the country are also able to download WastEd Time Recycling Education Worksheets.

Free Recycling Provision

SITA provides free recycling services at those sites within the Sydney Metropolitan Area which are open to the public. This includes free receival of potentially hazardous materials such as batteries and LPG gas bottles. Kemps Creek Resource Recovery Precinct is not open to the public, however the nearby Eastern Creek Waste and Recycling Centre is open to the public.

18.2 Assessment of Potential Impact

18.2.1 Social and Economic Impacts

As has been discussed in Chapter 3 of this EIS, 16.3 million tonnes of waste was generated in 2008 and 2009 in NSW, a quantity that continues to increase. Accordingly, the NSW Government has a variety of sustainable environmental management targets (discussed in Chapter 3) which aim to divert waste away from landfills and to ease pressure on remaining landfill capacity. The Development would provide the State with the capacity to process an additional 100,000 tonnes of waste. This would assist the NSW Government in meeting its waste diversion targets, in addition to reducing pressure on existing landfills and meeting its sustainable environmental management targets.

The Development has the potential to result in a beneficial social impact for the local economy through job creation. In the short term, construction activities are expected to generate up to 130 skilled and unskilled construction jobs at its peak, which would contribute directly to the PCC economy. During operation, the Development is expected to create 22 FTE operational jobs, at the same time as supporting ancillary services in the local economy. The additional 22 staff would provide additional job prospects for the local community, bringing the total staff numbers to 60 FTE. Identified as a significant growth area by the NSW Government in the *Metropolitan Plan for Sydney 2036*, the Development would assist the Penrith LGA support growth targets by creating additional employment opportunities in the area.

SITA has also committed to sourcing construction materials locally where possible, which would provide financial benefits to the PCC and NSW economy. As has been discussed in Chapter 19 of this EIS, the local suppliers Boral, Ausreo, Austral and Stramit would be used to supply construction materials, from the suburbs of Prestons, Wetherill Park, Erskine Park, Lucas Heights and Kemps Creek.

The waste and environmental levy is a market-based instrument established under the POEO Act, 1997 and applied to drive waste avoidance and help resource recovery compete against landfill disposal. The levy for disposing putrescible waste in the Sydney metropolitan area has risen from $18/t in 1990 to $95.20 in 2012/2013 (OEH, 2012). It is anticipated that costs would continue to rise as landfill space becomes increasingly scarce and landfill levies increase. Replacing landfill space with additional alternative waste treatment capacity would initially lead to a small increase in the cost of disposal, however this cost increase is likely to be smaller as landfill costs increase (which is likely to occur as space continues to come at a greater premium). These costs need to be balanced against the significant environmental benefits, and the social and other economic benefits that would result from the Development. Further, the Wright Review (2009), argues that the "increasing *NSW Waste and Environment Levy* should quickly propel further growth in (relatively inexpensive) recovery and recycling of …waste". The Development would reduce the amount of putrescible waste going to landfill, therefore leading to lower levels of greenhouse gas emissions when compared to emissions from landfill as waste decomposes (refer to Chapter 19 of this EIS).

As has been discussed, the Development is an expansion of an existing facility located on a site currently used for the same purposes. There would not be any significant social or economic trade-offs, such as the loss of grazing land or the loss of a potential industry as the facility is already operating. It would not result in any social displacement, would not require any land acquisition, and would not require a change in existing land use. Rather, there are likely to be social advantages as there would be an improvement in the environmental performance of the facility and amenity of the surrounding area as a result of the Development (as discussed later in this chapter).

18.2.2 Community Infrastructure and Services

The Development would result in the addition of up to 130 construction and 22 operational staff, which may utilise Penrith's commercial and community facilities. Given the size of the Penrith economy (Gross Regional Product $5,854 million in the financial year ending 2011 (economy.id, 2012)), it is likely the Development workforce would be absorbed relatively easily, and that additional community services in the locality would not be necessary. It is noted that PCC does not levy Section 94 contributions from this type of development to provide contributions towards community facilities in the region.

18.2.3 Amenity Impacts

The amenity of an area can be affected by air pollution (odour in particular in the case of the Development), noise levels and traffic generation. Reductions in amenity resulting from increased odour, noise and traffic can potentially lead to negative social impacts in the absence of mitigation and management measures. As discussed in detail in Chapters 5, 8, 9, 10 and 21 of this EIS, the Development has incorporated a number of design responses (such as the enclosure of all composting operations) and mitigation measures (such as daytime construction hours, use of quieter mobile equipment and upgrade of the access road and intersection) to minimise any impacts on the amenity of surrounding properties.

Despite making changes to the design of the Development in response to concerns regarding odour emissions further mitigation is required for two receivers near the Site. The results of the air quality modelling undertaken for the Development indicate that the maximum 99th percentile odour concentrations at all sensitive receivers surrounding the Site would be below the criterion of 4 OU. However, when the cumulative assessment was undertaken for the proposed Development and the adjacent landfill, odour concentrations between 4 and 5.1 OU were predicted at two receivers located adjacent to the eastern boundary of the Resource Recovery Precinct. SITA is currently in discussion with the affected landowners with the aim of identifying and implementing an appropriate mitigation and management approach to these impacts. The Development would not have an adverse traffic impact during construction or operation, and construction noise is expected to have negligible impacts on the majority of surrounding sensitive receivers during the peak construction period. The Development is within the noise limits set for the existing SAWT facility in the conditions of approval and EPL, and when assessed against more contemporary INP assessment criteria, any predicted exceedances are in the order of one to two dBA, which is considered minor.

18.2.4 Property Values Impact

Given that it is an existing facility, the properties nearby to the Development would have prices which already account for their location near to a Resource Recovery Precinct. Consequently, the Development is not expected to have an impact on property values as the Resource Recovery Precinct would continue to operate as it has been since 1990 with continued landfilling as approved.

18.3 Mitigation and Management Measures

As discussed in Section 18.2, the Development is not anticipated to have an adverse economic impact on the surrounding community but there would potentially be adverse amenity impacts associated with odour and noise. Mitigation and management measures are required to ensure the amenity of the neighbouring properties are not adversely impacted during construction and operation. These include:

- implementing appropriate mitigation measures (as agreed between SITA and the landowners) for odour impacts at the two affected receivers
- implementing appropriate mitigation measures within a Construction Noise Management Plan and Operational Noise Management Plan, as outlined in Section 9.4.1 and 9.4.2 respectively
- adopting a more proactive approach of informing adjacent landowners if and when facility issues are anticipated i.e., maintenance activities and performance issues.

SITA has a dedicated Environmental Hotline for anyone living or working close to its sites in NSW and Victoria. The service is available 24 hours a day, 7 days a week, and is answered by an external call centre which logs the feedback and forwards it immediately to the relevant staff. This allows SITA to take immediate action to determine the cause of any concerns the community may have, and gives SITA the best chance of rectifying the situation quickly. The Environmental Hotline will assist SITA in ensuring that any issues associated with the Development that may impact the amenity of the area or concern residents are addressed in a timely manner.

18.4 Conclusions

The Development would provide short term economic benefits during construction and longer term economic opportunities through local procurement and additional employment opportunities.

The Development would deliver improvements to the environmental performance of the existing SAWT facility, leading to improvements in the amenity of surrounding properties. However, there is potential for some amenity impacts resulting from operation of the Development, particularly in relation to odour. The recommended mitigation measures would minimise these impacts.

19.0 Greenhouse Gas

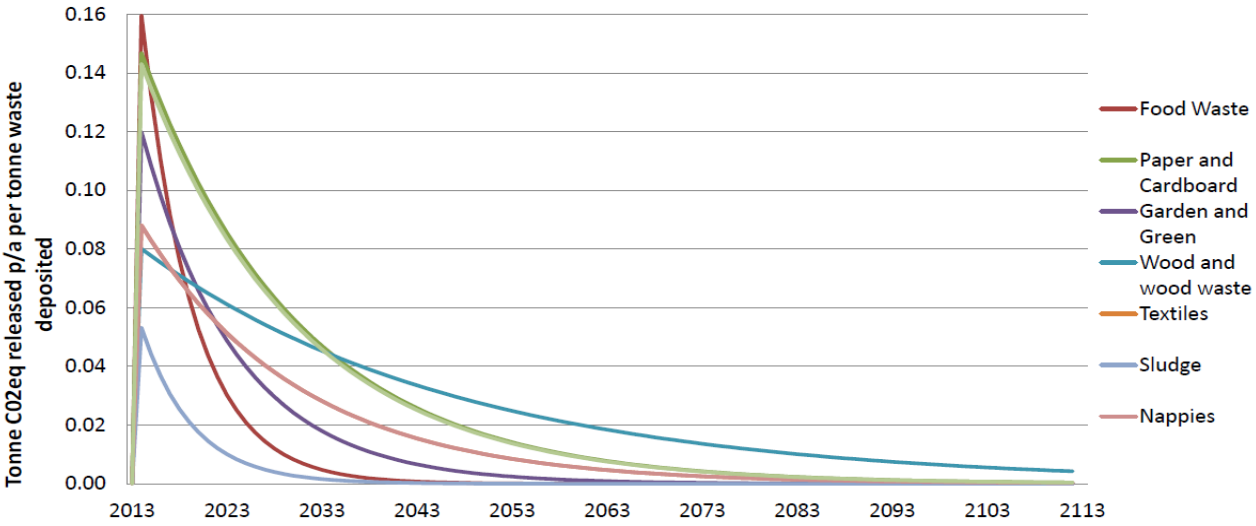
The following chapter provides a summary of the Greenhouse Gas Assessment Report, which is provided in Appendix G.

19.1 Existing Environment

Green House Gases (GHGs) are gases in the atmosphere that absorb and re-radiate heat from the sun, thereby trapping heat in the lower atmosphere. This is known as the greenhouse effect. GHGs can be emitted as a result of natural processes (e.g. carbon dioxide released from leaf litter decomposing on a forest floor) or from human activities (e.g. methane released from organic waste decomposing in a capped landfill). Since the industrial revolution, there has been an increase in the amount of human induced GHG emission, resulting in an increase in GHG concentration in the atmosphere, subsequently resulting in climate change.

Landfilling of both MSW and SSO generates GHG emissions. The GHGs that are emitted from landfills are primarily methane and nitrous oxide. These GHGs are produced as the waste decomposes in an oxygen deprived (anaerobic) environment. During 2010 and 2011, solid waste disposal from landfills in Australia generated approximately 11.3 million tonnes of carbon dioxide equivalent (tCO2-e), which is around three percent of Australia's national emissions) (DCCEE, 2012b). Carbon dioxide equivalent (CO2-e) is a "measure used to compare the emissions from various greenhouse gases based upon their global warming potential" (OECD, 2005). Nitrous oxide, methane and perfluorocarbons are examples of GHGs that often presented in measures of CO2-e.

Figure 19-1 illustrates the GHG emissions released over time for different waste types in a typical landfill in the NSW region. As shown, landfill waste continues to generate GHG emissions decades after initial placement in a landfill.



Source: Bygrave, 2012

Figure 19-1 GHG Emissions Released Over Time for Different Waste Types (NSW region)

The existing SAWT facility produces GHGs in its operations, however results in a reduction in some emissions released into the atmosphere as it diverts waste from landfill. The facility diverts waste from landfill by processing source separated food and garden organics, MSW and biosolids. During this process recyclable material is recovered, residual waste is sent to landfill, and compost is produced from the remaining MSW and SSO. The compost produced from the landfill is reused on sporting fields within Penrith City Council where appropriate and for mine rehabilitation.

19.2 Methodology

A quantitative assessment of the potential GHG emissions of both the construction and operational stages of the Development was conducted. The assessment was conducted in accordance with generally accepted GHG accounting and reporting principles, namely the *National Waste Policy Implementation Plan (2010),* the Carbon

Price Mechanism set out in the *Clean Energy Act 2011*, and *National Greenhouse and Energy Reporting Act, 2007.*

To calculate the GHG emissions associated with the construction and operation phases of the Development, the following four steps were undertaken:

1) the GHG assessment boundary was determined for the Development (refer to Table 19-1 and Table 19-2)

2) GHGs relevant to the Development were identified

3) the emission sources were classified by scope (either Scope 1, 2 or 3, as described below)

4) the quantity of GHG emissions was calculated.

GHG emissions are categorised into three different scopes (either scope 1, 2 or 3) in accordance with the Greenhouse Gas Protocol (World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD), 2004), Intergovernmental Panel on Climate Change (IPCC) and Australian Government GHG accounting/classification systems. Emissions are categorised into the different scopes to help delineate between direct emissions from sources that are owned or controlled by the Development and indirect emissions that are a consequence of Development activities but occur at sources owned or controlled by another entity. The three GHG scopes are:

- **Scope 1,** also called “direct emissions”. These emissions are generated directly by the Development, e.g. methane emissions generated as waste decomposes in an anaerobic environment.
- **Scope 2**, also referred to as “indirect emissions”. These emissions are generated outside of the Development’s boundaries to provide energy to the Development, e.g. the use of purchased electricity from the grid.
- **Scope 3** are all indirect emissions (not included in Scope 2) due to upstream or downstream activities. For example indirect upstream emissions associated with the extraction, production and transport of purchased construction materials.

The GHG emission sources included in the assessment boundary for the construction of the Development and the relevant GHG scope are listed in Table 19-1.

Table 19-1 GHG Emission Sources - Construction

Emission Source	Activity	Emission Scope		
		1	2	3
Fuel used for transport purposes	Transport of construction materials to site			✓
Fuel used for construction	Operation of construction equipment and site vehicles	✓		✓
Materials	Use of construction materials (embodied emissions)			✓
Electricity used	Operation of site infrastructure including site offices		✓	✓

The GHG emission sources which were included in the assessment boundary for the operational stage of the Development and the relevant GHG scope are listed in Table 19-2.

Table 19-2 GHG Emission Sources – Operation

Emission Source	Activity	Emission Scope		
		1	2	3
Fuel used for transport purposes	Transport of materials (residual waste / recovered recyclables / compost) from site			✓
Fuel used for operation at the SAWT facility	Operation of stationary equipment	✓		✓
	Operation of mobile equipment	✓		✓
	Operation of site vehicles	✓		✓
Electricity used	Operation of facility		✓	✓
Fugitive composting emissions	Methane and nitrous oxides generated during composting	✓		
Materials	Use of materials (embodied emissions)			✓
Residuals to landfill	Methane and nitrous oxide generated in landfill by residual waste			✓

Several sources were excluded from the GHG inventory, including emission sources that are less than five percent of total construction or operation emissions and fuel used by construction and operational workers travelling to/from the site. For further details on the sources that have been excluded, and the justifications for this being the case, see the full Greenhouse Gas Assessment in Appendix G.

The quantitative GHG assessment conducted for the Development was subsequently used to conduct a qualitative assessment of the potential impacts these emissions have on the environment.

19.3 Assessment of Potential Impacts

19.3.1 Construction

It is estimated that the construction stage of the Development would generate approximately:

- 720 tCO_2-e of direct Scope 1 GHG emissions
- 16 tCO_2-e of indirect Scope 2 GHG emissions
- 2,068 tCO_2-e of indirect upstream Scope 3 GHG emissions.

The total (Scope 1, 2 and 3) construction GHG emissions would be approximately 2,805 tCO_2-e.

The fuel used on-site by construction equipment is the only source of direct Scope 1 GHG emissions. The use of electricity to power a site office is the only source of Scope 2 GHG emissions. The major source of Scope 3 emissions is from the use of construction materials, with the most significant sources being the use of concrete and steel.

19.3.2 Operation

GHG emissions associated with the operational phase of the Development have been calculated on an annual basis, and are provided in Table 19-3 below. The list identifies the estimated GHG emissions pre and post 2017 as the Australian Government has committed to using more conservative Global Warming Potentials (GWP) from 1 July 2017 onwards.

Table 19-3 Annual GHG Emissions in the Operation Stage of the Development (tCO_2-e)

Scope	Pre 2017 (tCO_2-e)	Post 2017 (tCO_2-e)
1	10,129	10,811
2	3,960	3,960[1]
3	52,595	62,426
Total	66,684	77,197

The Development would use fully enclosed composting methodology to maintain aerobic conditions. However, the composting emissions were calculated using the standard NGA emissions factors (DCCEE, 2012), which are based on the open windrow composting process. Fully enclosed composting generates less GHG emissions than open windrow composting as aerobic conditions are maintained throughout the composting process. Hence, the estimate conservatively assumes that some anaerobic decomposition occurs and fugitive emissions of methane and nitrous oxide would be generated from the composting process (however this is not representative of the Development's composting process).

The fugitive GHG emissions from composting would be the major source of annual operational Scope 1 GHG emissions. However, it is expected that process monitoring and control measures would ensure aerobic composting conditions at the facility. Hence, these emissions have been included as a conservative measure only.

It is estimated that the total annual operational Scope 1, 2 and 3 GHG emissions associated with the Development (approximately 77,000 tCO_2-e based on post 2017 calculations) are approximately equivalent to 0.05 percent of NSW's annual GHG emissions (in 2009 to 2010). Scope 3 emissions are the major sources for the development, at 62,426tCO_2-e based on post 2017 calculations.

19.3.3 Energy Efficiency

The Development would improve the energy efficiency of operations at the existing SAWT facility. A summary of the key energy efficiency advantages of the Development, relative to existing operations, is provided below:

- a reduction in the amount of front end loader operations and manual handling would reduce fuel and electricity consumption
- the exhaust air from the pre-treatment buildings would be reused in the composting process, thereby minimising energy usage
- the roof and walls of the enclosed composting hall would include translucent panel sheeting to maximise natural light within the building, thereby minimising energy used for lighting
- all leachate produced as a result of operations in the Composting Hall and Tunnel Composting System would be directed to enclosed leachate tanks, reducing the need for electricity powered aeration of leachate ponds
- enclosed composting for the entire process reduces fugitive emissions from composting material outdoors.

19.4 Mitigation and Management Measures

The following mitigation measures could be implemented during construction and operation to reduce the GHG emissions associated with the Development, where reasonable and feasible:

- preferential use of local materials to reduce fuel consumption associated with material transportation
- minimise fill and construction materials handling to reduce quantity of fuel consumption
- use low GHG intensive alternative fuels (for example biofuels) in equipment and vehicles
- preferential use/purchase of vehicles with low fuel consumption ratings and energy efficient equipment/plant
- train staff in practices to reduce fuel consumption in use equipment and vehicles such as eliminating idling

[1]Post 2017 the GWP of methane will change from 21 to 25 and the GWP of nitrous oxide will change from 310 to 298. These changes have been included in the calculated estimates of operational GHG emission from the sources: fugitive composting emissions; and residuals to landfill. There is no nitrous oxide or methane in the Scope 2 emissions for the Development, therefore this figure does not change post 2017.

- regularly maintain equipment and vehicles to maximise fuel efficiency
- preferential selection of materials with lower embodied emissions where possible
- use of electricity generated by the landfill gas powered generator proposed at the Resource Recovery Precinct (subject to a separate DA, and undetermined at the time of writing this EIS)
- manage and monitor the composting process to ensure that aerobic conditions are maintained (thereby avoiding the generation of fugitive GHG emissions associated with anaerobic decomposition of organic waste)
- adopt energy efficient design principles, such as translucent panels and modern electronic energy management devices.

19.5 Conclusion

The Development would result in the production of GHGs during both construction and operation, however it would also result in a reduction in some emissions released into the atmosphere as it diverts waste from landfill. During the construction phase of the Development electricity, fuel and materials would be consumed. These activities would generate a total of approximately 2,805 tCO_2-e of Scope 1, 2 and 3 emissions. The operation phase of the Development would also generate GHG emissions, for example from the consumption of diesel fuel and electricity to run the facility and the generation of fugitive emissions. It is estimated that the total annual operational Scope 1, 2 and 3 GHG emissions associated with the Development (approximately 77,000 tCO_2-e) are approximately equivalent to 0.05 percent of NSW's annual GHG emissions (in 2009 to 2010).

To avoid/reduce GHG emissions associated with the Development, mitigation measures are recommended which relate to minimising the quantity and/or emissions intensity of electricity used, fuel used by plant and equipment and fuel used in the transport of materials; minimising the quantity and/or embodied carbon of materials used; and avoiding the generation of fugitive GHG emissions.

20.0 Summary of Mitigation and Management Measures

This chapter contains a summary of the construction and operation mitigation and management measures for the Development.

20.1 Introduction

In accordance with the DGR's, a summary of the mitigation and management measures has been prepared which sets out SITA's commitments for the Development. The summary has also been prepared in accordance with the DGR's which require the EIS to include a "consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS". The preparation and implementation of these environmental mitigation and management measures for the Development holds great significance in ensuring that potential environmental impacts are minimised.

The summary of mitigation and management measures addresses construction and operation of the Development and has been compiled on an issues basis. It has been informed by the environmental impact assessment undertaken as part of this EIS and detailed in Chapters 8.0 through 19.0.

20.2 Construction Mitigation and Management Measures

Environmental mitigation and management measures to be implemented during the construction phase of the Development are detailed in Table 20-1. These mitigation measures would be detailed in a Construction Environment Management Plan (CEMP) for the Development. All construction would be undertaken in accordance with this CEMP.

Table 20-1 Construction Environmental Mitigation and Management Measures

Mitigation and Management Measure
Air Quality
Prepare an AQMP for the construction activities.
Modify or suspend dust-generating activities during periods of high wind speeds or if dust plumes from the construction activities are visible.
Confine vehicular access to designated construction access roads (which have a sealed or gravel surface) and minimise haul road lengths within the construction area.
Regularly tune and maintain construction equipment, plant and machinery to minimise visible smoke and air emissions.
Continue dust deposition monitoring at the boundary of the Resource Recovery Precinct.
Continue to maintain a complaints management system.
Noise
Implement a Construction Noise Management Plan.
Carry out noise intensive construction works during standard construction hours wherever practicable.
Select appropriate plant for each task, to minimise the noise impact.
Fit non-tonal reversing alarms on all construction equipment where possible.
Orient noisy equipment away from residential sensitive receivers.
Implement a complaints handing procedure for construction noise complaints.
Include noise management strategies within induction for construction workers, particularly in regards to early staff arrivals and works during the morning shoulder period (being 6am to 7am).

Mitigation and Management Measure
Traffic
Prepare a CTMP to manage traffic generated during construction. The CTMP would detail vehicle routes, the number of construction vehicles, hours of operation, access arrangements and traffic control measures.
Surface and Groundwater
Temporary earthworks would be carried out to protect disturbed areas during construction. Temporary works would be installed and regularly inspected in line with the CEMP. Temporary works would include: - constructing clean stormwater diversion drains to reduce clean stormwater migration onto the Site - installing temporary sedimentation ponds/traps for capturing sediments contained within stormwater runoff within disturbed areas of the Site during earthworks until disturbed areas are re-established - watering of stockpiles to stabilise temporary stockpiles to minimise sediment transportation into drainage lines - installing silt fences or other equivalent methods to prevent the migration of sediments off-site into surrounding water bodies - removing of temporary soil and water management structures only after areas have been stabilised - completing regular visual inspections of stockpiles, drainage lines and construction areas to assess the effectiveness of mitigation and management measures.
Plant and machinery would be operated in a responsible manner by experienced drivers to ensure that spills of construction materials are minimised. All plant and machinery would be regularly maintained to ensure good working order, to minimise the risk of fuel and oil leaks. In the unlikely event of a spill or leak, the use of spill kits and emergency containment would minimise the impacts on surface and / or groundwater.
Develop a water quality monitoring program and implement the program during construction to ensure that water quality within Badgerys Creek is not adversely impacted. The water quality monitoring program would include: - identifying all monitoring parameters - identifying representative sampling locations and the frequency of sampling - completing water quality testing by a NATA accredited laboratory - an outline of the framework and format for reporting of monitoring results.
Geology and Soils
Prepare an ESCP for the Site to manage soil erosion during construction.
Minimise the duration that areas are disturbed such that surfaces are stabilised or landscaped immediately after the completion of works in a specific area, where practicable.
Locate temporary stockpiles of construction materials away from drainage lines and stabilise stockpiles to prevent migration of soils.
Minimise the size and duration of materials stockpiles during construction.
Install check dams or other energy dissipation devices to control stormwater velocities in temporary construction drainage channels to minimise the potential for migration of sediments away from the Site.
Construct diversion drainage channels to reduce the amount of stormwater passing as overland flow across disturbed areas.
Install geofabric sediment fences down slope of disturbed areas where there is the potential for runoff to enter Badgerys Creek.
Regularly inspect the Site during construction to ensure that the ESCP is properly implemented.

Mitigation and Management Measure
Hazard and Risk
Install a fire rated wall in the composting areas.
Land Use
No mitigation required.
Landscape and Visual
Retain perimeter vegetation.
If required, position additional lighting in a manner that minimises the extent of light spill during these morning and evening periods, and is directed away from residences located to the north and north east of the Site.
Ecology
Maintain the restriction of access to the Badgerys Creek riparian area and Cumberland Woodland revegetation area for SITA staff and construction contractors.
Ensure that native vegetation within the Site and in close vicinity of the construction works (the single Roughbark Angophora) is fenced off prior to the commencement of construction.
Implement an ESCP to minimise and manage soil and water impacts.
Seal or landscape disturbed areas as construction is completed.
Ensure that locally indigenous species are used for any landscaping or additional perimeter plantings.
Heritage
In the event that Aboriginal objects are uncovered during the proposed works: - Cease all works in the vicinity immediately to prevent any further impacts and bring a qualified archaeologist to site to make an assessment. Management options for any newly identified objects would be dependent on the nature and significance of these objects. - Notify OEH as soon as possible of the object's location if an Aboriginal object is found and the object is not already recorded with AHIMS.
In the event that human remains are located during the construction activities: - Cease all works in the area immediately, and the NSW Police and OEH would be notified. The area would be secured to prevent any unauthorised access and further impacts to the find or finds. - Notify OEH and do not resume in the designated area until approval in writing is provided by OEH if the remains are found to be of Aboriginal origin and the NSW Police consider the site not an investigation site for criminal activities.. In the event that a criminal investigation ensues, works would not resume in the designated area until approval in writing from the NSW Police is obtained.
Socioeconomic
No mitigation required.
Greenhouse Gas
Preferential use of local materials to reduce fuel consumption associated with material transportation.
Minimise fill and construction materials handling to reduce quantity of fuel consumption.
Use low GHG intensive alternative fuels (for example biofuels) in equipment and vehicles.
Preferential use/purchase of vehicles with low fuel consumption ratings and energy efficient equipment/plant.

Mitigation and Management Measure
Train staff in practices to reduce fuel consumption in use equipment and vehicles such as eliminating idling.
Regularly maintain equipment and vehicles to maximise fuel efficiency.
Preferential selection of materials with lower embodied emissions where possible.
Use of electricity generated by the landfill gas powered generator proposed at the Resource Recovery Precinct (subject to a separate DA, and undetermined at the time of writing this EIS).
Manage and monitor the composting process to ensure that aerobic conditions are maintained (thereby avoiding the generation of fugitive GHG emissions associated with anaerobic decomposition of organic waste).
Adopt energy efficient design principles, such as translucent panels and modern electronic energy management devices.

20.3 Operation Mitigation and Management Measures

Environmental mitigation and management measures to be implemented during operation of the Development are detailed in Table 20-2.These mitigation measures would be detailed in an Operation Environmental Management Plan (OEMP) for the Development.

Table 20-2 Operation Environmental Mitigation and Management Measures

Mitigation and Management Measure
Air Quality
Restrict vehicular access to designated sealed hardstands and access roads.
Regularly tune and maintain equipment, plant and machinery to minimise visible smoke and air emissions.
Ensure the fast-acting roller doors at the Receival hall do not remain open for an unnecessary length of time.
Continue dust deposition monitoring at the boundary of the Resource Recovery Precinct.
Continue to maintain a complaints management system.
Provide appropriate odour mitigation for the two receivers located adjacent to the eastern boundary of the Resource Recovery Precinct which are anticipated to be impacted by odour above the 4 OU criteria. SITA is currently in discussion with the affected landowner with the aim of identifying and implementing an appropriate mitigation and management approach to these impacts.
Noise
Introduction of noise mitigation to the wheel loaders to ensure maximum sound power level of 108 dB(A) or introducing new loaders with a sound power level less than 108 dB(A).
Attenuation of all seven biofilter extraction fan ducting systems such that noise emanated from the top of each stack is reduced by 10 dB(A). The most appropriate and effective noise mitigation for controlling the noise generated by the fans would be to introduce a silencer between the biofilter extraction fans and the stack outlets.
Cessation of wheel loader outdoor operations after 10 pm.
Erection of an 8.5-metre high and 30-metre long wall of sufficient density along the northern side of the external refining bunkers to reduce noise generated by mobile plant at the northern receptors. The bunkers area would also be roofed at the same height as the refining building.

Mitigation and Management Measure
Use of quackers (broadband reversing alarms) instead of tonal reversing alarms on all mobile plant.
Implement an Operational Noise Management Plan.
Implement procedures for regular maintenance of plant and mobile equipment, to ensure they are kept in good working order.
Implement induction and training for operational staff on the nature of permitted activities during the hours of operation, for example, when external activities are to cease.

Mitigation and Management Measure
Traffic
Upgrade the intersection between the Resource Recovery Precinct Access Road and Elizabeth Drive.
Surface and Groundwater
Transport excess leachate off site to manage the risks to surface water. In addition to the removal of excess leach by trucks, a number of additional options to manage leachate were considered as part of the Site water balance. This identified the potential supplementary mitigation option of increasing the size of the SSO Compost Leachate Pond. Increasing the size of the SSO Compost Leachate Pond would minimise the potential for leachate overflows. The reduction in excess leachate and number of overflow events would depend on the size of the SSO Compost Leachate Pond. For example, should the pond have capacity for 4,000kL, around eight overflow events are predicted to occur per annum, requiring 68 tank truck movements per year (compared to 115 truck movements if current practices are continued). The removal of excess leachate offsite remains as the preferred leachate management measure. Further consideration to the potential expansion of the SSO Compost Leachate Pond is required during detailed design. This is to ensure that the benefits associated with reducing the reliance of off-site disposal is balanced against other potential costs (design, installation and management), Site constraints (in terms of space availability) and potential implications to operational flexibility. In the event that compost leachate overflows into the Harvested Stormwater Pond adjacent to the car park, the re-use of water from that pond would be suspended with all water pumped to tankers for treatment at an off-site location. Stormwater discharges to Badgerys Creek would continue as currently permitted by the conditions of the existing EPL. Other mitigation and management measures that would be implemented, or would continue to be implemented, are: - general site maintenance would also ensure that infrastructure remains in good-working order - provision of spill kits to ensure appropriate response to spills that may pose a risk to surface water runoff - use of HDPE for new compost leachate ponds - surface and groundwater monitoring would continue to be completed and reported in accordance with the EPL and Environmental Monitoring Manual (SITA, 2011). All surface water sample analysis would be undertaken by a NATA-endorsed analytical laboratory and reported to PCC and EPA.
Geology and Soils
No mitigation required.
Hazard and Risk
Install a fire rated wall in the composting areas.
Develop a shutdown procedure for the unlikely event that a fire occurs in the composting areas.
Update the existing emergency response plan as appropriate to include evacuation and response procedures for the Composting Hall and new Refining Building in the event a fire does occur.
Update the existing SOP for spill response as appropriate for the proposed Development.
Land Use
No mitigation required.

Mitigation and Management Measure
Landscape and Visual
Construct all new buildings and structures (including the stacks for the biofilters) with materials and colours that are consistent with the existing facility so as to remain sympathetic with the surrounding semi-rural landscape, including the use of earthen tones and minimising the use of reflective surfaces as far as practicable.
Design lighting to minimise light spill as much as possible on surrounding receivers.
Maintain and supplement, where possible, existing screen vegetation along the boundaries (particularly the northern boundary) of the Resource Recovery Precinct.
Ecology
Maintain the existing Vegetation Management Plan (including weed management) and existing water quality monitoring program.
Maintain permanent fencing and access restrictions that separate and protect areas of native vegetation from the operational activities.
Continue pest and vermin management at the Site.
Heritage
Maintain the fence to prevent access to the riparian area of the Site in order to ensure that disturbance to the previously recorded artefact scatter KC/1 is avoided.
Socioeconomic
Adopt a more proactive approach of informing adjacent landowners if and when facility issues are anticipated i.e., maintenance activities and performance issues.
Greenhouse Gas
GHG mitigation and management measures for operation are consistent with those for construction.

21.0 Residual Environmental Risk Analysis

This chapter presents the results of the residual environmental risk analysis.

21.1 Approach

The Residual Environmental Risk Analysis for the Development is based on a process adapted from *AS31000:2009 Risk Management – Principles and Guidelines* and has also been prepared to meet the DGRs. Residual environmental risk is assessed qualitatively on the basis of the significance of environmental effects of the Development and the ability to confidently manage those effects to minimise harm to the environment.

The significance of environmental effects was rated based on existing site conditions, the receiving environment, the level of understanding of the type and extent of impacts, and community response to the environmental consequences of the Development. This enables both the actual and perceived impacts to be considered. The environmental effects of the Development are detailed in Chapters 8.0 through 19.0. The ability to manage environmental effects was similarly given a rating based on the complexity of mitigation measures, the known level of performance of the mitigation measures proposed, and the opportunity for adaptive management. The mitigation measures are outlined in the summary of mitigation and management measures in Chapter 21.

The rating for each environmental issue in the Residual Environmental Risk Analysis is based upon the following considerations:

Significance of Effects

Extreme	Undisturbed receiving environment; type or extent of impacts unknown; substantial community concern.
High	Sensitive receiving environment; type or extent of impacts not well understood; high level of community concern.
Moderate	Resilient receiving environment; types and extent of impacts understood; community interest.
Minor	Disturbed receiving environment; type and extent of impacts well understood; some local community interest.
Low	Degraded receiving environment; type and extent of impacts fully understood; little community interest.

Ability to Manage Effects

Complex	Complicated array of mitigation measures required; safeguards or technology are unproven; adaptive management inappropriate.
Substantial	Significant mix of mitigation measures required; limited evidence of effectiveness of safeguards; adaptive management feasible.
Straight forward	Straightforward range of mitigation measures required; substantial track record of effectiveness of safeguards; adaptive management unlikely to be required.
Standard	Simple suite of mitigation measures required; substantial track record of effectiveness of safeguards; adaptive management unlikely to be required.
Minimal	Little or no mitigation measures required; safeguards are standard practice; adaptive management not required.

Table 21-1 shows the residual environmental risk analysis. The significance of each issue, and the ability to manage the effects of that issue, was giving a ranking between one and five. These two numbers were then multiplied to give a numerical ranking for the issue between 1 and 25.

Table 21-1 Residual Environmental Risk Analysis (Table 21.1)

Ability to Manage Effects	**Significance of Effects**				
	Extreme(5)	**High** (4)	**Moderate**(3)	**Minor**(2)	**Low**(1)
Complex(5)	25	20	15	10	5
Substantial(4)	20	16	12	8	4
Straight forward(3)	15	12	9	6	3
Standard(2)	10	8	6	4	2
Minimal (1)	5	4	3	2	1

Table 21-2 presents the results of the Residual Environmental Risk Analysis and compares this to the prioritisation of environmental issues undertaken prior to conducting the detailed environmental impact assessment and prior to developing mitigation measures for the Development (refer to Section 7.4).

The Residual Environmental Risk Analysis indicates that the Development presents an overall risk rating of around 6 on a scale of 1-25 in relation to each of the identified environmental issues, provided that the recommended mitigation and management measures are implemented. It is important to note that in a number of instances (such as odour and noise) this is a cumulative impact of the Development and the landfill that results in their rating.

Table 21-2 Residual Environmental Risk Analysis

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Air Quality				
Dust and air emissions during construction	**Low**	**Minor:** Potential emissions to air during construction consist predominantly of dust emissions associated with construction traffic and equipment. Emissions would also include products of fuel combustion from vehicles and equipment used in construction.	**Straight forward:** Impacts would be minimised by implementing mitigation measures outlined in Chapter 8. The current dust management strategy would continue to be implemented for the duration of the construction period, and also during operation. The management strategy would be supplemented by air quality monitoring. Mitigation measures that would include stabilising of disturbed areas, covering of loads during transport and watering of unsealed and exposed surfaces using a water cart to minimise dust emissions.	**6**

[2] See Section 7.4.2 for more details on the pre-detailed impact assessment prioritisation of issues, and the issues prioritisation matrix.

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Dust and air emissions during operation	**Low**	**Minor:** Emissions of dust and other air emissions resulting from the Development are not expected to be a significant contributor to the local ambient dust levels as all composting activities and refining is proposed to occur indoors.	**Straight forward:** a number of mitigation strategies to minimise odour and dust emissions during the proposed operations have been incorporated into the design of the Development. To further reduce potential impacts, mitigation measures would be incorporated, that would include sealing regularly trafficked surfaces, regularly maintaining, modifying or tuning equipment, plant and machinery, undertaking measures to modify or suspend dust-generating activities during periods of high wind speeds, and ensure that the negative pressure of the building and performance of the biofilters is maintained.	**6**
Odour emissions during operation	**High**	**Moderate:** The results of the air quality modelling undertaken for the Development indicate that the maximum 99th percentile odour concentrations at all sensitive receptors surrounding the Site would be below the criterion of 4 OU. However, when the cumulative assessment was undertaken for the proposed Development and the adjacent landfill, odour concentrations between 4 and 5.1 OU were predicted at two receptors located adjacent to the eastern boundary of the Resource Recovery Precinct.	**Straight forward:** Despite making changes to the design of the Development in response to concerns regarding odour emissions (such as internal handling, processing, composting and refining of all materials and use of enclosed leachate tanks), mitigation is required for two receptors near the Site as a consequence of the cumulative operation of the Development and landfill. SITA is currently in discussion with the affected landowners with the aim of reaching agreement regarding suitable mitigation.	**9**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Noise				
Temporary construction noise including earthworks, erection of structures, installation of plant, internal fit-out and temporary processing of waste external to buildings	**High**	**Moderate**: The bulk earthworks stage of construction is considered to be the likely nosiest activity as it potentially involves the largest number of plant items operating simultaneously. During the daytime period and under adverse meteorological conditions, a 1 dB(A) exceedance would occur at sensitive receiver R1, however, this is considered to be a negligible impact.	**Standard:** Construction noise is expected to have negligible impacts on the majority of surrounding sensitive receivers during the peak construction period. However, as some exceedances are predicted at nearby sensitive recievers, it is proposed that a Construction Noise Management Plan be put in place.	**6**
Operational noise including indoor and outdoor operations, and increased traffic flows	**Moderate**	**Moderate:** As a result of the Development, there would be a reduction in external plant and equipment due to the internalisation of composting activities, an increase in biofilters fans, a change in the hours of operation, an increase in light vehicles, and an increase in heavy vehicle movements associated with the delivery and dispatch of material. Indoor operations at the Development are proposed 24 hours a day, seven days per week (including Public Holidays). Outdoor operations are proposed between 6 am and 10 pm Monday to Friday (with no restriction on vehicle movements).	**Standard:** No additional mitigation measures are proposed to be incorporated into the design of the Development over and above the following measures (which have been factored into the noise impact assessment). These include noise mitigation to the wheel loaders, attenuation of all seven biofilter extraction fans, and cessation of wheel loader operations after 10pm.	**6**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Traffic				
Temporary increase in traffic during construction	**High**	**Minor:** The Elizabeth Drive / Resource Recovery Precinct Access Road intersection is expected to operate at LoS A during the 5 to 6 am construction peak. The results also demonstrate that the level of service of this intersection during the PM Peak period would not be impacted by construction, with the LoS being comparable to the LoS in 2014 without the Development. The LoS of The Northern Road / Elizabeth Drive and Elizabeth Drive / Mamre Road intersections would be the same in 2014 with or without the Development.	**Straight forward:** A CTMP would be put in place to manage the traffic generated during construction. The CTMP would detail vehicle routes, the number of construction vehicles, hours of operation, access arrangements and traffic control measures.	**6**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Increase in traffic during operation	**Medium**	**Moderate:** Factoring in the intersection upgrade, the future year assessment of operation of the Development in 2016 and 2026 shows that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection operates at LoS E during the AM Peak. This is a considerable improvement on the existing situation, however, heavy vehicles departing the Site may still experience some delays when turning to the west. Other movements at the intersection, namely eastbound traffic exiting the Site, show improved performance as they are no longer required to wait behind westbound vehicles. The Elizabeth Drive / The Northern Road and Elizabeth Drive / Mamre Road intersections continue to operate at LoS B during both the AM and PM peak hours in 2016 and 2026 and therefore are not impacted by the proposed Development.	**Straight forward:** Background traffic growth on Elizabeth Drive is the major traffic issue for The Development, with high volumes of additional traffic forecast to use the road in future years. This growth necessitates that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection be upgraded to a 'seagull' intersection prior to the commencement of peak operations.	**9**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Surface and Groundwater				
Surface water quality impacts during construction	**Low**	**Moderate:** Construction of the Development, particularly during Site preparation and earthwork activities, has the potential to result in erosion of disturbed areas or construction material stockpiles. Vehicle and plant movements during construction would also have the potential to impact on surface water quality within the construction area and in Badgerys Creek. Without the implementation of appropriate control measures, erosion and mobilisation of sediments could result in degradation of water quality within the construction area and in Badgerys Creek. There is also the potential for other pollutants such as oil and grease from construction equipment to contaminate runoff.	**Standard:** Impacts would be minimised by implementing the mitigation measures described in Chapter 11. A water quality monitoring program would be developed as part of a Soil and Water Management Plan (SWMP), which would form part of the Construction Environmental Management Plan (CEMP) to manage soil and water during construction. Mitigation measures such as constructing clean stormwater diversion drains, installing temporary sedimentation ponds/traps for capturing sediments and installing silt fences or other equivalent methods to prevent the migration of sediments would be undertaken. These mitigation measures would be implemented to reduce the potential for contaminated runoff to enter Badgerys Creek.	**6**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Surface water quality impacts during operation	**Medium**	**Moderate:** The greatest potential impacts on hydrology and water quality during operation of the Development would result from an increase in the volume of stormwater drainage runoff, the management of excess leachate, overflows from the MSW Compost Leachate Pond to the Harvested Stormwater Pond, spills and leaks resulting in discharge of contaminated stormwater.	**Standard:** The mitigation measures outlined in Chapter 11.0 would be implemented in order to minimise surface water impacts during operation. These mitigation measures would include the installation of a cover over the MSW Compost Storage Pad or increasing the size of the SSO Compost Leachate Pond, general site maintenance, provision of spill kits, use of HDPE for new compost leachate ponds and surface and groundwater monitoring	**6**
Impacts to groundwater during construction	**Low**	**Moderate:** Vehicle and plant movements during construction would have the potential to impact on groundwater quality within the construction area and in Badgerys Creek. Further, there is potential for surface water infiltration to impact groundwater quality across the Site during construction.	**Standard:** Potential for impact would be minimised by implementing appropriate controls and management measures through the CEMP. These would include applying restrictions of construction works within areas of required disturbance, appropriate staging of works to decommission the existing leachate ponds servicing the maturation pad (replaced with enclosed leachate collection tanks), construction of a clay liner overlaid by a HDPE liner for the new compost leachate collection pond for the Compost Storage Pad, as well as undertaking groundwater monitoring to ensure migration of leachate to groundwater does not occur during construction.	**6**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Impacts to groundwater during operation (leachate ingress)	**Low**	**Moderate:** There is potential for surface water infiltration to impact groundwater quality across the Site during operation.	**Standard:** As is current practice at the Site, all leachate collection ponds are appropriately lined with a clay liner overlaying a HDPE liner. Stormwater is also harvested from impermeable surfaces for re-use in Site operations, with stormwater discharged to Badgerys Creek in-line with water quality requirements specified in the EPL. The existing groundwater monitoring program would continue, which would ensure that surface water is conveyed from Site efficiently to limit infiltration to groundwater.	**6**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Geology and Soils				
Erosion and sedimentation during construction	**Medium**	**Moderate:** Construction activities would result in disturbance of underlying soils and have the potential to result in erosion of soils. Construction activities associated with the Development that may give rise to soil erosion include stockpiling of construction fill materials and excavated soil, excavation of sub-grade for construction of foundations for buildings etc, placement of fill materials for buildings etc, trenching for additional services infrastructure, movement of construction equipment within the Site and movement of construction equipment and delivery vehicles along the temporary construction access road which would consist of a gravel surface. The potential for erosion would be minimised by implementing erosion control measures.	**Standard:** The potential for erosion to occur would be minimised by implementing erosion control measures detailed in an Erosion and Sediment Control Plan (ESCP). Erosion control measures would include measures such as minimising stockpiling, diverting surface water from disturbed areas, use of silt fences and settlement ponds and vegetating stockpiles if requiring stabilisation to negate erosion.	**6**
Erosion and sedimentation during operation	**Low**	**Minor:** The majority of the Site would be covered with buildings and sealed surfaces such as hardstand areas, parking areas and roadways which would not give rise to erosion. Therefore, there would be little potential for erosion or sedimentation to occur during operation.	**Minimal:** No mitigation is required.	**2**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Hazard and Risk				
Exposure of employees and surrounding land uses and sensitive receivers to hazards and risks associated with operation	**Medium**	**Minor:** Through the use of existing and enhanced systems, controls and processes for the existing SAWT facility and the proposed Development, and implementation of the recommended mitigation and management measures, the hazards associated with the proposed Development would be appropriately managed. Therefore, it has been determined that the Development is not hazardous or offensive.	**Standard:** The use of existing and enhanced systems, controls and processes for the existing SAWT facility and the proposed Development, along with some additional recommended mitigation and management measures, would be adequate for managing hazards and risks. It is recommended that a shutdown procedure be developed in the unlikely event a fire occurs in the composting areas. The existing emergency response plan should be updated as appropriate to include evacuation and response procedures for the Composting Hall and new Refining Building in the event a fire does occur. The existing SOP for spill response should also be updated.	**4**
Land Use				
Construction impacts to adjacent and nearby land uses	**Very low**	**Minor:** Given the industrial nature of the existing facility, the construction phase of the Development is unlikely to have any impacts on nearby land uses.	**Minimal:** No mitigation is required.	**2**
Operation impacts to adjacent and nearby land uses	**Medium**	**Moderate:** Odour, noise and traffic is considered to be the potential impact that is most likely to cause land use conflicts with surrounding rural areas.	**Straight Forward:** Mitigation and management measures for odour, noise and traffic are listed in Chapters 8, 9 and 10.	**9**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Landscape and Visual				
Construction related visual amenity impacts	**Low**	**Minor:** The Development proposes to augment the existing AWT facility, a highly disturbed portion of the Site already. Visual amenity will be consistent with that already approved for the site.	**Minimal:** The retention of perimeter vegetation is considered sufficient to minimise any temporary change in the visual appearance of the Site as construction is underway.	**2**
Impacts related to visual amenity of the expanded facility	**Low**	**Minor:** The Development would consist of augmentation of existing buildings. Visual amenity of the facility would remain consist with existing conditions. Further, surrounding receivers are generally considered not to be significantly adverse, due to the relative distance of all surrounding receivers, screening provided by intervening vegetation and the future mitigative effects of the final landform levels of the landfill.	**Standard:** Mitigation measures to minimise operation visual impacts include: construction of all new buildings with materials and colours that are consistent with the existing facility, design lighting to minimise light spill as far as possible, and to maintain and supplement existing screen vegetation.	**4**
Ecology				
Impact on flora and fauna on-site, particularly the Roughbark Angophora on the northern border of the Site	**Very low**	**Minor:** The Development will not have an adverse impact on on-site flora or fauna as the Site is already highly disturbed and largely clear of vegetation.	**Standard:** The Roughbark Angophora on the northern border of Site would be retained, and would be fenced off prior to the commencement of construction activities in the vicinity.	**4**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Impact on flora and fauna off-site	**Low**	**Minor:** The Development would not have an adverse impact on terrestrial flora and fauna in areas surrounding the Site, including to Badgerys Creek to the west.	**Standard:** A Soil and Water Management Plan would be prepared to ensure that operations do not pose a threat to Badgerys Creek flora and fauna. Access to the Badgerys Creek riparian area and Cumberland Woodland revegetation area would continue to be restricted for both SITA staff and construction contractors.	**4**
Heritage				
Impacts to indigenous and non-indigenous heritage items	**Very low**	**Minor:** The Site is highly disturbed and has undergone development in areas proposed for the Development. The likelihood of discovering any indigenous and non-indigenous heritage items is low.	**Minimal:** No mitigation required.	**2**
Socioeconomic				
Generation of employment opportunities	**Positive impact**	**Positive impact:** The Development would employ an additional 22 FTE positions for operation of the expanded facility, as well as a peak construction workforce of 130.	**Minimal:** No mitigation required.	**Positive impact**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Impact on amenity of nearby residential land uses (i.e. noise, air quality, hazard and risk)	**Medium**	**Moderate:** While not excessive or unmanageable, the potential for odour and noise impacts at surrounding receivers is apparent. Traffic noise would impact residences during the AM peak period of 7am to 9am along Elizabeth Drive. The results of the air quality modelling undertaken for the Development indicate that the maximum 99th percentile odour concentrations at all sensitive receptors surrounding the Site would be below the criterion of 4 OU.	**Straight forward:** Mitigation and management measures for odour, noise and traffic are listed in Chapters 8, 9 and 10.	**9**
Demand for community resources and impact on the community	**Very low**	**Low:** There is not expected to be any demand for community resources such as education or healthcare as a result of the Development. A majority of FTE employees added to the Applicants workforce would be assumed to reside in the local area.	**Minimal:** No mitigation required.	**1**
Benefits to the Penrith LGA economy	**Positive impact**	**Positive impact:** The Development would generate positive benefits for the Penrith LGA through the estimated capital expenditure of $50 million.	**Minimal:** No mitigation required.	**Positive impact**

Issue	Priority (Pre- detailed Impact Assessment and Mitigation)[2]	Significance of Effects	Ability to Manage Effects	Residual Environmental Risk (Post-Mitigation)
Greenhouse Gas				
Greenhouse gas emissions due to operations	**Moderate**	**High:** The Development would generate greenhouse gas emissions as a result of composting operations. However, the Development would also result in a reduction in some emissions released into the atmosphere as it diverts waste from landfill.	**Straightforward:** Appropriate mitigation measures would be applied to reduce GHG emissions as outlined in Chapter 19. This includes basic measures to reduce GHG emissions through the minimisation of electricity usage, use of biofuels for power equipment, and regularly maintaining plant and equipment. The Applicant also has a pending DA to capture methane from the adjacent landfill and generate power to supply operations at the Development.	**12**

22.0 Justification and Conclusions

This chapter presents a justification for the Development and a conclusion to the environmental impact assessment. It considers a range of issues including the benefits of the Development, protection of the environment, the objects of the EP&A Act, and the principles of ecologically sustainable development.

22.1 Justification

22.1.1 Summary of Strategic and Development Justification

The 2009 Wright Review, commissioned by the former Minister for Planning, reviewed the remaining putrescible landfill capacity and demand in the Sydney metropolitan area to provide advice on future waste infrastructure needs, and to update the *Independent Public Assessment – Landfill Capacity and Demand* published in September 2000. The Wright Review also recognised the need for substantial investment in further AWT capacity for both municipal and C&I sectors to enable the NSW Waste Targets to be met and maintained.

While it was concluded that there is sufficient landfill capacity for more than 20 years to cater for Sydney's waste, these conclusions rely, in part, on increased investment in AWTs to divert greater amounts of putrescible waste from landfills. This would result in reduced pressures being placed on the remaining landfill capacity. To achieve Commonwealth and State Government policies for waste avoidance and resource recovery in Australia and NSW, there is a growing and urgent need for further investment in AWTs in the Sydney metropolitan area and NSW. Therefore, there are two key areas supporting the need and justification for the Development:

- need with respect to the remaining limited landfill capacity, NSW State Targets and customer demand
- environmental benefits that would result from the Development.

At present, there are only a limited number of AWT facilities within the Sydney metropolitan area. This includes the existing SAWT facility, the UR-3R facility at Eastern Creek, the Earthpower facility at Camellia (which processes commercial organic waste), and to a lesser extent due to technical issues, the Spring Farm ARRT (formally Jacks Gully). These provide limited capacity to further increase throughput over time. As a consequence, there has been additional pressure placed on technically proven facilities such as the existing SAWT facility at Kemps Creek.

Since the release of the 2009 Wright Review, there has been limited investment in AWT facilities for municipal waste in Sydney. In fact, the review assumed that a number of proposed or approved AWTs would be fully operational by 2018/2019. These facilities, which would have provided an additional capacity of 440,000 tpa by 2018/2019, have not been realised (to date) or are no longer proceeding[3].

The Development represents a much needed investment in AWT technology in the Sydney metropolitan area, to meet growing demand and to deliver broader environmental and social benefits to Sydney and NSW by:

- diverting up to an additional 45,000 tpa of municipal waste from landfill and easing pressure on Sydney's remaining putrescible landfill capacity
- providing additional AWT capacity within the Sydney metropolitan area to address the shortfall in AWT capacity that is required to meet the demands of municipal councils
- contributing towards the realisation of the NSW WARR Strategy 2007 and NSW State target of 66 percent diversion of municipal waste away from landfill
- enhancing the environmental performance of the existing SAWT facility.

[3] As of September 2012, the Woodlawn AWT and Lucas Heights AWT have been approved but not constructed. The Chullora AWT never proceeded to assessment and the Part 3A declaration has been revoked.

In addition to providing a significant increase in waste diversion and treatment capacity in the Sydney metropolitan area, the Development would improve operations at the existing SAWT facility. As there has been a slower uptake than assumed by the 2009 Wright Review for AWTs in Sydney, the Development has the advantage of expanding a proven facility to provide additional capacity for putrescible waste throughput. This in turn would assist in reducing pressure on Sydney's remaining landfill capacity. This represents a significant opportunity to divert municipal waste from landfill in the Sydney metropolitan area and NSW and would assist the NSW Government in achieving its goal of increasing recovery and use of secondary materials in NSW, and in doing so, contribute towards the achievement of the NSW State targets.

22.1.2 Environmental, Social and Economic Impacts

Key environmental, social and economic issues have been subject to environmental assessment and the potential for impact has been identified. Consideration of the environmental and social impacts of the Development in particular have been fundamental to the design of the expanded facility. Key potential environmental impacts associated with the Development are detailed in Chapters 8 through 19 of this EIS and are summarised below:

- **Air Quality.** Construction activities are not expected to have a significant impact on sensitive receivers, and any impact would be short term given the nature of the construction activity. The works would be undertaken with standard construction equipment and the emissions would be managed using best practice construction management and mitigation processes. The assessment of the odour and particulate emissions from operation of the Development demonstrate that the Development alone would comply with the EPA criteria for odour of 4 OU, and would be a low contributor when compared to the current background levels of particulates. However, when the cumulative assessment was undertaken for the proposed Development and the adjacent landfill, odour concentrations between 4 and 5.1 OU were predicted at two receivers located adjacent to the eastern boundary of the Resource Recovery Precinct. SITA is currently in discussion with the affected landowner with the aim of identifying and implementing an appropriate mitigation and management approach to these impacts
- **Noise.** Construction noise is expected to have negligible impacts on the majority of surrounding sensitive receivers during the peak construction period. Nonetheless, mitigation and management measures would be implemented to manage noise emissions during construction. A number of reasonable and feasible noise mitigation measures have been factored into the Development to reduce the operational noise contributions of the Development. As a result, the Development is within the noise limits set for the existing SAWT facility in the conditions of approval and EPL. Further, when assessed against more contemporary INP assessment criteria, any predicted exceedances are in the order of 1-2 dB(A). Such exceedances are considered to be minor. Any further reductions are not considered reasonable or feasible. For cumulative noise emissions that would occur as a result of the Development and the landfill, compliance with the EPL noise limits for the landfill has been demonstrated in this EIS. It is acknowledged that exceedances of the INP assessment criteria are predicted, including noise contributions up to 8 dB(A) over the criterion at one sensitive receiver during the daytime period and during adverse meteorological conditions. However, the landfill is the more significant contributor to the total noise emissions of the two assessed operations. As noise mitigation strategies for the Development are considered to be reasonable and feasible, any further reductions by the Development are not considered appropriate. Further, strategies to respond to the predicted contributions by the landfill are beyond the scope of this DA and EIS. Ongoing monitoring would be undertaken, in conjunction with onsite observations, to ascertain compliance and to feed into future performance reviews of the Precinct.
- **Traffic.** The Elizabeth Drive / Resource Recovery Precinct Access Road intersection is expected to operate at LoS A during the 5 to 6 am construction peak. The results also demonstrate that the level of service of this intersection during the PM Peak period would not be impacted by construction, with the LoS being comparable to the LoS in 2014 without the Development. The LoS of The Northern Road / Elizabeth Drive and Elizabeth Drive / Mamre Road intersections would be the same in 2014 with or without the Development. A CTMP would be put in place to manage the traffic generated during construction. The CTMP would detail vehicle routes, the number of construction vehicles, hours of operation, access arrangements and traffic control measures. Background traffic growth on Elizabeth Drive is the major traffic issue for The Development, with high volumes of additional traffic forecast to use the road in future years. This growth necessitates that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection be upgraded to a 'seagull' intersection prior to the commencement of peak operations. Factoring in the intersection upgrade, the future year assessment of operation of the Development in 2016 and 2026 shows that the Elizabeth Drive / Resource Recovery Precinct Access Road intersection operates at LoS E during the AM Peak. This is a considerable improvement on the existing situation, however, heavy vehicles

departing the Site may still experience some delays when turning to the west. Other movements at the intersection, namely eastbound traffic exiting the Site, show improved performance as they are no longer required to wait behind westbound vehicles. The Elizabeth Drive / The Northern Road and Elizabeth Drive / Mamre Road intersections continue to operate at LoS B during both the AM and PM peak hours in 2016 and 2026 and therefore are not impacted by the proposed Development.

- **Surface and Groundwater.** Construction and operation activities associated with the Development have the potential to impact on surface and groundwater quality and flow if not managed appropriately. Impacts to surface and groundwater associated with the Development would be minimised by implementing mitigation control measures. With the implementation of the appropriate management measures across the Site, it is concluded that the Development is unlikely to have significant impacts on the surface water and groundwater environments. Additional mitigation measures, particularly with respect to leachate management, would ensure appropriate management of water at the Site.
- **Geology and Soils.** The main potential for impacts to soils and geology would occur during construction. Construction activities have the potential to cause soil erosion, however, the potential for erosion would be minimised by implementing erosion control measures. When fully operational, the majority of the Site would consist of hardstand areas and buildings which would not give rise to erosion. There is little risk of encountering contamination during construction given the Site was filled prior to construction of the existing SAWT facility, waste is composted and stored within buildings or on sealed/hardstand surfaces, leachate ponds at the Site are lined with HDPE, and there has never been an incident involving a chemical spill at the facility. There is little to no potential for contaminants associated with operation of the Development to enter underlying soils and migrate from the Site since all waste processing and composting activities would be conducted within enclosed buildings, leachate tanks or HDPE lined leachate ponds would be installed, and chemicals would continue to be stored indoors in sealed containers.
- **Hazard and Risk.** Through the use of existing and enhanced systems, controls and processes for the existing SAWT facility and the proposed Development, and implementation of the recommended mitigation and management measures, the hazards associated with the proposed Development would be appropriately managed. Therefore, it has been determined that the Development is not hazardous or offensive and therefore does not require further assessment under the provisions of SEPP 33.
- **Landscape and Visual.** The visual impacts of the Development on surrounding receivers are generally considered not to be significantly adverse, due to the relative distance of all surrounding receivers, screening provided by intervening vegetation and the future mitigative effects of the final landform levels of the landfill. In particular, the distance of nearest receivers to the Development means that the change in dimension and height of the Development from the existing facility would not be significantly noticeable or pose significant additional intrusive impacts compared to the existing situation. The Development would not significantly change the scale or look of the existing facility, operations would remain consistent with that currently being undertaken on-site and would be confined within the footprint of the Resource Recovery Precinct, which has been an existing land use in the area for over 20 years. The final landform of the landfill upon rehabilitation would improve views of the Development in the future by physically obscuring and reducing the visibility of the facility at some receivers.
- **Ecology.** The Site has been extensively cleared and disturbed, and has low ecological value. Direct impacts on the adjoining riparian areas, which contain two EEC's and potential species habitat, would not occur as part of the Development. The single Roughbark Angophora which is present at the Site would not be impacted by the Development. As such, the Development is not anticipated to have any direct or indirect impacts on ecology subject to implementation of the recommended mitigation and management measures.
- **Aboriginal and Historic Heritage.** Given the past activities at the Site and the location of the Development on previously disturbed areas, the Development is not anticipated to have any direct or indirect impacts on sites of Aboriginal or historic heritage. In the event that Aboriginal objects or human remains are uncovered at the Site, management responses would be implemented.
- **Socio Economic.** The Development would provide short term economic benefits during construction and longer term economic opportunities through local procurement and additional employment opportunities. SITA contributes to the local community through their continued waste education programs. The Development would deliver improvements to the environmental performance of the existing SAWT facility, leading to improvements in the amenity of surrounding properties. However, there is potential for some amenity impacts resulting from operation of the Development, particularly in relation to odour. Mitigation measures are recommended to minimise these impacts.

- **Greenhouse Gas.** The Development would result in the production of GHG's during both construction and operation, however would result in a reduction in some emissions released into the atmosphere as it diverts waste from landfill. During the construction phase of the Development electricity, fuel and materials would be consumed. These activities would generate GHG emissions directly and indirectly, a total of approximately 2,805 tCO_2-e Scope 1, 2 and 3 emissions. The operation phase of the Development would also generate GHG emissions, for example from the consumption of diesel fuel and electricity to run the facility and the generation of fugitive emissions. It is estimated that the total annual operational (Scope 1, 2 and 3) GHG emissions associated with the Development (approximately 66,000 to 77,000 tCO_2-e) are approximately equivalent to 0.05 percent of NSW's annual GHG emissions (in 2009 to 2010).

More detailed mitigation measures to avoid or ameliorate these, and more minor potential impacts, have been recommended within relevant sections of this EIS to reduce the potential impact to an acceptable level of environmental risk.

This EIS includes environmental performance objectives to guide the Development and contains environmental performance criteria from which to measure the environmental performance of the Development. This EIS and accompanying specialist studies demonstrates that the Development would not result in significant impact on the environment and would generate significant social and economic benefits to the Western Sydney Region and NSW. They also confirm that the proposed concept has a strong justification for proceeding and is considered to be suitable for approval under Part 4 of the EP&A Act.

22.1.3 Objects of the Act

The objects of the EP&A Act provide a framework within which the justification for the Development can be considered. A summary of this assessment is provided in Table 22-1.

Table 22-1 Objects of the EP&A Act and Relevance to the Development

EP&A Act objective	Comment
To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, waters, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	The Development would occur entirely within the boundary of the Resource Recovery Precinct and would not have any direct or indirect adverse impacts on agricultural land, natural areas, forests, minerals, cities, towns or villages. Mitigation measures are recommended to ensure Badgerys Creek is not adversely impacted by the Development. The Development would have a positive impact on the management and conservation of natural and artificial resources. Waste accepted by the Development would be sorted with a portion sent to landfill, a portion recycled and the remainder processed into compost for beneficial use, such as for mine rehabilitation. Through this process, approximately 45 percent of the Development's intake would be diverted from landfill, resulting in a reduction in GHG emissions. The Development would create employment opportunities both during construction and operation.
To encourage the promotion and co-ordination of the orderly and economic use and development of land.	The Development involves the expansion of an existing facility within the boundary of the Resource Recovery Precinct, resulting in the orderly and economic use of land which is already used for waste management and processing. Economically, expanding the existing SAWT facility and leveraging the existing technology was deemed to be the preferred alternative when compared to developing an entirely new facility or adopting different composting technology. The Development would have economic benefits in terms of job creation.

EP&A Act objective	Comment
To encourage the protection, provision and co-ordination of communication and utility services.	The Development would utilise existing communication and utility services.
To encourage the provision of land for public purposes.	The Development would be a secure development with no direct public access to the Site.
To encourage the provision and co-ordination of community services and facilities.	The Development would not provide community services or facilities, however the provision of waste management services is critical for public health
To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	The Site has been subject to extensive disturbance, through past quarrying, landfilling and waste processing activities. As a result, the Site has low ecological value. Direct impacts on the adjoining riparian areas, which contain two EEC's and potential species habitat, would not occur as part of the Development. The single Roughbark Angophora which is present at the Site would not be impacted by the Development.
To encourage ecologically sustainable development.	The Development has been assessed and deemed to be consistent with the five principles of ecologically sustainable development.
To encourage the provision and maintenance of affordable housing.	The Development does not include the provision of affordable housing.
To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Throughout preparation of the EIS for the Development, consultation has been undertaken with relevant levels of government.
To provide increased opportunity for public involvement and participation in environmental planning and assessment.	Community consultation has been undertaken prior to and during the EIS and concept design process. The concept design for the Development was modified in response to community concerns particularly relating to odour and noise such that all composting is proposed to be conducted internally. Consultation would continue through the detailed design phase, construction and operation of the Development. The EIS will be placed on public exhibition.

22.1.4 Ecologically Sustainable Development

Sustainable development is defined by the World Commission on Environment and Development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN, 1992). The EP&A Act encourages ecologically sustainable development (ESD) in line with four sustainability principles set out under the EP&A Regulation. The sustainability principles are:

- the precautionary principle
- the principle of intergenerational equity
- conservation of biological diversity and ecological integrity
- improved valuation, pricing and incentive mechanisms.

ESD requires the effective integration of social, economic and environmental considerations in decision-making processes. Table 22-2 summarises how the Development is consistent with the principles of ESD.

Table 22-2 Application of the Principles of ESD to the Development

ESD principle	Overview of Principle	Development
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. In the application of the precautionary principle, public and private decisions should be guided by:* *(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and* *(ii) an assessment of the risk-weighted consequences of various options.*	The Development has considered the precautionary principle by carrying out detailed environmental investigations in order to gain as much knowledge about the environmental characteristics of the Site and surrounding area, and the processes and interactions of various components of the environment as is reasonably possible. This knowledge has been used to determine the potential environmental impacts and recommend environmental management practices and mitigation measures to ensure significant impacts do not occur and residual environmental impacts are minimised. The Site would continue to operate as an AWT facility with an increase in capacity of the facility. The Development would further reduce the amount of waste placed into landfill, assisting to meet NSW State Targets and service the continuing rise in customer demand. While a number of potential threats are outlined in the residual environmental risk analysis in Chapter 22, all are considered unlikely to cause serious or irreversible environmental damage. As detailed in Chapters 8 through 19, measures to prevent environmental degradation during construction and operation would be addressed by a series of mitigation and management measures, and by an extension of SITA's existing environmental management policies. This approach is consistent with the precautionary principle. The environmental impact assessment of the Development has been undertaken in parallel with consultation with Government agencies to ensure the key issues have been identified and addressed, and lack of scientific certainty with respect to potential issues has been minimised.

ESD principle	Overview of Principle	Development
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.*	Mitigation measures have been developed as part of this EIS in accordance with current best management practice recognising the requirement to achieve, where possible, a neutral or beneficial effect on the environment. The mitigation measures which form a fundamental part of the Development would ensure that there are not significant adverse impacts to the environment and that the quality of the environment is maintained for the benefit of future generations. The Development would result in a reduction in energy use compared with the existing facility, which would reduce GHG emissions and the contribution of the facility to climate change. The energy efficiency measures for new operational plant and buildings that are incorporated into the Development include: - translucent roof panels to increase natural light and reduce electricity use from internal lighting on the new Composting Hall - automated composting operations with variable speed drive for optimal energy usage - directing of all leachate produced in the Composting Hall, Tunnel Composting System and biofilters to enclosed leachate tanks for reuse, thereby reducing the need for aeration of large leachate dams. Benefits to future generations would also be realised by: - provision of jobs during construction and operation - diverting up to an additional 45,000 tpa of municipal waste from landfill and easing pressure on Sydney's remaining putrescible landfill capacity - providing additional AWT capacity within the Sydney metropolitan area to address the shortfall in AWT facility capacity that is required to meet the demands of municipal councils - contributing towards the realisation of the NSW WARR Strategy 2007 and NSW State target of 66 percent diversion of municipal waste away from landfill - enhancing the environmental performance of the existing facility. Further discussion on the economic and social benefits of the Development are provided in Chapter 18.

ESD principle	Overview of Principle	Development
Conservation of biological diversity and ecological integrity	*Namely that conservation of biological diversity and ecological integrity should be a fundamental consideration.*	The history of the Site has changed the Site conditions to the point where the Site and immediate surrounding area, with the exception of the Badgerys Creek riparian area, has very limited biological diversity and ecological integrity. The Development is able to be constructed without any significant impact on the biological diversity and ecological integrity of the locality. There would be no adverse impact upon threatened species, populations or ecological communities or their habitats as a result of construction or operation.
Improved valuation, pricing and incentive mechanisms	*Namely, that environmental factors should be included in the valuation of assets and service, such as:* *(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement* *(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,* *(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*	This principle identifies that environmental factors should be included in the valuation of assets and services, such as polluter pays, full life cycle costing, and utilising incentive structures/market mechanisms to meet environmental goals. It is difficult to assign a monetary value to the environment of the locality given a lack of precedent in valuing environmental resources not considered for commercial use. As a monetary value could not be placed on the environmental attributes of the Site, the approach taken was to manage environmental impact by identifying site-specific safeguard measures to mitigate against adverse environmental effects, and to include the cost of these measures in the overall cost of the Development. This enables the value and price of the environmental resource to be more accurately reflected.

22.2 Conclusion

This EIS has addressed the key issues identified in the DGRs issued in accordance with the EP&A Act. A check list showing where the DGRs are addressed in this EIS is provided in Chapter 7. The assessment has also addressed the additional key issues identified in the environmental risk analysis in Chapters 7 and 21. The key issues identified include:

- Air quality emissions and amenity impacts during operation, particularly associated with odour
- Noise and amenity impacts during construction and operation
- Traffic and transportation during construction and operation

- Surface and groundwater, particularly surface water impacts during operation
- Erosion and sedimentation during construction
- Hazard and risks during operation
- Greenhouse gas emissions
- Visual impacts
- Flora and fauna impacts
- Heritage impacts
- Socio economic impacts.

As detailed in Chapters 8.0 through 19.0, and summarised in Section 22.1.2, the Development would not result in significant environmental and social impacts, and would generate economic benefits through job creation during construction and operation. Where environmental and social impacts have been identified, particularly in relation to the cumulative odour and noise impacts associated with the Development and adjacent landfill, mitigation and management measures have been recommended to ameliorate these potential impacts. In the case of potential odour impacts, SITA is currently in discussion with the affected landowner with the aim of reaching agreement regarding suitable mitigation.

The Development represents a much needed investment in AWT technology in the Sydney metropolitan area, to meet growing demand and to deliver broader environmental and social benefits to Sydney and NSW by:

- diverting up to an additional 45,000 tpa of municipal waste from landfill and easing pressure on Sydney's remaining putrescible landfill capacity
- providing additional AWT capacity within the Sydney metropolitan area to address the shortfall in AWT capacity that is required to meet the demands of municipal councils
- contributing towards the realisation of the NSW WARR Strategy 2007 and NSW State target of 66 percent diversion of municipal waste away from landfill
- enhancing the environmental performance of the existing SAWT facility.

Considering these benefits, the fact that the Development would not have significant environmental and social impacts, and that mitigation is recommended to ameliorate impacts, the Development has a strong justification for proceeding and is considered to be suitable for approval under Part 4 of the EP&A Act.

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