



# Submission Evaluation Report

Central Waste Facility Organics Processing Facility EIS



Prepared for Bega Valley Shire Council

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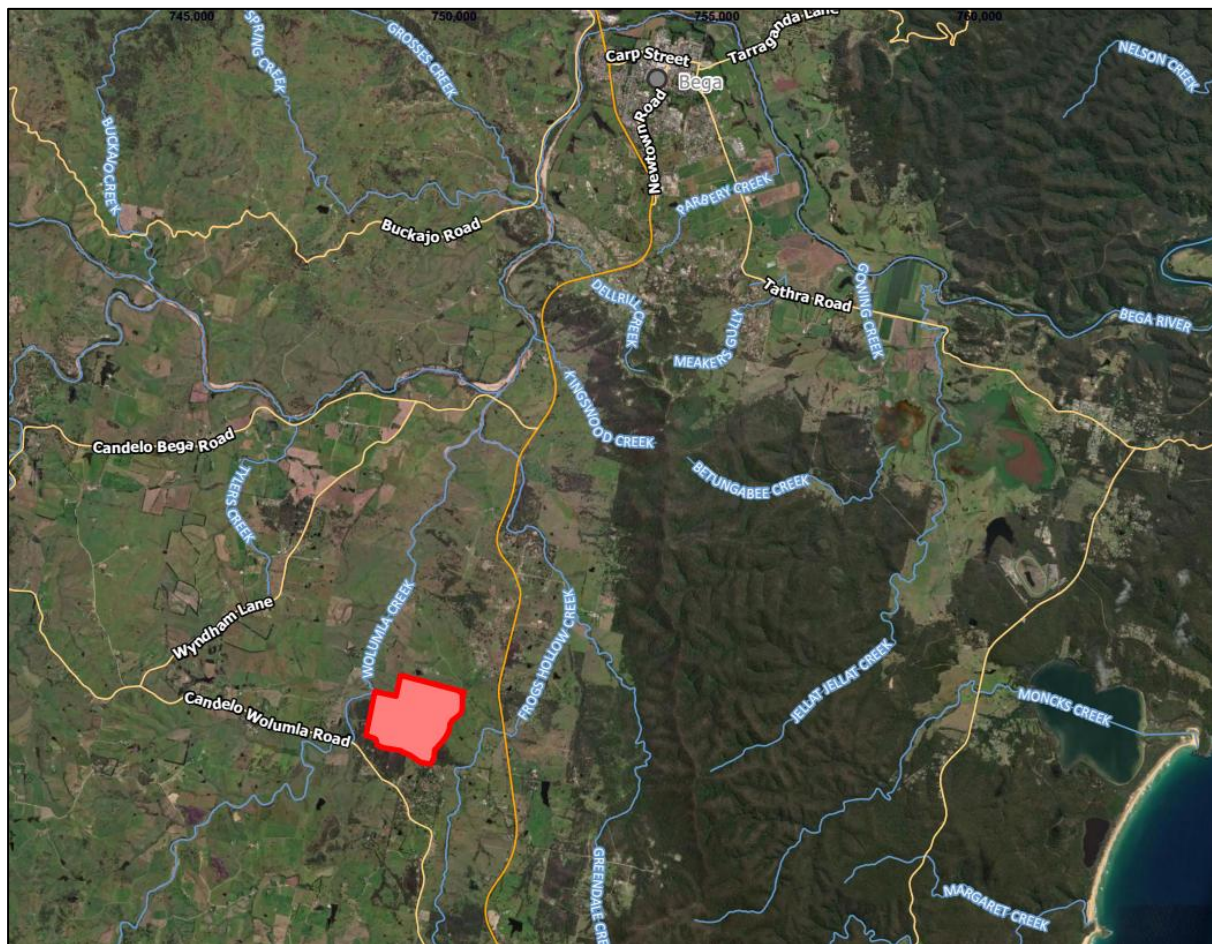
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# 1 Introduction

## 1.1 The Project as Described in the Environmental Impact Statement

Bega Valley Shire Council (BVSC) currently provides waste collection and management services to its population, with its waste facilities comprising of the Central Waste Facility (CWF), Bemboka Waste and Recycling Centre (WRC), Bermagui WRC, Candelo WRC, Eden WRC, Merimbula WRC and Wallagoot WRC. Merimbula WRC is the location of BVSC's current organics processing facility; however, it has reached capacity with spatial constraints preventing expansion of the facility. In order to meet the increasing organics processing demand, BVSC, on behalf of its contractor/operator (SOILCO), is seeking approval for the construction and operation of a new Organics Processing Facility (OPF) within the boundaries of the BVSC Central Waste Facility (CWF) Site.

The CWF is located at 235 Wanatta Lane, 17.5km south of the town of Bega and 5.7km north-west of Wolumla as shown in the locality **Figure 1-1**.



**Figure 1-1: CWF Locality**

The CWF site currently occupies Lot 402 DP 1191314 with a National Broadband Network (NBN) site occupying Lot 401 of DP 1191314 within the bounds of the CWF site. As part of the OPF development, a segment of land within the CWF lot will be subdivided into Lot 403 DP 1191314 and is representative of where the development will occur. The operator will oversee the operations within the lot boundary at the subject site for an initial ten-year contract. It is noted that when the lot division of the CWF occurs, the lot description currently assigned to the CWF will be changed to Lot 404 DP1191314. Note

that a NBN satellite facility not affiliated with BVSC and the proposed OPF subject site are located within the bounds of the CWF shown in **Figure 1-1**.

A breakdown of the lot divisions (inclusive of changes to the CWF lot description) is provided in **Figure 1-2**. An overview of the proposed location of the Bega OPF on the CWF Site relative to the other infrastructure onsite is provided in **Figure 1-3**.

The operator will design, construct, operate and maintain the OPF on BVSC's behalf for an initial term of 10 years (with two possible 5-year extensions). The operator is a credible and reliable business with over 40 years of organics recycling experience on the east coast of Australia. The operator will apply for a separate Environmental Protection License (EPL) for the development and will be responsible for upholding its conditions. BVSC will operate the OPF in perpetuity after the contract ceases either themselves or via a new operations and maintenance contract.

The development will utilise covered aerated static pile (CASP) technology. CASP uses concrete bays covered with membranes which reduces odour and leachate from the facility. The development will accept FOGO and clean garden organics as feedstock from BVSC's kerbside collection service and self-haul garden organics from WRCs within the BVSC region. The facility will be closed to the public and will have operating hours consistent with the CWF from Monday to Saturday (8am to 4pm), with no active onsite operations on Sunday.

The development will allow BVSC to further expand FOGO collections and provide greater processing capacity to account for future growth within the region.

As the proposal is not for an energy-from-waste facility, any conditions relating to energy-from waste as outlined in Section E 'Waste and Chemicals', within the Secretary's Environmental Assessment Requirements (SEARs) report is not applicable.

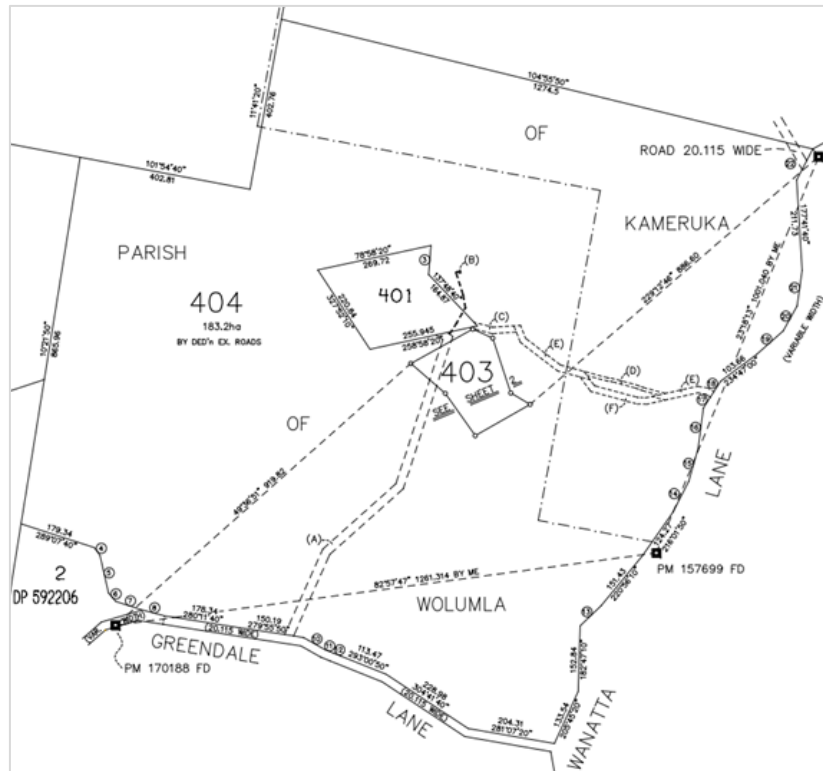


Figure 1-2: Breakdown of CWF Lot Divisions

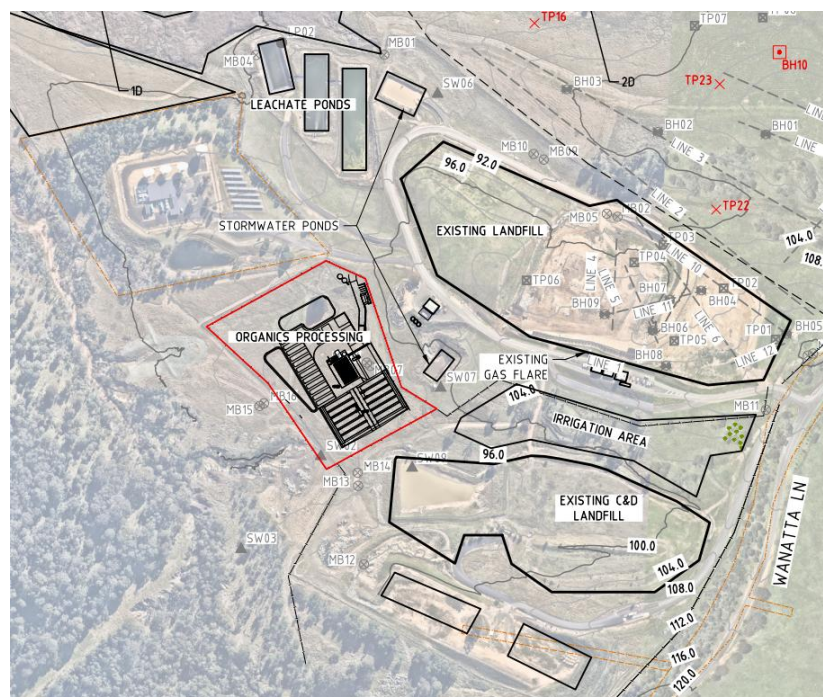


Figure 1-3: Proposed Location of the Bega OPF on the CWF Site

## 1.2 Statutory Context

The development is not considered State Significant Development since the \$30 million Capital Investment Value (CIV) threshold is not exceeded (development is approximately \$10.6 million including GST). The development of the OPF is a Regionally Significant Development and requires an Environmental Impact Statement (EIS) as it meets the following definition of Particular Designated Development under Schedule 6, Section 7, Clause 1(c) of the *State Environmental Planning Policy (Planning Systems) 2021 (SEPP Planning Systems)*:

*Development for the purposes of- waste management facilities or works, that meet the requirements for designated development under Schedule 3, Section 45 of the Environmental Planning and Assessment Regulation (EP&A Regulation) 2021.*

Section 45, Clause 3 of EP&A Regulation is of particular importance to the development of the OPF as it relates to:

*Development for the purposes of a waste management facility or works that purify, recover, reprocess or process more than 5,000 tonnes per year of solid or liquid organic materials.*

Under the LEP, the proposed development is classified as a waste management facility and is located on land zoned RU1 – Primary Production. The development is not referenced in the LEP as permissible with consent and is inconsistent with the aims and objectives of the RU1 land zone. The Transport and Infrastructure State Environmental Planning Policy (SEPP), which supersedes the Bega LEP, allows for the development of waste management facilities with consent on land zoned as RU1 – Primary Production.

## 1.3 Environmental Impact Statement Exhibition

The OPF EIS was initially made publicly available on the BVSC website under ‘DAs on exhibition’ from the 17<sup>th</sup> of March 2025 until the 15<sup>th</sup> of April 2025. Ratepayers within 2km of the site were also mailed directly via planning with instructions on how to access the EIS on exhibition. Additionally, signage promoting the EIS exhibition was present on the fence at the CWF site. During this first exhibition period, the following documents were added to support the EIS:

- Appendix N: Preliminary Hazard Analysis- added on 26th March;
- Appendix T: Hydrology Assessment- added on 19th March; and
- Appendix V: Fire Safety Assessment (in draft)- added on 25th March.

As a result of the late addition of the above documents and a noted requirement for additional review time of materials from respondents, the exhibition period was extended for another 33 days (16<sup>th</sup> of April until the 19<sup>th</sup> of May 2025). During both review periods, any person (including a public authority) was able to make a written submission to the assessing officer. No hard or e-copies of the EIS and its associated documents were otherwise available.

## 1.4 Purpose of the Document

This report identifies the submitters and issues raised during exhibition of the EIS (Section 2) and any clarifications or responses to issues raised during exhibition (Section 3 and Section 4). As a result of this report, any outstanding environmental management measures identified by respondents during the exhibition period but yet to be in place will be highlighted and subsequently support further robustness of the site and its operations.

## 2 Analysis of Submissions

### 2.1 Submissions Received

A total of eight submissions were received during exhibition of the EIS and consisted of:

- 2 Individual Community Members;
- 1 Commercial Entity:
  - Essential Energy; and
- 5 Government Entities:
  - Bega Valley Shire Council Development Engineer;
  - Department of Climate Change, Energy, the Environment and Water (Heritage);
  - New South Wales Environmental Protection Agency;
  - Department of Planning Housing and Infrastructure- Crown Lands; and
  - Transport for New South Wales (TfNSW).

### 2.2 Submission Responses

This report provides an overview of submission responses in relation to individual community members only as the submissions from government and commercial entities have been responded to separately. Each submission has been examined to understand the issues and concerns raised by respondents. Each submission has also been assigned an individual submission identification number for reference within this report and are shown below in **Table 2-1** alongside the associated issues and concerns raised within the submission. The complete submissions received by Individual community members have been included within **Appendix A** of this report.

**Table 2-1: Overview of Individual Community Member Submissions**

| Submission Number | Section number where issues are addressed                                                |
|-------------------|------------------------------------------------------------------------------------------|
| 1                 | 4.1.2.1, 4.1.2.2, 4.1.2.3, 4.2.2.1, 4.3.2.1, 4.4.2.1, 4.4.2.2, 4.5.2.1, 4.6.2.1, 4.7.2.1 |
| 2                 | 4.1.2.4, 4.1.2.5, 4.1.2.6, 4.1.2.7, 4.2.2.2                                              |

Responses to submissions received by commercial and government entities have been issued separately by BVSC and in direct response to the associated submission and are not included within this report.

The response received from Transport for NSW (TfNSW) noted no issues and did not require a return submission.

### 3 Actions Taken Since Exhibition

In response to the exhibition of the EIS and the feedback received, the following actions as outlined in **Table 3-1** have been undertaken.

**Table 3-1: Overview of Actions Undertaken Since Exhibition of EIS**

| Action                                                                                                                                                                                                                                                                                                                                      | Contributor         | Justification for Action                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------|
| Air Quality and Odour Letter Response (Clarification)                                                                                                                                                                                                                                                                                       | The Odour Unit      | Address comments received by EPA submission during community exhibition                                  |
| Engagement of Anderson Consulting                                                                                                                                                                                                                                                                                                           | SOILCO              |                                                                                                          |
| Leachate and Stormwater Modelling and Management Memo Response                                                                                                                                                                                                                                                                              | Anderson Consulting |                                                                                                          |
| Amending Site Layout Design (deeper leachate pond, addition of rip rap spillway, addition of bioretention basin, provision for off-site tankering of leachate and Incorporation of additional stormwater drainage infrastructure)                                                                                                           | SOILCO              |                                                                                                          |
| Inclusion of Survey coverage data in a table and a map of survey units to demonstrate how the area of the current DA 2024.321 has been subject to archaeological survey in accordance with requirements 5, 9 and 10 of the 'Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales' (Code of Practice). | AMAC                | Address comments received by Department of Climate Change, Energy, the Environment and Water (Heritage); |
| Inclusion of a map of updated site extents considering test excavation results                                                                                                                                                                                                                                                              | AMAC                |                                                                                                          |
| Inclusion of a map of overlaying current works footprint on the updated site extents with consideration of test excavation results to demonstrate sites which will be harmed by the proposal                                                                                                                                                | AMAC                |                                                                                                          |
| Inclusion of a table in the impact assessment identifying the type of harm, degree of harm and consequence of harm of each site in the study area                                                                                                                                                                                           | AMAC                |                                                                                                          |

|                                                                                                                                                                                       |      |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--|
| Amendment of recommendations to reflect the need for an Aboriginal Heritage Impact Permit for AHIMS sites 62-6-0861, 62-6-0865 and 62-6-0866 to be obtained prior to harm of the site | AMAC |  |
| Aboriginal Site Impact Recording Forms submitted to AHIMS following the test excavation results                                                                                       | AMAC |  |
| Recommendations for Unexpected finds and Aboriginal Cultural Heritage Management Plan expanded                                                                                        | AMAC |  |

Further engagement with the community did not occur following the completion of the exhibition period.

## 4 Response to Submissions

### 4.1 Traffic and Transportation

#### 4.1.1 Issue Description

Traffic and Transportation issues have been outlined by both respondents below in **Table 4-1**.

**Table 4-1: Traffic and Transportation Issue Description**

| Issue Description                                                                                                                                                                                    | Submission number |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Incorrect traffic data used in the traffic study resulting in underestimates of traffic volumes and impacts.                                                                                         | 1                 |
| Insufficient consideration of cumulative impacts of traffic                                                                                                                                          | 1                 |
| Incomplete information regarding ongoing operations including end use products, their makeup, storage and transport                                                                                  | 1                 |
| Concerns about the increase in truck and waste traffic that will exist because of this proposal                                                                                                      | 2                 |
| Trucks will obstruct Wanatta Lane while waiting for entry to site                                                                                                                                    | 2                 |
| Trucks turning rip up the road and revegetation is being deteriorated because of the existing trucks. The road is now becoming degraded and bitumen that once existed is now being degraded to dirt. | 2                 |
| Propose a gross limit of less than 8 tonnes on Wanatta Lane                                                                                                                                          | 2                 |

#### 4.1.2 Issue Response

##### 4.1.2.1 Incorrect Traffic Data

As outlined in the following subsections, data utilised as part of the traffic study is based on both observed data provided as part of this assessment and calculations associated with the design and operation of the facility. Traffic volumes are viewed as reasonable and unlikely to be underestimated.

##### Traffic Data Surrounding Site

Traffic data was recorded at the Princes Highway and Wanatta Lane intersection by Traffix in November 2023 as part of the EIS. In order to determine existing traffic volumes at the intersection, a

vehicle count survey was utilised to determine peak hour volumes while a bidirectional automatic tube count was utilised to determine daily and weekly traffic volumes. Peak hour volumes were collected at the intersection of Princes Highway and Wanatta Lane only while daily and weekly volumes were collected on Wanatta Lane west of the Princes Highway, on the Princes Highway north of Wanatta Lane and on the Princes Highway south of Wanatta lane. Intersection traffic volume has been provided below in **Table 4-2**.

**Table 4-2: Princes Highway and Wanatta Lane Intersection Traffic Volume**

| Duration of Traffic Volume Collection | Location of Measurement                       | Period of Measurement      | Quantity of vehicles |
|---------------------------------------|-----------------------------------------------|----------------------------|----------------------|
| Peak Hour                             | Princes Highway and Wanatta Lane intersection | AM Peak Hour (8:00-9:00am) | 565                  |
|                                       |                                               | PM Peak Hour (4:30-5:30pm) | 474                  |
| Daily Volumes                         | Wanatta Lane west of Princes Highway          | Weekday Average Traffic    | 382                  |
|                                       |                                               | 7-day average              | 326                  |
|                                       | Princes Highway north of Wanatta Lane         | Weekday Average Traffic    | 5,633                |
|                                       |                                               | 7-day average              | 5,039                |
|                                       | Princes Highway south of Wanatta Lane         | Weekday Average Traffic    | 5,446                |
|                                       |                                               | 7-day average              | 4,877                |
| Weekly Volumes                        | Wanatta Lane west of Princes Highway          | Weekday total traffic      | 1,912                |
|                                       |                                               | 7-day total traffic        | 2,282                |
|                                       | Princes Highway north of Wanatta Lane         | Weekday total traffic      | 28,164               |
|                                       |                                               | 7-day total traffic        | 35,275               |
|                                       |                                               | Weekday total traffic      | 27,232               |

| Duration of Traffic Volume Collection | Location of Measurement               | Period of Measurement | Quantity of vehicles |
|---------------------------------------|---------------------------------------|-----------------------|----------------------|
|                                       | Princes Highway south of Wanatta Lane | 7-day total traffic   | 34,142               |

Specific traffic volumes over these periods have been included within Table 6-7 of the submitted EIS.

Traffic data surrounding the site has been collected and processed by Traffix who are qualified as a Traffic Impact Assessment (TIA) specialist.

#### Existing CWF Traffic

Truck movement data in relation to the existing operation of the CWF have been provided by BVSC from the 9<sup>th</sup> of January 2023 until the 30<sup>th</sup> of June 2023. By utilising data from the 9<sup>th</sup> of January as an indication, the following movements to and from the CWF associated with its existing operation were noted:

- 12 vehicle movements between 8:00am and 9:00am;
- 8 vehicle movements between 4:30pm and 5:30pm;
- All other movements were distributed between 8am and 6pm; and
- Negligible trips are associated with the NBN site, with the occasional light vehicle accessing the site for maintenance.

Truck movements associated with the existing operations of the site have been included within Section 6.3.2.5 of the submitted EIS.

CWF traffic data makes use of weighbridge data sourced from the CWF and represents the most accurate representation of vehicle movements onsite/offsite.

#### OPF Construction Traffic

The additional traffic generation at the CWF associated with the construction of the OPF has been provided by SOILCO and is anticipated to be as follows:

- Bulk excavation works: 3 truck arrivals per day (3 in, 3 out) and a maximum of one (1) truck arrival during peak periods (1 in, 1 out);
- VENM Fill Works: 6 truck arrivals per day (6 in, 6 out);
- Structure Works: 2 truck arrivals per day (2 in, 2 out) and a maximum of one (1) truck arrival during peak periods (1 in, 1 out); and
- Fitout and Finishes Work: 1 truck arrivals per day (1 in, 1 out).

Additional combined traffic generation associated with the OPF construction have been included within Section 6.3.3.3 of the submitted EIS.

SOILCO are experienced developers of organics processing facilities and truck movements required to construct the facility can be calculated via estimated materials requiring movement onsite and the timeframe planned for each stage of the development.

### OPF Operational Traffic

The additional traffic generation at the CWF associated with the operation of the OPF has been provided by SOILCO and is inclusive of the commercial vehicle/truck volumes and light vehicles associated with staff, the provision of blending materials (soil and sand) and the sale of finalised compost materials. The following additional combined traffic generation is anticipated to occur at site:

- Vehicles per Day: 26 vehicle trips (13 in, 13 out):
  - Trucks per day: 18 vehicle trips (9 in, 9 out);
  - Light vehicles per day: 8 vehicle trips (4 in, 4 out);
- Vehicles in AM Peak: 8 vehicle trips (4 in, 4 out):
  - Trucks per day: 8 vehicle trips (4 in, 4 out);
  - Light vehicles per day: 0 vehicle trips (0 in, 0 out)
- Vehicles in PM Peak: 2 vehicle trips (1 in, 1 out):
  - Trucks per day: 2 vehicle trips (1 in, 1 out); and
  - Light vehicles per day (0 in, 0 out).

Additional combined traffic generation associated with the OPF operations have been included within Section 6.3.3.4 of the submitted EIS.

SOILCO are experienced operators of organics processing facilities and truck movements required to move material offsite can be calculated via approximate throughput of the facility.

#### 4.1.2.2 Cumulative Impacts of Traffic

By utilising a SIDRA intersection analysis, Traffix were able to determine any variations in the level of service that may occur at the intersection of Princes Highway and Wanatta Lane due to the OPF development when compared to the existing conditions. The Princes Highway and Wanatta Lane intersection is where additional traffic impacts of the OPF development will be most felt by the public and as such is appropriate gauge of traffic-based impacts of the site.

As outlined below in **Table 4-3**, minimal differences exist in the degree of saturation and intersection delay at the Princes Highway and Wanatta Lane intersection between the AM and PM peak periods of both scenarios (current and OPF in operation). These minimal differences lead to a consistent level of service between both scenarios and as such, the intersection will continue to operate with negligible impacts.

**Table 4-3: Intersection Performance- Base Case vs Development**

| Scenario       | Control Type | Peak Period      | Degree of Saturation | Intersection Delay (Sec) | Level of Service |
|----------------|--------------|------------------|----------------------|--------------------------|------------------|
| 2023 Base Case | Give-Way     | AM (8-9am)       | 0.187                | 15.3                     | B                |
|                |              | PM (4:30-5:30pm) | 0.156                | 11                       | A                |

|                                 |          |    |       |      |   |
|---------------------------------|----------|----|-------|------|---|
| 2023 Base Case plus Development | Give-Way | AM | 0.188 | 16.5 | B |
|                                 |          | PM | 0.156 | 10.9 | A |

Cumulative impacts associated with the operation of the Princes Highway and Wanatta Lane intersection are outlined in Section 6.3.3.5 of the submitted EIS.

The cumulative effect of the additional vehicles on the condition of the road itself are further discussed below in Section 4.1.2.5.

#### 4.1.2.3 Incomplete Information Regarding Ongoing Operations

The additional traffic generation at the CWF associated with the operation of the OPF has been provided by SOILCO and is inclusive of the commercial vehicle/truck volumes and light vehicles associated with staff, the provision of blending materials (soil and sand) and the sale of finalised compost materials. The following additional combined traffic generation is anticipated to occur at site:

- Vehicles per Day: 26 vehicle trips (13 in, 13 out):
  - Trucks per day: 18 vehicle trips (9 in, 9 out);
  - Light vehicles per day: 8 vehicle trips (4 in, 4 out);
- Vehicles in AM Peak (8-9am): 8 vehicle trips (4 in, 4 out):
  - Trucks per day: 8 vehicle trips (4 in, 4 out);
  - Light vehicles per day: 0 vehicle trips (0 in, 0 out)
- Vehicles in PM Peak (4:30-5:30pm): 2 vehicle trips (1 in, 1 out):
  - Trucks per day: 2 vehicle trips (1 in, 1 out); and
  - Light vehicles per day (0 in, 0 out).

Of note, the two (2) vehicle trips occurring within the PM peak period are representative of any necessary unplanned after-hour operations onsite. Generally, no consistent or planned vehicle movements will be recorded during this period, and impacts will be minor.

Traffic generation associated with the OPF operations have been included within Section 6.3.3.4 of the submitted EIS and are inclusive of vehicle movements associated with ongoing operational data such as the sale, preparation and transport of end use products.

#### 4.1.2.4 Increases In Truck and Waste Traffic

The increases in truck and waste traffic have been outlined above in Section 4.1.2.3. During the AM and PM hour peaks, additional truck and light vehicle movements associated with the OPF operations do not exceed 8 vehicle trips (4 in, 4 out). On average, this equates to 2 vehicle trips (1 in, 1 out) every 15 minutes during peak hour traffic. Additionally, when the maximum of 8 vehicle trips is compared to the AM peak hour traffic (565 vehicles) or the PM peak hour traffic (474 vehicles) as outlined in **Table 4-2**, the additional trips equate to an approximate 1-2% increase in traffic.

Increases in truck and waste traffic are as such considered negligible.

#### **4.1.2.5 Trucks will Obstruct Wanatta Lane While Waiting for Entry to Site**

As outlined above in Section 4.1.2.4, additional trips associated with the operation of the OPF will equate to 2 vehicle trips (1 in, 1 out) every 15 minutes during peak hour traffic or an approximate 1-2% overall increase in traffic. Any existing truck obstruction on Wanatta Lane will likely not discernibly increase as a result of the OPF development.

#### **4.1.2.6 Road and Revegetation Deterioration**

While increased vehicles and trucks associated with the construction and operation of the OPF will lead to a greater impact on the roadways surrounding the OPF site, as outlined in Section 4.1.2.4 of this report, the additional vehicle trips only equate to an approximate 1-2% increase in traffic. With such a minor increase, road conditions will be maintainable within the scope of BVSC's existing Road Asset Management Plan.

Revegetation is likely to be unaffected by any truck movements onsite. As per the Traffix report, the intersection of Princes Highway and Wanatta Lane already accommodates articulated vehicles associated with the existing waste facility. No vehicles associated with the construction or operation of the OPF will exceed the size of vehicles already allowed access to the CWF.

Upon review, this issue requires no further action.

#### **4.1.2.7 Gross limit of less than 8 tonnes on Wanatta Lane**

BVSC currently utilises Wanatta lane as an entry point to the CWF for its current waste operations. The waste collection vehicles utilised as part of BVSC's current waste service have a gross weight of up to 10.5 Gross Vehicle Mass (GVM) when empty and can get up to 22.5T GVM once full. Other vehicles that access the site such as truck and dog and multi axle vehicles will also exceed the 10.5T GVM weight. Council will need to cater for vehicles up to 42.5T GVM.

There is no weight limit for vehicles on Princes Highway or Wanatta Lane. Permits are still required for OverSize-OverMass vehicles in accordance with the National Heavy Vehicle Regulator (NHVR), and these vehicles are unlikely to enter the site. Weight limits for vehicles are generally applied where there is a safety or design reason to limit, and there is no reason to do this for this site or these roads.

If Council were to impose a weight limit on these roads the collections contractor would need to purchase additional, smaller vehicles and engage more staff to operate them. As a result of these changes, increased logistical fees would likely be incurred due to the greater amount of vehicle trips and staff required to transport waste onsite. Any amendments to logistics or contracts may result in increased costs to the rate payer. Traffic volumes onsite would also increase should smaller vehicles be utilised for waste collections.

Upon review, placing a gross limit of less than 8 tonnes on Wanatta lane is seen as an unsustainable solution and requires no further action.

## 4.2 Odour

### 4.2.1 Issue Description

Odour issues have been outlined by both respondents below in **Table 4-4**.

**Table 4-4: Odour Issue Description**

| Issue Description                                                                                                                                                                     | Submission number |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Insufficient consideration of cumulative odour impacts                                                                                                                                | 1                 |
| What will the odour predictions be. Odour will be a concern especially when a westerly wind occurs. Can it be guaranteed that there will be no or very little stench coming from this | 2                 |

### 4.2.2 Issue Response

#### 4.2.2.1 Consideration of Cumulative Odour Impacts

The composting process (Covered Aerated Static Pile (CASP) using FOGO) and landfill (putrescible waste) differ in both odorant composition and emission. While the Air Quality and Odour Impact Assessment (AQOIA) did assess cumulative impacts from the composting and landfill activities, these were ultimately modelled as distinct odour source types within a single cumulative scenario. The approach of modelling these odour profiles separately is consistent with Section 3.3 of the NSW EPA document *Technical Framework (and notes)- Assessment and management of odour from stationary sources in NSW* (2006) (NSW EPA Technical F & N) which recommends distinguishing sources with distinct odour characteristics.

As outlined below in Figure 4-1 and Figure 4-2, the cumulative impacts were assessed using a combined model run that included both the composting facility and the Central Waste Facility, with each treated as an individual source group. When considered as two distinct sources, the cumulative impact effects for both odour profiles meet the relevant NSW EPA odour criterion. The air quality assessment conducted by The Odour Unit (TOU) concluded that all receptors subject to odour being emitted from the OPF and the landfill are predicted to be below the relevant NSW EPA Odour criterion during both the 15,000 tpa and 30,000 tpa stage. As a result, it is suggested that both existing and future impacts can be managed to an extent that does not adversely impact the local amenity at the nearest sensitive receptor under normal operations.

In order to further support the AQOIA, following community exhibition, a response memo in relation to feedback provided by the EPA has since been undertaken by TOU as outlined in Section 3 of this report and is attached in **Appendix B**.

Consideration of cumulative odour impacts have been outlined within Table 6-53 of the submitted EIS.

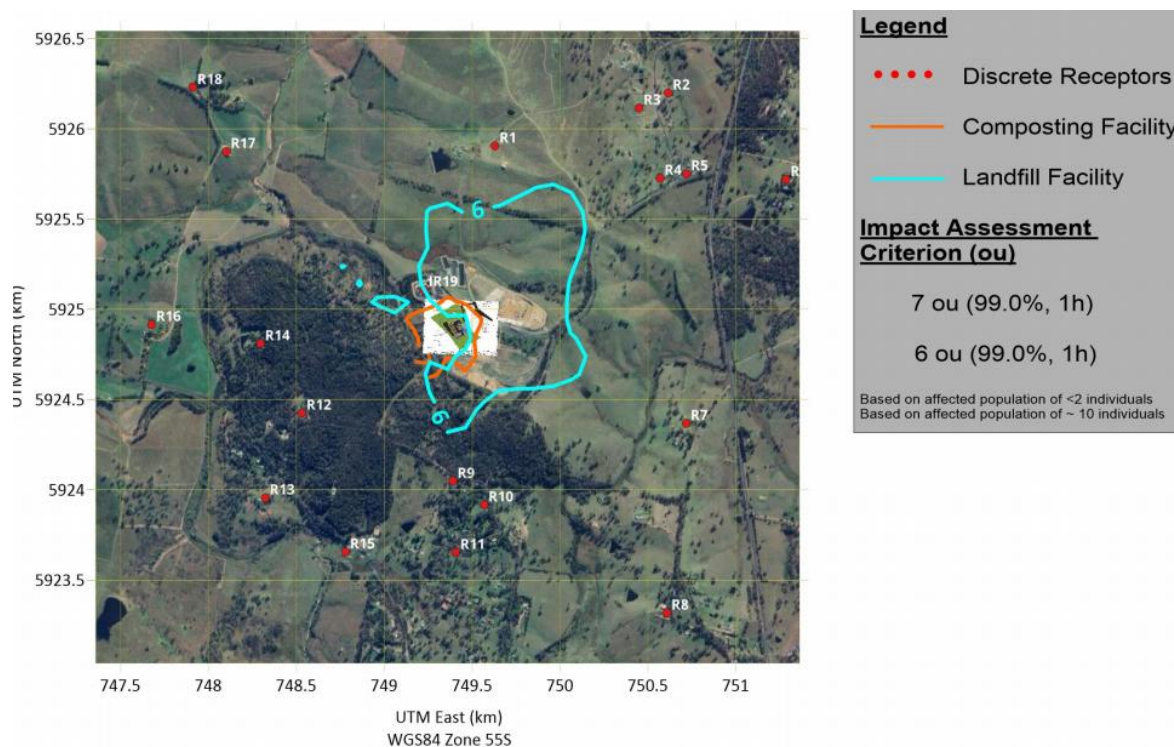


Figure 4-1: OPF and CWF Cumulative Independent Odour Dispersion Modelling Results (15,000 tpa Scenario)

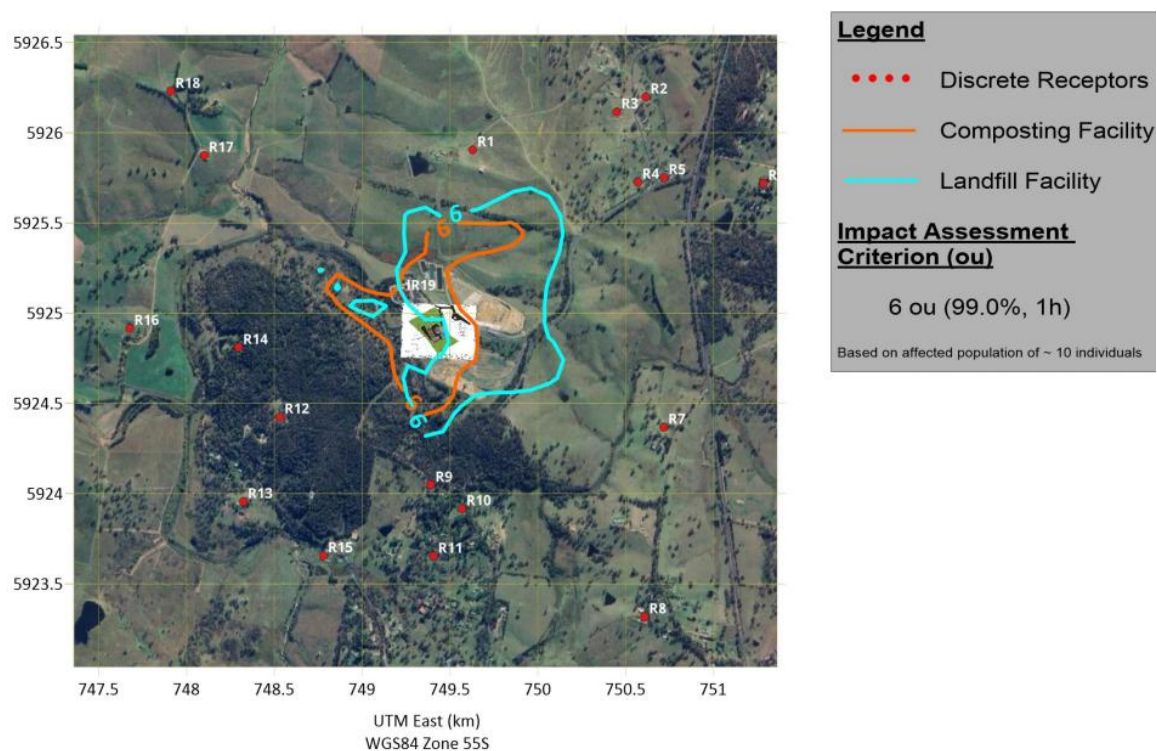


Figure 4-2: OPF and CWF Cumulative Independent Odour Dispersion Modelling Results (30,000 tpa Scenario)

#### 4.2.2.2 What Will the Odour Predictions Be?

Based on the population density of the local area, an acceptable odour assessment criterion as per the NSW EPA Technical F & N was utilised to determine the impact of odour on the local amenity of the nearest sensitive receptors. Due to the surrounding rural and semi-urban area of the OPF development, the Impact Assessment Criteria (IAC) adopted for the Air Quality and Odour Assessment is 7 ou for the 15,000 tpa scenario and 6 ou for the 30,000 tpa scenario.

Odour dispersion modelling results for the OPF at its initial capacity of 15,000 tpa (Phase 1) and extended capacity of 30,000 tpa (phase 2) have been provided below in **Figure 4-3** and **Figure 4-4** against the IAC determined by the technical framework. As seen within **Figure 4-3** and **Figure 4-4**, the impact area associated with the odour during both phases does not exceed the respective 7 ou and 6 ou (99.0%, 1-hr) criteria at the nearest discrete sensitive receptors.

Industrial receptor 19 in the below **Figure 4-3** and **Figure 4-4** is representative of the NBN Co satellite ground station that is adjacent to the existing CWF and development. It is understood that IR19 will have a single full-time staff member on-site and can be remotely monitored. Therefore, the modelled peak emissions at IR19 under the existing CWF and OPF development conditions (including 30,000 tpa) are not considered problematic based on the modelled frequency and duration of occurrence when the NSW EPA criterion of 6 ou is exceeded.

Of note, in **Figure 4-4**, isolated pockets of odour developing separately from the main odour plume centred around the development and in closer proximity to additional receptors are found to exist. These isolated pockets are a result of the topographical and meteorological conditions (most notably during the early morning) occurring at the CWF and do not exceed the 6 ou (99.0%, 1-hr) criteria associated with the 30,000 tpa scenario.

In summary, the OPF is predicted to not adversely impact the local amenity of the nearest sensitive receptors.

Odour dispersion predictions have been outlined within Section 6.2.3.4 of the submitted EIS.

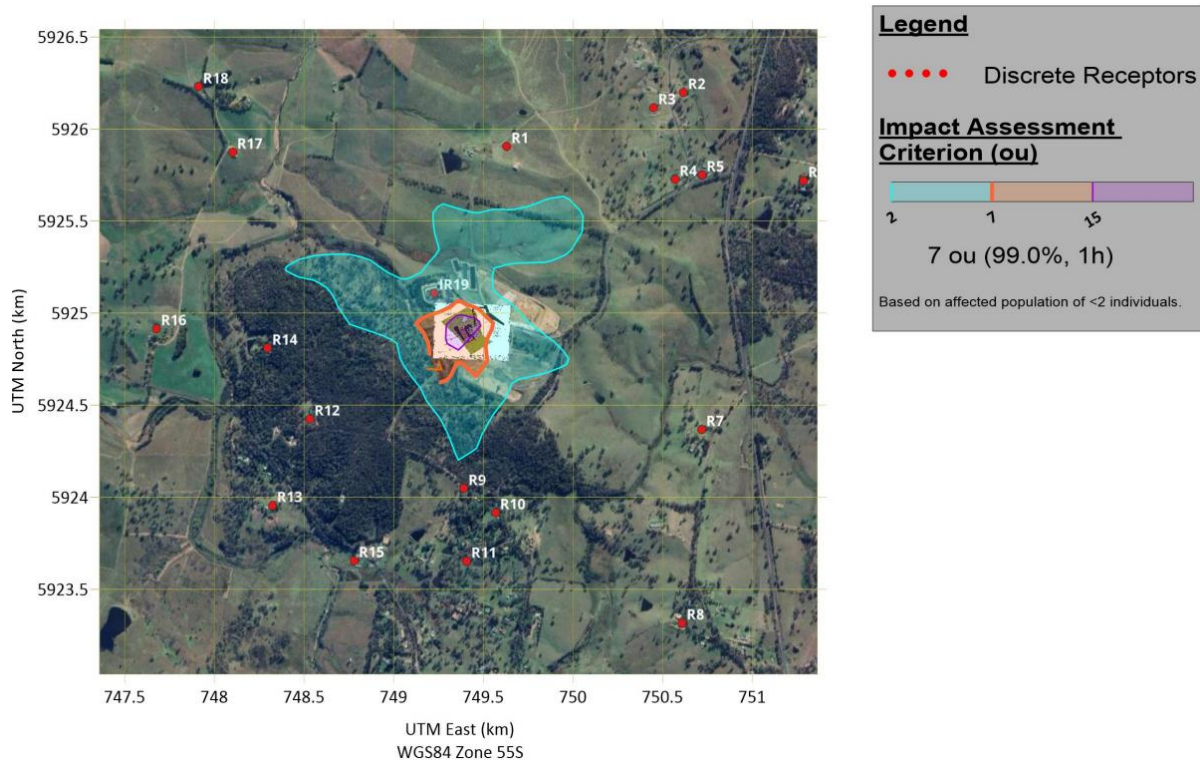


Figure 4-3: OPF Odour Dispersion Modelling Results (15,000 tpa Scenario)

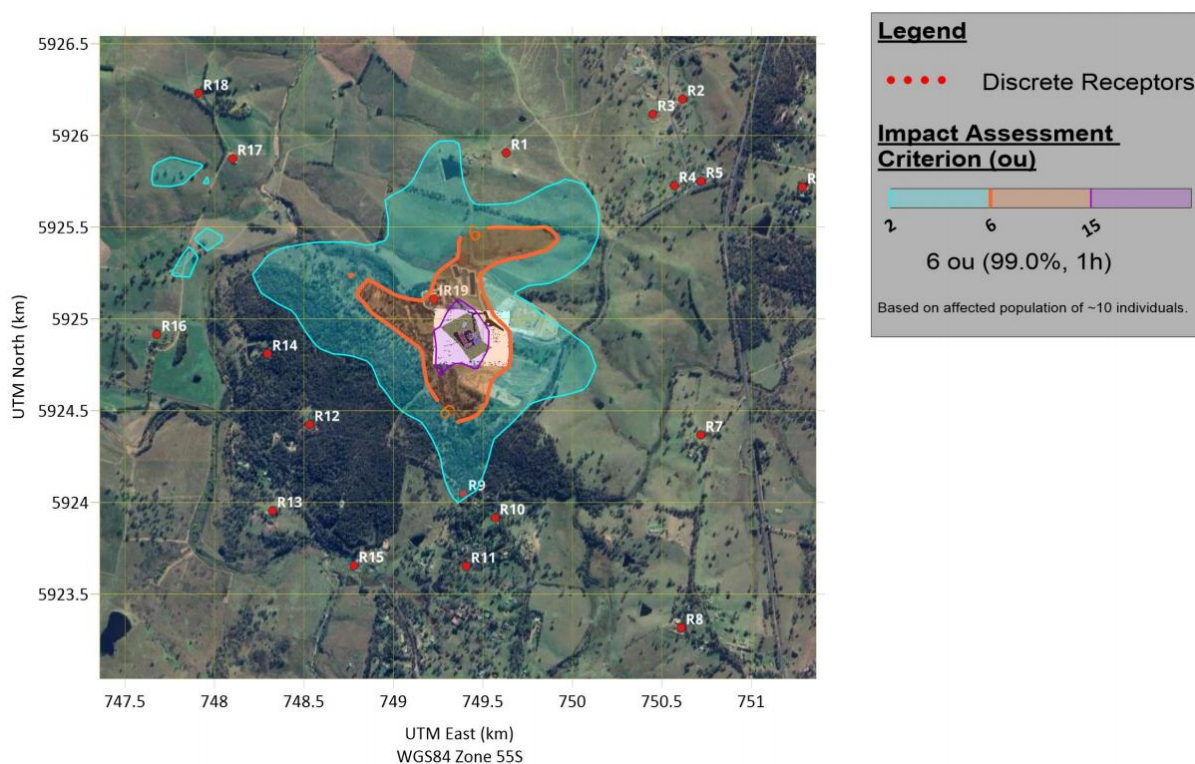


Figure 4-4: OPF Odour Dispersion Modelling Results (30,000 tpa Scenario)

## 4.3 Noise

### 4.3.1 Issue Description

Noise issues have been outlined by one respondent below in **Table 4-5**.

**Table 4-5: Noise Issue Description**

| Issue Description                                      | Submission number |
|--------------------------------------------------------|-------------------|
| Insufficient consideration of cumulative noise impacts | 1                 |

### 4.3.2 Issue Response

#### 4.3.2.1 Consideration of Cumulative Noise Impacts

The noise and vibration assessment for the OPF development have noted that cumulative impacts may occur during the construction and operational stages of the development.

The predicted cumulative construction noise impacts measured in  $LA_{Aeq, 15 \text{ min}}$  dB(A) (ambient noise measured over a 15-minute period) are noted to likely exceed the recommended Construction Noise Management Levels at the following receptors:

- R12 - During Bulk Excavation (+2dB(A)); and
- R13 - During Bulk Excavation (+3dB(A)), Structure Construction (+1dB(A)) and Fit Out Stage (+1dB(A)).

The cumulative impacts of the current CWF operations and the proposed OPF operations will cause a minor exceedance in noise at receptors R1 (+1dB) and R13 (+2dB).

While noise resulting from increased traffic is occurring during all phases (construction and operation), increases are considered negligible (less than a 0.1dB(A) increase). It is noted that an exceedance of 2-3dB is considered negligible as a change in noise by this degree is considered indiscernible. As such there are minimal cumulative impacts associated with the operational noise.

Cumulative noise impacts have been outlined within Table 6-53 of the submitted EIS.

## 4.4 Pest Management

### 4.4.1 Issue Description

Pest management issues have been outlined by one respondent below in **Table 4-6**.

**Table 4-6: Pest Management Issue Description**

| Issue Description                                     | Submission number |
|-------------------------------------------------------|-------------------|
| Insufficient consideration of cumulative pest impacts | 1                 |
| No information regarding pest management              | 1                 |

### 4.4.2 Issue Response

#### 4.4.2.1 Consideration of Cumulative Pest Impacts

The key management process for mitigating any impacts associated with pests at the OPF will be the timely movement of organic materials from the receival hall to the Covered Aerated Static Pile (CASP) system. As a result of the cover associated with the CASP system, organic material will be inaccessible to pests during the most likely period for impacts to occur. Following the completion of the CASP process, matured materials are unlikely to attract pests.

Organic material entering the OPF site will be processed and placed in the covered CASP bays the same day. This timely processing of organic materials within the CASP will allow minimal time for cumulative impacts associated with other pests at the CWF to occur.

#### 4.4.2.2 No Information Regarding Pest Management

Pests and vermin at the OPF will be managed in line with the following management controls:

- Same day processing and covering of biodegradable organic material;
- Maintaining a pest proof perimeter fence;
- Monitoring and awareness of signs of feral animals within the facility; and
- A scheduled pest control program.

## 4.5 Dust

### 4.5.1 Issue Description

Dust management issues have been outlined by one respondent below in **Table 4-7**.

**Table 4-7: Dust Management Issue Description**

| Issue Description                                     | Submission number |
|-------------------------------------------------------|-------------------|
| Insufficient consideration of cumulative dust impacts | 1                 |

### 4.5.2 Issue Response

#### 4.5.2.1 Consideration of Cumulative Dust Impacts

In order to comply with requirements of Part 5.7A and section 66(6) of the POEO Act 1997 and the existing licensing requirements of the CWF site, 7 dust monitoring points have been established around the border of the CWF site with the purpose of monitoring air quality. It has been noted that air emissions recorded from these points are considered negligible. As outlined within the Air quality and Odour Impact Assessment Report, SOILCO are not required to manage any additional dust monitoring points at the OPF.

Dust generated as part of the construction of the OPF will be suppressed within the construction site through the use of water sprinklers or water carts across ground surfaces when the surface has dried and there is potential to generate visible levels of dust.

In order to minimise dust generation associated with the operation of the OPF, the following dust management practices will be enacted:

- All vehicles entering the site are fully sealed and covered;
- The receival building will be covered to minimise the generation of dust from received materials;
- Water will be sprayed to suppress dust generation from ground surfaces within the site; and
- A speed limit of 10km/hr will be enacted for the OPF site.

With the above considered, the existing conditions are found to promote negligible dust generation onsite, and should appropriate mitigation measures be enacted during the construction and operation phase, cumulative dust impacts are considered negligible.

The cumulative impacts of dust resulting from the development have been previously examined in Sections 3.6.8, 6.2.2.1, 6.2.4 and 6.5.3.2 of the submitted EIS.

## 4.6 Leachate and Stormwater

### 4.6.1 Issue Description

Leachate and stormwater management issues have been outlined by one respondent below in **Table 4-8**.

**Table 4-8: Leachate and Stormwater Management Issue Description**

| Issue Description                                                  | Submission number |
|--------------------------------------------------------------------|-------------------|
| Insufficient controls regarding stormwater and leachate management | 1                 |

### 4.6.2 Issue Response

#### 4.6.2.1 Insufficient Stormwater and Leachate Management Controls

The initial leachate management system has been designed in accordance with NSW EPA's *Environmental Guidelines for Composting and Related Organics Processing Facilities (DEC 2004; the "EPA Guidelines")*, and based on the required volume of storage to be kept available at any time to capture a 1 in 10 year, 24-hour Annual Exceed Probability (AEP) event. The initial stormwater management system has been designed to conform to the 2020 Water Sensitive Urban Design (WSUD) Developer Handbook- *Music Modelling and Design Guide*.

In order to further support the stormwater and leachate management controls present onsite, following community exhibition, a secondary review of the management controls have since been undertaken by Anderson Consulting as outlined in Section 3 of this report. The following amendments to site designs have been implemented to solidify the leachate and stormwater management of the OPF and are based on recommendations by Anderson Consulting in the Leachate and Stormwater Modelling and Management Memo attached in **Appendix C**:

- Deepening the planned leachate ponds from 1m to 3m;
- Provision for off-site tankering of leachate to manage volumes during high inflow periods (i.e. 20kL/day during stage 1, 40kL/day during stage 2 when ponds reach 90% capacity);
- Incorporation of additional stormwater drainage infrastructure to maintain separation between stormwater and leachate within the CASP cells;
- Adding a rip rap spillway to reduce speed of any overflow from leachate ponds on the site; and
- Adding a bioretention basin to further slow down any overflow from the rip rap spillway.

## 4.7 Operational Process Flow

### 4.7.1 Issue Description

Incomplete information regarding ongoing operations including end use products, make up, storage and transport have been outlined by one respondent below in **Table 4-9**.

**Table 4-9: Operational Process Flow Issue Description**

| Issue Description                                                                                                       | Submission number |
|-------------------------------------------------------------------------------------------------------------------------|-------------------|
| Insufficient information regarding ongoing operations including end use products, their make-up, storage and transport. | 1                 |

### 4.7.2 Issue Response

#### 4.7.2.1 Consideration of Ongoing Operations

##### End Use Products

Compost product will meet *Australian Standard AS-4454:2012 - Composts, soil conditioners and mulches* and the relevant NSW Environment Protection Authority's *Resource Recovery Order (RRO)* for land applications of organics. By following these requirements, it will ensure that the products are safe for the application to land and protects not only the environment and human health, but also current and future land uses in which the compost has been applied.

Compost product may be distributed as a saleable product (dependent on market demands) via SOILCO's product distribution networks.

The nature of end use products developed at the OPF have previously been examined in Section 3.6.10 of the submitted EIS.

##### Make-up

The mass balance for the composting process at the subject site (for both the 15,000 tpa and 30,000 tpa) is shown in **Table 4-10**.

**Table 4-10: Mass Balance**

| Aspect         | 15,000 tpa                                                                                                                                        | 30,000 tpa                                                                                                                                        |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Material | 190t/week of Food and Garden Organics (General Solid Waste - Putrescible)<br>100t/week of Garden Organics (General Solid Waste - Non-Putrescible) | 385t/week of Food and Garden Organics (General Solid Waste - Putrescible)<br>190t/week of Garden Organics (General Solid Waste - Non-Putrescible) |

|                |                                                                           |                                      |
|----------------|---------------------------------------------------------------------------|--------------------------------------|
| Input Moisture | Water/leachate mix 50% (with allowable range 45% - 60%)                   |                                      |
| Particle Size  | 90% <= 250mm.<br>Biogenic organic content: >= 50% dry matter weight based |                                      |
| Input Capacity | 290t/week average approx. 15,000 tpa                                      | 575t/week average approx. 30,000 tpa |

Following the completion of the composting process, manufacturing of products will occur for distribution.

The makeup of materials undergoing composting at the OPF have previously been examined in Sections 3.6.1 and 3.6.4.1 of the submitted EIS.

### Storage

All organic materials will be stored onsite throughout the composting process until the finished product has passed quality release and is viable for sale. Storage areas onsite include:

- An open, covered receival building with concrete floors and storage bays- initial receival of materials;
- Covered Aerated Static Pile (CASP) bays;
- Compost maturation and finished goods storage area; and
- Oversize management area.

Compost material storage areas at the OPF have been previously examined in Section 3.3.1 of the submitted EIS.

### Transport

The additional traffic generation at the CWF associated with the operation of the OPF has been provided by SOILCO and is inclusive of the commercial vehicle/truck volumes and light vehicles associated with staff, the provision of blending materials (soil and sand) and the sale of finalised compost materials. The following additional combined traffic generation is anticipated to occur at site:

- Vehicles per Day: 26 vehicle trips (13 in, 13 out):
  - Trucks per day: 18 vehicle trips (9 in, 9 out);
  - Light vehicles per day: 8 vehicle trips (4 in, 4 out);
- Vehicles in AM Peak: 8 vehicle trips (4 in, 4 out):
  - Trucks per day: 8 vehicle trips (4 in, 4 out);
  - Light vehicles per day: 0 vehicle trips (0 in, 0 out)
- Vehicles in PM Peak: 2 vehicle trips (1 in, 1 out):
  - Trucks per day: 2 vehicle trips (1 in, 1 out); and
  - Light vehicles per day (0 in, 0 out).

The incoming/outgoing vehicles associated with the sale of end market materials from the OPF site are included within the vehicle movements associated with the operation of the site provided in Section 6.3.3.4 of the submitted EIS.

## 5 Revised Management Measures

The EIS identifies appropriate mitigation measures to control the environmental impacts of the proposed OPF development during both construction and ongoing operation. The mitigation measures address issues such as air quality and odour, noise, soil and water, flooding, traffic and transport, visual amenity, indigenous and non-indigenous heritage, biodiversity, fire and hazards impacts. After consideration of the issues raised during the community exhibition period, any revised or additional mitigation measures not previously captured or outlined within the *Summary of Potential Impacts and Main Mitigation Measures* of the submitted EIS have been outlined below in **Table 5-1**.

**Table 5-1: Further Mitigation Measures Not Outlined in the OPF EIS**

| Reference              | Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pest Management</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| PM1                    | Organic material entering the OPF site will be processed and placed in the covered CASP bays the same day.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| PM2                    | <p>Pests and vermin at the OPF will be managed in line with the following management controls:</p> <ul style="list-style-type: none"> <li>• Covering rapidly biodegrading organics;</li> <li>• Maintaining a pest proof perimeter fence;</li> <li>• Monitoring and awareness of signs of feral animals within the facility; and</li> <li>• A scheduled pest control program.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Dust Management</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| D1                     | A speed limit of 10km/hr will be enacted for the OPF site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Water</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| W28                    | <p>The following amendments to site designs have been implemented to better address the leachate and stormwater management of the OPF:</p> <ul style="list-style-type: none"> <li>• Deepening the planned leachate ponds from 1m to 3m;</li> <li>• Provision for off-site tankering of leachate to manage volumes during high inflow periods (i.e. 20kL/day during stage 1, 40kL/day during stage 2 when ponds reach 90% capacity);</li> <li>• Incorporation of additional stormwater drainage infrastructure to maintain separation between stormwater and leachate within the CASP cells;</li> <li>• Adding a rip rap spillway to reduce speed of any overflow from leachate ponds on the site; and</li> <li>• Adding a bioretention basin to further slow down any overflow from the rip rap spillway.</li> </ul> |

# **APPENDIX A**

## **Community Submission**

---

[REDACTED]

---

**From:** [REDACTED]  
**Sent:** Monday, 19 May 2025 7:56 PM  
**To:** RecordsMailbox  
**Subject:** DA2024.321

To Whom it May Concern,

I would like it noted that insufficient time has been allowed for a regular person to review the vast quantity of documentation provided. This has resulted in me not being able to review all documentation, therefore my objections are incomplete.

I would like to voice my objection to this development for the following reasons.

- Incorrect traffic data used in the traffic study resulting in under estimates of traffic volumes and impacts
- Insufficient consideration of cumulative impacts of noise, odour, pests, dust and traffic
- No info re pest management
- Insufficient controls regarding stormwater and leachate management
- Incomplete information regarding ongoing operations including end use products, their make-up, storage and transport.

Of the documents I have reviewed, which isn't all of them due to insufficient time, there are numerous errors, many of which constitute gross negligence, incompetence or both. Therefore I request all documentation be reviewed by independent professionals to ascertain how many more are similar in their errors.

Regards,  
[REDACTED]

From : [REDACTED]

[REDACTED]

14 April 2025

Re: Notification of Proposed Designated Development  
Proposed composting facility associated structure and subdivision

To whom it may concern,

I am writing to you concerning the proposed increase to the development of the existing waste facility at Wolumla.

I have grave concerns about the increase of truck and waste traffic that will exist because of this proposal.

[REDACTED] Wanatta lane in what was the old Princes Highway. Already we have trucks waiting for the waste facility [REDACTED]. The trucks turning rip up the road and revegetation is being deteriorated because of the existing trucks. The road is now becoming degraded and bitumen that once existed is now being degraded to dirt.

Adjacent to [REDACTED] is a school bus stop. There is a serious worry that increases in truck traffic especially during bus drop off and pick up times.

I would like to propose that this lane have a gross limit of less than 8 tonnes.

I would like to know what the odour prediction will be. This is a concern especially when a westerly wind occurs this will [REDACTED]. Can you please guarantee that there will be no or very little stench coming from this.

Sincerely yours,

[REDACTED]

# **APPENDIX B**

## **AQOIA Response Memo**

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25 June 2025

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## **RESPONSE TO NSW EPA REQUEST FOR ADDITIONAL INFORMATION – AIR QUALITY AND ODOUR IMPACT ASSESSMENT DA 2024.321 – BVSC ORGANICS PROCESSING FACILITY**

The following letter addresses the matters documented in *Attachment A – Air Quality* of a response issued by the New South Wales Environment Protection Authority (NSW EPA) dated 4 April 2025 in relation to the Air Quality and Odour Impact Assessment (AQOIA) dated 11 December 2024 for the proposed organics processing facility (the **Proposed Works**) by Bega Valley Shire Council (BVSC) at Wanatta Lane, Wolumla, New South Wales (Lot 402 DP 1191314). The responses contained in this letter should be read in conjunction with the AQOIA.

### **1. A revised odour assessment that includes a cumulative odour assessment that accounts for both the proposed composting and landfill activities.**

The AQOIA did assess cumulative impacts from the composting and landfill activities, but these were modelled as distinct odour source types within a single cumulative scenario. This is consistent with Section 3.3 of the NSW EPA Technical F & N, which *recommends* distinguishing sources with distinct odour characteristics. The composting process (CASP using FOGO) and landfill (putrescible waste) differ in both odorant composition and emission dynamics. As shown in Figure 5.7 and Figure 5.8 of the AQOIA, the cumulative impacts were assessed using a combined model run that included both the composting facility and the Central Waste Facility, with each treated as an individual source group. This approach also aligns with Barclay & Scire (2011), which recommends defining separate source groups to enable attribution of contributions and allow targeted mitigation. The use of distinct source profiles allowed us to more accurately represent the real-world dispersion of odours from each facility and avoids inappropriate lumping of emissions that could mischaracterise their combined effects.

### **2. The odour assessment criteria be revised based on the exposed population to 2 OU (or greater) for a cumulative scenario.**

The AQOIA applies an odour impact assessment criterion (IAC) of 6 ou, in accordance with Equation 4.1 and Table 18 of the NSW EPA Approved Methods. This criterion corresponds to a small population exposure — approximately 10 people — based on the number and distribution of residential receptors surrounding the site. The NSW EPA's request appears to assume a much larger affected population, citing that 13 receptors could be exposed to odour levels of 2 ou or greater. However, this is inconsistent with the data presented in Table 4.6 of the AQOIA, where a maximum of three receptors exceeds 2 ou under any individual scenario (composting or landfill). When modelled cumulatively, no sensitive receptors exceed the adopted 6 ou criterion. Importantly, the Proposed Works is located in a low-density rural setting, surrounded primarily by RU1 (Primary Production) and R5 (Large Lot Residential) zoned land, with the nearest receptor more than 700 m from the site boundary. Applying a 2 ou criterion - which is designed for urban populations greater than 2,000 - is not appropriate in this context and would conflict with the population-based scaling approach explicitly described in the NSW EPA Approved Methods. The use of a 6 ou criterion reflects both the statistical framework of the NSW EPA Approved Methods and the practical realities of rural land use. This is supported by the NSW EPA Technical F & N, which states that less stringent criteria are appropriate in sparsely populated areas where fewer people are likely to be impacted.

### **3. The odour assessment must be revised to demonstrate compliance with the odour impact assessment criteria.**

Table 4.6 of the AQOIA shows that only one receptor (IR\_19) exceeds the relevant odour impact assessment criterion under the composting-only scenario. This receptor is the NBN Co Satellite Ground Station, classified as an industrial/commercial site, not a residential or community receptor.

The NSW EPA Approved Methods provide odour impact criteria for sensitive receptors, which include residences, schools, and hospitals, but not industrial or commercial facilities. The NBN site has been confirmed to have no regular public access, and site operations are attended by a single full-time staff member during daytime hours only. As such, the reported exceedance at IR\_19 represents a technical exceedance only and does not indicate a material off-site impact at a location defined as a sensitive receptor under the NSW EPA Technical F & N. Furthermore, this exceedance occurs under isolated composting conditions, and the cumulative scenario - which includes both composting and landfill sources - shows that all receptors, including IR\_19, remain below the adopted 6 ou criterion. No residential or community receptors exceed the impact assessment criteria under any modelled scenario, including cumulative impacts. Therefore, the Proposed Works is demonstrated to be compliant with odour assessment requirements.

***4. The odour assessment must be revised to clearly and transparently describe the referenced odour data for each modelled odour emission source***

As outlined in Section 4.3 of the AQOIA, odour emission data for the composting sources were collected by The Odour Unit (TOU) at the Soilco Facility in Kembla Grange on 7 August 2024 (considered to be a reasonably representative operation to reflect the Proposed Works). While the Soilco Facility in Kembla Grange does not operate CASP, it uses a forced aeration composting system with similar feedstock and throughput characteristics to the Proposed Works.

At the time of AQOIA, no facilities operating a true CASP configuration were accessible for odour sampling. As such, in selecting a surrogate site, every effort was made to match key operational variables, particularly feedstock composition, aeration approach, and cover technology. The Soilco Facility in Kembla Grange processes a high proportion of FOGO and garden organics, consistent with the expected material mix at the Proposed Works. That sampling was conducted under active process conditions to ensure representative emissions data, particularly for the forced aerated composting system. The odour emission rates collected from the Soilco Facility in Kembla Grange were processed conservatively and applied to point sources representing aeration stacks within the CASP bays (refer to Tables 4.2–4.5). These values reflect real-world operational data, adjusted for design-specific parameters at the Proposed Works.

For the leachate dam sources, the odour emission values were drawn from TOU's internal emissions database, based on measured data from similar aerated leachate storages at NSW composting and landfill sites. A default surface flux rate of  $1 \text{ ou} \cdot \text{m}^3/\text{m}^2 \cdot \text{s}$  was used, which is consistent with well-managed, aerobic conditions -- as will be implemented at the Proposed Works.

Overall, all source values were selected to represent reasonable worst-case emissions and align with the NSW EPA Technical F & N requirement for odour modelling inputs to be both justified and representative.

***5. The odour assessment must be revised to demonstrate how the referenced odour data is representative of odour emissions for the proposal.***

The Soilco Facility in Kembla Grange was selected as a surrogate site due to its strong alignment with the Proposed Works in terms of:

- Feedstock composition: Soilco processes a similar blend of FOGO and garden organics, closely matching the Proposed Works expected input of 66% FOGO and 33% garden organics (refer to Table 3-5 of the EIS);

- Aeration and cover configuration: While Soilco Facility in Kembla Grange does not operate a formal CASP system, it uses forced aeration system, providing a functionally comparable odour control mechanism to the proposed CASP system at the Proposed Works; and
- Operational scale: The throughput and general process flow at Soilco Facility in Kembla Grange are consistent with the modelled 15,000 and 30,000 tpa scenarios for the Proposed Works.

At the time of AQOIA, no operational CASP facilities were accessible for sampling, and the Soilco Facility in Kembla Grange represented the best available match. The sampling was conducted during active aeration, and emissions were applied to the model as continuous 24-hour values, providing a conservative, worst-case estimate. To ensure the accuracy of the surrogate data, the AQOIA recommends a site-specific odour validation assessment be undertaken once the facility is operational. This will confirm the representativeness of the model inputs and inform any additional mitigation if required.

This approach is consistent with the NSW EPA Technical F & N, which allows the use of surrogate data during the planning phase were supported by process justification.

***6. The Odour assessment must be revised to include further detail on the methodology used to calculate the odour emission rate for each source. Sufficient information must be provided to allow for the odour emission rates to be reproduced.***

The odour emission rates used in the AQOIA were calculated in accordance with:

- AS/NZS 4323.3; and
- AS/NZS 4323.4.

A total of six odour samples were collected on 7 August 2024 from key source types at the Soilco Kembla Grange Facility, including aerated bays and stockpiles. Measured odour concentrations were used to calculate:

- OERs for point sources (e.g. aeration stacks) using:
  - $\text{OER (ou/m}^3\text{/s)} = \text{Odour concentration (ou/m}^3\text{)} \times \text{Flow rate (m}^3\text{/s)}$
- SOERs for area sources using:
  - $\text{SOER (ou/m}^3\text{/m}^2\text{/s)} = \text{OER} / \text{Surface area}$

Example:

An equivalent compost stack with 3,426 ou/m<sup>3</sup> and a flow rate of 0.14 m<sup>3</sup>/s results in an OER of 480 ou.m<sup>3</sup>/s.

A curing pile with a SOER of 0.07 ou/m<sup>3</sup>/m<sup>2</sup>/s over 45 m<sup>2</sup> results in an OER of 3.2 ou.m<sup>3</sup>/s.

For each source type, values were averaged across samples and then applied in the model as continuous 24-hour emissions to ensure a conservative outcome. Where direct sampling was not possible (e.g. leachate dams), values were drawn from TOU's emissions database based on similar facilities.

***7. The Odour assessment must be revised to provide the SPER's (OU/ m3/m2/s) calculated from the sampling data used for undertaking the odour assessment, including the supporting calculations. The revised odour assessment must also provide further details on the operating conditions at the time sampling was undertaken, as well as***

***assess impacts based on odour emissions that are demonstrated to be representative of a reasonable worst-case scenario***

The SOERs are detailed in Table 4.4 and Table 4.5 of the AQOIA and were derived using the standard method in AS/NZS 4323.4. The sampling was conducted at the Soilco Kembla Grange Facility on 7 August 2024 under typical operating conditions, during active aeration of the bays. As outlined in our response to Point 6, odour concentrations were combined with chamber flow and surface area data to calculate SOERs, with values applied in the model as constant 24-hour emissions to represent a reasonable worst-case scenario. Where direct measurements were not feasible (e.g. leachate dam), conservative default SOERs were applied based on TOU's internal database. This approach ensures that modelled emissions are both transparent and conservative, consistent with NSW EPA Technical F & N.

***8. The odour assessment must be revised to describe and justify the characterisation of the CASP Bay's as point sources. Supporting evidence should be provided to support the characterisation, where appropriate.***

The CASP bays were modelled as point sources to reflect the design of the semi-permeable, covered aerated static pile system, which promotes vertical air movement during active aeration.

Although the membrane covers are not fitted with defined vents, the forced aeration beneath the semi-permeable covers creates directed upward airflow, resulting in plume-like emissions rather than diffuse surface release. To represent this behaviour, each CASP bay was modelled using four vertically directed point sources, spaced to reflect the bay layout. This approach provides a more accurate representation of how odour disperses from the system compared to a traditional area source, and meets the intent of a point source characterisation under the NSW EPA Approved Methods due to:

- Controlled and consistent airflow direction; and
- Distinct vertical dispersion pattern.

The modelling of the CASP bays in this way ensures that the momentum of upward air movement is appropriately captured in the dispersion outputs.

***9. The odour assessment must be revised to describe and justify the selected parameters for each odour source (including CASP Bays and the receival hall). Supporting data to justify the selected parameters should also be provided.***

The parameters used in Tables 4.3, 4.4, and 4.5 of the AQOIA were selected based on a combination of:

- Measured data from field sampling at the Soilco Kembla Grange Facility on 7 August 2024;
- Engineering design specifications for the Proposed works; and
- TOU's internal emissions database, which draws on NATA-accredited odour sampling from similar composting operations.

Each source was characterised based on its emission behaviour (point vs area), airflow conditions, physical layout, and the operational phase being represented.

- CASP Bays (Tables 4.3 and 4.4):
  - Odour emission rates were derived from field samples at Soilco Kembla Grange Facility (refer to Section 4.3 of the AQOIA);
  - Flow rate: 0.14 m<sup>3</sup>/s per point source, based on similar forced-aeration systems using semi-permeable covers;

- Exit velocity and temperature: Estimated from standard airflow modelling assumptions, with 35°C representing typical air temperature within actively aerated compost systems; and
- Height: 1.5 m was used to represent effective vertical release from the bay under forced aeration, consistent with systems without stacks but with strong upward airflow.
- Receiving Hall (Table 4.5):
  - Modelled as an area source, reflecting passive emissions from a ventilated but enclosed space;
  - SOER: 0.1 ou·m<sup>3</sup>/m<sup>2</sup>·s, based on TOU data from similar organics receiving buildings; and
  - Temperature: 25°C, representing indoor ambient conditions under natural/mechanical ventilation.
- Other Sources (e.g. product piles, leachate dams):
  - Dimensions reflect architectural and site layout plans; and
  - SOERs were selected based on measured values where available or conservative defaults (e.g. 1 ou·m<sup>3</sup>/m<sup>2</sup>·s for aerated leachate).

All parameters were chosen to be realistic, technically justified, and conservative, ensuring that the modelled odour emissions represent a reasonable worst-case scenario. This approach is consistent with the NSW EPA Technical F & N and standard industry practice when field data and design inputs are available but operational validation has not yet occurred.

**10. The odour assessment must be revised to account for odour emissions during compost turning.**

The odour modelling assumed continuous, worst-case 24-hour emissions from each CASP bay to conservatively represent peak odour conditions during active composting. While the CASP system involves turning and relocating material after approximately 20 days, this activity consists of the following operational features:

- Is brief and affects only a small portion of the total material at any given time; and
- Occurs after the most odorous early composting stage, which has already been completed under covered, aerated conditions

Although turning was not modelled as a discrete event, its potential impact is accounted for by applying the highest measured emission rates continuously, regardless of actual operational timing. The emissions were also modelled as vertical point sources, which promote effective dispersion. This approach ensures a conservative representation of odour impacts, including short-term events like turning, and is consistent with the NSW EPA Technical F & N.

**11. The odour assessment must be revised to demonstrate that the CALMET generated meteorological data is representative and adequately describes the expected meteorological patterns at the site. The demonstration must include both graphical analysis and statistical analysis with the meteorological data at the premises, or other suitable meteorological station. Further guidance on statistical methods can be found in the EPA CALPUFF guidance.**

The meteorological dataset used for odour modelling was developed by Air Quality Support (AQS) using the TAPM/CALMET system, in accordance with the NSW EPA Approved Methods and guidance from Barclay & Scire (2011).

The key details include:

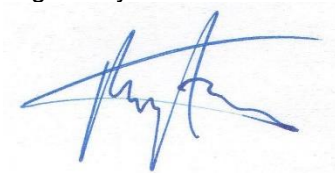
- Representative year: 2017, selected as meteorologically neutral based on analysis of wind, temperature, humidity, and the Southern Oscillation Index;
- Domain resolution: 100 m spacing over a 9.5 km × 9.5 km CALMET grid;
- Data sources: TAPM (v4.0.5) supplied prognostic inputs, with terrain and land use customised using SRTM 90 m and NSW Land Use 2017 datasets;
- Observed data: Bega BoM AWS was used for regional validation; and
- Dispersion relevance: The data capture seasonal variation, diurnal wind shifts, mixing height dynamics, and local terrain effects relevant to dispersion outcomes.

A supporting memorandum from AQS (dated 29 April 2024) outlines the modelling methods, inputs, and representativeness of the selected dataset. This confirms suitability for input to CALPUFF and supports the meteorological foundation of the AQOIA. This is **appended** to this response letter.

Regards,

The Odour Unit

Signed By:



Michael Assal MEngSc, B. Eng (Hon)/B.Sc, AMIChemE, MIEAust, CAQP  
Operations Manager



Melissa Gilbert BEnSc  
Consultant

**Attachment:**

- Meteorological dataset memorandum



Kyle Gilchrist  
Senior Consultant  
Air Quality Support  
[kyle@airqualitysupport.com.au](mailto:kyle@airqualitysupport.com.au)

29 April 2024

Melissa Gilbert  
Consultant & QLD Laboratory Coordinator  
The Odour Unit (Qld) Pty Ltd

By email: [mgilbert@odourunit.com.au](mailto:mgilbert@odourunit.com.au)

## **D23L-1: Meteorological Dataset – Frogs Hollow NSW**

Dear Melissa,

Air Quality Support (AQS) was commissioned by The Odour Unit Pty Ltd (The Odour Unit) to generate a three-dimensional meteorological dataset for a site near Wanatta Ln at Frogs Hollow, NSW.

The meteorological dataset was generated using the TAPM/CALMET modelling system and is suitable for use as direct input to the CALPUFF dispersion model. The TAPM and CALMET models were configured based on best practice. The preparation of the meteorological dataset considered guidelines discussed in the following documents:

- Guideline – Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2022)
- ; and
- Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, Australia (Barclay and Scire, 2011).

This memorandum summarises the methodology and assumptions used in the generation of the meteorological dataset. This memo accompanies the meteorological dataset uploaded to The Odour Unit's SharePoint directory.

If you have any questions or comments, please feel free to contact the undersigned.

Kind regards,

### **Kyle Gilchrist**

Senior Consultant  
Air Quality Support  
E: [kyle@airqualitysupport.com.au](mailto:kyle@airqualitysupport.com.au)  
M: +61 410 894754



## 1 Meteorological modelling

The prognostic model TAPM (developed by CSIRO, version 4.0.5) and the diagnostic meteorological model CALMET (developed by EarthTec, version 6.5.0) were used to generate the three-dimensional meteorological dataset for the region.

The three-dimensional wind field produced by TAPM/CALMET was then used to create a meteorological file suitable for use with the CALPUFF dispersion model.

Model domains defined for the TAPM (2 innermost nests) and CALMET are shown in Figure 1-2.

### 1.1 Selection of representative year

The selection of representative year for modelling considered observations of meteorological variables critical to dispersion. Temperature, relative humidity, wind speed and direction collected from the BoM AWS site at Bega from 1 January 2017 to 31 December 2023 were analysed in order to determine the most suitable representative year for dispersion modelling purposes.

In addition to these, the El Niño Southern Oscillation Index (SOI), which indicates the development and intensity of El Niño and La Niña events, was also considered. SOI values in the range of -7 to 7 in the SOI is indicative of a neutral period. SOI values below -7 are indicative of El Niño, causing a reduction in winter and spring rainfall. On the other hand, SOI values above 7 are typically associated with La Niña events, generally related to wetter than normal rainfall conditions. SOI values were sourced from the BoM website (2024).

The selection of representative year was based on the following:

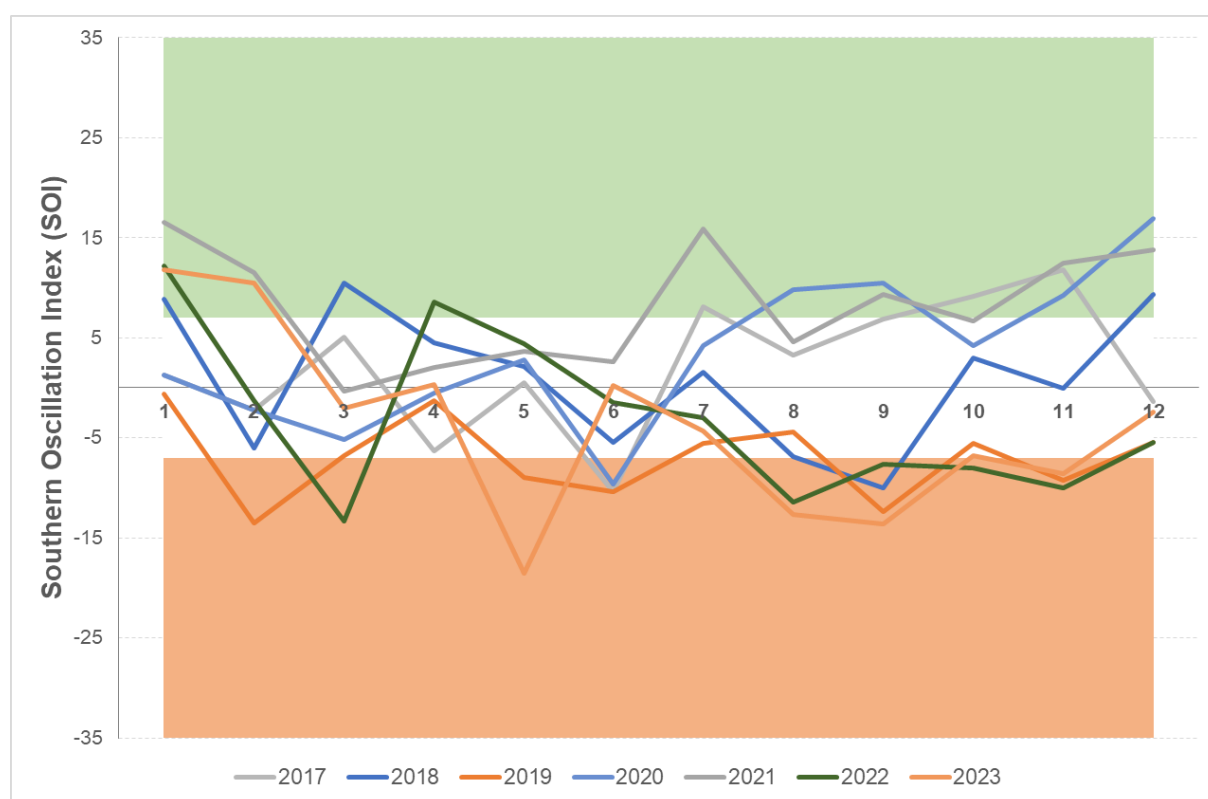
- Distributions of temperature, relative humidity, wind speed and direction (U- and V- components of wind) should be as close to the mean distribution as possible.
- Sustained El Niño and La Niña events should be avoided.

The year 2017 was selected as the representative year to be used in the assessment. This is based on the results of the analysis which shows:

- The Pearson correlation coefficients for most of the variables are greater than 0.99 for the years 2017 to 2020.
- 2017 had the highest average Pearson coefficient and 8 neutral months for the SOI.

**Table 1-1 Statistics used in selection of representative year**

| Statistics                            | Parameter           | 2017          | 2018          | 2019          | 2020          | 2021          | 2022          | 2023          |
|---------------------------------------|---------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Pearson<br>Correlation<br>Coefficient | Temperature         | 0.9940        | <b>0.9956</b> | 0.9899        | 0.9915        | 0.9677        | 0.9878        | 0.8408        |
|                                       | Relative Humidity   | <b>0.9983</b> | 0.9833        | 0.9908        | 0.9948        | 0.9931        | 0.9881        | 0.9593        |
|                                       | Wind speed          | <b>0.9974</b> | <b>0.9993</b> | <b>0.9984</b> | <b>0.9977</b> | <b>0.9977</b> | <b>0.9986</b> | 0.9876        |
|                                       | U-component of wind | <b>0.9976</b> | <b>0.9996</b> | <b>0.9990</b> | <b>0.9996</b> | <b>0.9985</b> | <b>0.9980</b> | 0.9849        |
|                                       | V-component of wind | <b>0.9991</b> | <b>0.9996</b> | <b>0.9994</b> | <b>0.9990</b> | <b>0.9993</b> | <b>0.9992</b> | <b>0.9967</b> |
|                                       | Average             | <b>0.9973</b> | <b>0.9955</b> | <b>0.9955</b> | <b>0.9965</b> | 0.9913        | 0.9943        | 0.9539        |
| # Neutral<br>Years                    | SOI                 | 8             | 8             | 7             | 7             | 6             | 2             | 6             |



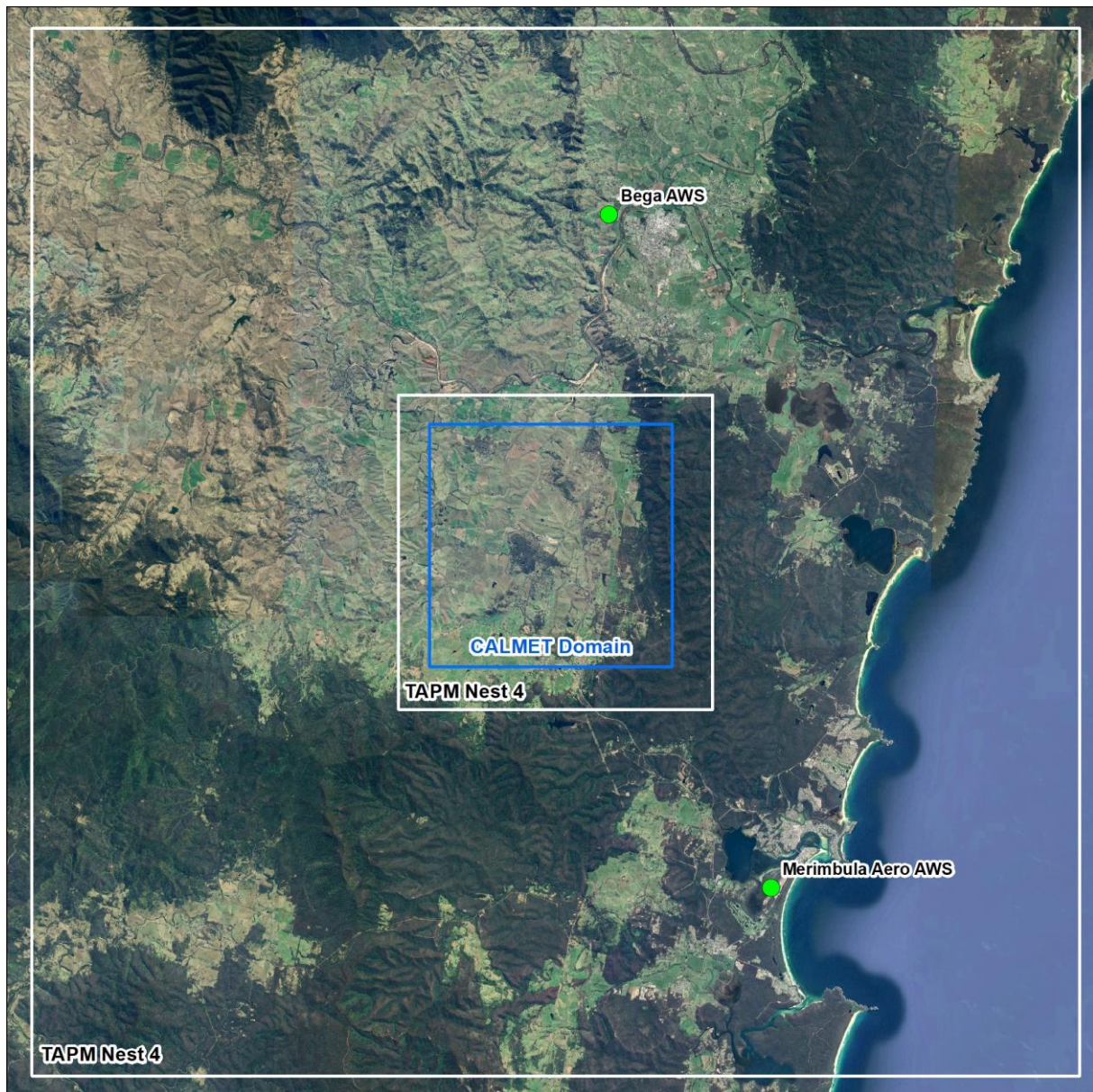
**Figure 1-1 Southern Oscillation Index (SOI) from 2017 to 2023**

## 1.2 TAPM

TAPM (Hurley, 2005) is a prognostic meteorological model widely used in Australia to predict 3D meteorological conditions at varying scales. TAPM solves the fundamental fluid dynamics equations to predict meteorology at a mesoscale (20 km to 200 km) to a local scale (resolution of hundreds of meters). TAPM includes parameterisations for cloud/rain micro-physical processes, urban/vegetation canopy and soil, and radiative fluxes.

TAPM uses synoptic meteorological information for the region, generated by a global using observations from multiple weather stations gridded to an approximate resolution of 75 km. This synoptic information

is used in conjunction with surrounding terrain, land-use, soil moisture content and soil type to simulate the meteorology of a region as well as at a specific location.



**Figure 1-2 TAPM and CALMET model domains**

Where required, terrain and land-use data generated from the TAPM default database were improved. This included a visual analysis of available imagery and more complex methods using spatial analysis and techniques using GIS (Geographic Information Systems). Further refinements were done to ensure that the latest geographic developments were represented in the model.

A comparison of the default and custom land use dataset for the two innermost nests are shown in Figure 1-3 and Figure 1-4.

TAPM (version 4.0.5) was configured as follows:

- Modelling period for one year from 1 January to 31 December 2017;
- 41 x 41 grid points with an outer grid of 30km and nesting grids of 30km, 10 km, 3km, 1km, and 300m;
- 30 vertical levels;
- Grid centred near Project site (latitude  $-36^{\circ} 47' 300''$ , longitude  $149^{\circ} 48' 00''$ );
- Terrain data for the two innermost nests customised using SRTM 90-m (version 4.0) dataset (CGIAR, 2004);
- Land use data for the two innermost nests customised using the New South Wales (NSW) Land Use Dataset (NSW Gov, 2017);
- Land water mask, soil data, and monthly leaf area index (LAI) values were adjusted to follow the improved coastline delineation;
- Default options selected for advanced meteorological inputs; and
- No data assimilation.



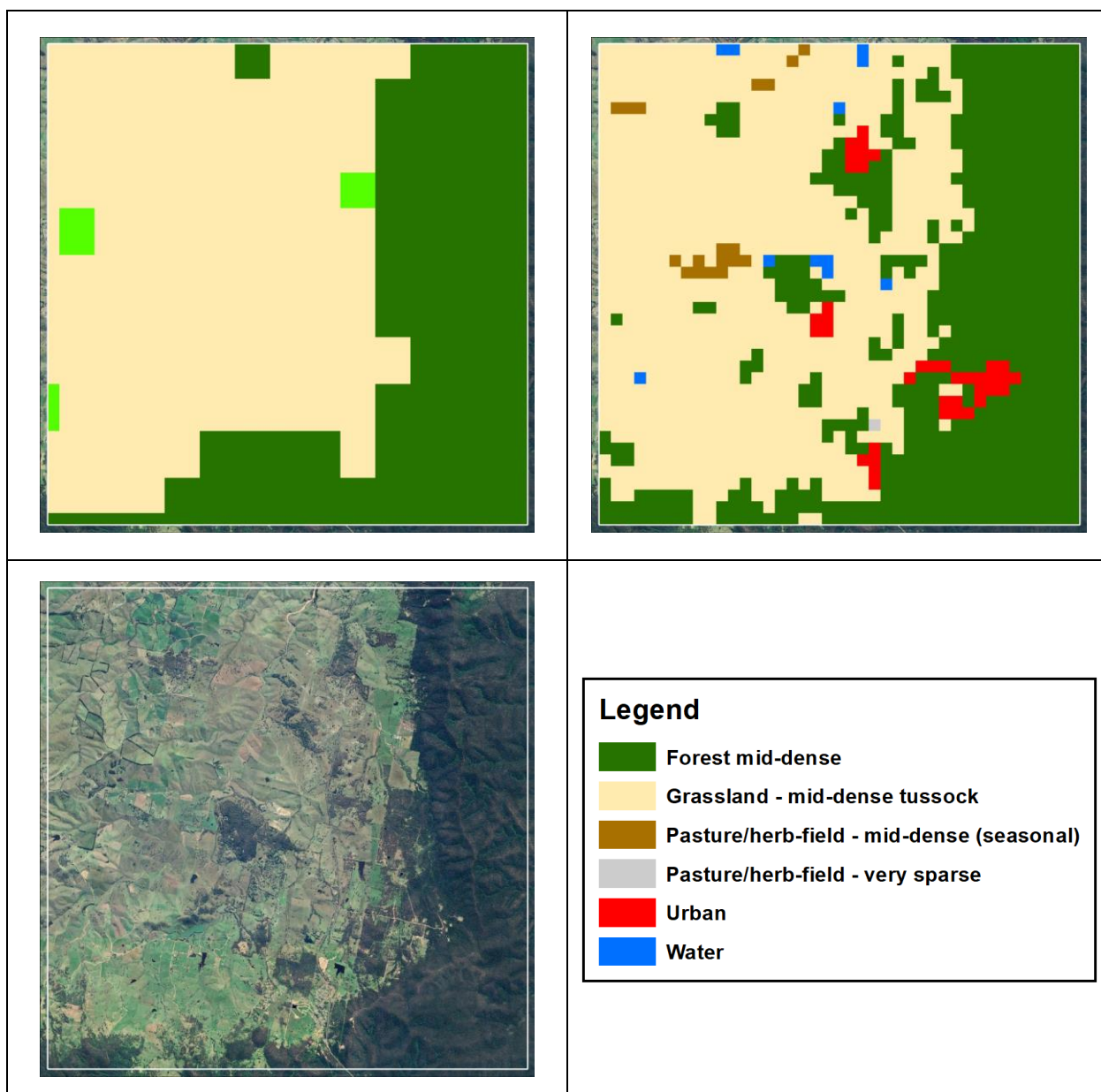
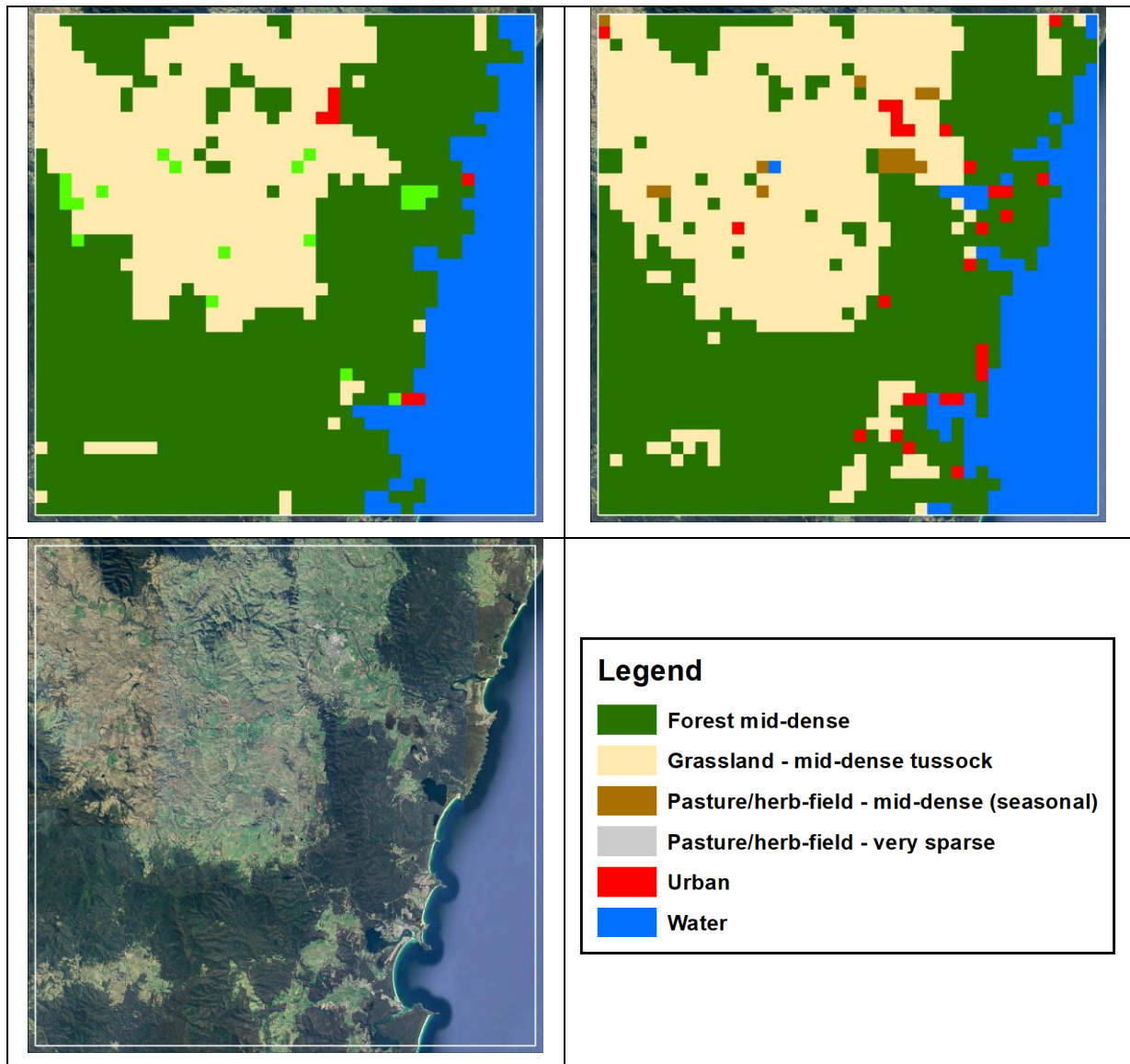


Figure 1-3 TAPM land use categories for the innermost nest, default and customised.



**Figure 1-4 TAPM land use categories for the second innermost nest, default and customised.**

### 1.3 CALMET

CALMET (TRC, 2009) is an advanced non-steady-state diagnostic 3D meteorological model typically used as the meteorological pre-processor for the CALPUFF dispersion model. CALMET is a diagnostic model and can be initialised with gridded 3D data from prognostic models such as TAPM.

CALMET was used to simulate meteorological conditions in the region, using TAPM-generated 3D meteorological data in the innermost nest as initial guess field. The initial guess field is then adjusted for the kinematic effects of terrain, slope flows, blocking effects and 3D divergence minimisation.

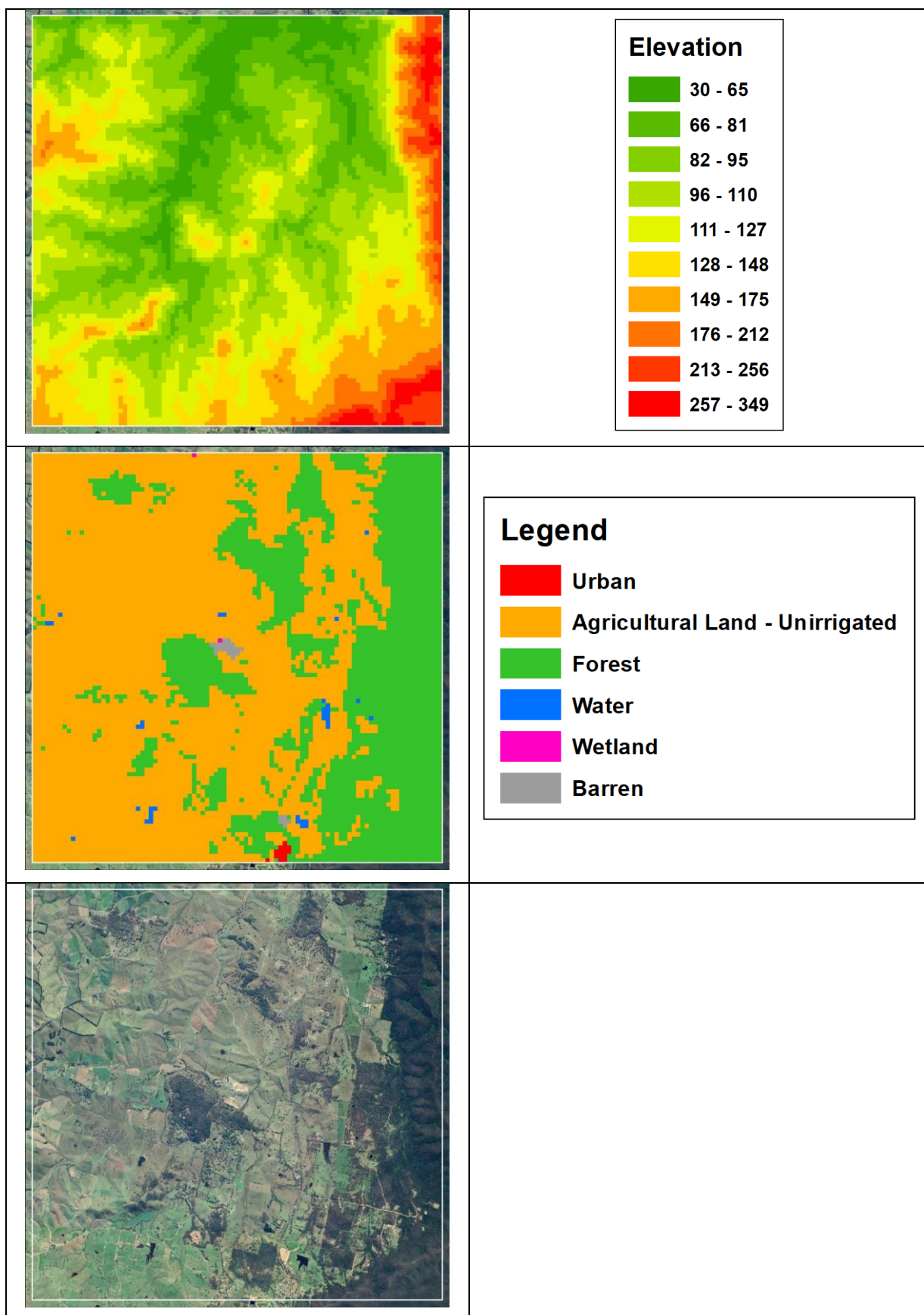
CALMET was configured in accordance with best practice. Principles of dispersion modelling detailed in the Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System (Barclay and Scire, 2011) were also considered.

CALTAPM (version 7.0.0) was used to extract the TAPM output and convert to a format (i.e. 3D.DAT) suitable to use as direct input to CALMET.

CALMET (version 6.5.0) was configured as follows:

- Modelling period for five years from 1 January 2017 to 31 December 2017;
- Domain area of 95 by 95 grid points at 100 m spacing, covering a 9.5 km × 9.5 km area;
- Southwest corner at 744910 mE, 5920090 mN (MGA94 Zone 55S)
- Twelve vertical levels set at 20 m, 40 m, 80m, 160 m, 320 m, 640 m, 1000 m, 1500 m, 2000 m, 2500 m, 3000 m, and 4000 m;
- Coriolis parameter internally calculated;
- Terrain radius of influence set at 5 km;
- NOOBS mode using prognostic wind fields generated by TAPM input as MM5/3D.dat at upper air as initial guess field;
- Land use data customised using the New South Wales Land Use 2017 land use dataset (NSW Gov, 2021);
- Elevation data based on 90-m SRTM (CGIAR, 2004) dataset; and
- All other options set to default.





**Figure 1-5 CALMET custom geographic data (elevation and use land)**

## 2 Dispersion Meteorology

This section presents an analysis of the site-specific meteorological data generated by the TAPM/CALMET meteorological modelling system. Analysis of meteorological parameters critical to the dispersion of pollutants at the locations of the proposed facilities are presented in the following sections.

### 2.1.1 Wind speed and direction

Wind speed and wind direction are important meteorological parameters that drive the dispersion of air pollutants. Distributions of winds predicted at the site location is presented in Figure 2-1.

Figure 2-1 shows that winds in the range of 0.5 to 4 m/s are most common, occurring around 69% while winds between 4 and 8 m/s occur 20% of the time. Winds are predominantly from the northeast to southern sectors (NE to S) sectors, occurring 61% of the time while winds from the southwest sectors occur approximately 13% of the time. High wind speeds ( $> 8$  m/s) are infrequent, occurring less than 2% of the time and calm winds occur less around 9% of the time.

Seasonal wind roses are shown in Figure 2-2, showing that south-westerly winds are common during winter and autumn seasons, while winds from the north and eastern sectors occur mainly during summer and spring.

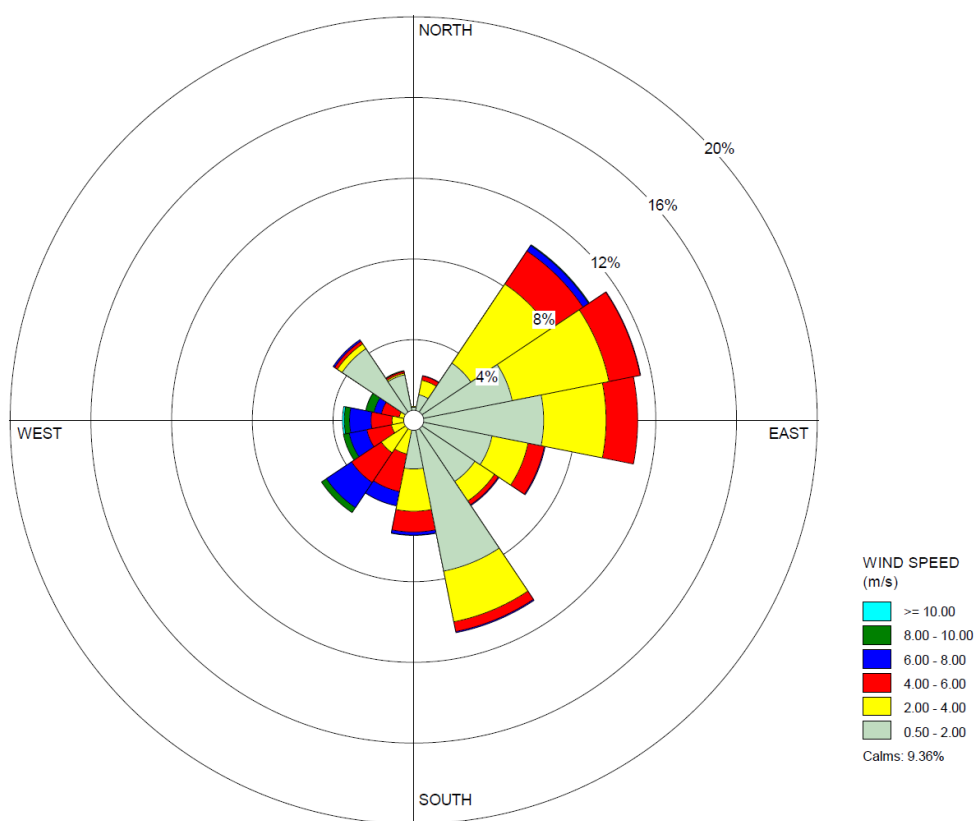
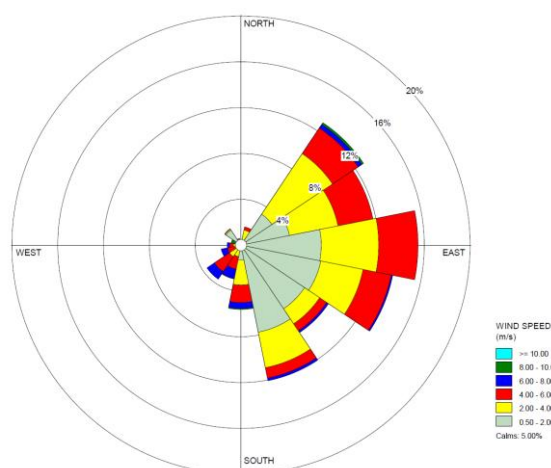
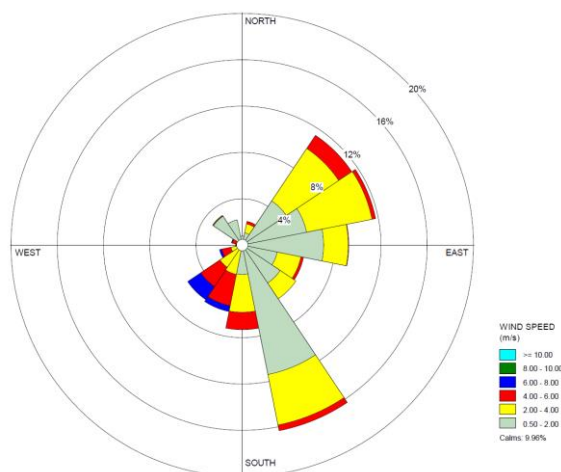


Figure 2-1 Summary of wind distribution at site location.

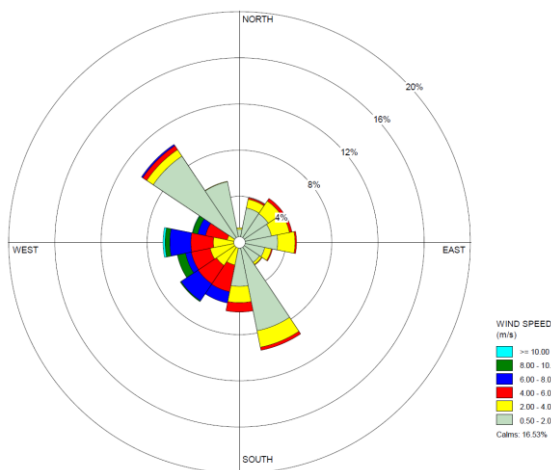
Summer



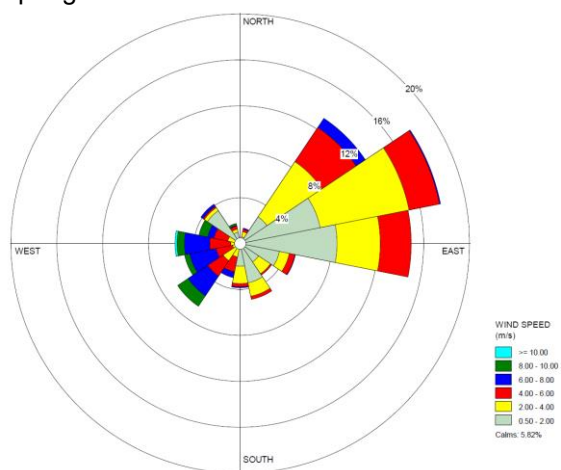
Autumn



Winter



Spring



**Figure 2-2: Seasonal distribution of wind at site location**

### 2.1.2 Atmospheric stability

The flow of air in the planetary boundary layer (lowest one kilometre of the atmosphere) is an important factor in the dispersion of air pollutants. This flow is affected by turbulence, which describes the vertical and horizontal motion of air and how a plume may be spread out and diffused. The rate of plume diffusion is proportional to turbulence. Lower diffusion rates resulting from low turbulence results in higher concentrations in the plume.

Turbulence is driven by thermal and mechanical influences as the atmosphere interacts with the land surface. Thermally driven turbulence is generated by convection as the sun heats the ground and the air above it is warmed, causing it to rise. Mechanically driven turbulence is generated by frictional effects as wind passes over the surface or by wind shear, produced at the boundary of two coinciding layers of wind or two different air masses.

A key indicator of thermally driven turbulence or convection in the atmosphere is stability, which is measured by the environmental lapse rate or vertical temperature profile of the atmosphere. Stability is a term applied to the properties of the atmosphere that govern the acceleration of the vertical motion of an air parcel. The acceleration is positive in an unstable atmosphere (turbulence increases), zero when the atmosphere is neutral, and negative (deceleration) when the atmosphere is stable (turbulence is

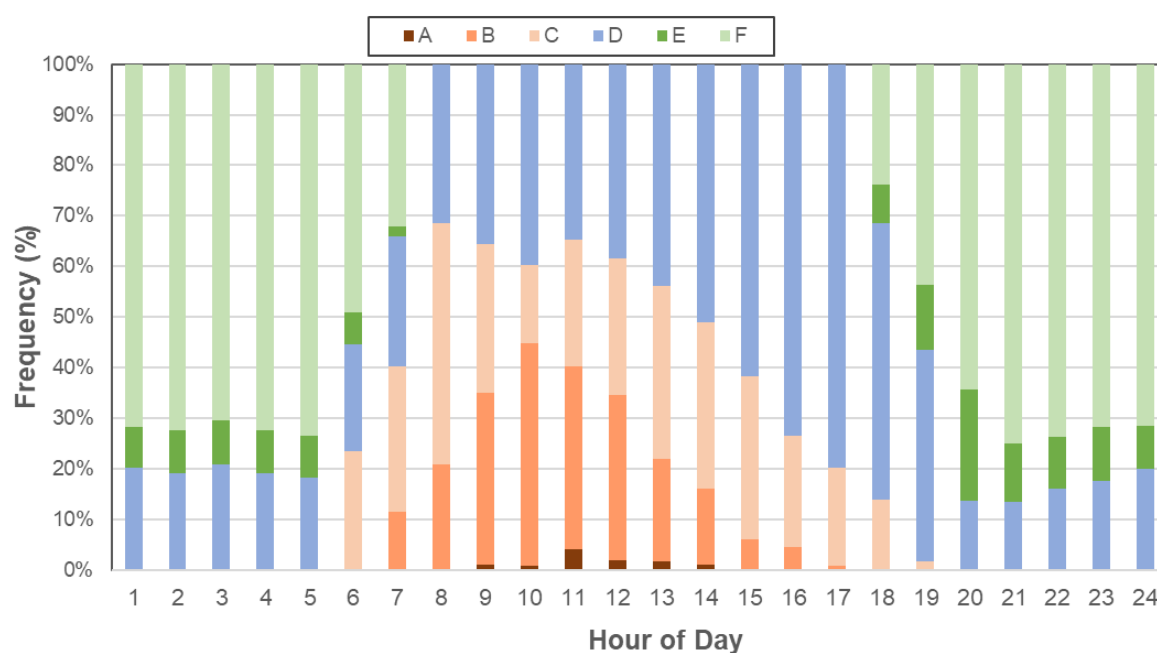
suppressed). The vertical temperature gradient in the atmosphere governs whether a parcel of air or plume, released into it will rise, fall, disperse, or remain relatively still. Plume warmer than the surrounding will tend to rise, while a plume cooler than the atmosphere will sink. Wind, or horizontal air movement, affects mechanical turbulence and therefore also affects atmospheric stability. As the wind speed increases, atmospheric stability will tend toward neutral conditions.

Atmospheric stability is commonly defined in terms of six main stability classifications. This is known as the Pasquill-Gifford (PG) stability classification and is widely used to describe the turbulent state of the atmosphere. The stability classes range from A Class, which represents very unstable atmospheric conditions that may typically occur on a sunny day, to F Class stability which represents very stable atmospheric conditions that typically occur during light wind conditions at night.

Unstable conditions (Classes A-C) are characterised by strong solar heating of the ground that induces turbulent mixing in the atmosphere close to the ground, and usually results in material from a plume reaching the ground closer to the source than for neutral or stable conditions. This turbulent mixing is the main driver of dispersion during unstable conditions. Dispersion processes for neutral conditions (Class D) are dominated by mechanical turbulence generated as the wind passes over irregularities in the local surface, such as terrain features and building structures. During the night, the atmospheric conditions are neutral or stable (Class D, E and F). During stable conditions, plumes from fugitive releases will be subject to minimal atmospheric turbulence. A plume released below an inversion layer during stable conditions that has insufficient vertical momentum or thermal buoyancy to penetrate the inversion will be trapped beneath it and result in elevated ground-level concentrations.

Atmospheric stability classes were derived from the meteorological dataset generated by the TAPM/CALMET meteorological modelling system. The frequency distribution of the PG classes by time of day at the site location during the model period is presented in Figure 2-3.

Figure 2-3 shows that daytime hours are dominated by the unstable and neutral classes B, C and D, while stable (E and F) classes are most common at night. Unstable classes B and C are shown to start occurring from 6am, and finish in the late afternoon, coinciding with the rise or collapse of the mixing height.



**Figure 2-3 Diurnal distribution of atmospheric stability classes**

### 2.1.3 Mixing height

The mixing height refers to the height above ground within which pollutants released at or near ground can mix with ambient air. During stable atmospheric conditions at night, the mixing height is often quite low, and pollutant dispersion is limited within this layer. During the day, incoming short-wave solar radiation from the sun heats the ground, which in turn re-radiates long wave radiation back into the atmosphere, heating the air above it. The heating of the air near the ground generates the growth of convection cells causing the air, and hence the mixing height, to rise. The air above the mixing height during the day is generally cooler. The growth of the mixing height is dependent on how well the air can mix with the cooler upper levels of air and therefore depends on turbulence, i.e. meteorological factors such as the intensity of solar radiation and wind speed. During strong wind speed conditions, the air will be well mixed, resulting in a high mixing height.

The hourly profile of the mixing height predicted by the TAPM/CALMET meteorological modelling is shown in Figure 2-4. Figure 2-4 shows that the mixing height develops around 7am, increases to a peak around 4pm before descending rapidly at 5pm.

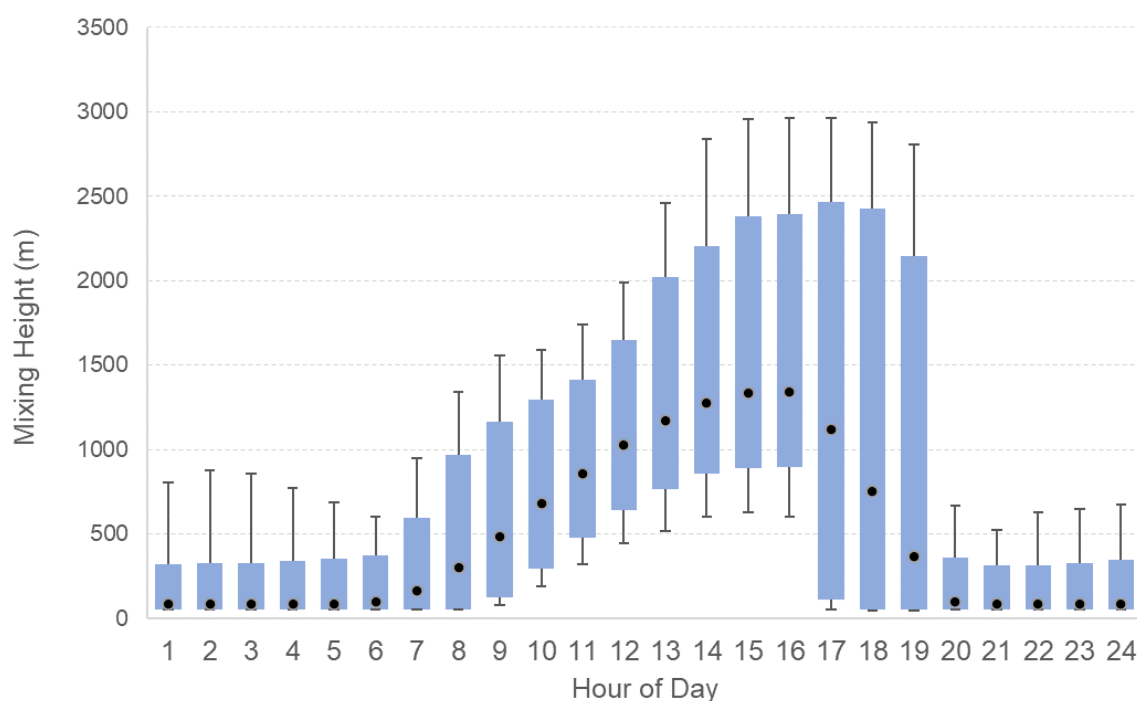


Figure 2-4 Diurnal mixing height profile

### 3 References

Australian Collaborative Land Use and Management Program Partners, 2016. The Australian Land Use and Management Classification Version 8.

Barclay, J. and Scire, J., 2011. Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia

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[New South Wales EPA \(NSW EPA\), 2022. Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales](#)

New South Wales Government (NSW Gov) 2021. New South Wales (NSW) Land Use Dataset - <https://datasets.seed.nsw.gov.au/dataset/nsw-landuse-2017-v1p2-f0ed>

TRC, 2009. CALPUFF Training Course Manual.



# **APPENDIX C**

## **Leachate and Stormwater Modelling and Management Memo**

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# MEMO

File Ref: 1253\_Memo\_170725\_F1.Docx

**To:** David Schumacher – GM, Planning and Approvals

**From:** Chris Anderson – Principal Engineer and Scientist (Anderson Consulting)

**Date:** 17 July 2025

**Subject:** SOILCO Bega – Leachate and stormwater modelling and management

Dear David,

SOILCO engaged Anderson Consulting (AC) to assist with leachate and stormwater-related assessments, and to undertake a review of the existing documentation prepared for the proposed Bega SOILCO facility. AC was also tasked with reviewing and providing additional information to support responses to the Request for Information (RFI) issued as part of the Environmental Impact Statement (EIS) process for the project.

The RFI items referred to AC are outlined below:

1. *The water quality objectives assessment must be revised to demonstrate how the project will meet and protect the ANZG 2018 Guidelines default trigger values during the construction and operational phase should discharges occur. Operational phase should include information for both 15,000 tpa and 30,000 tpa.*
2. *The environmental assessment must outline the practical measures that can be taken to avoid a discharge or mitigate water pollution where the capacity of the leachate detention basin is exceeded.*

*Any discharges from the proposal will enter Wolumla Creek and the Bega River which both have a range of environmental values and uses. Although the Composting guidelines recommend a minimum leachate dam capacity of a 1 in 10-year 24-hour stormwater event, the environmental assessment has not demonstrated that this will be adequate to protect the water quality objectives for the receiving waterway.*

*The revised assessment must also address the following matters:*

- *Proposed mitigation measures to reduce the impacts should an overflow occur from the leachate dam*
- *Data regarding the existing stormwater dam capacity and proposed water quality exiting the stormwater dam into the receiving environment*
- *Specific locations and volume calculations and triggers for the proposed 'first flush'*
- *Bioretention basin – proposed retention time, quality of the water (including expected sediment loads) reporting to the bioretention basin and proposed quality of water post bioretention basin being discharged into the receiving environment and confirmation that leachate is not proposed to be discharged through the bioretention the basin.*
- *If approval is issued for the proposal, the EPA will require an outline of the proposed surface water and groundwater monitoring network prior to commissioning.*

## **Background**

A Stormwater Management Report was prepared by Tonkin, dated 26 March 2024, titled *Lot 402 DP1191314 Wanatta Lane, Wolumla* (hereafter referred to as the SWMP). It is understood that the SWMP was submitted as part of the Environmental Impact Statement (EIS) process. It is understood that the current Request for Information (RFI) items were issued in response to a review of the SWMP and seek clarification or additional supporting information.

The Stormwater Management Plan (SWMP) outlines a site-wide strategy based on the separation of stormwater into three distinct streams:

1. **Clean stormwater** - runoff from areas not impacted by site operations is diverted away from the processing areas and around process area to discharge to the receiving environment.
2. **Non-process stormwater** - runoff from roadways, roofs, and other hardstand areas not affected by processing activities is captured, conveyed to underground storage tanks for reuse on-site, with overflow from the tank treated through bioretention systems before eventual discharge.
3. **Process-affected stormwater (leachate)** - runoff from processing areas, including composting and maturation zones, is classified as leachate and directed to purpose-designed, lined leachate dams for containment and reuse in site operations.

To assess the configuration and performance of the proposed stormwater and leachate management systems and to evaluate potential impacts on the receiving environment from the proposed development a suite of modelling assessments was undertaken. Three models were developed and are briefly described below:

1. **Leachate Water Balance Model** - Used to assess the frequency and duration of overtopping events from the leachate ponds under both Stage 1 and Stage 2 scenarios.
2. **Site Stormwater Model** - Developed to evaluate the effectiveness of on-site stormwater treatment measures, including the water tank and bioretention basin.
3. **Local Catchment Model** - An integrated model combining outputs from the leachate and site stormwater models to assess potential changes to downstream water quality associated with the proposed development.

## Modelling

### Climate data

Climate data for the local area, including rainfall and evaporation, was sourced from the CSIRO Long Paddock website. The dataset spans from 1900 to 2024, providing 125 years of continuous historical daily records. A summary of the annual rainfall and evaporation statistics is presented in Table 1. This includes key statistical measures (e.g. minimum, percentiles, median, average, and maximum) and the associated annual rainfall totals.

*Table 1 - Rainfall and evaporation statistics*

| Statistic       | Annual Rainfall (mm) | Annual Evaporation (mm) |
|-----------------|----------------------|-------------------------|
| Minimum         | 382                  | 1,159                   |
| 25th Percentile | 608                  | 1,371                   |
| Median          | 785                  | 1,415                   |
| Average         | 841                  | 1,389                   |
| 75th Percentile | 990                  | 1,417                   |
| 90th Percentile | 1,232                | 1,423                   |
| Maximum         | 1,788                | 1,621                   |

To better understand rainfall variability and extreme events, the highest rainfall depths for various durations were analysed. The results, including corresponding dates, are presented in Table 2. These show that the most extreme rainfall events, across all durations from 1-day to 10-day rainfall totals, occurred in 1919.

*Table 2 - Largest rainfall events for various event durations*

| Duration of event | Start Date | End Date   | Total Rainfall (mm) |
|-------------------|------------|------------|---------------------|
| 1-Day             | 27/02/1919 | 27/02/1919 | 400.5               |
| 3-Day             | 25/02/1919 | 27/02/1919 | 684.4               |
| 5-Day             | 23/02/1919 | 27/02/1919 | 687.9               |
| 7-Day             | 25/02/1919 | 3/03/1919  | 692.5               |
| 10-Day            | 25/02/1919 | 6/03/1919  | 706.1               |

In addition, the Stormwater Management Plan (SWMP) notes that the leachate pond was sized in accordance with the NSW EPA's Environmental Guidelines for Composting and Related Organics Processing Facilities (DEC 2004), which recommend using the 1-in-10-year, 24-hour rainfall event for leachate pond design. This corresponds to a 24-hour rainfall depth of 197 mm. A review of the historical dataset indicates that daily rainfall exceeding 197 mm occurred on 11 occasions between 1900 and 2024.

### 1 - Leachate Modelling (Process affected water)

A daily timestep water balance model was created for the 125-year period to assess the performance of the proposed leachate ponds and assess how frequently they would overtop using various scenarios. The water balance incorporated the predicted leachate production from CASP, leachate generation rates from maturation stockpiles, local climate

data, proposed storage sizes, differing catchment areas and use of leachate in the composting operations.

A summary of the modelling assumptions, including catchment areas, pond volumes, and other parameters, is provided in Attachment 1. The SWMP assumed a proposed leachate pond depth of 1 metre. However, the daily timestep leachate modelling indicates that ponds with a depth of 3 metres (and resultant increased volume) are required to achieve adequate storage. The adopted scenario also includes the provision for leachate tankering at a rate of 20kL/day when pond levels reach 90 percent of capacity for the stage 1 development and 40kL/day for the Stage 2 development. Notably, the modelled pond capacities are conservative, as they do not account for any freeboard. In practice, the inclusion of a freeboard allowance would reduce the likelihood of overtopping.

### ***Leachate modelling results - Stage 1***

The results for Stage 1 indicate that, with the incorporation of a 3 m deep leachate pond and tankering of 20 kL/day initiated when the pond reaches 90% capacity are summarised as follows:

- 7 overflow events over 125 years
- Average recurrence interval (ARI): 1 in 18 years
- Longest overflow duration: 4 days
- Average overflow duration: 1.85 days

### ***Leachate Modelling Results - Stage 2***

Modelling of Stage 2 leachate management, including a 3 m deep pond and provision for tankering at a rate of 40 kL/day when the pond reaches 90% capacity are summarised as follows:

- 14 overflow events over 125 years
- Average recurrence interval (ARI): 1 in 9 years
- Longest overflow duration: 4 days
- Average overflow duration: 1.5 days

#### ***Note on the overtopping frequency***

The *EPA Guidelines: Composting and Related Organics Processing Facilities* (DEC, 2003) recommend that leachate ponds be sized to accommodate a 1-in-10-year, 24-hour rainfall event. This criterion is interpreted as aiming to limit overtopping events to an average frequency of once every ten years.

When modelling pond performance using a daily timestep, the specific storm magnitude becomes less critical than the frequency of overtopping, due to the cumulative and variable nature of leachate generation (e.g. antecedent rainfall conditions) and the storage system's hydrological response. Therefore, assessing long-term overtopping risk using continuous simulation and frequency analysis is considered a more representative and robust approach than relying solely on a single design storm event.

## 2 - Site stormwater modelling

A daily timestep MUSICX model was setup for a 125-year period based on the source node, and treatment node setup described in the SWMP, with the rainfall and evaporation as described in the climate data above.

The MUSICX modelling included the roof areas and hardstand, as well as the tank storage and reuse and the bioretention system. It is noted that the SWMP setup had the bioretention basin with a filter permeability of 36mm/hr, this value was increased to 100mm/hr to satisfy the minimum recommendation of the 2014 Water by Design Bioretention Technical Guidelines.

The purpose of the modelling was to assess the treatment performance of the proposed site treatment devices (tank and bioretention system). A summary of the model setup is included as Attachment 2.

### Results

The results of the site stormwater modelling are summarised in Table 3, which presents the average annual pollutant loads, the treated loads, and the percentage reductions achieved by the proposed stormwater treatment measures for both Stage 1 and Stage 2.

The modelling demonstrates that the bioretention system provides:

- A >93% reduction in Total Suspended Solids (TSS),
- A >65% reduction in Total Nitrogen (TN), and
- A >76% reduction in Total Phosphorus (TP).

These outcomes exceed or meet the stormwater treatment targets adopted in the Stormwater Management Plan (SWMP), which are based on Blacktown City Council's recommendations:

- 80% TSS,
- 65% TP, and
- 45% TN reduction.

A more detailed discussion of the individual performance of the water tank and bioretention system is provided later in this memo

*Table 3 - Site stormwater modelling results*

| Stage 1                        | Sources | Residual Load | % Reduction |
|--------------------------------|---------|---------------|-------------|
| Flow (ML/yr)                   | 4.80    | 4.02          | 16.25       |
| Total Suspended Solids (kg/yr) | 905.34  | 34.48         | 96.19       |
| Total Phosphorus (kg/yr)       | 1.78    | 0.32          | 82.15       |
| Total Nitrogen (kg/yr)         | 11.11   | 3.24          | 70.88       |
| Gross Pollutants (kg/yr)       | 119.19  | 0.00          | 100.00      |
| Stage 2                        | Sources | Residual Load | % Reduction |
| Flow (ML/yr)                   | 6.66    | 5.86          | 11.97       |
| Total Suspended Solids (kg/yr) | 956.19  | 62.77         | 93.44       |
| Total Phosphorus (kg/yr)       | 2.08    | 0.49          | 76.50       |
| Total Nitrogen (kg/yr)         | 15.06   | 5.15          | 65.81       |
| Gross Pollutants (kg/yr)       | 165.22  | 0.00          | 100.00      |

### 3 - Local catchment stormwater modelling

To assist in understanding the potential influence of the proposed development on downstream water quality, a local catchment model was developed using MUSICX. The modelled catchment encompasses approximately 73 hectares, incorporating the subject site as a component of the broader catchment area. The primary objective was to establish “existing case” background water quality conditions against which the potential impact of future site operations could be assessed. The catchment area (shown on Figure 1) was determined based on available LiDAR<sup>1</sup> (from 2013 and 2018) for the local area.

Although Bega Valley Shire Council has undertaken water quality monitoring in the area, only two rounds of data were available. This is deemed insufficient to calibrate the MUSICX model. As such, default pollutant generation parameters were applied.

For the purpose of this assessment, the source node land use composition of the local catchment was conservatively assumed to be 50% agricultural and 50% forested land<sup>2</sup>. Notably, existing developments in the vicinity - such as the emergency landfill to the south-east of the subject site and adjacent road corridors - were conservatively treated as forested or agricultural areas in the model rather than developed land uses<sup>3</sup>. A summary of the model setup is included as Attachment 2

The extent of the modelled catchment area and the adopted reporting (discharge) point are shown in Figure 1.



Figure 1- Catchment boundary and reporting point (base image source Bing)

Developed case scenarios were prepared for both Stage 1 and Stage 2 of the proposed development. These scenarios incorporated stormwater runoff from developed surfaces,

<sup>1</sup> Sourced from Elvis - Elevation and Depth - Foundation Spatial Data <https://elevation.fsd.org.au/>

<sup>2</sup> Determination based on a review of aerial photography of the area.

<sup>3</sup> The adoption of the forest and agricultural source nodes without incorporation of industrial, quarry or roadway source nodes will produce a lower pollutant concentration in runoff (i.e.. More conservative when used as the base case existing concentrations).

including treatment via tanks and a bioretention basin, as well as potential leachate overflow events, which were assessed using the 125-year daily timestep water balance model described earlier.

It is noted that, under both Stage 1 and Stage 2 configurations, any leachate pond overflows would be routed to the bioretention system for treatment. However, for the purpose of conservatively assessing potential impacts, the treatment benefit provided by the bioretention basin for leachate overflows was not included in the water quality analysis. Instead, leachate overflows were assumed to by-pass the bioretention systems.

Leachate concentrations were adopted based on available monitoring data from the SOILCO Wogamia facility and comparable sites, with the following fixed values assumed over the entire simulation period:

- Total Suspended Solids (TSS): 1,000 mg/L
- Total Nitrogen (TN): 140 mg/L
- Total Phosphorus (TP): 50 mg/L

These values are considered conservative, as overflow events are most likely to occur during extended wet periods when the leachate is diluted by rainfall and stormwater inputs. Consequently, actual concentrations during overflow events would typically be lower than those adopted in the model.

### ***Local catchment modelling results***

The results of the three 125-year modelled scenarios (Existing Case, Stage 1 Developed, and Stage 2 Developed) are summarised in Table 4 below. Water quality outcomes were extracted at the designated reporting point, as shown on Figure 1 (above).

To ensure meaningful comparison between scenarios, results were derived using flow-based sub-sampling, whereby only time steps with runoff (i.e. flow  $>0 \text{ ms}^{-1}$ ) were included in the analysis. This approach avoids skewing of water quality statistics by non-flow periods.

For each scenario, statistical outputs of water concentrations have been reported, including:

- Median concentration
- 95th percentile concentration
- 99th percentile concentration

These metrics enable a meaningful comparison of pollutant loads under each scenario and assist in assessing the potential influence of the proposed development on downstream water quality for a range of events.

The results indicate that the median concentrations of Total Suspended Solids (TSS), Total Nitrogen (TN), and Total Phosphorus (TP) are lower under both Stage 1 and Stage 2 development scenarios when compared with the existing case.

This reduction may be attributed to:

- The implementation of on-site stormwater treatment measures, including bioretention and water tanks; and
- The reduction in effective contributing catchment area to surface runoff due to the leachate ponds, which intercept and retain flows.

*Table 4 - Water quality modelling results for the local catchment reporting point*

| Median values                      |                            |                         |                         |                          |
|------------------------------------|----------------------------|-------------------------|-------------------------|--------------------------|
| Scenario                           | Flow (m <sup>3</sup> /day) | TN concentration (mg/L) | TP concentration (mg/L) | TSS concentration (mg/L) |
| Existing                           | 20.91                      | 1.002                   | 0.086                   | 17.32                    |
| Stage 1                            | 19.82                      | 0.942                   | 0.080                   | 16.00                    |
| Stage 2                            | 22.68                      | 0.939                   | 0.080                   | 15.82                    |
| 95 <sup>th</sup> percentile values |                            |                         |                         |                          |
| Scenario                           | Flow (m <sup>3</sup> /day) | TN concentration (mg/L) | TP concentration (mg/L) | TSS concentration (mg/L) |
| Background                         | 1049.13                    | 1.41                    | 0.13                    | 25.64                    |
| Stage 1                            | 1036.42                    | 1.41                    | 0.13                    | 24.99                    |
| Stage 2                            | 1036.24                    | 1.42                    | 0.13                    | 24.96                    |
| 99 <sup>th</sup> percentile values |                            |                         |                         |                          |
| Scenario                           | Flow (m <sup>3</sup> /day) | TN concentration (mg/L) | TP concentration (mg/L) | TSS concentration (mg/L) |
| Existing                           | 2298.71                    | 1.74                    | 0.16                    | 34.00                    |
| Stage 1                            | 2271.01                    | 1.75                    | 0.17                    | 33.83                    |
| Stage 2                            | 2251.84                    | 1.77                    | 0.17                    | 34.29                    |

For 95% of flows:

- TN in Stage 2 is marginally higher than the existing case (+0.01 mg/L).
- TP remains unchanged across all scenarios (0.13 mg/L).
- TSS is lower under both Stage 1 and Stage 2 scenarios.

For 99% of flows:

- TN is slightly higher in both Stage 1 (+0.01 mg/L) and Stage 2 (+0.03 mg/L).
- TP is also marginally elevated in Stage 1 and 2 (+0.01 mg/L).
- TSS is lower in Stage 1, while Stage 2 shows a minor increase (+0.29 mg/L) compared to the existing scenario.

Overall, the results demonstrate that for 99% of flow events, the modelled water quality concentrations are comparable to the existing scenario. The proposed development, incorporating the identified mitigation and treatment measures, does not result in any adverse impact on modelled water quality in the receiving environment.

### **Proposed layout changes to mitigate potential impacts**

Based on the outcomes of the modelling described above, several modifications to the proposed design, originally outlined in the SWMP, have been recommended.

These include:

- Incorporation of additional stormwater drainage infrastructure to maintain separation between stormwater and leachate within the CASP cells
- Increasing the depth of leachate ponds to 3 m to provide additional storage capacity

- Provision for off-site tankering to manage leachate volumes during high inflow periods

It is noted that a Soil and Water Management Plan (SWMP) will be prepared prior to the commencement of construction activities.

This plan will:

- Include additional background data collection to support refined water balance modelling based on updated detailed design information
- Be updated during Stage 1 to incorporate site-specific monitoring data, enabling continuous refinement of the water balance and leachate management strategy
- Outline additional soil and water management measures and mitigation measures for prior to construction, construction and operational phases, including those proposed in response to the RFI items such as background monitoring, leachate pond level alarms, leachate pond transfers, additional tankering, additional leachate storage in Stage 2, surface water and ground water monitoring program, maintenance and inspection requirements routine, prior and following rainfall events, bioretention and treatment system monitoring and maintenance etc.

## Response to RFI items

For ease of reference, each RFI item is replicated below in *italic* text followed by our response in normal text.

1. *The water quality objectives assessment must be revised to demonstrate how the project will meet and protect the ANZG 2018 Guidelines default trigger values during the construction and operational phase should discharges occur. Operational phase should include information for both 15,000 tpa and 30,000 tpa.*

The results of the local catchment modelling are presented in Table 4 above. Overall, the results demonstrate that, during the operational phase, 99% of flow events result in modelled water quality concentrations that are comparable to the existing scenario. The proposed development, incorporating the planned mitigation and stormwater treatment measures, does not result in any adverse impact on the modelled water quality of the receiving environment.

For the construction phase, a Soil and Water Management Plan will be prepared prior to works commencing. The plan will outline required erosion and sediment control measures, along with monitoring and management protocols, in accordance with the procedures detailed in the Blue Book (Managing Urban Stormwater: Soils and Construction). The plan will also include background water quality monitoring requirements to characterise the receiving environment and support future compliance assessments

2. *The environmental assessment must outline the practical measures that can be taken to avoid a discharge or mitigate water pollution where the capacity of the leachate detention basin is exceeded.*

*Any discharges from the proposal will enter Wolumla Creek and the Bega River which both have a range of environmental values and uses. Although the Composting guidelines recommend a minimum leachate dam capacity of a 1 in 10-year 24-hour stormwater event, the environmental assessment has not demonstrated that this will be adequate to protect the water quality objectives for the receiving waterway.*

The results of the modelling demonstrate that for Stage 1 a suitable ARI of 1 overflow per 18 years is achievable. During Stage 1 site specific leachate generation and use values will be collected and used to update the leachate water balance modelling with regard to Stage 2. The current modelling has Stage 2 overtopping 1 every 9 years. Stage 2 has scope (if required, based on site specific operational data) for adjustments to be made to the design (such as increase the Stage 2 pond volume by increasing its depth or increased tankering) to reduce the overflow events.

*The revised assessment must also address the following matters:*

- *Proposed mitigation measures to reduce the impacts should an overflow occur from the leachate dam*

To prevent, minimise, or mitigate impacts resulting from leachate overflow, the following measures are proposed and can be implemented. It is noted that a Soil and Water Management Plan will be prepared prior to construction to further detail these strategies:

- Minimise the generation of leachate by maximising the diversion of clean stormwater runoff from leachate catchments, including the use of the Controlled Aerobic Static Pile (CASP) system.
- Install pond level alert systems to provide early warning of high pond levels.
- Maintain adequate pond capacity through proactive leachate removal (e.g. early-stage tankering).
- Increase off-site tankering volumes during high-risk periods.
- In the case where Stage 2 has not been constructed an increased pond size can be designed and implemented.
- Transfer leachate to the secondary leachate pond (Stage 2) where capacity is available.
- Implement temporary storage on-site if required (e.g. frac tanks)
- Increase irrigation of compost windrows (within environmental limits) to reduce leachate pond volumes.
- Direct overflow (using a suitable spillway) through the bioretention system to provide additional treatment and filtration prior to discharge to the receiving environment.
- *Data regarding the existing stormwater dam capacity and proposed water quality exiting the stormwater dam into the receiving environment*

No survey or water quality monitoring data is available for the existing dam, a Soil and Water Management Plan is proposed to be prepared prior to construction works commencing on-site. The Soil and Water Management plan will outline the background monitoring required to establish suitable background data (including the dam on-site) prior to the works commencing.

- *Specific locations and volume calculations and triggers for the proposed 'first flush'*

The 'first flush' referenced in the SWMP comprises a 50 kL tank that captures stormwater runoff from roofs, roadways, and hardstand areas. This system does not function as a traditional first-flush diversion device. Rather, it is designed to capture and reuse site

stormwater runoff, thereby reducing discharge to the receiving environment. A review of the tank's performance (in the 125-year stormwater MUSICX model) in meeting on-site water demands indicates that it supplies approximately 80 percent of the total water demand over the modelled period. This reuse results in a reduction of the annual discharge volume to the bioretention system by approximately 50 percent for both Stage 1 and Stage 2.

- *Bioretention basin – proposed retention time, quality of the water (including expected sediment loads) reporting to the bioretention basin and proposed quality of water post bioretention basin being discharged into the receiving environment and confirmation that leachate is not proposed to be discharged through the bioretention the basin.*

The bioretention basin as described in the SWMP with a permeability of 36mm/hr will have a residence time of 14 hours. The 2014 Water by Design Bioretention Technical Guidelines recommend a minimum filter permeability rate of 100mm/hr, if this is used the basin will have a residence time of 5 hours. The modelling results discussed below adopted a permeability rate of 100mm/hr.

The results from the MUSICX model for the mean annual loads, with the bioretention setup as per SWMP is shown in Table 5.

*Table 5 - Bioretention basin mean annual loadings and reductions for Stages 1 and 2*

| <b>Stage 1 basin performance</b> | <b>Inflow</b> | <b>Outflow</b> | <b>% Reduction</b> |
|----------------------------------|---------------|----------------|--------------------|
| Flow (ML/yr)                     | 4.15          | 4.02           | 3.03               |
| Total Suspended Solids (kg/yr)   | 430.81        | 19.00          | 95.59              |
| Total Phosphorus (kg/yr)         | 1.13          | 0.28           | 75.45              |
| Total Nitrogen (kg/yr)           | 8.93          | 2.65           | 70.32              |
|                                  |               |                |                    |
| <b>Stage 2 basin performance</b> | <b>Inflow</b> | <b>Outflow</b> | <b>% Reduction</b> |
| Flow (ML/yr)                     | 6.00          | 5.86           | 2.31               |
| Total Suspended Solids (kg/yr)   | 557.22        | 40.26          | 92.77              |
| Total Phosphorus (kg/yr)         | 1.48          | 0.43           | 71.13              |
| Total Nitrogen (kg/yr)           | 12.91         | 4.15           | 67.84              |

The results show a significant reduction in suspended sediment (>90%), total nitrogen (>67%) and total phosphorus (>71%) by the bioretention system. Noting that the SWMP adopted the following targets based on Blacktown Council recommendations being 80% TSS reduction, 65% TP reduction and 45% TN reduction.

To further understand the modelled water quality discharge from the bioretention systems, flow based sub-samples were exported from the daily modelled data. In essence the water quality of the basins was assessed when discharge events were occurring (i.e. flow greater than 0m<sup>3</sup>/s). The results of that analysis shown in Table 6 below.

*Table 6 - Bioretention basin median water inflow and outflow quality (flow-based subsample > 0m<sup>3</sup>/s)*

| Scenario | TN inflow (mg/L) | TN outflow (mg/L) | TP inflow (mg/L) | TP Outflow (mg/L) | TSS inflow (mg/L) | TSS Outflow (mg/L) |
|----------|------------------|-------------------|------------------|-------------------|-------------------|--------------------|
| Stage 1  | 2.02             | 0.60              | 0.19             | 0.06              | 43.98             | 2.64               |
| Stage 2  | 2.02             | 0.60              | 0.18             | 0.06              | 41.09             | 2.59               |

Modelled water quality results indicate that outflows from the proposed bioretention basin are of higher quality than the modelled runoff water quality for the local catchment in the existing case median scenario reported in Table 4. This reflects an improvement in stormwater quality as a result of the proposed treatment measures.

In the event of overflow from the leachate basins, it is proposed that these flows will be directed to the bioretention basin to facilitate additional treatment prior to discharge to the receiving environment. The Soil and Water Management Plan will include detailed procedures for inspecting the bioretention basin following significant rainfall events and following any leachate discharge events. These inspections will assess factors such as filter media performance (e.g. potential blockage), accumulation of sediment and gross pollutants, evidence of scouring, vegetation condition, and infiltration capacity.

The Soil and Water Management Plan will also include a routine monitoring program to assess the ongoing performance of the bioretention system and to identify any need for maintenance, refurbishment, or corrective action.

## Conclusion

The modelling confirms that the proposed system, incorporating increased leachate pond storage to a depth of 3 metres, off-site tankering, and improved separation of stormwater and leachate, provides effective management of site water under both Stage 1 and Stage 2 conditions.

For Stage 1, only seven leachate overtopping events are predicted over a 125-year period, which equates to an average recurrence interval (ARI) of approximately one in 18 years. For Stage 2, which includes a larger contributing catchment, 14 overtopping events are predicted, corresponding to an ARI of approximately one in nine years. In both cases, overflow events are short in duration.

Modelling of the local catchment confirms that the proposed development does not adversely impact downstream water quality. The stormwater treatment measures, including the water tank and bioretention system, have been appropriately sized and are capable of treating site runoff to an adequate standard that meets the adopted water quality targets.

A Soil and Water Management Plan will be prepared prior to construction. This plan will include baseline data collection to support refinement of the water balance using site-specific information. It will also incorporate updated modelling based on detailed design and describe construction-phase controls and operational measures to manage water on-site and minimise environmental risk. The plan will be reviewed and updated during Stage 1 to ensure the system remains effective and compliant with regulatory requirements based on ongoing monitoring and actual site conditions.

I trust this is acceptable. Please do not hesitate to contact me if you require any further details or elaboration.

Yours sincerely,



**Chris Anderson**

*Principal Engineer & Scientist*

*BEngEnv BSc Lan & Wat Man MEIANZ MIEAust CPEng NER RPEQ*

**Attachments:**

*Attachment 1 – Leachate modelling set-up summary*

*Attachment 2 – Stormwater modelling setup summary*

## Attachment 1 – Leachate modelling setup summary

Daily timestep model – 125 years of rainfall data for locale

| Statistic       | Annual Rainfall (mm) | Annual Evaporation (mm) |
|-----------------|----------------------|-------------------------|
| Minimum         | 382                  | 1,159                   |
| 25th Percentile | 608                  | 1,371                   |
| Median          | 785                  | 1,415                   |
| Average         | 841                  | 1,389                   |
| 75th Percentile | 990                  | 1,417                   |
| 90th Percentile | 1,232                | 1,423                   |
| Maximum         | 1,788                | 1,621                   |

Pond evaporation assumed to have a pan coefficient of 0.7.

### Scenarios

Stage 1 (15,000 tpa)

Stage 2 (30,000 tpa).

### Leachate catchment areas

#### Stage 1

- Pond surface area 1320m<sup>2</sup>
- CASP 2295m<sup>2</sup> of this it is assumed that only 5% of the area contributes to leachate (95% to stormwater). That is, the tarped CASP bays and the internal roadways are assumed to be stormwater and not affected by production runoff (separate leachate collection system in bays).
- The area under the CASP tarps was assumed to contribute 0.5m<sup>3</sup>/day of leachate per day, as per SOILCO advice.
- Maturation area 1750m<sup>2</sup> consisting of 1130m<sup>2</sup> of piles and 620 m<sup>2</sup> of hardstand.

#### Stage 2

- Pond surface area 2600m<sup>2</sup>
- CASP 5000m<sup>2</sup> of this it is assumed that only 5% of the area contributes to leachate (95% to stormwater). That is the tarped CASP bays and internal roadways are assumed to be stormwater and not affected by production runoff. (separate leachate collection system in bays).
- The area under the CASP tarps was assumed to contribute 0.5m<sup>3</sup>/day of leachate per day, as per SOILCO advice.
- Maturation area 3452m<sup>2</sup> consisting of 1305m<sup>2</sup> of piles and 2146 m<sup>2</sup> of hardstand.

To simulate the daily leaching characteristics of a mature mulch pile for the 125 climate period to incorporate into the leachate model for both Stages. A bioretention node in MUSICX was used, by setting the depth to the height of the proposed maturation piles and adjusting the porosity of the media to 0.6 and setup the permeability to 10mm/hr. flows were then applied to the requisite area representing the stockpiles and those leaching flows from the piles were added into the daily water balance model.

### Pond volumes

#### Stage 1

A depth of 3m being a volume of 2900m<sup>3</sup>.

#### Stage 2

A depth of 3m being a total volume of 6579m<sup>3</sup> (Stage 1 2900m<sup>3</sup> and Stage 2 3679m<sup>3</sup>).

## Attachment 2 - Stormwater modelling setup

Climate data same as leachate modelling 125 years for locale.

Daily timestep MUSIC X model (site and local catchment models).  
Default source node configuration adopted.

### Site stormwater model

#### Stage 1

Source node types used:

- Roof of buildings 946m<sup>2</sup>
- Road (representing road and hardstand) 3170m<sup>2</sup>
- Roof (CASP tarp and ground runoff) 2280m<sup>2</sup>

#### Stage 2

Source node types used:

- Roof of buildings 946m<sup>2</sup>
- Road (representing road and hardstand) 3170m<sup>2</sup>
- Roof (CASP tarp and ground runoff) 4750m<sup>2</sup>

### Stage 1 and Stage 2 treatment nodes

#### *Rainwater Tank*

50kL, overflow pipe 150mm, entire tank drawdown possible, daily use of 2.28kL (16kL/week).

#### *Bioretention basin*

- Surface area and filter area 80m<sup>2</sup>
- Extended detention depth 0.5m
- Saturated hydraulic conductivity 100mm/hr
- Filter depth 0.5m
- TN content of filter 400mg/kg and Ortho-P content 40mg/kg
- 0mm exfiltration rate.

### Local catchment model

#### Stage 1

Source node types used as above for Stage 1 site stormwater model and:

- Forest 36.082ha
- Agricultural 36.082ha

#### Stage 2

Source node types used as above for Stage 2 site stormwater model and:

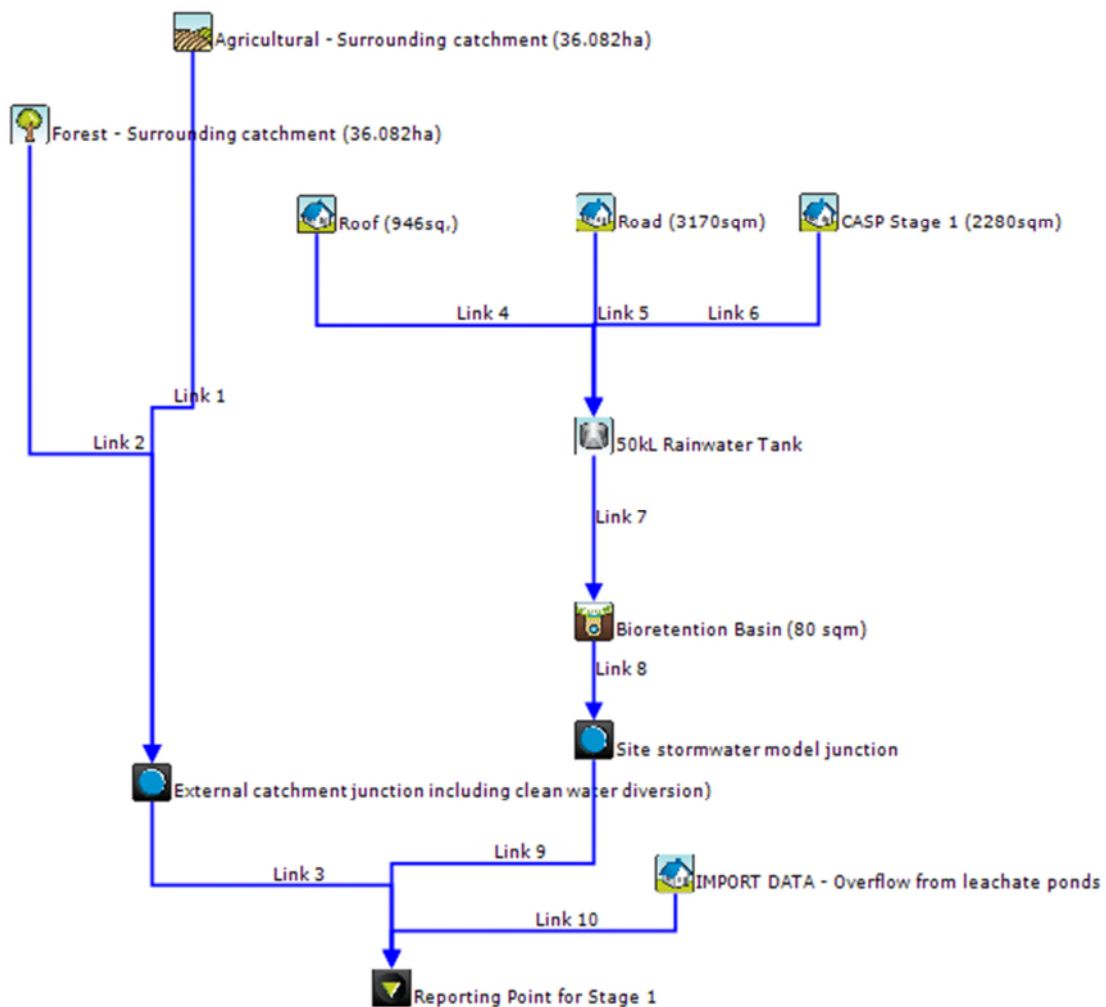
- Forest 35.715ha
- Agricultural 35.715ha

The treatment nodes for the local catchment model were the same as the site model. With the site model being a subset of the local catchment model.

Daily overflow volumes were imported from the leachate model with fixed nutrient concentrations of:

- Total Suspended Solids (TSS): 1,000 mg/L
- Total Nitrogen (TN): 140 mg/L
- Total Phosphorus (TP): 50 mg/L

A screen grab of the Stage 1 MUSICX model is shown below.





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