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Chris Ritchie
Department of Planning and Environment
GPO Box 39
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2nd September 2016

MP06_0095 MOD 3 – Proposed Modification to Chemsal Waste Facility – RFI Response

In response to the Departments request for further information in the letter dated 5th July 2016, an Odour Assessment has been prepared by SLR Consulting and provided in Attachment 2. The assessment confirms the proposed modification will not generate a discernable odour impact.

Please see below responses to agency comments raised in response to notification of the proposed modification.

Agency Issue	Response
NSW Fire and Rescue	
No objection to removal of biennial emergency drills to be undertaken in liaison with FRNSW.	Noted.
Condition of Consent that the Fire Safety Study (FSS) be revised in consultation with FRNSW.	Agreed. Toxfree will provide written notice to FRNSW requesting input, prior to the commencement of the FSS.
NSW Environment and Protection Authority (EPA)	
Solidification of liquid waste not supported.	Agreed. Liquid waste will not be treated through the solidification process.
Comments 1, 2, 5, 7, 8, 9 and 10	Agreed. Standard conditions of EPL.
Comments 3 & 4 - Install air pollution control equipment and emission monitoring system to AAN plant and maintain at acceptable levels.	Agreed. Details will be incorporated into the amended EPL to be formalized post approval of this modification.
Comment 6 - Erosion and sediment control system required.	Noted. Existing systems are in place. Modified activities will be undertaken within the existing bunded areas.
Penrith City Council	
Consider potential noise from extended operating hours. Mechanisms to ensure compliance with noise criteria including the Industrial Noise Policy should be addressed by way of conditions of consent.	Current and proposed site operations result in only minor noise. No heavy machinery is used. Noise generating activities are limited to forklifts and trucks accessing the site. The site is within an industrial area and over 600m from the nearest residential receiver.

Agency Issue	Response
Ensure recommendations of the PHA are enforced.	Noted. DP&E and EPA conduct regular inspections to audit compliance with approvals.
Existing bunding must be compatible with the liquids and chemicals to be received.	Toxfree undertake monthly inspections of all bunds to check for leaks and ensure integrity. The proposed new materials to be received will not affect the suitability of the bunding.
All materials are to be stored within the bunded building with no outdoor storage of waste materials or empty containers.	Waste is stored undercover (not always inside the building) and only empty containers without residues are stored outside (not under cover) i.e. stillages, reconditioned 205L drums, skip bins, etc. The sites stormwater network has an emergency shut off value, where it is kept closed at all times in case of a spill.
Ensure operational assumptions of the PHA are enforced.	Noted. There are no operational commitments assumed in the PHA that are considered onerous or unnecessary to the sites functionality. DP&E and EPA conduct regular inspections to audit compliance with approvals.
Detailed information on the receipt, management and processing of food and sewerage wastes and fire wash water, acids and alkalis is required. The potential for odour generation should be considered.	Table 4-2 of the Environmental Assessment (EA) by PEP Consulting 1st May 2016, identifies the proposed treatment process for each new waste received. These processes are described in detail in Section 2.1 of the EA. Further, Food waste NEPM code K120 is specifically 'liquid food waste' only - defined as '*Vegetable oils & derivatives, Vegetable & fruit processing effluent, Other liquid food waste'*. Does not include putrescible solid waste. Therefore, all food waste arriving onsite will be liquid, transported and stored in sealed containers in accordance with POEO Act requirements. The EPL will specify that these materials are stored only and not treated. An example is surplus/out of date orange juice in sealed 205L drums. Sewerage waste will also be transported and stored in sealed containers. There will be no decanting or consolidating. Since the waste will arrive and stored in sealed containers, there is no odour impact. The odour potential of the other new wastes is discussed in the Odour Assessment Report prepared by SRL Consulting provided In Attachment 2.

I trust this resolves the outstanding queries and the Department is now in a position to approve the modification.

Please don't hesitate to contact me if you have any queries.

Regards

Shay Riley-Lewis
B.Env.Sc (Env Mgt), GDURP, CPP, MPIA
Director
Environmental Planner
PEP Consulting

Attachments

Attachment 1 – Agency Comments
Attachment 2 – Odour Impact Assessment

NSW GOVERNMENT | Planning & Environment

Contact: Susan Fox
Phone: (02) 9228 6466
Email: susan.fox@planning.nsw.gov.au

Ms Shay Riley-Lewis
PEP Consulting Pty Ltd
Level 1 140 King Street
Newcastle NSW 2300

(via E-mail): shay@pepconsulting.com.au

Dear Ms Riley-Lewis,

MP06_0095 MOD 3 -Proposed Modification to Chemsal Waste Chemical Storage Facility - 40 Christie St, St Marys (Lot 431 DP 854814) – Request for further Information

I refer to email dated 9 June 2016, providing further information in relation to the proposed modification to Chemsal Waste Chemical Storage Facility.

Air quality
The Department has reviewed the information and is not satisfied the odour impacts associated with increasing the processing and storage capacity have been adequately addressed in the environmental assessment.

In order for the Department to finalise its assessment, the Department requires an Odour Impact Assessment to be undertaken by an experienced and qualified consultant in accordance with EPA's Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (2005) and Assessment and Management of Odour from Stationary Sources in NSW (2006).

Please provide the Odour Impact Assessment within four weeks from the date of this letter.

Penrith City Council
Please find enclosed Penrith City Council (Council) response to the Environmental Assessment. Please ensure that consider Council's letter in your Response to Submission Report.

This is also available on the Department's website at the following location: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7641.

If you have any questions, please contact Susan Fox, Senior Planning Officer, on the details above.

Yours sincerely

C. Ritchie 5/7/16.

Chris Ritchie
Director
Industry Assessments
as delegate for the Secretary

NSW GOVERNMENT | Fire & Rescue NSW

File Ref. No: BFS16/884 (10463)
TRIM Doc. No: D16/42938
Contact: Arthur Brown

24 May 2016

Department of Planning and Environment
Industry Assessments
C/- Susan Fox
GPO Box 39
SYDNEY NSW 2001

Email: susan.fox@planning.nsw.gov.au

Attention: Ms Fox

Dear Madam

Chemsal Waste Chemical Storage Facility (MP06_0095 MOD3)
40 Christie Street St Mary's
(Modification 3, Changes to Treatment Processes)

I refer to your correspondence dated 13 May 2016 in regards to the above modification request and which is currently on Notification. Fire and Rescue NSW (FRNSW) note that we have been invited by the Department of Planning & Environment (DPE) to comment upon the above proposal (including advice on recommended conditions of consent).

Fire & Rescue NSW (FRNSW) have reviewed the Notification documentation associated with the modification request. The following comments and recommendations are submitted for consideration:

1. Due to the relocation of Dunheved Fire Station from Christie Street to Plasser Crescent, FRNSW advise that we do not object to the proponent's modification request in regards to removal of the requirement for biennial emergency drills to be undertaken in liaison with FRNSW.

2. Should the modification application be granted, FRNSW recommend that a condition of consent is imposed that requires the site's fire safety study (FSS) to be revised. This recommendation is made due to the proposed increase in the storage of approved wastes and the proposed expansion of treatment capabilities associated with the existing chemical immobilization and stabilization process.

3. In the event of the modification application being approved and recommendation 2 above being adopted, FRNSW further recommends that the proponent be required to consult with FRNSW prior to commencing the FSS.

For further information, please contact Arthur Brown of the Fire Safety Assessment Unit, referencing FRNSW file number BFS16/884 (10463). Please ensure that all correspondence in relation to this matter is submitted electronically to bfs@fire.nsw.gov.au.

Yours faithfully

Mark Castelli
Team Leader
Fire Safety Assessment Unit

PENRITH

Our reference: ECM: 7182076
Contact: Jane Hetherington
Telephone: 4732 8078

16 June 2016

NSW Government Planning & Environment
Attention: Susan Fox

Email to: susan.fox@planning.nsw.gov.au

Dear Ms Fox

Re: Penrith City Council Submission to Proposed Modification to Tox Free (formerly Chemsal) Waste Chemical Storage Facility (MP06_0095 MOD3) at No. 40 Christie Street St Marys

I refer to the Department's letter dated 30 May 2016 seeking Council's comments relating to MP06_0095 MOD3 for Modifications to the consent for the Chemsal Waste Storage Facility at 40 Christie Street, St Marys (Lot 431 DP 854814).

The development is a scheduled activity under the *Protection of the Environment Operations Act*. In turn, the environmental impacts associated with activities undertaken on the site will be regulated by the Environmental Protection Authority (EPA) through an Environmental Protection Licence (EPL). The EIS supporting this application states that an application for licence variation has been lodged with the EPA. In assessing this modification and responding to the request for a licence variation, the NSW EPA and the Department is requested to consider the following:

- It is requested that the Department consider potential noise impacts associated with the proposed extended hours of operation and should consent be granted, mechanisms to ensure compliance with noise criteria, including the Industrial Noise Policy should be addressed by way of conditions of consent.

- The Department and the NSW EPA is requested to ensure a thorough review of the Preliminary Hazard Analysis (PHA) is undertaken, including consideration of existing nearby developments and any potential interaction that may occur between those and the development site. Consent, if issued should include mechanisms to ensure that the requirements and recommendations specified within the PHA are enforced throughout operation of the development.

- The Department and NSW EPA are requested to ensure that the existing (and proposed) bunding is compatible with the liquids and chemicals present in the facility, both singularly and in combination, to ensure that the integrity of the bunding material shall not be adversely impacted by the nature of the chemicals present on site.

Penrith City Council
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- The development be required to continue to store all materials within the bunded building with no outdoor storage of waste materials, including empty containers.
- In assessing the potential risk associated with the proposal, the PHA makes a range of specific assumptions directly related to specific operational aspects. Consent, if issued should include mechanisms to ensure that the requirements and recommendations specified within the PHA are enforced during operation of the development.
- Whilst the exact location of the AAN process has not been established (the application identifies three potential locations), the proposed modification will occur within the existing warehouse within bunded areas. The Department and NSW EPA should ensure that the existing (and proposed) bunding is compatible with the liquids and chemicals, both singularly and in combination, to ensure that the integrity of the bunding material shall not be adversely impacted by the nature of the chemicals present on site.
- The modification proposes to increase the current storage quantity limits including the quantity of acids and alkalis. Furthermore, the AAN process will require the relocation of a number of storage depot locations that are used to collect and store hazardous and dangerous goods. As the storage amendments associated with the modification shall be facilitated within the existing infrastructure, adverse environmental impacts are not anticipated, subject to the storage complying with all relevant Dangerous Goods and WorkCover legislative requirements, and NSW EPA requirements, including the requirement for all waste materials (including empty containers) being stored only within the building within a bunded area.
- Whilst the EIS states that "the proposed modification to operations would not result in a significant increase in volumes of all wastes received", the information submitted in relation to the "Additional Incoming Waste Volumes" shows a range of wastes proposed to be received and processed on site that are not currently permitted, including food and sewerage waste and fire wash water as well as acids and alkalis. Detailed information regarding the receipt, management and processing of these wastes are not included in the application. The receipt and processing/management of these wastes has the potential to create environmental impacts including odour emissions that may not arise from existing operations. Assessment of this aspect of the development should be considered and addressed by the NSW EPA.

Should you have any questions in relation to the above, please contact me on (02) (02) 4732 8125.

Yours sincerely

Gavin Cherry
Acting Development Assessment Co-ordinator

Penrith City Council
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ENVIRONMENT PROTECTION AUTHORITY

Our reference: SF16/21988
Licence No.: 12628

Chris Ritchie
Director Industry Assessment
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Dear Mr Ritchie

Proposed Modification to Tox Free (formerly Chemsal) Waste Chemical Storage Facility (MP06_0095 MOD3) St Marys, Penrith Local Government Area

I refer to your letter dated 12 May 2016 and the supporting information titled 'Environmental Assessment MP 06_0095 MOD3, Modification to existing development consent for additional treatment technologies at 40 Christie Street, St Marys (Lot 431DP 854814) prepared for Tox Free Australia Pty Ltd by PEP Consulting, Level 1, 140 King Street Newcastle NSW 2300 found on the Department of Planning website.

The EPA has reviewed the information provided in your letter dated 12 May 2016 and on the Department of Planning's Website regarding this proposal. EPA's recommendations/comments regarding the proposed development, based on the information provided and obtained from the Department of Planning Website, are given in Attachment A.

The EPA advises that should approval for the Proposal be successfully obtained, the existing environment protection licence for the premises must be varied before the new operations can be commenced.

Should you have any enquiries regarding this matter please contact Jeevan Jacob of this office on (02) 9995 5902.

Yours sincerely

M A Bowles

Martin Bowles
A/Manager Hazardous Materials Unit
Environment Protection Authority

PO Box A290 Sydney South NSW 1232
59-61 Goulburn St Sydney NSW 2000
Tel: (02) 9995 5000 Fax: (02) 9995 5999
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Attachment A

Proposed Modification to Tox Free (formerly Chemsal) Waste Chemical Storage Facility (MP06_0095 MOD3), 40 Christie Street, St Marys

Background

Tox Free Australia Pty Ltd, currently operates a waste storage and treatment (no-thermal treatment) facility at 40 Christie Street, St Marys (environment protection licence No.12628). Current activities at the facility include a mercury lamp crushing unit, paint containers and aerosol cans crushing unit, and hazardous chemical waste storage and handling (decanting, consolidation). Some of the waste materials stored and handled at the premises are classified as dangerous goods under the Australian Dangerous Goods Code.

The facility used to treat certain hazardous waste under EPA's *Specific Immobilisation Approvals* ("SIA") however, the facility currently does not have a valid SIA. The facility's environment protection licence requires that hazardous or restricted non-liquid waste must only be treated under an immobilisation approval.

Tox Free Australia Pty Ltd at Christie Street St Marys proposes to install an acid alkali neutralisation plant, solidify liquid waste prior to disposal to landfill, and treat hazardous and restricted waste by Chemical Immobilisation and Stabilisation ("CIS") processes at the premises. The company also intends to increase the dangerous goods storage at the premises.

The current EPA position on non-liquid waste treatment is that the treatment must achieve any of the following:

a. reduce the concentration of contaminant(s) in the waste by means other than dilution
b. immobilise contaminant(s) in the waste in accordance with an SIA issued by the EPA
c. satisfy specific standard/criteria approved by the EPA.

Solidification of liquid waste is not an acceptable treatment option for disposing of liquid waste.

EPA intends to require air emission control and monitoring requirements to be met by the proponent in relation to the waste acid alkali neutralisation plant. EPA considers that neutralisation of waste acids and waste alkalis have the potential to emit toxic air emissions.

Recommendations/Comments

1. Except as otherwise expressly provided in any other condition of the licence, the licensee must comply with section 120 of the Protection of the Protection of the Environment Operations Act 1997.

   Section 120 of the Protection of the Environment Operations Act 1997 prohibits the pollution of waters.

2. Section 129 of the Protection of the Environment Operations Act 1997 provides that the licensee must not cause or permit the emission of any offensive odour from the premises.

3. The proponent shall install appropriate air pollution control equipment and emission monitoring system to ensure that all air emissions from the waste acid alkali neutralisation plant is maintained at acceptable levels and these emissions are monitored correctly and regularly.

4. The proponent must ensure that the sampling position(s) for obtaining representative samples of the discharge to atmosphere from stack, duct or other similar outlet from the waste acid alkali

neutralisation plant must comply with the requirements of an ‘ideal sampling position’ of Australian Standard AS4323.1-1995.

5. Waste materials that are classified as dangerous good under the Australian Dangerous Goods Code as in force from time to time must be stored and handled in accordance with Storage and Handling of Workplace Dangerous Goods March 2001 National Code National Code of Practice [NOHSC:2017(2001)].

6. Stormwater from all areas of the premises which has the potential to mobilise sediments and other contaminated material must be controlled and diverted through appropriate erosion and sediment control/pollution control measures or structures.

7. Licensed activities must be carried out in a competent manner. This includes:
    a. processing, handling, movement and storage of materials and substances used to carry out the activity; and
    b. treatment, storage, processing, transport and disposal of waste.

8. 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.

9. All waste received at the Premises and transported from the premises must be classified in accordance with the EPA’s *Waste Classification Guidelines* as in force from time to time.

10. All operations and activities occurring at the Premises must be conducted in a manner that will not cause offensive noise.

Chemical Waste Storage and Treatment Facility

Odour Assessment

Report Number 610.16735

2 September 2016

Toxfree Australia Pty Ltd

40 Christie Street

St Marys

NSW 4399

Version: v1.0

Chemical Waste Storage and Treatment Facility

Odour Assessment

PREPARED BY:

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This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Toxfree Australia Pty Ltd. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
610.16735	v1.0	2 September 2016	Alison Radford	K Lawrence	FINAL
610.16735	V0.1	25 August 2016	Alison Radford	K Lawrence	DRAFT

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FIGURES

1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Toxfree Australia Pty Ltd (Toxfree) to perform an assessment of potential odour impacts associated with a proposed increase in processing and storage capacity of their chemical waste storage and treatment facility at 40 Christie Street in St Mary's, NSW (the Project site).

It is understood that an assessment of the potential odour impacts of the proposed changes outlined in the modification application MP06_0095 MOD3 has been requested by the Department of Environment & Planning. The assessment is required to consider the potential impact from an increase in processing and storage capacity at the Project site and also the measures taken to ameliorate impacts, where appropriate.

This assessment has been performed with reference to relevant standards, guidelines and resources, including:

- *The Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW OEH, 2005)*; and*
- *Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW* (NSW DEC, 2006).

However, there is no available emissions information for the proposed processes therefore the quantitative assessment approach outlined in the Approved Methods cannot be undertaken. In its place, a qualitative risk assessment has been used to address the potential for odours from the site to impact surrounding industrial and residential receptors.

2 PROJECT OVERVIEW

2.1 Project Location

The existing facility is located within the established St Mary's industrial estate at 40 Christie Street, St Mary's. The site is approximately 7 km east of the Nepean Hospital, 650 m east of Wianamatta Creek, approximately 650 m to the nearest residence and surrounded by other industrial facilities. The location of the Project site is shown in **Figure 1**.

Figure 1 Project Location

2.2 Project Description

The Project site currently receives approximately 3,800 tonnes of solid and liquid waste for storage and transfer per year. The proposed modification to operations would not result in a significant increase in volumes of all wastes received, but rather provide an improved economic return and environmental benefit by treating more wastes on-site prior to transfer off-site.

The modifications proposed with this application are:

- Establish an Acid/Alkaline Neutralisation (AAN) treatment system
- Expand the treatment capability of the existing Chemical Immobilisation and Stabilisation (CIS) process to handle a variety of waste streams
- Use a solidification treatment process for selected liquid/sludge/solid, non-dangerous goods, hazardous waste streams

In addition to these process modifications, the application also intends to extend operating hours from 6 am – 6 pm to 5 am – 10 pm, and increase storage limits of existing approved wastes.

The proposed increased volume of wastes to be received is shown in **Table 1**. In addition to those currently approved, two additional waste types are proposed to be received at the site to be treated using the proposed solidification treatment processes (inert sludges or slurries and non-controlled liquid waste) and two waste types to be stored and transferred (food and sewerage waste). The proposed modified treatment process would produce additional wastes as outlined in **Table 2**.

Table 1 Additional Incoming Waste Volumes

Waste Code	Waste Description	Treatment Process	Volume
K120	Food waste	Storage / transfer	5,000 tonnes (at any one time)
K130	Sewerage waste	Storage / transfer	5,000 tonnes (at any one time)
Z130[1]	Inert sludges or slurries	Solidification	40,000 L/day
Z140[1]	Non-controlled liquid waste	Solidification	40,000 L/day
N140[2]	Fire wash waters	Solidification / CIS	When required in certain situations (ie emergency fire)
B100	Acids	AAN	35,000 L
C100	Bases	AAN	25,000 L
A130/T100	Cyanide	AAN	5,000 kg

Notes:
1. Waste type in addition to those currently approved for storage
2. Volumes not specifying frequency will be based on maximum limit on-site at any one time.

Table 2 Additional Outgoing Waste Volumes

Waste Type	Waste Volumes[1]
Acid Alkaline Plant	
Non-hazardous liquid waste	10,000 L/day
Non-hazardous non-liquid waste (sludge)	5,000 L/day
CIS Plant	
General solid waste	20 tonnes/day
Solidification Bins[2]	
Restricted solid waste	40 tonnes/day

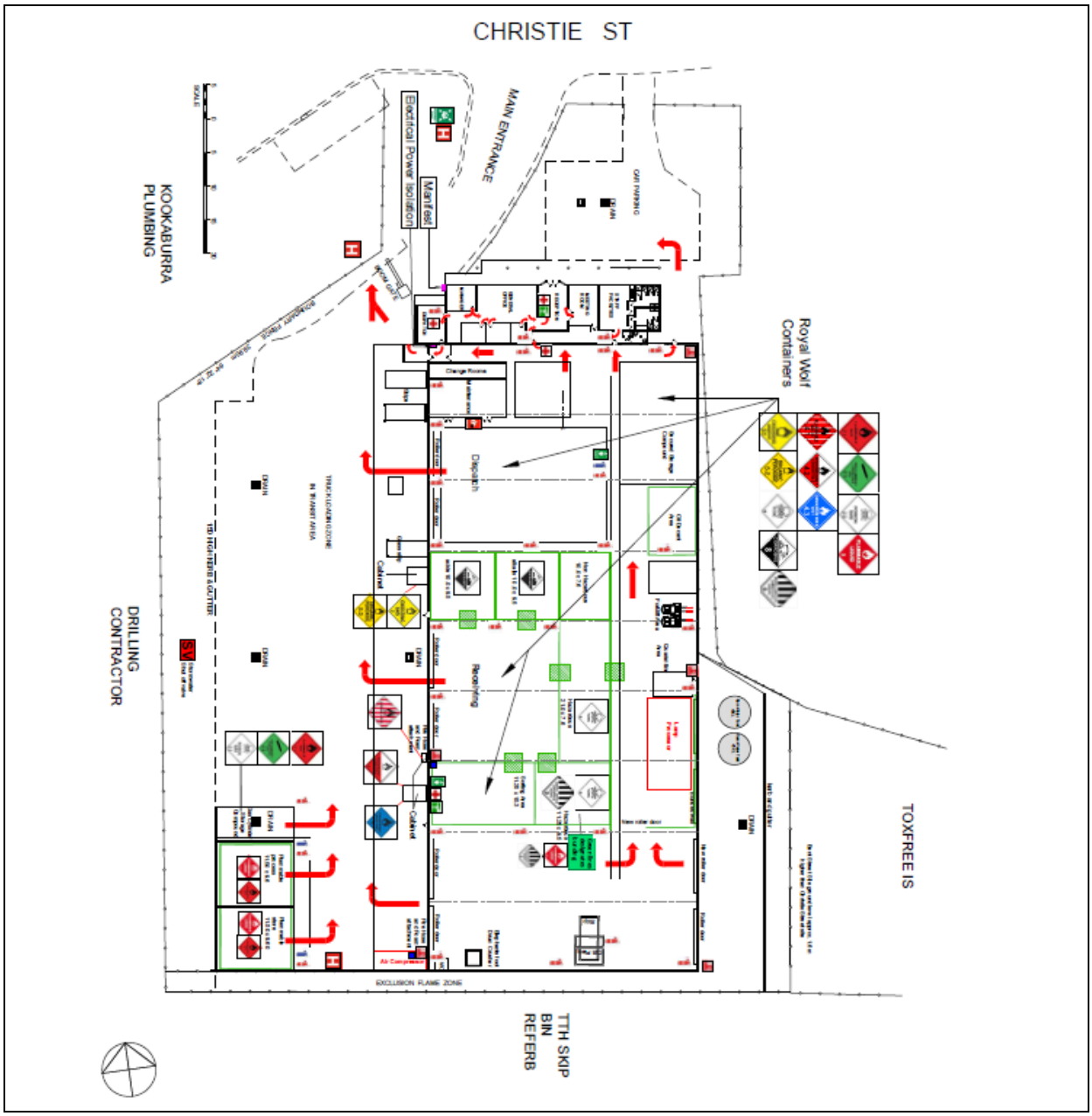
Notes:
1. In addition to volumes currently generated.
2. Waste generated from the solidification process would otherwise be generated by the approved CIS treatment process.

The site layout is shown in **Figure 2**.

All CIS and Solidification treated wastes would undergo the required treatment, curing and validation processes as required by the relevant EPA Immobilisation Approval prior to offsite disposal. Treated waste would then be disposed of at a suitably licenced landfill. Solidification treated waste would likely be transported to Sita's Kemps Creek Landfill as 'restricted solid waste' in accordance with NSW EPA Waste Classification Guidelines. It is anticipated this modified process will generate approximately 17,500 tonnes per year of 'restricted solid waste' in lieu of 'general solid waste' from the CIS process.

General solid waste would be transported to a licenced landfill.

Figure 2 Site Layout



2.2.1 Acid Alkaline Neutralisation

The Acid Alkali Neutralisation (AAN) treatment system aims to consolidate packaged wastes currently received at the site. Containers of acid or alkalis are received from schools, laboratories, universities and households via EPA/Council collections. Acids received typically include sulphuric acid, hydrochloric acid and acidic based cleaners. Alkalis include lime, caustic soda and sodium hydroxide. Currently, containers are received, packed onto pallets and transported to the Toxfree Links Road facility where they are decanted into intermediate bulk containers (IBCs) and pumped out and transported to a third party for processing.

The AAN combines acids and bases to create a neutral solution. Heat from neutralisation reactions is removed through refrigerated cooling system. pH and temperature will be continuously monitored on the AAN Mixing Tank and gas scrubber. Once the pH stabilises within the acceptable range, the contents is pumped to a standby IBC to settle for 1 day. Following settlement, the liquid is pumped off by vacuum tanker and transported offsite to an appropriately licenced facility. Settled solids are drained from the IBC and tested for contaminants and an appropriate CIS treatment formulated.

The AAN plant will be fitted with a fume extraction system discharging approximately 2 m^3/minute of air. A caustic scrubbing system (sodium hydroxide solution) will be utilised to scrub the air extracted from around the decanting station and above the neutralisation tank. The caustic scrubber exhaust will discharge at least three metres above the roof height to limit building downwash effects. Ducting transition will be fitted on to the exhaust to increase efflux velocity to 10 m/s in accordance with best practice.

2.2.2 Chemical Immobilisation and Stabilisation (CIS)

The Christie Street facility is approved for CIS as described in the approved Part 3A Modification 2. This modification proposes CIS treatment of T120 photo chemicals, as well as the existing waste codes approved, rather than the approved storage.

The processing of T120 photo chemicals (which may contain silver) will be consistent with the current CIS approval. If the treated waste meets quality control criteria upon curing and testing it is proposed that the immobilised waste be disposed of as General Solid or Restricted Solid waste to a suitably licensed landfill. Treatment of photo chemicals with the CIS process is expected to generate only a minor increase in solid waste to landfill.

2.2.3 Solidification Bins

Selected liquid/sludge/solid, non-dangerous good, hazardous wastes streams will be blended into ‘spadeable’ restricted solids waste in accordance with EPA Waste Guidelines. Currently many wastes are approved to be treated by the CIS process, however for some waste products this process increases the cost to waste producers for appropriate disposal. Selected non-dangerous goods can instead be adequately neutralised to ‘restricted solid waste’ for disposal at an appropriately licenced landfill at a fraction of the cost of disposal as ‘liquid waste’ or ‘solid waste’ following CIS treatment.

Solid waste products already received at the facility such as out of specification vermiculite (absorbent), cement, soda ash, mulch or dust would be added to the liquid waste and mixed with an excavator in a 15 m^3 bin. The bin would be self-bunded and fitted with a weather-proof rollout tarp. These solids are currently received at the facility for secure disposal. Should there be insufficient quantity available onsite, additional could be purchased.

Treated wastes would be loaded into a storage bin and transported by hook truck to Sita’s Kemps Creek Industrial Landfill for disposal. It is anticipated the process would generate approximately 40 tonne per day of ‘Restricted Solid Waste’ that would otherwise have been generated by the approved CIS treatment process.

2.3 Potential Odour Emissions

Toxfree's current and proposed operations have the potential to generate odorous air emissions. The following sections describe the likely emission points on-site and their potential to contribute to air quality impacts on the local area. All the potential current and proposed sources are listed in **Table 3** and summarised in **Section 2.3.1** and **Section 2.3.2**.

Table 3 Potential Sources of Air Emissions

Activities On-site	Potential Sources of Air Emissions	
	Current Operations	**Proposed Operations**
Lamp Processing Area	• Emissions generated from the lamp processing area primarily consist of mercury from lamps and bulbs. • The exhaust air from the lamp processing is passed through a filter (reverse pulse) and activated carbon. The activated carbon activated carbon is deposited into 205 L drums. • The reported concentration of mercury measured during stack emission tests in October 2015 was 0.0015 mg/m^3, which is below the EPL concentration limit of 0.2 mg/m^3.	• No change to process
Flammable Process Area	• Emissions generated from the Flammable process area primarily consist of VOCs (including n-pentane, n-hexane, toluene, p-xylene and/or m-xylene, 2-methylpentane, trichloroethylene and dicholormethane) from storage of Class 3 (flammable liquid), Class 6 (toxic) and Class 8 (corrosive) Dangerous Goods. • Emissions are currently captured and treated with an activated carbon filter (with a chemical indicator that indicates when the carbon needs to be changed) prior to discharge into the atmosphere. • The highest reported concentration of VOCs (as n-pentane) measured during stack emission tests in October 2015 was 5.29 mg/m^3, which is below the EPL concentration limit of 40 mg/m^3.	• No change to types of materials permitted to be stored • Volumes allowed to be stored on site will increase
ANN Plant	• Not currently operating	• Acids received typically include sulphuric acid, hydrochloric acid and acidic based cleaners. • Alkalis typically received include lime, caustic soda and sodium hydroxide. • Heat from neutralisation reactions is removed through refrigerated cooling system. • The proposed AAN plant will be fitted with an extraction system discharging approximately 2 m^3/minute of air. The gas scrubber system will comprise a sodium hydroxide spray tower chemical scrubbing system to remove toxic gases that are potentially created during AAN neutralisation and pre-consolidation. The scrubbing system will be utilised to scrub the air extracted from around the

Activities On-site	Potential Sources of Air Emissions	
	Current Operations	**Proposed Operations**
		decanting station and above the neutralisation tank.
CIS	• CIS treatment of approved waste codes • Approval for storage of T120 photo chemicals • Existing waste is not considered odorous	• CIS treatment of T120 photo chemicals, as well as the existing waste codes approved. • T120 photo chemicals are not considered odorous.
Solidification bins	• Not currently operating	• Solidification bins will process inert sludges or slurries, non-controlled liquid waste, and fire wash waters. • Use of self bunded bin for solidification mixing process. • No mixing in the solidification bins during excessively windy conditions. • May be dust emissions from solidification process but no odour emissions.
Storage and Transfer	• Not currently operating for sewerage and food waste	• Sewerage and food waste will be stored on-site and transferred off-site • There will be no decanting or consolidating of wastes on-site • Containers will be sealed and not opened and will therefore not result in any odorous emissions.
Spills	• Types of odorous spills that could occur include volatile organic compounds (VOCs), non-toxic salts, waste from resins etc, waste from inks etc, surfactants, contaminated soils etc) • Spill management procedures are in place (bunding, site inspections, spill kits etc)	• Additional types of spills could occur (ie acids, alkalis, sewage, food waste etc) • All food waste is to be transported and stored in sealed containers. • All sewerage waste is to be transported and stored in sealed containers. • Existing spill management procedures are in place (bunding, site inspections, spill kits etc)

2.3.1 Current Operations

Toxfree's current operations have the potential to generate air emissions including odour as a result of the storage of waste chemicals. Volatile chemical species of Class 3 (flammable liquid), Class 6 (toxic) and Class 8 (corrosive) Dangerous Goods could be expected to come from the Flammable process area to the southwest of the Project site. These emissions are currently captured and treated with an activated carbon filter (with a chemical indicator that indicates when the carbon needs to be changed) prior to discharge into the atmosphere. The discharge point is directed out the wall of the flammable area enclosure and is discharged 3 m above the roof/gutter line.

Stack emissions monitoring of the discharge point on the Flammable processing area has been undertaken. The results from testing undertaken in October 2015 are presented in **Table 4**.

Table 4 Odour Detection of Stack Emission Testing Results

Volatile Organic Compounds	Stack Testing October 2015 (mg/m^3)		Odour Detection Threshold		Odour Character
	Run 1	Run 2	ppm	mg/m^3	
N-pentane	<0.83	0.97	2.2	6.5	Pleasant / gasoline
2-methylpentane	<0.83	**0.97**	-	0.29	Faint petroleum odour
n-hexane	1.16	1.3	65 – 248	229 - 874	Gasoline
dichloromethane	3.47	**5.2**	1.2 – 440	4.2 - 1528	Chloroform like odour
trichloroethylene	0.99	0.97	0.5 – 167	2.7 - 897	Chloroform like odour
toluene	**0.66**	**0.65**	0.16 – 37	0.6 - 139	Sweet, pungent, benzene-like odour
p-xylene and/or m-xylene	0.33	**0.49**	0.08 – 40	0.3 - 174	Aromatic odour

The capacity of the existing treatment systems is sufficient to accommodate the additional dangerous goods storage volumes.

Toxfree's current operations also include a Lamp Processing area on the eastern side of the site which recycles lamps and bulbs (**Figure 2**). These lamps contain mercury and the exhaust air from the lamp processing is passed through a filter (reverse pulse) and activated carbon. The discharge point is directed out the wall of the lamp processing area and is discharged 3 m above the roof line and approximately 7 m above the building's gutter. The activated carbon is deposited into 205 L drums. The proposed modifications to the site's operation will not impact the throughput of the lamp processing area.

All the ventilation is natural in the main warehouse where smoke, cyanide, and chlorine detectors have been installed. Staff conduct daily checks of their work areas to identify odours and spills. There have been no odour complaints received since Toxfree began operations at the site.

2.3.2 Proposed Operations

The proposed AAN plant will be fitted with an extraction system discharging approximately 2 m^3/minute of air. The gas scrubber system will comprise a sodium hydroxide spray tower chemical scrubbing system to remove toxic gases that are potentially created during AAN neutralisation and pre-consolidation. The scrubbing system will be utilised to scrub the air extracted from around the decanting station and above the neutralisation tank.

Dust generated from the solidification bins is expected to be minor. Solidification mixing will occur within a 15 m^3 high-sided bin to contain the mixture and minimise exposure to wind. Once mixed and tested, the waste would be loaded into a self-bunded, contained storage bin. Bin mixing would not occur during excessively windy conditions.

It is the additional storage of waste chemicals in the Flammable process area and the extraction system associated with the AAN plant that form the primary sources of additional odour emissions generated by the site following the implementation of the proposed modifications to operations. Therefore, these activities and emission points form the focus of this qualitative odour assessment. Emissions from the continued operation of the CIS and the solidification bins have not identified as producing odorous emissions and have not been addressed further in this assessment.

In addition to the above sources, the proposed operations involve the storage and transfer of K120 liquid food waste and K130 sewerage waste. The K120 food waste is defined as vegetable oils and derivatives, vegetable and fruit processing effluent and other liquid food waste, it does not contain putrescible solid waste. Therefore all liquid food waste arriving on-site will be transported and stored in sealed containers in accordance with POEO Act requirements. These materials will be stored only and not treated or processed. Since the waste will arrive and be stored in sealed containers this waste has not likely to produce odorous emissions.

3 RELEVANT ODOUR GUIDELINES

Impacts from odorous air contaminants are often nuisance-related rather than health-related. Odour performance goals guide decisions on odour management, but are generally not intended to achieve “no odour”.

The detectability of an odour is a sensory property that refers to the theoretical minimum concentration that produces an olfactory response or sensation in 50 of the population. This point is called the *odour threshold* and defines 1 odour unit (ou). An odour goal of less than 1 ou would theoretically result in no odour impact being experienced.

In practice, the character of a particular odour can only be judged by the receiver’s reaction to it, and preferably only compared to another odour under similar social and regional conditions. Based on the literature available, the level at which an odour is perceived to be a nuisance can range from 2 ou to 10 ou depending on a combination factors including population sensitivity, background level, public expectation (considered offensive or easily tolerated), source characteristics (i.e. emitted from a stack or general area) and health effects.

Odour performance goals need to be designed to take into account the range in sensitivities to odours within the community, and provide additional protection for individuals with a heightened response to odours, using a statistical approach which depends on the size of the affected population.

The NSW EPA has developed odour goals to assess the likelihood of nuisance impact arising from the emission of odour. There are two factors that need to be considered:

1. what "level of exposure" to odour is considered acceptable to meet current community standards in NSW, and
2. how can dispersion models be used to determine if a source of odour meets the goals which are based on this acceptable level of exposure.

The term "level of exposure" has been used to reflect the fact that odour impacts are determined by several factors the most important of which are:

- the **F**requency of the exposure
- the **I**ntensity of the odour
- the **D**uration of the odour episodes and
- the **O**ffensiveness of the odour
- the **L**ocation of the odour.

In determining the offensiveness of an odour it needs to be recognised that for most odours the context in which an odour is perceived is also relevant. Some odours, for example the smell of sewage, hydrogen sulfide, butyric acid, landfill gas etc., are likely to be judged offensive regardless of the context in which they occur. Other odours such as the smell of jet fuel may be acceptable at an airport, but not in a house, and diesel exhaust may be acceptable near a busy road, but not in a restaurant.

In summary, whether or not an individual considers an odour to be a nuisance will depend on the FIDOL factors outlined above and although it is possible to derive formulae for assessing odour annoyance in a community, the response of any individual to an odour is still unpredictable.

Odour goals need to take account of these factors.

It is often not possible or practical to determine and assess the cumulative odour impacts of all odour sources that may impact on a receptor in an urban environment. Therefore, the NSW odour performance goals allow for population density, cumulative impacts, anticipated odour levels during adverse meteorological conditions, and community expectations of amenity.

The EPA's Odour Technical Framework document, *Assessment and Management of Odour from Stationary Sources in NSW* (NSW DEC, 2006), provides a policy framework for assessing and managing activities that emit odour and offers guidance on dealing with odour issues. It outlines:

- the legislation that applies to odour assessment and management in NSW;
- a fair and transparent process for assessing odour impacts from new developments;
- a system to help protect the environment and community from odour impacts while promoting fair and equitable outcomes for odour-emitting activities; and
- a technical reference document for proponents/developers, planners and regulators.

The Framework is accompanied by the *Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW* (Department of Environment and Conservation, 2006), which provides detailed odour assessment procedures.

The odour assessment methodologies and criteria specified in the Technical Framework are adopted in the Approved Methods. The Approved Methods states that the impact assessment criteria for complex mixtures of odorous air pollutants must be applied at the nearest existing or likely future off-site sensitive receptor(s).

As this assessment is qualitative in nature, an assessment of impact against a criterion is not achievable. However, the FIDOL factors have been used to guide the qualitative assessment in understanding the level of exposure the local sensitive receptors may be exposed to and ascertain the potential for odour impact at these locations.

4 SENSITIVE RECEPTORS

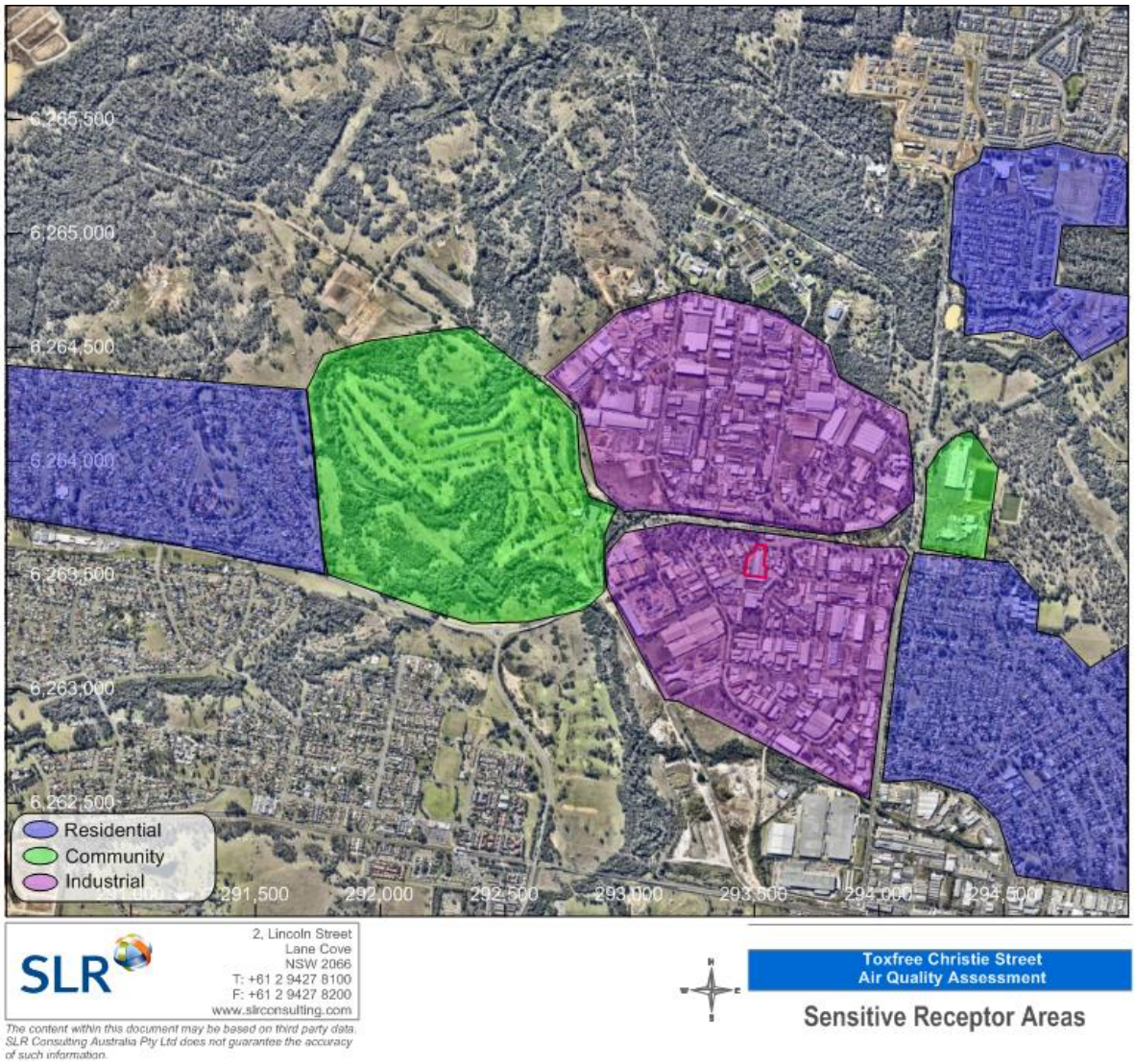
The *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*, issued by the Department of Environment and Conservation in August 2005 defines a sensitive receptor as:

> *"A location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area. An air quality impact assessment should also consider the location of known or likely future sensitive receptors."*

As noted above, the Project Site is located in an industrial area. The industrial nature of these sites means they would not be considered as sensitive in the way that an office, school or hospital would be, hence this report focusses on potential impacts at the nearest residential and recreational areas.

The closest residential receptors are located approximately 1.8 km to the west on the other side of Dunheved Golf Club, 1.3 km to the northeast and 0.6 km to the east. Public recreational areas in the vicinity of the site include the Dunheved Golf Club and the Dunheved Estate Reserve. These sensitive areas are outlined in **Figure 3**.

Figure 3 Sensitive Receptor Areas



5 LOCAL ENVIRONMENT

5.1 Local Meteorology

The nearest available meteorological monitoring stations operated by the Bureau of Meteorology (BOM) are the Badgerys Creek automatic weather station (AWS) (Station number 067108) and Horsley Park Equestrian Centre AWS (Station number 67119), located approximately 16.7 km south southwest and 13.7 km southeast of the Project site, respectively.

The Horsley Park Equestrian Centre AWS is closer to the Project site however Badgerys Creek AWS is located equidistant from the Great Dividing Range and the meteorological conditions experienced at Badgerys Creek AWS are expected to be reflective of those experienced at the Project site. The long-term climate data summary for the area presented in the following sections is based on historical data from the Badgerys Creek AWS.

5.2 Temperature

Monthly mean maximum and minimum temperatures recorded at Badgerys Creek AWS are presented in **Figure 4**. The data show that average maximum summer temperatures in the region often exceed 28°C. During the winter months the average maximum temperature falls below 20°C. Average minimum temperatures range from just above 15°C in summer to just below 5°C in winter.

5.3 Rainfall

Long-term rainfall statistics for Badgerys Creek AWS are summarised in **Figure 5**. Rainfall is relatively high in summer and tends to be lowest during winter and early spring. Peak rainfall occurs in summer, with maximum daily rainfall occurring in January.

5.4 Relative Humidity

Monthly average 9 am and 3 pm relative humidity data for Badgerys Creek AWS are presented in **Figure 6**. The humidity levels are higher in the morning compared to the afternoon. Levels are relatively consistent year round with a slight decrease occurring in spring.

Figure 4 Monthly Average Minimum and Maximum Temperatures Badgerys Creek AWS (1995-2016)

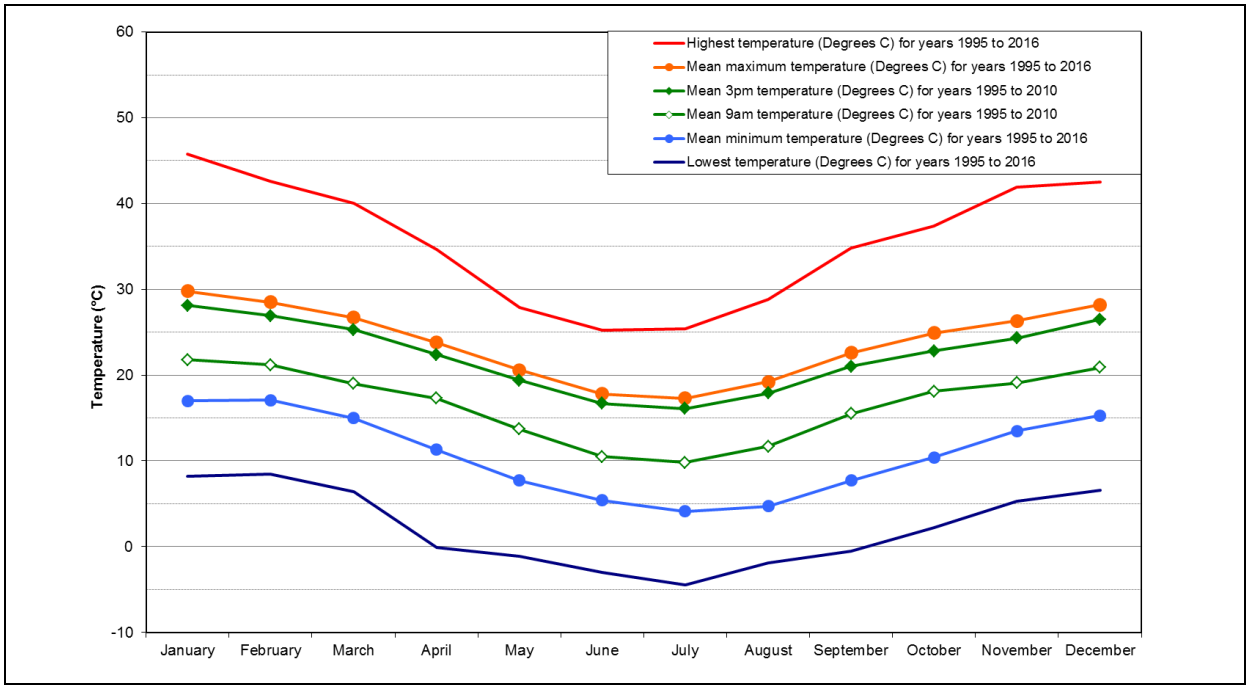


Figure 5 Monthly Average Rainfall Data – Badgerys Creek AWS (1995-2016)

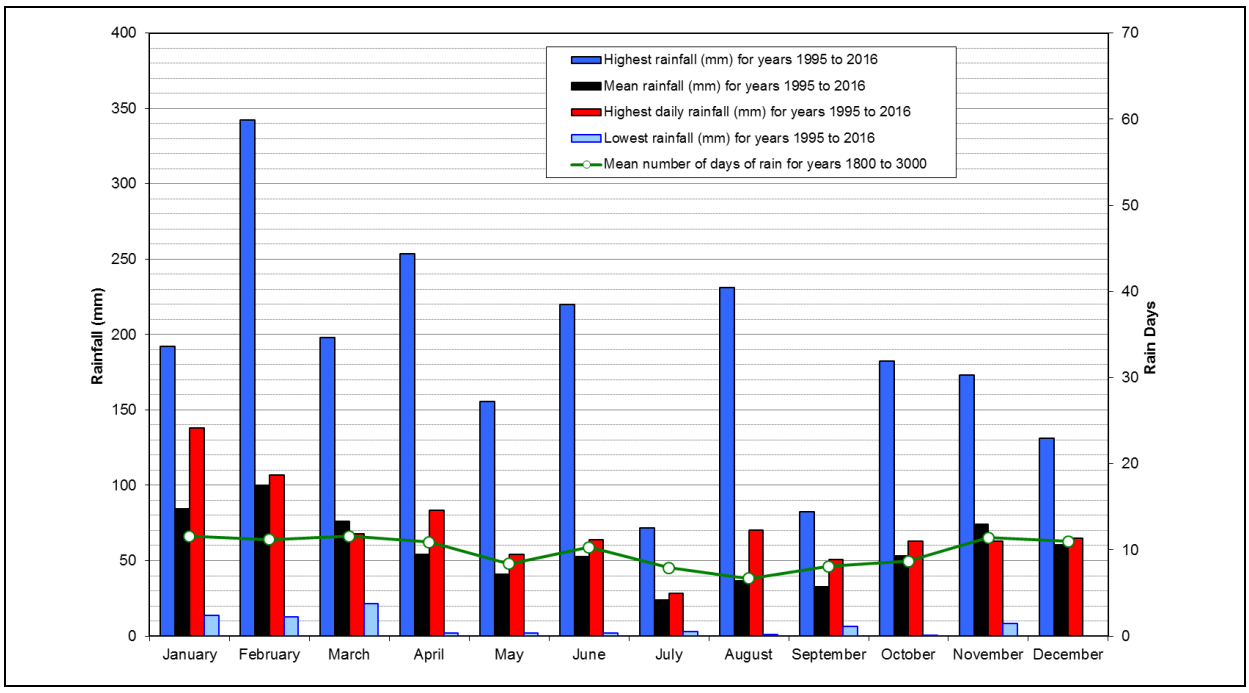
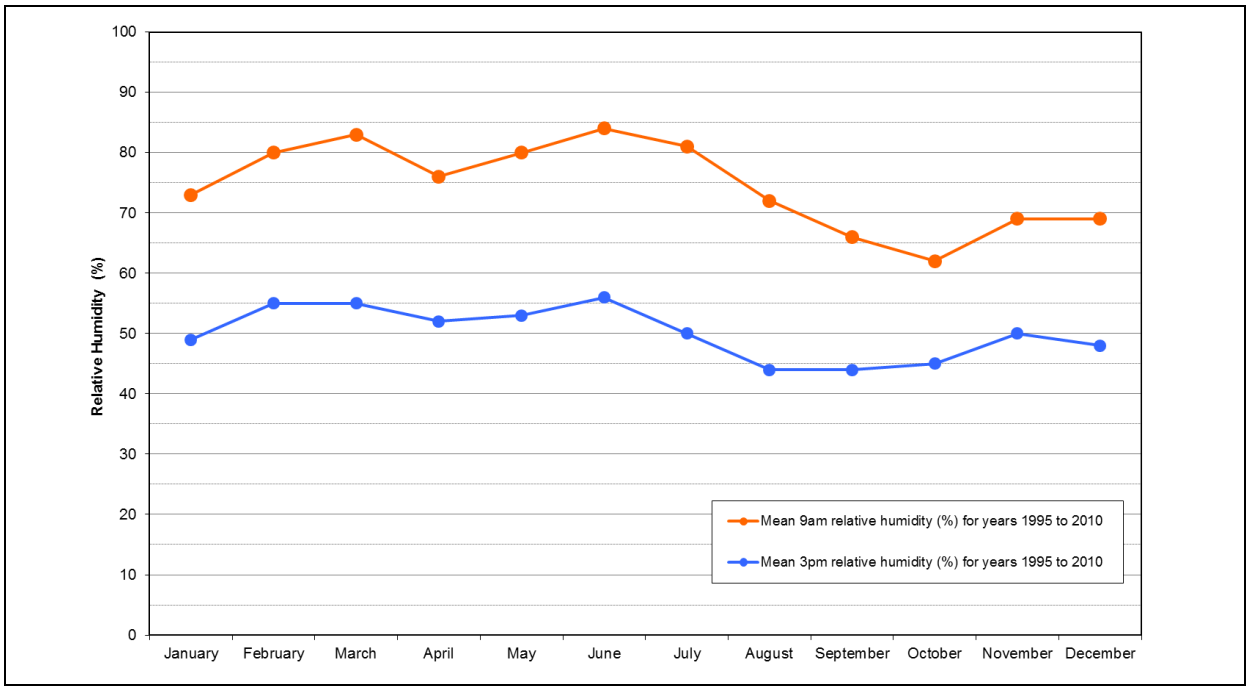


Figure 6 Monthly Average 9 am and 3 pm Relative Humidity – Badgerys Creek AWS (1995-2010)

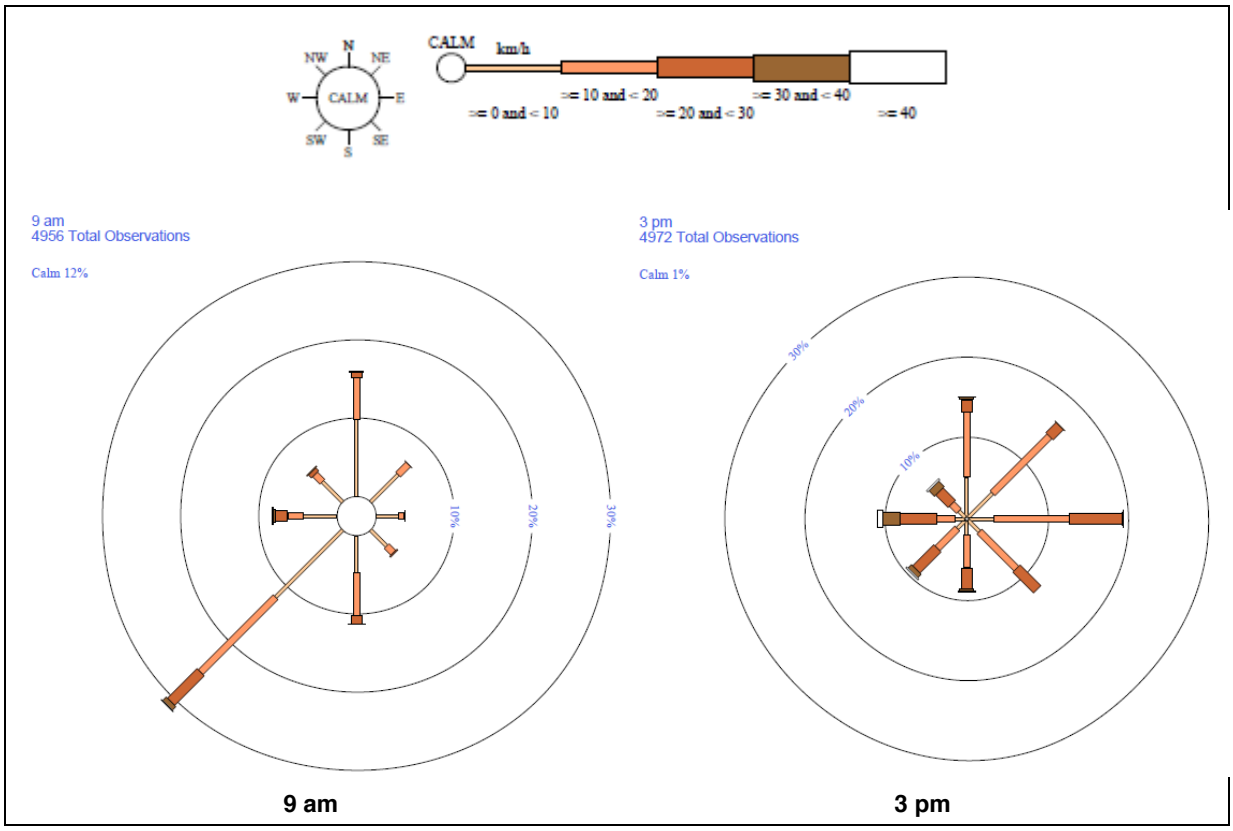


5.5 Wind Speed and Wind Direction

Local wind speed and direction influence the dispersion of air pollutants. Wind speed determines both the distance of downwind transport and the rate of dilution as a result of 'plume' stretching. Wind direction, and the variability in wind direction, determines the general path pollutants will follow and the extent of crosswind spreading. Surface roughness (characterised by features such as the topography of the land and the presence of buildings, structures and trees) will also influence dispersion.

Annual average 9:00 am and 3:00 pm wind data for Badgerys Creek AWS based on long-term data (1995 – 2010) are presented as wind roses in **Figure 7**. The wind roses show predominant southwesterly winds in the morning and winds from the eastern quadrant in the afternoon.

Figure 7 Annual Average 9:00 am and 3:00 pm Wind Data (Badgerys Creek AWS 1995 – 2010)



6 ASSESSMENT METHODOLOGY

Qualification of the frequency, intensity, duration, offensiveness, and location of odour sources and their emissions is necessary when appraising potential future impacts on sensitive land uses. Specific methodologies are described in further detail in the relevant sections of this document however the following broad "risk based" approach has been adopted.

The risk-based assessment takes account of a range of impact descriptors, including the following:

- **Nature of Impact**: does the impact result in an adverse or beneficial environment?
- **Sensitivity**: how sensitive is the receiving environment to the anticipated impacts? This may be applied to the sensitivity of the environment in a regional context or specific receptor locations.
- **Magnitude**: what is the anticipated scale of the impact?

The integration of sensitivity with impact magnitude is used to derive the predicted **significance** of that change.

6.1 Nature of Impact

Predicted impacts may be described in terms of the overall effect upon the environment:

- **Beneficial**: the predicted impact will cause a beneficial effect on the receiving environment.
- **Neutral**: the predicted impact will cause neither a beneficial nor adverse effect.
- **Adverse**: the predicted impact will cause an adverse effect on the receiving environment.

6.2 Receptor Sensitivity

Sensitivity may vary with the anticipated impact or effect. A receptor may be determined to have varying sensitivity to different environmental changes, for example, a high sensitivity to changes in air quality, but low sensitivity to noise impacts. Sensitivity may also be derived from statutory designation which is designed to protect the receptor from such impacts.

Sensitivity terminology may vary depending upon the environmental effect, but generally this may be described in accordance with the following broad categories:

- Very high
- High
- Medium
- Low

Table 5 outlines the methodology used in this study to define the sensitivity of receptors to air quality impacts.

Table 5 Methodology for Assessing Sensitivity of a Receptor

Sensitivity	Impact	Criteria
Very High	Air Quality Impacts	Receptors of very high sensitivity to air pollution (e.g. dust or odour) such as: hospitals and clinics, and retirement homes.
High	Air Quality Impacts	Receptors of high sensitivity to air pollution, such as: schools, residential areas, food retailers, glasshouses and nurseries.
Medium	Air Quality Impacts	Receptors of medium sensitivity to air pollution, such as: farms / horticultural land, offices/recreational areas, painting and furnishing, hi-tech industries and food processing, and outdoor storage (ie new cars).
Low	Air Quality Impacts	All other air quality sensitive receptors not identified above, such as light and heavy industry.

6.3 Magnitude

Magnitude describes the anticipated scale of the anticipated environmental change in terms of how that impact may cause a change to baseline conditions. Magnitude may be described quantitatively or qualitatively. Where an impact is defined by qualitative assessment, suitable justification is provided in the text.

Table 6 Magnitude of Impacts

Magnitude	Description
Substantial	Impact is predicted to cause significant consequences on the receiving environment (may be adverse or beneficial)
Moderate	Impact is predicted to possibly cause statutory objectives/standards to be exceeded (may be adverse)
Slight	Predicted impact may be tolerated.
Negligible	Impact is predicted to cause no significant consequences.

6.4 Significance

The risk-based matrix provided below illustrates how the definition of the sensitivity and magnitude interact to produce impact significance.

Table 7 Impact Significance Matrix

Sensitivity \ Magnitude		[Defined by Table 6]			
		Substantial Magnitude	**Moderate Magnitude**	**Slight Magnitude**	**Negligible Magnitude**
[Defined by Table 5]	**Very High Sensitivity**	Major Significance	Major/ Intermediate Significance	Intermediate Significance	Neutral Significance
	High Sensitivity	Major/ Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
	Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
	Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

7 RISK ASSESSMENT

This section provides a framework for the assessment of risks associated with the odour sources identified in **Section 2**. The risk assessment uses the methodology presented in **Section 6** of this report. In the context of this methodology, the risk is termed "*impact significance*".

7.1 Receptor Sensitivity

The nearby sensitive receptors to the Project site include residences approximately 600 m to the east, community receptors approximately 150 m to the north and industrial receptors surrounding the Project site in most directions.

In terms of the methodology in **Section 6**, the sensitivity of the surrounding residential areas to emissions generated by the Project site should be considered ***high***, the sensitivity of the community areas considered ***medium*** and the surrounding industrial areas considered to be ***low*** (refer **Table 5**).

Predominant southwesterly winds occur in the morning with winds from the eastern quadrant predominant in the afternoon. The community receptor, Dunheved Estate Reserve is most likely to be affected in the morning as it will be downwind. Industrial receptors will be affected under all wind directions as they surround the site, but more often the receptors to the northeast and west. Under the predominant wind directions, the residential receptors to the northeast (1.3 km away) and those 600 m to the west have the greatest potential to be impacted compared to the other residences.

7.2 Potential Odour Impacts from the Lamp Processing Area

By addressing the FIDOL factors, the potential for odour impacts from this source at the sensitive receptors may be determined.

- Frequency – the closest residential areas have the potential to experience impacts whenever the lamp processing area is operational (day time only) and when the wind direction is westerly, which occurs approximately 10% of the time. The community receptor, the Dunheved Estate Reserve, will be occasionally visited by locals but they will not occupy the space for a continuous period and therefore are less likely to experience frequent potential odour impacts.
- Intensity – the odour generated by the lamp processing area is likely to be minimal as emissions primarily consist of mercury from lamps and bulbs and mercury is odourless.
- Duration – the duration of a potential odour impact may last as long as the lamp processing area is operational and for as long as the wind blowing in a direction over the site to the receptor. Any receptor located in the northeast is most likely to be potentially impacted by odour given winds from the southwest occur for 30% of the morning period.
- Offensiveness – as noted above, emissions from this process primarily consist of mercury from lamps and bulbs which is odourless, and therefore by definition, not offensive.
- Location – the impact of location on the acceptability of odours from the site has been accounted for by the receptor sensitivity classifications detailed in **Section 7.1**.

The lamp processing area is unlikely to generate any odour emissions as the emissions primarily consist of mercury from lamps and bulbs and mercury is odourless. In addition, the processing capacity will not increase as part of the proposed modifications to site operations. Therefore, if no odour impacts have occurred in the past (ie no complaints received from local receptors) it's unlikely that future operations will cause any odour impacts.

Given the above considerations, and the relatively small scale of operations, the potential impact of the lamp processing area (see **Table 6**) is considered to be ***negligible*** for all receptors; residential, industrial and recreational (i.e. the impact is predicted to cause no significant consequences). Correspondingly, the potential impact significance for the local receptors is concluded to be ***neutral*** for all receptors (see **Table 7**).

Table 8 Impact Significance – Air Quality Impacts from Lamp Processing Area

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/ Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/ Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

7.3 Potential Odour Impacts from Storage of Waste Chemicals in the Flammable Process Area

By addressing the FIDOL factors, the potential for odour impacts from this source at the sensitive receptors may be determined.

- Frequency – the residence may experience potential impacts when the wind direction is westerly, which occurs approximately 10% of the time. The community receptor, the Dunheved Estate Reserve, will be occasionally visited by locals but they will not occupy the space for a continuous period and therefore are less likely to experience frequent potential odour impacts.
- Intensity – emissions generated from the flammable process area primarily consist of VOCs, which can be odorous, however emissions are currently captured and treated with an activated carbon filter prior to discharge into the atmosphere. The resulting emissions to atmosphere are therefore expected to have a low intensity.
- Duration – the duration of a potential odour impact may last for as long as the wind blowing in a direction over the site to the receptor. Any receptor located in the northeast is most likely to be potentially impacted by odour given winds from the southwest occur for 30% of the morning period.
- Offensiveness – as demonstrated in **Table 4**, the only VOCs with the possibility of being detected at the stack emission point are 2-methylpentane, dichloromethane, toluene, and xylene, which only just reach the low end of the odour detection threshold. These odours would be undetectable at any distance from the stack.
- Location – the impact of location on the acceptability of odours from the site has been accounted for by the receptor sensitivity classifications detailed in **Section 7.1**.

The capacity of the existing treatment systems is sufficient to accommodate the additional dangerous goods storage volumes.

Given the above considerations, and the relatively small scale of operations, the potential impact of the flammable processing area (see **Table 6**) is considered to be ***negligible*** for all receptors; residential, industrial and recreational (i.e. the impact is predicted to cause no significant consequences) (**Table 9**). Correspondingly, the potential impact significance for the local receptors is concluded to be ***neutral*** for all receptors (see **Table 7**).

Table 9 Impact Significance – Air Quality Impacts from Storage of Waste Chemicals in the Flammable Process Area

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/ Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/ Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

7.4 Potential Odour Impacts from ANN Plant

By addressing the FIDOL factors, the potential for odour impacts from this source at the sensitive receptors may be determined.

- Frequency – the residence may experience potential impacts whenever the ANN Plant is operational and when the wind direction is westerly, which occurs approximately 10% of the time. The community receptor, the Dunheved Estate Reserve, will be occasionally visited by locals but they will not occupy the space for a continuous period and therefore are less likely to experience frequent potential odour impacts.
- Intensity – the odour generated by the ANN Plant is unlikely to be intense. The acid/base reactions taking place will result in the formation of chlorine gas from reaction of sodium hypochlorite with hydrochloric acid, and sulfur dioxide from reaction of sodium hypochlorite with sulfuric acid. Heat from neutralisation reactions is removed through refrigerated cooling system to reduce emissions of any volatile compounds through the stack. In addition, installation of a sodium hydroxide packed tower chemical scrubbing system aims to remove gases created during the AAN process.
- Duration – the duration of a potential odour impact may last as long as the ANN Plant is operational and for as long as the wind blowing in a direction over the site to the receptor. Any receptor located in the northeast is most likely to be potentially impacted by odour given winds from the southwest occur for 30% of the morning period.
- Offensiveness - the odour generated by the ANN plant could be offensive in high concentrations. Chlorine gas and sulfur dioxide are odorous gases but are unlikely to be present in detectable levels after scrubbing.
- Location – the impact of location on the acceptability of odours from the site has been accounted for by the receptor sensitivity classifications detailed in **Section 7.1**.

Given the above considerations, and the relatively small scale of operations, the potential impact of the ANN Plant is considered to be ***negligible*** (i.e. the impact is predicted to cause no significant consequences) for the industrial receptors. Correspondingly, the potential impact significance for the local receptors is concluded to be ***neutral***.

It is highly unlikely that odorous emissions from the ANN Plant would reach residential and community receptors with a frequency, duration or intensity that would lead to odour impacts. Even though the odours from these gases from this process are unlikely to be intense, they can be offensive in nature. Therefore, the potential impact of the ANN Plant is considered to be ***slight*** (i.e. the predicted impact may be tolerated) for the residential and community receptors. Correspondingly, the potential impact significance for the local receptors is concluded to be ***intermediate/minor*** or ***minor*** (see **Table 7**).

Table 10 Impact Significance – Air Quality Impacts from the ANN Plant

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/ Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/ Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

7.5 Storage and Transfer

By addressing the FIDOL factors, the potential for odour impacts from this source at the sensitive receptors may be determined.

- Frequency – the closest residential areas have the potential to experience impacts whenever a spill occurs and when the wind direction is westerly, which occurs approximately 10% of the time. The community receptor, the Dunheved Estate Reserve, will be occasionally visited by locals but they will not occupy the space for a continuous period and therefore are less likely to experience frequent potential odour impacts.
- Intensity – the odour generated by storage and transfer of liquid waste will be minimal as all liquid food waste arriving on-site will be transported and stored in sealed containers
- Duration – the duration of a potential odour impact may last as long as the wind is blowing over the site to the receptor. Any receptor located in the northeast is most likely to be potentially impacted by odour given winds from the southwest occur for 30% of the morning period.
- Offensiveness – as noted above, emissions from this process are likely to be minimal as all the containers are sealed. The odour from the sewerage could be offensive in high concentrations however the liquid waste is less likely to be offensive as it contains no putrescible waste.
- Location – the impact of location on the acceptability of odours from the site has been accounted for by the receptor sensitivity classifications detailed in **Section 7.1**.

Given the above considerations, and the relatively small scale of operations, the potential impact of spills is considered to be ***negligible*** for all receptors; residential, industrial and recreational (i.e. the impact is predicted to cause no significant consequences). Correspondingly, the potential impact significance for the local receptors is concluded to be ***neutral*** for all receptors.

Table 11 Impact Significance – Air Quality Impacts from Storage and Transfer

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/ Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/ Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

7.6 Spills

By addressing the FIDOL factors, the potential for odour impacts from this source at the sensitive receptors may be determined.

- Frequency – the closest residential areas have the potential to experience impacts whenever a spill occurs and when the wind direction is westerly, which occurs approximately 10% of the time. The community receptor, the Dunheved Estate Reserve, will be occasionally visited by locals but they will not occupy the space for a continuous period and therefore are less likely to experience frequent potential odour impacts.
- Intensity – the odour generated by spills is dependent on the chemical or waste product is spilt. However, it is likely to be minimal as spill management procedures and bunding will contain spills and enable timely clean up.
- Duration – the duration of a potential odour impact will only last as long as the clean-up process takes and for as long as the wind blowing in a direction over the site to the receptor. Any receptor located in the northeast is most likely to be potentially impacted by odour given winds from the southwest occur for 30% of the morning period.
- Offensiveness – as noted above, emissions from this process will depend on type of spill.
- Location – the impact of location on the acceptability of odours from the site has been accounted for by the receptor sensitivity classifications detailed in **Section 7.1**.

There is a small risk of small scale spills on the site on occasion. The intensity and offensiveness of the odour will depend on the type of spill however, existing spill management procedures will enable fast containment and quick clean-up of any spills.

Given the above considerations, and the relatively small scale of operations, the potential impact of spills is considered to be ***negligible*** for all receptors; residential, industrial and recreational (i.e. the impact is predicted to cause no significant consequences). Correspondingly, the potential impact significance for the local receptors is concluded to be ***neutral*** for all receptors.

Table 12 Impact Significance – Air Quality Impacts from Spills

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/ Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/ Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

8 CONCLUSION

A qualitative odour assessment has been carried out to assess the potential odour impacts associated with the increase in processing and storage capacity of their chemical waste storage and treatment facility at 40 Christie Street, St Mary's.

The qualitative odour risk assessment presented in the report is based upon the continued operation of the existing processes and the introduction of the ANN Plant operations and storage and transfer of liquid food waste and sewerage. It has been undertaken to provide a thorough and appropriate risk-based impact assessment.

The impact significance of each potential source of odour emissions was determined according to a risk-based assessment to highlight any areas that risks might be realised (refer to **Section 6** for the assessment methodology). The results of the assessment are summarised in **Table 13**.

Table 13 Results of Qualitative Odour Risk Assessment

Impact Significance	**Receptors**		
	Residential	**Community**	**Industrial**
Lamp Processing	Neutral	Neutral	Neutral
Flammable Processing	Neutral	Neutral	Neutral
ANN Plant	Intermediate/Minor	Minor	Neutral
Storage and Transfer	Neutral	Neutral	Neutral
Spills	Neutral	Neutral	Neutral

The risk assessment took into consideration each identified air emission source, typical emissions generated by each source, the FIDOL factors, and predominant wind conditions experienced in the area.

Taking into account the above, it is concluded that the increase in processing and storage capacity at this Project site is appropriate as the potential for odour impacts at the surrounding residential, community and industrial receptors is predicted to be of 'intermediate/minor' impact significance (i.e. the predicted impact may be tolerated) or of 'neutral' impact significance (i.e. the impact is predicted to cause no significant consequences).

9 REFERENCES

- NSW DEC. (2006). Technical Framework - Assessment and management of odour from stationary sources in NSW. Sydney: NSW Department of Environment and Conservation.
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- NSW OEH. (2005, August). Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales. Prepared by the NSW EPA, which is part of the NSW Office of Environment and Heritage (OEH).