
Environmental Management Plan

Kemps Creek SAWT ARRT

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Introduction

1.1 Purpose

The purpose of this document is to describe the environmental management of operational activities at the Kemps Creek SUEZ Advanced Waste Treatment (SAWT) Advanced Resource Recovery Technology (“ARRT”) facility that have, or are likely to have, an impact on the environment. This document sets out detailed procedures and measures that must be taken to eliminate, minimise and mitigate environmental impact. Furthermore, to ensure compliance with relevant legislation, regulatory requirements and undertakings given by SUEZ. This document also assists internal and external stakeholders in assessing environmental performance and ensures transparency across environmental operations.

SUEZ’s Environmental, Quality and Safety (“EQS”) Management Systems structured in accordance with the requirements of the following standards:

- AS/NZS 4801:2001 Occupational Health and Safety Management Systems ISO
- 14001:2011 Environmental Management Systems; and ISO 9001:2000 Quality
- Management System.



SUEZ’s EQS management system is certified to the above standards by an independent third-party.

“SUEZ is committed to undertaking all activities in an environmentally responsible way, preventing pollution and proactively developing environmentally sustainable activities.” –
Environment Policy

Figure 1 Aerial view of Kemps Creek SAWT ARRT – taken 07 October 2016

1.2 Scope

This document applies to all activities undertaken at the Kemps Creek SAWT ARRT.

It is not intended that this Environmental Management Plan (EMP) repeat the wide range of environmental matters that were assessed leading to the issuing of the approval and licence. However, where it is helpful to clarify or draw to attention of the reader an issue discussed in the various reference documents the EMP either a.) refers to the respective document and relevant section; or b.) repeats relevant text.

1.3 Statutory Requirements

The steps for ensuring legal and regulatory compliance are set out in the *Legislative and Other Requirements Procedure*. This procedure outlines key responsibilities for updating and communicating statutory requirements. Relevant statutory requirements are maintained in the *Legislative Register – Environmental*.

The environmental aspects of the construction and operation of the SAWT facility were assessed in accordance with planning laws and in the context of legislation and guidelines applicable to each of those aspects. Each of the specialist

studies documented in the EA and Preferred Project Report list the legal and guideline documents considered in those studies

1.4 Environmental Protection Licence (12889)

Kemps Creek SAWT ARRT operates under an Environment Protection Licence ("EPL") issued by the New South Wales Environment Protection Authority ("EPA").

1.5 Development Consent

Kemps Creek SAWT ARRT operates under a State Significant Development Consent approved by the Minister for Planning in April 2008. Subsequently an additional development approval was granted in January 2014.

The principal features of the Minister's approval include:

- Permit for 20 years the annual receipt and processing of: (a) 120,000 tonnes of mixed and garden waste; and (b) 14,400 tonnes of biosolids
- Set out the requirement to develop, have approved and implement several management plans designed to protect the environment during both construction and operation.
- Allow the progressive/staged submission of management plans and monitoring programmes – intended mainly to allow construction-related environment documentation to be submitted in advance of operations-related documentation; and
- The conditions of approval take precedence over, but do not replace, environmental assessment documents and the commitments made.

1.6 Environmental Management Plan Requirements

Schedule 4 of the Minister's approval requires the preparation of an EMP for the operational phase of SAWT.

1.7 Organisational Structure at Kemps Creek SAWT ARRT

Please refer to Intranet SUEZ Australia

1.8 Workers and Training Requirements

The Facility Manager ensures the provision of adequate training for workers on-site to ensure that all requirements described in this EMP are met. It is also the Facility Manager's responsibility to provide adequate training to all workers performing critical tasks, such as inspection and direction of incoming wastes, operation of the equipment and environmental management on-site.

An environment, quality, and safety (EQS) management system has been implemented by SUEZ. It provides SUEZ's employees with information about their environmental responsibilities which are outlined in specific procedures.

1.9 Environmental Audit and Review

SUEZ evaluates the performance of Kemps Creek SAWT ARRT in accordance with *Management Systems Review Procedure*, *Monitoring and Measurement Procedure*, *Audit Procedure* and in conjunction with the Annual return process required of the EPL. The Annual Return records complaints received, testing and activation of the Pollution Incident Response Management Plan (PIRMP), documenting the results of environmental monitoring that has been conducted as a requirement of the EPL and recording non compliances and remedial actions taken or proposed for the non-compliances. The Development Consent outlines the following reporting and audit requirements:

- Annual Environmental Management Report (AEMR) (*Development Consent Condition 5*)
- Continuous Improvement Report (*Development Consent Condition 6*)
- Independent Environmental Audit, 3 yearly (*Development Consent Condition 6*)

These reports must be undertaken at the specified frequency and meet the requirements as outlined in the *Development Consent*.

1.10 Update and Version Control Documents

This document is version controlled. All updates to this document must be made in accordance with the *Document Control Procedure*.

As the documents are "live", changes can be initiated at any time regular reviews will be undertaken of all documents relevant to the operation and management.

Site Overview

2.1 Site Description and Layout

Kemps Creek SAWT ARRT is in the Penrith Local Government Area and is located within the existing Elizabeth Drive Landfill site (87,600 square meters). Surrounding land use is predominantly rural and rural residential development, as shown in Figure 2. The site is located approximately 41km west of the Sydney Central Business District and 5km west of Kemps Creek.

The EMP applies to facility operations within the SAWT exercised area plan located in *Appendix 1. "SAWT Area Plan"*, which shows the general layout of the SAWT facility (shown in red) in relation to the landfill.

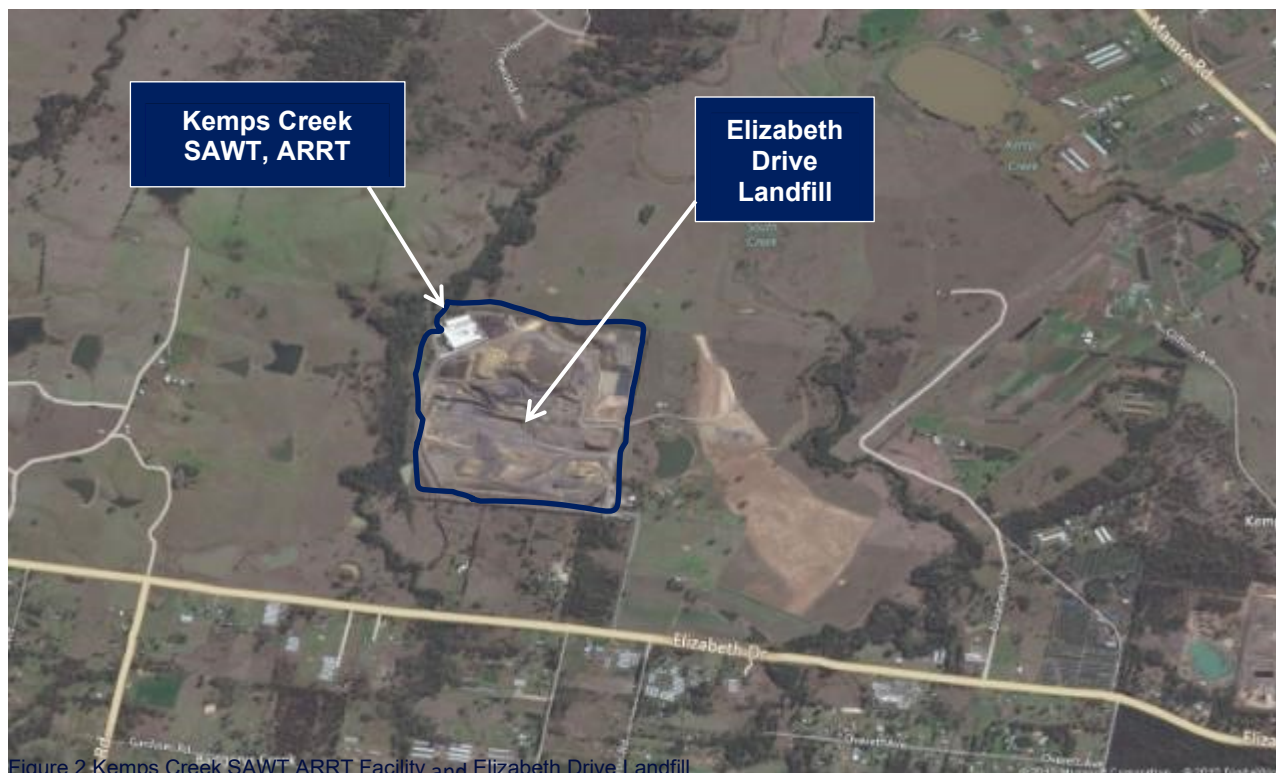


Figure 2 Kemps Creek SAWT ARRT Facility and Elizabeth Drive Landfill.

The north-western corner of the Elizabeth Drive site was selected as the preferred location because of geotechnical stability, undisturbed land, and distance from sensitive receptors. The corner location is the most distant position (on-site) from the residential dwelling to the east and from Elizabeth Drive South. Since facility construction, increased residential development in Twin Creeks has resulted in increased proximity of sensitive receptors.

The SAWT facility is located within a fenced compound at the end of the dedicated road between the facility and the main entrance to the broader SUEZ site.

The purpose of the SAWT facility is to minimise the amount of recyclable and putrescible waste disposed of to the Landfill by the implementation of sustainable waste management processes including sorting, recovery and composting, all by mechanical equipment.

The SAWT facility is capable of processing approximately 120,000 tpa of waste. Whilst not essential to the composting operation, the facility also has the capability to receive and treat up to 14,000 tpa of biosolids in addition to the waste.

The SAWT facility is designed to recover recyclable materials (steel, aluminium, glass, paper and cardboard), and produce compost. Inert residual material will be disposed of in SUEZ's adjacent Waste Non-Putrescible Landfill.

The SAWT site layout and location of various components of the facility (including leachate and sediment ponds) is shown in *Appendix 2. "SAWT site map"*.

2.2 Infrastructure

The main components of the Kemps Creek SAWT ARRT site include:

- Access road and weigh bridge
- Eastern and Southern maturation pads
- Three leachate collection dams and one overflow catchment leachate dam
- Additional maturation tunnels and bio filtration system for southern pad
- Stormwater collection pond
- Two back up fire protection tanks
- Final product storage and loading area
- Mobile plant wheel wash area
- Vehicle and Plant refuelling area
- Worker and visitor car parking areas
- Main building which consists of
 - Administration office
 - Production offices
 - Staff amenities
 - Receivable hall
 - Processing lines for material sorting
 - Thirty composting tunnels (pasteurisation process)
 - Designed refining area
 - Residual loading and transport area
 - Maintenance workshop
 - Transformer and switch room
 - Four bio filtration odour neutralising filters

Elizabeth Drive Landfill is located east-south to Kemps Creek SAWT ARRT and operates under a separate Environment Protection Licence to Elizabeth Drive Landfill (refer to the Environmental Management Plan, Elizabeth Drive Landfill for further details).

2.2.1 Hours of operation

Kemps Creek SAWT operates in compliance with EPL 12889.

2.2.2 Traffic Management

Refer to Traffic Management Plan for further details of traffic types and movements.

2.2.3 Drainage

All frequently trafficable areas for waste delivery are sealed surfaces with drainage networks to control and minimises the potential for sediment immobilisation. All water falling on hardstand areas is directed to the onsite storm water dam. In accordance with section O7 of EPL licence all above ground tanks and vats, including those used for treating of process wastewater, leachate and diesel have been designed and constructed so that the bunding of the tanks is a minimum of 110% of the tank volume in that bund.

2.2.4 Security

The Kemps Creek ARRT forms part of the Kemps Creek Advanced Resource Recovery Park and as such a 2-meter-high chain-wire fence surrounds the facility. The weighbridge workers supervise the main entrance into Kemps Creek Resource Recovery Park. Other entrance and exits which are not normally trafficable are locked to prevent unauthorised access and security is provided outside of operational hours. Refer to the SOP041 *Site Maintenance - Infrastructure Facilities* for further information.

2.2.5 Services

The facility is connected to mains water, telephone, and power lines. Septic tank systems are adopted at the facility for the collection, treatment, and disposal of effluent from the site. Disposal of solid waste collected in the septic tanks is conducted by approved contractors. For information on safely conducting work around utility services, refer to the SOP 102 *Utility Services*.

2.3 Overview of Kemps Creek SAWT ARRT Operations

SUEZ's Kemps Creek SAWT ARRT operations, including process flow information is contained in the *Product Quality Manual – Kemps Creek SAWT ARRT*.

Environment Incident Management and Stakeholder Engagement

3.1 Community Complaints

free call telephone line is operated on behalf of SUEZ. The telephone line, 1800 368 737, operates 24 hours a day, 7 days per week. Complaints about the site can be registered on this line. Complaints can also be lodged with the NSW EPA on 131 555 and directly to the site management. The details of all complaints received, and actions taken in response to the complaints are maintained on the SUEZ integrated management system. All complaints received are investigated and responded to within the allocated time frame set out in *Environmental Complaints Management SOP*.

3.2 Stakeholder Engagement Process

Kemps Creek Advanced Resource Recovery Park ("ARRP") has developed an External Stakeholder Engagement process. The following activities are undertaken to ensure consultation occurs with all stakeholders:

- Advise the EPA and neighbours of any activities that has the potential to cause an environmental impact
- Meetings with key stakeholders (i.e. EPA and Penrith City Council), (outlined in odour management plan)
- Make relevant information available on Suez's website
- Community tours are available through our Stakeholder Engagement department - website

3.3 Environmental Incident Management

All environmental incidents are to be recorded in accordance with the *Incident Reporting and Corrective Action Procedure*. Environmental complaints are handled in accordance with *SOP066 Environmental Complaints Management*. Where a pollution incident occurs the Pollution Incident Response Management Plan for Kemps Creek SAWT ARRT must be activated.

Note that all contact with a regulatory body must be approved by the relevant Facility Manager or Business Line Manager.

3.4 Environmental Reporting

In accordance with the *Protection of the Environment (Waste) Regulation 2014*, all environmental monitoring required by the licence is published to the [SUEZ website](#).

Monitoring data must be made available within 14 working days of obtaining the data or laboratory results.

3.5 Emergency Preparedness

In accordance with the *Emergency Management Procedure*, an *Emergency Response Plan* ("ERP") and PIRMP have been developed for Kemps Creek ARRP (which includes Kemps Creek SAWT ARRT).

Emergency drills are to be conducted in accordance with the *Emergency Management Procedure*. In the event of an emergency involving potential environmental damage the PIRMP must be activated. It is a requirement of the *Protection of the Environment Operations Act 1997* ("POEO Act") that the PIRMP is tested at minimum of 12 monthly intervals.

3.6 Reporting to Regulatory Authorities

All incidents of pollution will be recorded in accordance with **Section M4** of the EPL; Recording of pollution complaints and reported in accordance with **Section R2** of the EPL, Notification of environmental harm must be immediate.

Within 24 hours of detecting an exceedance of the limits/performance criteria in this approval, or the occurrence of an incident that causes (or may cause) harm to the environment, the Proponent shall notify the Department and EPA of the exceedance/incident.

Within 6 days of notifying the Department and EPA, the Proponent shall provide a written report to the Department and EPA that:

- a) describes the date, time, and nature of the incident.
- b) identifies the cause, or likely cause, of the incident; and
- c) describes what action has been taken to date to address the incident, and what actions are proposed to be implemented in the future to either address the consequences of the incident or avoid a recurrence of the incident. Waste Acceptance, Stockpiling and Material Export

Waste Acceptance, Stockpiling and Material Export

4.1 Waste Accepted at Kemps Creek SAWT ARRT

Kemps Creek SAWT ARRT only accepts waste that is listed in EPL 12889.

For information on weighbridge operations refer to Weighbridge Operations SOP.

4.2 Acceptance of Waste

Prior to delivery of waste, it is a requirement that the consignor of the waste has assessed the waste in accordance with the NSW *Waste Classifications Guidelines*. On entry to the facility, the delivery driver must state the contract or consignment number to the weighbridge operator. The weighbridge operator will then record the weight of the vehicle into the Mandalay system against the contract or consignment number.

Vehicles destined only for the landfill are directed in accordance with the location and identity of the active cell. Vehicles with loads assigned to the Kemps Creek SAWT ARRT are directed onto the dedicated access road. Those vehicles arrive at the facility entry control point and are directed to the marshalling area from which they reverse into the respective building roller door entrance and thence to a point at which the load is discharged.

Kemps Creek SAWT ARRT must only accept wastes in accordance with the EPL. Any waste that does not meet a certified waste category, contained within the EPL must not be accepted. As a part of the SUEZ's Waste Monitoring Program implemented at Kemps Creek SAWT ARRT, all incoming and outgoing transactions are recorded in Mandalay. Mandalay records can be provided upon request.

Activity	Day	Hours
Waste Receipt, outdoor operations & product dispatch	Monday to Friday	6:00AM to 6:00PM
	Saturday	8:00PM to 5:00PM
	Sunday	8:00AM to 4:00PM
Outdoor operations	Monday to Friday	6:00PM to 10:00PM*
	Public holidays	7:00AM to 4:00PM
Indoor operations	Monday to Saturday	7:00AM to 11:00PM
In case of emergency	Monday to Sunday	Anytime
Completely cover waste derived organic material, stored outside, with impervious sheeting	Everyday	4:30PM to 8:00AM
Turning, processing and refining of waste derived organic material stored outside	Monday - Saturday	8:00AM to 4:30PM
	Sunday and Public Holidays	8:00AM to 4:00PM

4.3 Stockpiles

There are limits on the stockpiles of waste that can be held on site. Only material that complies with *"The organic outputs derived from mixed waste order 2014"* can be stored on the final product pad. Now operating under Government Gazette Reference number: n2020-1124.

Waste derived organic material must not be stored on the unsealed area of the Lower pad. Organic material derived from Municipal Solid Waste ("MSW") must not be composted or matured outside.

A maximum of 8 complete windrows and 2 partially formed windrows containing maturing organic material produced from Food and Garden Organics ("FGO") is permitted to be stored outside at any one time.

The total outdoor surface area used for maturation, processing and storage of waste derived organic material must be less than 10,000m².

Environmental Management Programs and Monitoring

All monitoring activities set out in this section must comply with the requirements of the *Monitoring and Measuring Procedure* and the *Incident Reporting and Corrective Actions Procedure*.

5.1 General

SUEZ's consultation and assessment strategy involved the identification of environmental issues associated with the operation of the SAWT facility. It was concluded that some issues required no further action as they were covered by the Landfill Environmental Management Plan (LEMP) while other issues would require the preparation and implementation of environmental management programmes. Some of the issues can be dealt with through simple administrative actions such as the setting of the hours of operation of information of compliance with building codes, while others require more comprehensive and detailed guidance include the specification of criteria and monitoring actions.

The listing of environmental issues requiring either: a.) the development of management measures; b.) explanation or simple instruction.

In order to improve cross-referencing of environmental protection measures to the instrument/s in which the particular issue is raised (that is, EPL, approval, commitment), various measures in the Environmental Management Plans (EMPs) in the following sub-sections include abbreviations which refer the reader to the subject instrument/s.

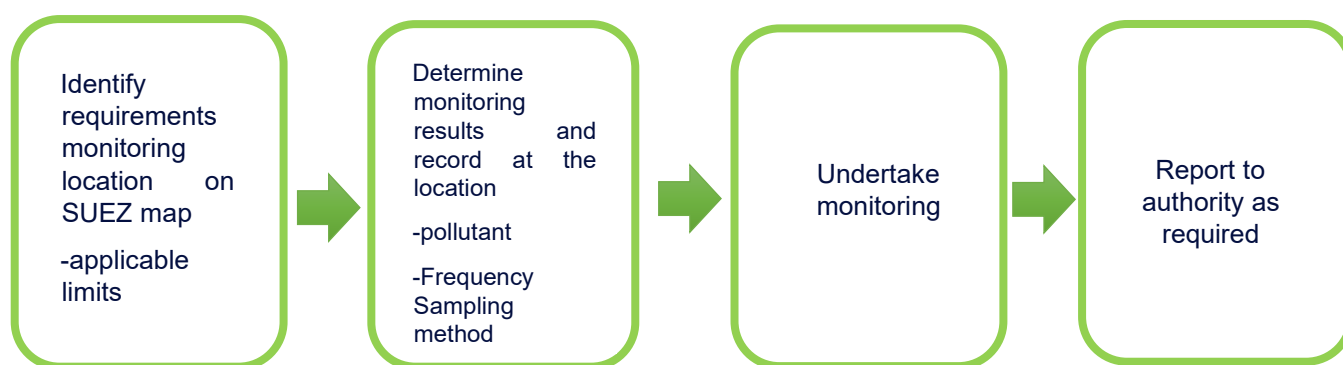


Figure 3 Summary of the monitoring process at Kemps Creek SAWT ARRT.

The responsibilities of SUEZ workers are outlined within the relevant Standard Operating Procedures (SOPs) and Work Instructions (WIs) outlining the operations. The responsibilities of actions within this Environmental Management Plan fall to the Facility Manager.

This provides increased certainty that, coupled with experienced site management and supervisory staff, operations will be carried out in a competent manner.

5.2 Environmental Commitments

In addition to the environmental issues identified in the EA process and for which Environmental Management Programmes are set out in the following section of this OEMP, SUEZ has made a commitment to enhance its environmental performance through a range of measures. Those additional measures were implemented during the design and construction phases. This section of the Environmental Management Plan identifies the commitments applicable to the operational phase of the SAWT.

The broad areas of commitment are to minimise impacts on:

- Geology, soils, and groundwater.
- Flooding and hydrology.
- Odour emissions.
- Visual amenity and landscape.
- Surface water quality.
- Flora and fauna.
- Dust.
- Heritage.
- Surface water quality.
- Greenhouse gas emissions.
- Noise during operation.
- Minimise the risk of fire hazard; and
- Minimise potential health and safety impacts to workers and future users of the compost material.

5.3 Records

All monitoring records referenced in this section must be maintained in accordance with the *Records Management Procedure* and:

- Be in a **legible form**, or in a form that can readily be reduced to a legible form
- Kept for a least 4 years after the monitoring or the event to which they relate took place; and
- Be able to be produced in a legible form to any authorised officer of the EPA who asks to see them

All samples taken in this section must contain:

- The date(s) the sample was taken
- The point/location at which the sample was taken
- The name of the person who collected the sample
- The time(s) at which the sample was taken

5.4 Limiting Conditions

All operations undertaken by SUEZ must **not** pollute waters (other than were permitted by the Environment Protection Licence – e.g., ammonia, total suspended solids).

The Environment Protection Licence also provides measurable limits on certain pollutants as well as limits on wastes that are permitted on site.

For details of the limiting conditions, refer to the relevant section which outlines management of that issue.

5.5 Operational Requirements

All plant and equipment installed at the premises or used in connection with the licensed activity:

- a) must be maintained in a proper and efficient condition; and
- b) must be operated in a proper and efficient manner.

5.6 Soil and Water

Section 120 of the POEO Act 1997 requires the establishment of an EPL if the activity has the potential to pollute waters.

The primary objectives of soil, water & leachate management are to ensure that the maximum amount of water is retained for use and re-use on site, and to ensure that the quality of water runoff from the site is maintained to ensure that there is no potential to pollute.

Please refer to *Appendix 4. "Water Balance diagram"* – Flow diagram of the clean water and leachate on site.

The operational objectives of this plan are the following:

- Avoid impact to water quality in groundwater and creeks and rivers downstream of the facility, especially Badgerys Creek.
- Control surface water runoff on-site by site grading and strategic placement and sizing of water management ponds.
- Manage leachate such that it neither overflows into the surrounding environment nor contaminates groundwater.

In addition to the EPL 12889 and the PEOP Act 1997, this plant must be consistent with the following documents (as outlined *Section 20 of the Development Consent*):

- Compliance with Edition 4 of the Landcom's Managing Urban Stormwater Guidelines (2004) (the Blue Book) prior to the commencement of operations.
- Compliance with DECC's Environmental Guidelines for Composting and Related Organics Processing Facilities (2004) (Composting Guidelines.)
- Compliance with the latest version of DECC's Managing Urban Stormwater: Council Handbook

The development consent requires the stormwater management scheme to have sufficient capacity to manage rainfall events up to the 90th percentile 5-day occurrence. According to the Bureau of Meteorology (BoM) Design Rainfall Data System (2016), the 90th percentile annual exceedance probability (AEP) for a 5-day rainfall event would result in between 69.4mm to 86.4mm of rainfall and is likely to occur, or be exceeded, between 2 and 3 times a year. This implies the stormwater management scheme would be overcome in the instances when this event occurs or is exceeded. The

SAWT facility historically discharges stormwater between 2 to 3 times a year, therefore the stormwater management scheme is functioning as intended and designed.

5.7 Baseline Data

Surface Water Quality

- Water quality monitoring has been regularly conducted in designated locations along Badgerys Creek as part of the environmental monitoring program specified in the existing landfill EPL and surface water criteria have been adopted for the site.
- Monitoring indicates that the waterway typically maintains acceptable water quality for suspended solids, turbidity and BOD.
- Water quality data reported in studies for the Second Sydney Airport NSW (Tuft, 1997), indicated that Badgerys Creek, upstream of the site, was a disturbed ecosystem with elevated levels of nitrogen and chlorophyll A and low levels of oxygen.
- Non-ionised ammonia was above the toxic threshold. The creek also supported plants characteristic of eutrophic ecosystem and a wide variety of invertebrates with a high proportion of pollution tolerant species. Introduced pest fish species, such as Gambusia and European Carp were reported as common.

5.8 Management Strategy

- The SAWT facility has been designed such that the main bulk of site runoff is clean, consisting of rain that has fallen within the SAWT facility boundaries (for example on the roofs of buildings) but has not been in contact with areas where waste, organic material or compost have been handled or stored.
- The remainder of the clean stormwater will come from roadways and other surfaces which do not contain waste.
 - The runoff from both areas will be diverted to the Stormwater Pond.
 - Stored stormwater runoff from this pond will be managed to ensure as much reuse as is practicable.
 - This reuse water will be used for application in the SAWT facility processes in preference to potable water or will be directly used for operational purposes such as irrigation, dust suppression and firefighting.
- The Stormwater pond has been designed to remove coarse particulates from runoff, including two grease traps, prior to (a) use on-site; or (b) discharge via overland flow.
- The SAWT facility has also been designed to be protected from upstream Diverted Stormwater which is stormwater generated up-gradient of the SAWT facility.
- This stormwater will be diverted around the SAWT facility and ultimately discharged, in accordance with the landfill's EPL, to Badgerys Creek via the existing North-Western (NW) Sedimentation Pond, the Stormwater and/or overland discharge.
- Water from these sedimentation ponds will be used for operational purposes such as use in the composting process, irrigation, dust suppression and in reserve for firefighting.
- All Sedimentation ponds have been lined with a low permeability liner to control infiltration of stored water into groundwater.
- EPA-licensed points of overflow discharge, namely the sediment pond and leachate overflow pond have been designed to flow only in periods of heavy or extended periods of rainfall.
- Badgerys Creek is the only receiving stream for stormwater from the SAWT facility. Stormwater will only be discharged to Badgerys Creek if the capacity of all other water captures and management measures is exceeded.
- All facilities and roads are elevated above the 1 in 100-year AEP flood event level or are bunded such that they are protected from that flood event.
- Protection shall be provided to areas that have the potential to experience erosion or inundation during a 1 in 100-year AEP storm event.
- Runoff for all events up to and including the 1 in 10-year, 24-hour AEP event will be retained on site.
- All drainage paths have been designed and constructed to prevent ponding and infiltration into the groundwater.
- Permanent stabilisation of embankments, channels has been achieved through vegetation and shall be maintained to remain effective.

- The SAWT site has been graded to ensure that stormwater is diverted appropriately and undergoes the level of treatment as required by regulation.
- Storage of stormwater runoff will be managed to ensure as much re-use, and there by reduction in potable water demand, as is practicable.
- Waste for the SAWT will be received in the Receiving and Resource Recovery Buildings to avoid contact with stormwater.

5.9 Infrastructure and Collection

Stormwater collected from the grounds of the facility are directed to the storm water collection pond at the front of the facility. This water can be re-used in the site operations or used for cleaning of roadways, hardstand areas or dust suppression.

5.10 Leachate

The management of leachate is to be conducted in accordance with the requirements set out in the *Leachate Management SOP*. There are three main sources where leachate is produced:

- **Condensate Leachate:** - highest concentration of chemical and biological contaminated leachate produced during the composting of organic materials within the Composting Tunnels.
- **Leachate from Cleaning:** - small volumes of moderate concentration leachate which will be generated within the facility through using small amounts of water to clean floors and equipment.
- **Stormwater Leachate:** - large volumes of low concentration of leachate which will be generated when rain falls on material handling, vehicle movement areas, maturation windrows and compost product stockpiles.

The purpose of effective leachate management is to ensure that leachate does not contaminate local water courses or ground water sources.

5.10.1 Management Strategy

To minimise leachate impacts during site operations SUEZ will undertake the following management strategies:

- Leachate generated is to be retained and treated, evaporated or in some way disposed of, rather than discharged. To meet this requirement, the design of the SAWT facility captures and reuses leachate preferentially.
- Regular monitoring and treatment of leachate runoff contained in the leachate and leachate overflow dams is undertaken
- Treated leachate will be stored in Final Product (M6), Upper (M2) and Lower Leachate Dams (M3). All leachate capture will be treated using an aeration system to treat high levels of COD and BOD. Treated leachate will be reused in the composting process at both the composting tunnels and maturation pads.
- Leachate dam capacity will be capable of holding runoff from 1 in 10-year, 24-hour duration storm event. Expected rainfall is to be monitored weekly and assessment of dam capacities is to occur. During rainfall events transfer of leachate via a tanker is to occur if required.
- Excess leachate water which does not meet OE&H quality specifications for water irrigation and reuse will be transported offsite for treatment at a licensed liquid waste treatment plant.
- Untreated leachate must not be discharged to Badgerys Creek
- Leachate storage and treatment ponds have been lined with low permeability liner to control infiltration to groundwater.
- Untreated leachate must not be discharged to Badgerys Creek unless it meets the requirements as stipulated in the EPL

Approval - The leachate barrier has been designed and constructed to meet the requirements of Schedule 3, Condition 18.

EPL - The leachate barrier has been designed and constructed to meet the requirements of Condition O9.

5.11 Sampling Equipment and Instructions

Water monitoring is conducted by gathering a sample of the leachate into laboratory bottles from the points as specified in the EPL. The samples are sent to the laboratory for analyses and a report is attained. For details on the methodology for leachate sample collection refer to the WI072.1 Environmental Site Monitoring (SAWT ARRF Kemps Creek).

A groundwater monitoring and response procedure is in place for the landfill. The EPA carries out independent reviews of monitoring data. If in their opinion, there is evidence of groundwater contamination by leachate, an investigation programme will be implemented, and remedial works carried out as required.

5.12 Air and Dust

The management of dust is to be conducted in accordance with the requirements of the SOP041 *Site Maintenance - Infrastructure Facilities*. The premises must be maintained in a condition which minimises or prevents the emission of dust. The purpose of dust management is to ensure that neighbouring properties are not adversely affected by dust, from operations attributed to the Kemps Creek SAWT ARRT.

5.12.1 Management Strategy

The following control measures will be in place to limit the potential for dust generation:

- The main site access roads at the Kemps Creek SAWT Facility are sealed, which are designed to keep heavy vehicle movement to a minimum and has designated speed limits.
- The receipt of waste and all mechanical processing is to occur within enclosed building.
- All materials are delivered in enclosed compactor body vehicles.
- Pre-treated waste materials removed from the site are transported off site in covered trucks.
- Minimise heavy vehicle movements on unsealed areas • Sealed roads are regularly cleaned using a street sweeper.
- Continually spraying of maturation and compost storage pads to increase moisture content while the material is turned or transferred
- Cleaning up material that may act as a dust source as soon as possible,
- Conduct regular cleaning of machinery and vehicles.

5.12.2 Monitoring

Dust monitoring will be in the form of visual checks carried out throughout the day. These checks undertaken by the Site Supervisor responsible for that area of the operation. During high winds or storm conditions the windrow turning, and shredding should be stopped temporarily to avoid the emission and dispersion of dust.

5.12.3 Performance Indicators

No dust complaints received for the ARRT. This will be monitored by the complaints CAR's that are raised within the SIMS system. All complaints are to be recorded into the SIMS system as per the requirements of *Incident Reporting and Corrective Action Procedure*. Refer to Section 3 for further information on the receipt and handling of complaints.

5.13 Soil, Erosion and Sediment Control Plan

Due to the nature of site operation, the site requires effective soil erosion management to ensure the impact to the environment is kept to a minimum.

5.13.1 Management Strategy

- All main access roads, maturation, processing, and storage pads have been sealed to minimise erosion and other areas have been graded.
- To minimise stormwater impacts during site operations SUEZ will undertake continual landscaping of the facility and surrounding areas with native species and suitable mulch.
- Implementation of Vegetation Management Plan.

5.13.2 Monitoring

Ongoing monitoring by site personnel will include debris within stormwater drains around facility, visual inspections of unsealed areas, stormwater channels for erosion. Dry sweeping of all manoeuvring areas occurs on a weekly basis to reduce high amounts of Total Suspended Solids within the Stormwater Pond.

5.14 Odour

It is intended that no offensive odours be emitted from the site under *S129 of the Protection of the Environment Operations Act 1997, (POEO Act)*. This provision of the POEO Act also includes provisions under the Act that provide a mechanism to deal with any potential breaches of the odour criteria and to provide a framework for dealing with the potential odour impacts.

The purpose of odour management is to prevent the degradation of local amenity from potential odour emissions or odorous activities associated with SAWT operations.

5.14.1 Management Strategy

The management of odour is to be conducted in accordance with the requirements set out in Odour Management SOP. For site specific management strategies and monitoring the *Odour Management Plan Kemps Creek SAWT* is to be followed. Odour Management requirements set out in EPL.

Leachate dams must be maintained to minimise odours, including the use of Bio-wish. In-process problems and the way they are rectified are documented in *Appendix 3 . "Leachate process rectification"*.

A regular maintenance and cleaning schedule will be in place in order to avoid blockage or damage to the tunnel tubes resulting in pooling of leachate outside the tunnels contributing to the odour. The following control measures should be included in the tunnel maintenance schedule:

- Schedule to replace damaged tunnel tubes as soon as identified.
- Cleaning of the tunnel tubes and drains using a suction truck as required and directed by Process and Quality Team.
- Scrape and clean the tunnels after being emptied.
- Pressure clean the air locks and tunnel tubes.
- The mesh at the back of the tunnels to be cleaned regularly to ensure adequate suction to the biofilters.
- Tunnel doors to be cleaned monthly and maintained according to the manufacturer's maintenance specifications.
- Any damage to the doors or structural damage to the facility building to be reported immediately and to be rectified as a priority to avoid release of odour from the facility.
- The bunded area in the fan room to be maintained clean and the scrubbers to be cleaned at least every 3 months.

In the event NSW Government apply restrictions to local government areas of concern during the pandemic, odour patrols will be reduced to once a week to ensure compliance with stay at home orders.

5.15 Litter

The management of litter is to be conducted in accordance with the requirements of the *Site Maintenance – Infrastructure Facilities SOP*.

5.16 Noise

The management of noise is to be conducted in accordance with the requirements of the *Site Maintenance – Infrastructure Facilities SOP*. The purpose of noise management is to ensure that no loss of amenity is caused to neighbours from noisy operations associated with the Kemps Creek SAWT operations.

The main sources of noise and the ARRT are:

- Main building housing processing lines, screens and trommels to separate recyclables
- Fans for extraction of air from facility to bio-filter beds
- Fans for provision of air to tunnel aeration floor
- Plant and machinery operating in and around the facility
- Waste disposal vehicles delivering waste material
- Compost transport vehicles transporting compost to customers

Noise generated from the Premises must not exceed the noise limits present in the table(s) below. The noise limits in the table(s) represent the noise contribution from the premises.

Table 1 – Noise Limits

Location	Day LAeq (15 minute)	Evening LAeq (15 minute)	Night LAeq (15 minutes)	Night LAmax
McGarvie Smith Farm	42	39	35	N/A
1745 Elizabeth Drive	41	40	37	47
1669A Elizabeth Drive	38	38	35	N/A
Caretakers Residence 1669A Elizabeth Drive	42	42	38	53

Morning Should Period

Location	Morning Shoulder Period LAeq (15 minute)
Document title: Environmental Management Plan	Issue date: 19 November 2021
Document #: PLANS004.2.1	Version no.: 6
This document is uncontrolled once printed	

McGarvie Smith Farm	39
1745 Elizabeth Drive	40
1669A Elizabeth Drive	38
Caretakers Residence 1669A Elizabeth Drive	42

5.16.1 Management Strategy

The following mitigation measures are adopted by the ARRT:

- All waste processing is conducted within the confines of the main building
- Operations of the facility are conducted within approved hours
- Regular maintenance of all plant and equipment onsite

5.16.2 Monitoring Requirements

Section L4 of the EPL requires that the facility does not to exceed specified noise limits and in order to determine if exceedance of specified limits may occur the facility undertakes periodic noise monitoring at the specified locations.

To ensure compliance with noise limits specified in the EPL Section L4, yearly noise monitoring must be undertaken or upon significant change in operations (e.g., operating hours, equipment or machinery).

5.17 Pest and Vermin

The management of pests and vermin is to be conducted in accordance with the requirements of the *Site Maintenance – Infrastructure Facilities SOP and Environmental Monitoring Manual*. The purpose of pest and vermin management is to reduce the impact on amenity to neighbours and the community caused from the attraction of vermin and pests to waste materials.

5.17.1 Management Strategy

Pest and vermin may be attracted to the MSW waste stored onsite or from litter that is generated during operations. The following mitigation measures are adopted at the ARRT:

- Regular cleaning of litter from site operations
- Regular use of road sweeper to clean trafficable areas and roadways
- Regular pest control and inspection by a licensed operator
- Security fencing installed around the perimeter of the site
- Pest control contractor engaged monthly
- Rat and mouse baiting

Periodic inspections are carried out by the Environment & Quality team to ensure that the ARRT is maintaining the requirements of this procedure.

5.18 Vegetation

Vegetation Management is to be conducted in accordance with the requirements of the *Site Maintenance – Infrastructure Facilities SOP* and the *Vegetation Management Plan*. The purpose of appropriate vegetation management is to ensure that no weed outbreaks occur to local areas due to activities undertaken at the ARRT.

5.18.1 Management Strategy

The following activities will be utilised to monitor and maintain vegetation on the ARRT:

- Regular inspection of grassed areas for weed infestations; and
- Planted areas will be regularly inspected, where depressions are noted these will be filled, reseeded, and mulched.

5.18.2 Monitoring Requirements

A combination of weekly, monthly and 6 monthly monitoring will be conducted in accordance with the *Monitoring and Measurements Procedure* and records retained on the applicable *Inspection Checklist*. All monitoring is recorded in Intelix.

5.19 Quality Assurance Program for the Design and Installation of the Leachate Management System

There are three ponds, to the north of the site the Leachate, Overflow and Sedimentation Ponds, there is one to the north of the Penrith Maturation Pond and one to the west of main building.

The leachate pond is lined with compacted clay and HDPE line.

The overflow pond is lined with compacted clay and covered with a layer of soil. The clay used for liner construction was from onsite and used as it displays very high permeability.

SUEZ has been unable to recover CAQ data for the Overflow and Sedimentation Ponds, however as the overflow pond is for emergency use only and the surface water pond is not for leachate, we cannot determine if a CQA report would have been required.

The pond north of the Penrith Maturation Pond and one to the west of the main building were lined with 1050mm compacted Clay Liner over a Trim and Compact subgrade to superintendent's approval.

5.20 Surface Water, Groundwater, and Leachate Monitoring and Response Programs

Contamination of groundwater and surface water has been minimised through the containment of leachate on hardstand areas and direction to leachate ponds until reused or disposed. Uncontaminated site runoff is directed to stormwater ponds, sedimentation ponds and the vegetation buffer along Badgerys Creek.

SUEZ's Elizabeth Drive Landfill carries out quarterly and annual groundwater monitoring. Results of this monitoring are provided to SAWT for information purposes.

In accordance with EPL 12889, Condition L2.3 monitoring results must comply with Table 1

Table 1 Water and/or Land Concentration Limits

Pollutant	Units of Measure	100 percentile concentration limit
Ammonia [NH₃]	Milligrams per litre	0.9
pH	pH	6.5-8.5
Total suspended solids (TSS)	Milligrams per litre	50

The table below (Table 2) outlines the pollutants and the frequency of sampling for regulatory purposes.

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Ammonia	milligrams per litre	Special Frequency 1	Grab sample
Biochemical oxygen demand	milligrams per litre	Special Frequency 1	Grab sample
Conductivity	microsiemens per centimetre	Special Frequency 1	Grab sample
Oil and Grease	milligrams per litre	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	Grab sample
Total organic carbon	milligrams per litre	Special Frequency 1	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

POINT 2,3,6

Pollutant	Units of measure	Frequency	Sampling Method
Ammonia	milligrams per litre	Yearly	Grab sample
Biochemical oxygen demand	milligrams per litre	Yearly	Grab sample
Chemical oxygen demand	milligrams per litre	Yearly	Grab sample
pH	pH	Yearly	Grab sample
Total suspended solids	milligrams per litre	Yearly	Grab sample

Table 2 – Water and/or Land Monitoring Requirements

5.20.1 Surface Water Monitoring

Surface water from rainfall runoff may become contaminated resulting from leachate generated from waste that is left outside the building or other contaminants. It is therefore a requirement of the planning approval and EPL 12889 that water quality is monitored during operations to ensure the site is compliant with its environmental performance and monitoring requirements.

All samples for regulatory compliance purposes are analysed by a National Association of Testing Authorities (NATA) accredited laboratory.

Grab Sample is the sampling method set as the requirement of EPL. The samples collected in relevant sample bottles required for testing.

Elizabeth Drive Landfill measures the Badgerys Creek watercourse in three locations each quarter as part of its monitoring program. Samples are tested for BOD, conductivity, Nitrogen (ammonia), TOC, TSS and pH.

5.20.2 Surface Water Response Plan

Contingency operations for non-complying discharges are in two stages including:

1. Re-circulating, treating, or removing and treating the contaminated water, followed by
2. Pumping water back into leachate pond with later removal and treatment of stored stormwater.

In the event of sedimentation pond overflow and where further discharges are likely (such as in an unlikely case of the sedimentation dam breach during a major storm event) the water will be diverted into another pond. Any excess stormwater will only have the effect of significantly diluting already relatively clean water.

Given the substantial volume available in each of the ponds onsite, such contingency provisions are expected to be adequate for most storm events where a "contain and treat" approach will be adopted in the case of any accidental spillages or contamination events (for example, spillage on site).

Monitoring of the discharge water from the stormwater pond to the existing sedimentation dam and from the overflow pond is to be conducted where discharge from the pond occurs.

No offsite release of pollutants and contaminants to storm water above acceptable levels in accordance with the monitoring conditions of EPL 12889.

All incidents of pollution will be recorded in accordance with **Section M4** of the EPL; Recording of pollution complaints and reported in accordance with **Section R2** of the EPL, Notification of environmental harm.

Similar procedures will apply in respect of Badgerys Creek monitoring. Should any stream monitoring results exceed set values, then discharges from the site will be curtailed until either the cause is clearly identified, or investigation has demonstrated that further exceedance of set/standard values can be prevented.

In the event of sedimentation pond overflow the following steps will be undertaken:

- i.) Re-direct in flows to an alternative pond or the landfill
- ii.) Pump out sufficient sedimentation pond water to temporary dam to enable restoration of dam failure
- iii.) Recommission sedimentation pond

5.20.3 Leachate Monitoring

Monitoring of leachate management is undertaken to ensure that no untreated leachate leaves the site. Monitoring will involve inspection of leachate pond levels weekly and after any significant rainfall event. In addition to this monitoring requirement, the process team undertakes regular monitoring, if there is a significant odour issue the leachate rectification process is initiated, refer to *Appendix 3. "Leachate process rectification"*.

Dam Levels are monitored daily by the process team and issues identified are actioned promptly according to the priority and are also recorded using the *Kemps Creek SAWT Weekly Checklist* and entered in InteleX.

5.20.4 Excess Leachate

The composting Guidelines allow for discharge of leachate directly to receiving waters for storm events with greater than a 1 in 10-year Annual Exceedance Probability (AEP). Any leachate that overflows during major storm events is significantly diluted. Dam levels will be maintained to allow capture of 1 in 10 AEP events, the overflow, maintained at empty. Excess leachate water which does not meet quality specifications for water irrigation and reuse will be transported offsite for treatment at a licensed liquid waste treatment plant.

5.20.5 Groundwater Monitoring

Groundwater varies between three to fifteen metres below surface level. This is expected given the shallow Shale bedrock across the site.

A groundwater monitoring and response procedure is in place for Elizabeth Drive Landfill (EDL). Groundwater monitoring undertaken as part of EDL indicates no significant changes to local groundwater quality, indicating minimal intrusion of contaminants or pollutants from the SAWT facility or EDL into the groundwater. This is due to existing surface clays which form a capping layer which restricts rainfall infiltration into the subsurface. As the maturation pads of SAWT have been paved, the risk of groundwater contamination has been minimised even further.

The EPA carries out independent reviews of monitoring data. If in their opinion, there is evidence of ground water contamination by leachate, an investigation programme will be implemented, and remedial works carried out as required.

Should there be any groundwater contamination detected, the Pollution Incident Response Management Plan will be implemented, and activities will be documented as part of the annual report in compliance with Condition 10.

Definitions

Act – Means the [*Protection of the Environment Operations Act 1997*](#)

activity – Means a scheduled or non-scheduled activity within the meaning of the [*Protection of the Environment Operations Act 1997*](#) **actual load** – Has the same meaning as in the [*Protection of the Environment Operations \(General\) Regulation 2009*](#)

anniversary date – The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the [*Protection of the Environment Operations Act 1997*](#), the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.

Approved Methods Publication – Has the same meaning as in the [*Protection of the Environment Operations \(General\) Regulation 2009*](#)

Assessable pollutants – Has the same meaning as in the [*Protection of the Environment Operations \(General\) Regulation 2009*](#)

BOD – Means biochemical oxygen demand **COD** – Means chemical oxygen demand **cond.** – Means conductivity

environment – Has the same meaning as in the [*Protection of the Environment Operations Act 1997*](#) **environment**

protection legislation – Has the same meaning as in the [*Protection of the Environment Administration Act 1991*](#)

EPA – Means Environment Protection Authority of New South Wales.

fee-based activity classification – Means the numbered short descriptions in Schedule 1 of the [*Protection of the Environment Operations \(General\) Regulation 2009*](#).

general solid waste (non-putrescible) – Has the same meaning as in Part 3 of Schedule 1 of the [*Protection of the Environment Operations Act 1997*](#)

general solid waste (putrescible) – Has the same meaning as in Part 3 of Schedule 1 of the [*Protection of the Environment Operations Act 1997*](#)

grab sample – Means a single sample taken at a point at a single time

hazardous waste – Has the same meaning as in Part 3 of Schedule 1 of the [*Protection of the Environment Operations Act 1997*](#) **licensee** – Means the licence holder described at the front of EPA licence 4068.

load calculation protocol – Has the same meaning as in the [*Protection of the Environment Operations \(General\) Regulation 2009*](#) **local authority** – Has the same meaning as in the [*Protection of the Environment*](#)

[*Operations Act 1997*](#)

MBAS – Means methylene blue active substances

mobile plant – Has the same meaning as in Part 3 of Schedule 1 of the [Protection of the Environment Operations Act 1997](#) **motor vehicle** – Has the same meaning as in the [Protection of the Environment Operations Act 1997](#)

O&G – Means oil and grease

percentile [in relation to a concentration limit of a sample] – Means that percentage [e.g. 50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period. In the relevant licence, the specified period is the Reporting Period.

plant – Includes all plant within the meaning of the [Protection of the Environment Operations Act 1997](#) as well as motor vehicles.

pollution of waters [or water pollution]. “Pollute water and related definitions” premises – Kemps Creek SAWT ARRT **public authority** – Has the same meaning as in the [Protection of the Environment Operations Act 1997](#) **regional office** – Means the relevant EPA office referred to in the Contacting the EPA document accompanying EPA licence 4068.

reporting period – For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the [Protection of the Environment Operations Act 1997](#), the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.

restricted solid waste – Has the same meaning as in Part 3 of Schedule 1 of the [Protection of the Environment Operations Act 1997](#) **scheduled activity** – Means an activity listed in Schedule 1 of the [Protection of the Environment Operations Act 1997](#)

TM – Together with a number, means a test method of that number prescribed by the [Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales](#).

TSP – Means total suspended particles

TSS – Means total suspended solids

Type 1 substance – Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements

Type 2 substance – Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements **utilisation area** – Means any area shown as a utilisation area on a map submitted with the application for EPA licence 4068

waste – Has the same meaning as in the [Protection of the Environment Operations Act 1997](#) **waste type** – Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non -putrescible), special waste or hazardous waste.

Related Documents

DOCUMENT NAME	REFERENCE
Bio-filters Manual	MAN030
Development Consent	
Environmental Protection Licence	12889
Legislative and Other Requirements	PROC001
Legislative Register – Environmental	REG005
Site Document Manifest	REG013

Document Control Procedure	PROC004
Environmental Management Plan	PLANS004
Traffic Management Plan	PLANS002
Site Management – Infrastructure Facilities	SOP041
Utility Services	SOP102
Environmental Complaints Management	SOP066
Incident Reporting and Corrective Action Procedure	PROC008
Monitoring and Measuring Procedure	PROC007
Leachate Management	SOP036
Contractor and Visitor Control Procedure	PROC013
Records Management	PROC009
Contractor and Visitor Control Procedure	PROC013
Leachate Management	SOP029
Water Management	SOP069
Odour Management	SOP065
Snakes, Spiders, Ticks and Fire Ants	SOP054
Emergency Management	PROC005
Emergency Response Plan	PLANS003
Management Systems Review	PROC012
Audit Procedure	PROC010
Product Quality Manual	MAN016
Operational Environmental Management Plan (OEMP) 17 th August 2017	

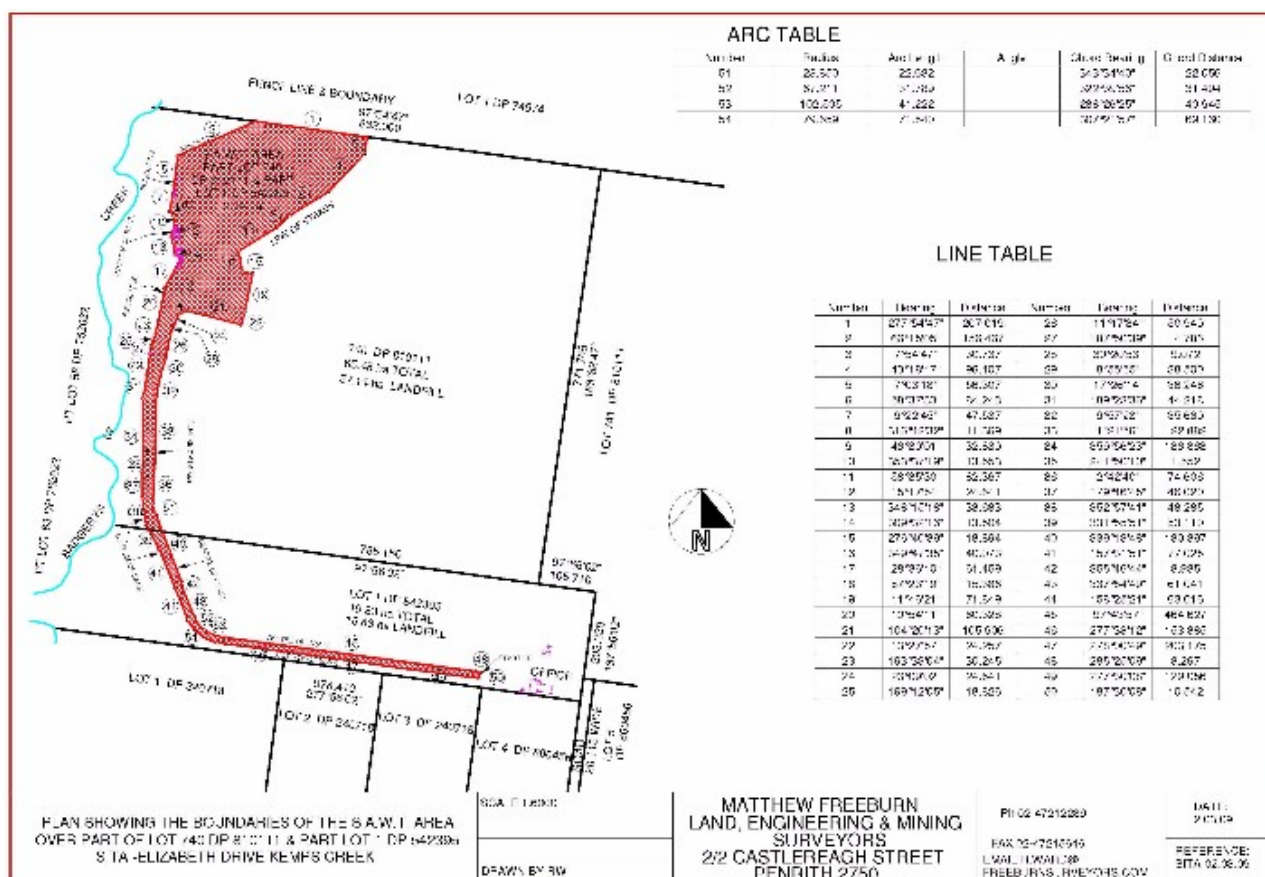
Review and Document Control

VERSION	CHANGE	REVIEWED	AUTHORISED	DATE ISSUED
1	Initial Issue	-	-	31 October 2016
2	Environmental Licence Variation Update, Leachate Management and Community Consultation	L Rossi	L Saunders	

3	Updated with addition of Baseline Data, Sampling Equipment, Monitoring points, Monitoring requirements, Soil erosion and sediment control plan, Surface Water, Groundwater and Leachate Response Plan, appendices and minor updates. Environmental Licence Update on 28 May 2019. All changes in the licence variation reflected on the plan	K Singh	L. Saunders	31 July 2019
4	Updated organisational structure (compliance officer removed)	M Hollingshead	M Banasaz	13 Oct 2020
5	Overall restructure of EMP. Section 1.4 – condensed. Deleted 1.5 Environmental Assessment, 1.6 – condensed, updated staffing to workers, hours of operation included in Acceptance of Waste, 2.2.2 Traffic Management condensed and TMP referenced. 4.1 condensed and EPL referenced, 4.2 hours of operation table inserted, use of Mandalay referenced, 5.6 Soil and Water added, 5.16 Noise Tables inserted, 5.19, condensed and updated, 5.20 Surface Water, Ground Water, and Leachate Monitoring and Response Programs updated, Baseline Data updated, inserted concentration limits and monitoring requirement table from EPL. SAWT site map updated reflective of monitoring points in EPL. Following appendices deleted. EPL, Hours of Op, Waste Accept, Stockpile limits, list of testing requirement, pollute water and related definitions, concentration limits, noise limits, odour limits, activities carried out in a competent manner, monitoring points, monitoring requirements, leachate sampling bottles, general solid waste definition, other operating condition, odour management and leachate management system drawings.	M Eather	M. Banasaz	09 Aug 2021
6	Noise assessment updated to yearly in 5.16.2 Monitoring Requirements to ensure site compliance in AEMR and Annual Returns.	M Eather	M. Banasaz	19 November 2021

Appendices

Appendix 1 – SAWT Area Plan



Appendix 2 – Kemps Creek Site Map with Monitoring Points



Stormwater Dam Discharge – Monitoring Point 1	
Upper Leachate Dam – Monitoring Point 2	
Lower Leachate Dam – Monitoring Point 3	
Leachate Overflow Dam - Monitoring Point 4	
Stormwater Pond – Monitoring Point 5	
Final Product Leachate Dam – Monitoring Point 6	

Appendix 3 - Leachate Process Rectification

Leachate Dam/Pond	Problem	Potential Cause	Actions / Suggestions
Lower Dam	Excessive Odour	High ammonia concentration	Adding four (4) packets of Biowish supplied by Integra Water. Ensure that the aerators are operational. If not, a maintenance request should be raised.
		Deodoriser fences not operational	Ensure deodoriser fences are operational. Contact Integra Water to solve issue.
		Anaerobic conditions	Ensure that the aerators are operational. If not, a maintenance request should be raised. Increase aeration in the dam by adding additional aerators. Relocation of aerators to dead zones.
Overflow Dam	Excessive Odour	High ammonia concentration	Ensure that the aerators are operational. If not, a maintenance request should be raised. Adding four (4) packets of Biowish supplied by Integra Water.
		Anaerobic conditions	Ensure that the aerators are operational. If not, a maintenance request should be raised. Increase aeration in the dam by adding additional aerators or recycling the leachate through a pump. Relocation of aerators to dead zones.
		Algal bloom	Increase aeration in the dam by adding additional aerators.
Upper Dam	Excessive Odour	High ammonia concentration	Ensure that the aerators are operational. If not, a maintenance request should be raised. Adding three (3) packets of Biowish supplied by Integra Water.
		Anaerobic conditions	Ensure that the aerators are operational. If not, a maintenance request should be raised. Increase aeration in the dam by adding additional aerators or recycling the leachate through a pump. Relocation of aerators to dead zones. Add additional aerators if needed.
		Algal bloom	Increase aeration in the dam by adding additional aerators or recycling the leachate through a pump.
Storm water	Excessive Odour	High ammonia concentration	Ensure that the aerators are operational. If not, a maintenance request should be raised. Adding three (3) packets of Biowish supplied by Integra Water.
		Anaerobic conditions	Ensure that the aerators are operational. If not, a maintenance request should be raised.

			<p>Increase aeration in the dam by adding additional aerators</p> <p>Relocation of aerators to dead zones.</p>
Final Product Dam	Excessive Odour	High ammonia concentration	<p>Ensure that the aerators are operational. If not, a maintenance request should be raised.</p> <p>Adding of three (3) packets of Biowish supplied by Integra Water.</p>
		Deodoriser fences not operational	<p>Ensure deodoriser fences are operational. Contact Integra Water to solve address and solve the issue.</p>
		Anaerobic conditions	<p>Ensure that the aerators are operational. If not, a maintenance request should be raised.</p> <p>Increase aeration in the dam by adding additional aerators.</p> <p>Relocation of aerators to dead zones.</p>
		Algal bloom	<p>Increase aeration in the dam by adding additional aerators.</p>

Appendix 4 – Water Balance Diagram

