WORKS APPROVAL ODOUR & EMISSIONS IMPACT ASSESSMENT

RIVER NOMINEES PT Y LTD: PUREARTH, WOOTTATING

River Nominees Pty Ltd: Purearth, Woottating

Works Approval Odour & Emissions Impact Assessment

Prepared for: Purearth

Project Ref: EAQ-25026

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Environment | Air Quality

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1 Background

Environmental & Air Quality Consulting Pty Ltd (EAQ) was engaged by River Nominees Pty Ltd, trading as Purearth (Purearth), to undertake an Odour & Emissions Impact Assessment (OIA) of Purearth's Woottating Organics Composting Facility (the Site) that will support Purearth's proposed Amendment to their current Works Approval for an upgrade of the Site.

The specifics of the upgrades will include an increase in the organics' composting capacity of the Site to accommodate Food Organics Garden Organics (FOGO) waste streams from an annual tonnage of 65,000 tonnes per annum, to 115,000 tonnes per annum.

The proposed upgrades in throughput are listed in Table 1-1 below.

Table 1-1: Prescribed Premises Categories and Proposed Amendments to Capacity

Category	Category Description	Category Production or Design Capacity	Current Works Approval Premises Production or Design Capacity	Proposed Amendment Works Approval Premises Production or Design Capacity
61	Liquid waste facility: premises on which liquid waste produced on other premises (other than sewerage waste) is stored, reprocessed, treated or irrigated.	100 tonnes or more per year	20,000 tonnes per annum (tpa)	**25,000 tpa**
67A	Compost manufacturing and soil blending: premises on which organic material (excluding silage) or waste is stored pending processing, mixing, drying or composting to produce commercial quantities of compost or blended soils.	1000 tonnes or more per year	65,000 tpa	**110,000 tpa**
37	Char manufacturing: premises on which wood, carbon material or coal is charred to produce a fuel or material of a carbonaceous nature or of enriched carbon content.	10 tonnes or more per year	nil	**21,000 tpa**

Table 1-2 lists the waste types to be received and their respective quantities.

Table 1-2: Proposed General Waste Acceptance

Waste Type	Quantity Limit (tonnes/year)	Specification
Greenwaste	20,000	None specified
FOGO Material	82,500	None specified
Food Waste	5,000	None specified
Poultry Mortalities	2,500	

Liquid Waste	25,000	Liquid waste acceptance is limited to the following sub-categories of putrescible and organic wastes as specified under the Environmental Protection (Controlled Waste) Regulations 2004: • K100 – Animal effluent and residues • K110 - Waste from grease traps • K200 - Food & beverage processing wastes • K210 - Septage wastes

The production increase will include changes to the existing processing infrastructure to include:

- An enclosed 2,520m^2 processing shed, with an additional 1,200m^2 concrete apron dedicated to handling FOGO wastes,
- Processing equipment and machinery installed within the new shed comprising;
  - a de-packaging plant to handle packaged food waste,
  - a shredder to aid in the decontamination process,
  - a trommel screen to remove oversize fraction and direct it to a biochar plant,
  - a biochar plant to convert contaminants and residual waste materials into soil amendment products, where the biochar plant is estimated to process 21,000 tpa of residual waste organic materials and contaminants, and will:
    - serve to reduce waste arising from Purearth's operations to practically zero.
  - a dryer & granulator to enable conversion of fine compost materials into granular form.
- An onsite weighbridge to capture critical waste data,
- A 110 kL water tank – primarily for firefighting purposes, but also useful for reducing dust particularly during civil works, and for flushing drains etc.,
- A conversion of the existing compost hardstand to a bunker composting system with each composting bunker having 3 metre (m) high concrete walls and solid construction structural rooves (Figure 2-3). The bunkers will provide the infrastructure to *contain and cover* the composting process, over a 4-week duration, such that malodours can be captured and treated via the existing biofilter,
- It is proposed that the eight (8) composting bunkers are constructed in place of the existing composting hardstand. The bunkers will have solid walls (concrete) erected on three sides. Each bunker will measure approximately 50.5 m x 11.0 m x 3.0 m in height. It is proposed that the installation of these bunker walls would be phased over a 3-month period, to enable composting operations to continue. It is assumed that these structures may be subject to environmental commissioning.

The Site currently produces composts, from organic wastes, in free-formed windrows on top of concrete slabs. The windrows are forced aerated from below and have manual covers placed during the 4-week composting process to retain odours and aid in controlling the process. Whilst the existing system is fit-for-purpose, the newly proposed bunker composting system will provide an even more efficient, automated and controlled composting process.

Additionally, the Site's capabilities will be expanded to include a new 40,000 m^2 hardstand providing additional space for the increased throughput to be placed in *finishing* windrows for maturation, screening, grading, storage, and loadout.

The new hardstand is graded to allow runoff into additional leachate capture dams. The construction of redesigned and new infrastructure will not impact ongoing operations that will continue to take place within the existing operational areas.

The proposed upgrades to the Site will allow Purearth to provide a high-quality compost product with minimal interruption to the process, with a higher level of composting control and overall odour abatement controls.

The process flow is illustrated in Figure 1-1.

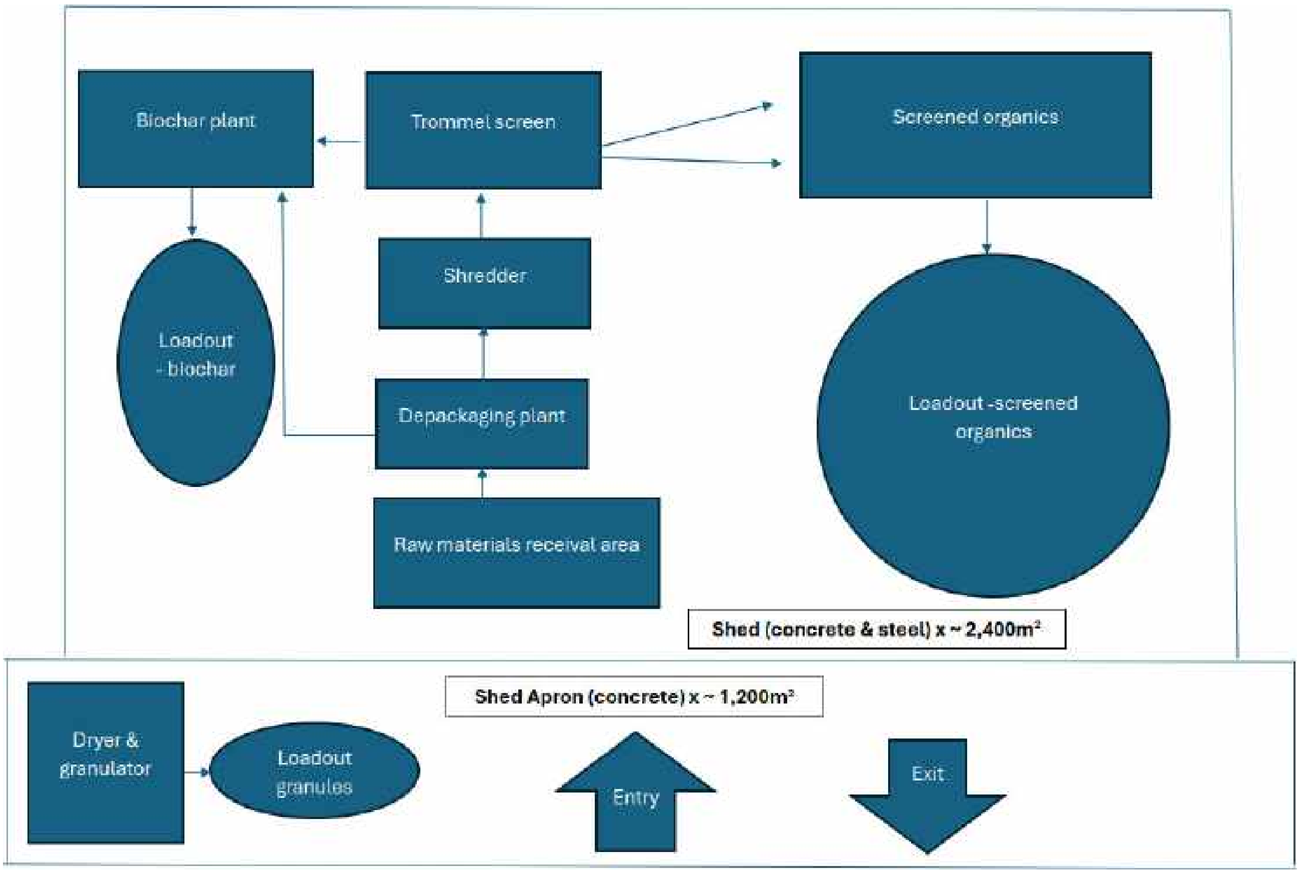


Figure 1-1: Purearth (Woottating) Proposed Process Throughput Flow

1.1 Regulatory Guidance for OIA

As part of this Application the Western Australian (WA) Department of Water and Environmental Regulation (DWER) Guideline "Better practice organics recycling" December 2022 is referred to given the nature of the activity undertaken at the Site.

Under Section 51 (s.51) of the WA Environmental Protection Act (EP Act), *"operators of facilities must take all reasonable and practicable measures to prevent or minimise emissions. Under s.51 of the EP Act, it is an offence for occupiers of prescribed premises not to take these measures".*

The Better practice organics recycling guideline:

- Sets environmental performance objectives (EPOs), which are the outcomes that must be achieved ;
- Identifies benchmark controls as the standard for operators to demonstrate they have achieved the EPOs; and
- Allows for alternative controls to achieve the EPOs, consistent with a risk-based approach and to support effective and innovative site-specific solutions.

Subsequently, DWER will apply controls to meet the EPOs, whether benchmark or operator-proposed alternatives, as conditions within approvals granted under Pt V Division 3 of the EP Act.

The EPOs most relevant to this Application are listed below.

Table 1-3: Environmental performance objectives

Aspect	Environmental performance objective
Emissions to land and water	Protect the environment by preventing and, where that is not possible, minimising emissions to land and water that may cause pollution or environmental harm.
Odour	Protect the environment by preventing and, where that is not possible, minimising odour emissions that may cause pollution or environmental harm.

DWER provides "Benchmark controls" that serve to achieve the applicable EPOs, these are grouped into the following types:

- Planning: these controls refer to what operators are to prepare and act on to effectively implement infrastructure, equipment, process and management requirements;
- Infrastructure and equipment: these controls refer to design and installation specifications; and
- Operations: these controls refer to process and management requirements, including maintenance, monitoring and response measures.

DWER also supports that operators can implement suitable alternative controls in place of the benchmark controls.

This Application OIA additionally refers the most recent WA DWER Guideline "Odour emissions" June 2019 document where the Guideline provides assessment methods for delivering adequate odour data and information to the DWER for the assessment of applications under Part V of the EP Act; where, *"Part V Division 3 of the EP Act provides the Department with mechanisms for regulating odour, by way of conditions on works approvals and licences applied to prescribed premises"*.

The DWER employs a risk-based approach to its assessment of applications for instruments under Part V of the EP Act.

In determining the risk posed by odour, DWER considers:

- the location, proximity and sensitivity of receptors;
- the management of odour sources and activities;
- the intensity and offensiveness of the odour;
- potential odour impacts from other nearby sources;
- the topography and complexity of terrain;
- the size and / or complexity of the facility when compared with other Australian operations;
- any unusual configuration of odour sources or technology compared with other Australian operations;

- whether the proposal is located in a Strategic Industrial Area (SIA);
- the presence of multiple industry categories which may emit odours on the same site;
- current and cumulative impacts from odour; and
- pathways and impacts on sensitive receptors.

The key components of the OIA in following the DWER Guideline are:

a. Screening analysis; and
b. Detailed analysis (where required).

2 Purearth Woottating Site

The Site is located at 324 Horton Road, Woottating Western Australia and within the Shire of Northam.

The Site is approximately 45 kilometres (kms) east, north-east of the Perth Metropolitan Area, 58 kms inland from the nearest coastline and sits inland of the Darling Escarpment (Scarp) at a height of approximately 300 m above sea level (Australian Height Datum).

The Site resides amongst undulating hills, valleys and overall terrain complexity that has a direct effect on wind flows across the Site and subsequently an effect on odour plumes from the Site.

The land use within the Woottating locality is rural, as is the land use for the Site. The Site is not a special control area.

There are rural activities surrounding the Site as well as industrial/extractive industries to the north-west from the Site's boundary.

Purearth's nearest rural residential sensitive receiver is approximately 1.6 kms to the west, south-west and another receiver approximately 1.7 kms to the south-east of the Site's central location. The next closest receiver is an industrial receiver.

The Locality of the Site is illustrated in Figure 2-1 to follow.

The Sites' proposed configuration layout is presented in Figure 2-2.

The proposed Composting Bunker Design Structural Framework is illustrated in Figure 2-3.

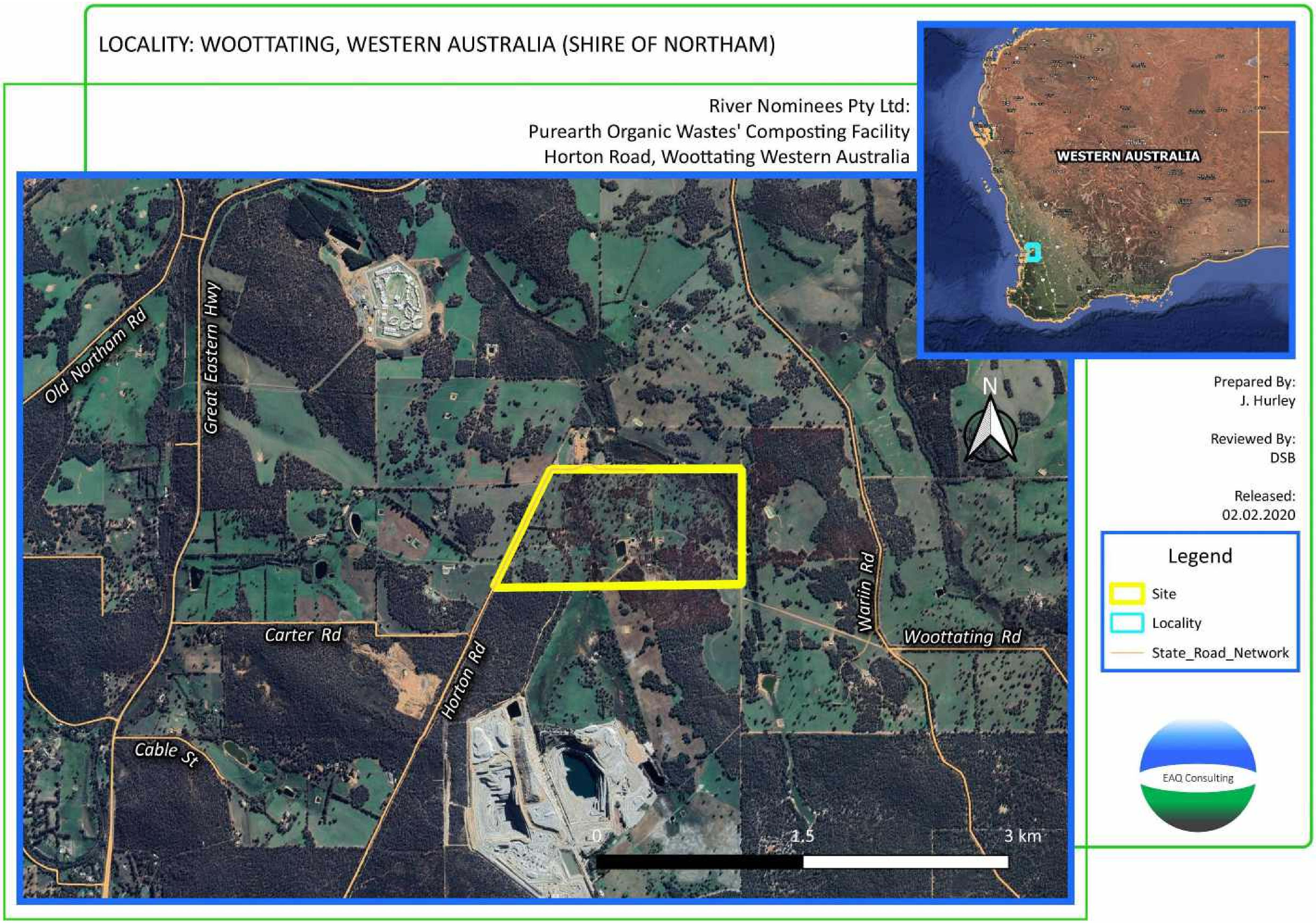


Figure 2-1: Locality of Purearth's Woottating Site (Shire of Northam)

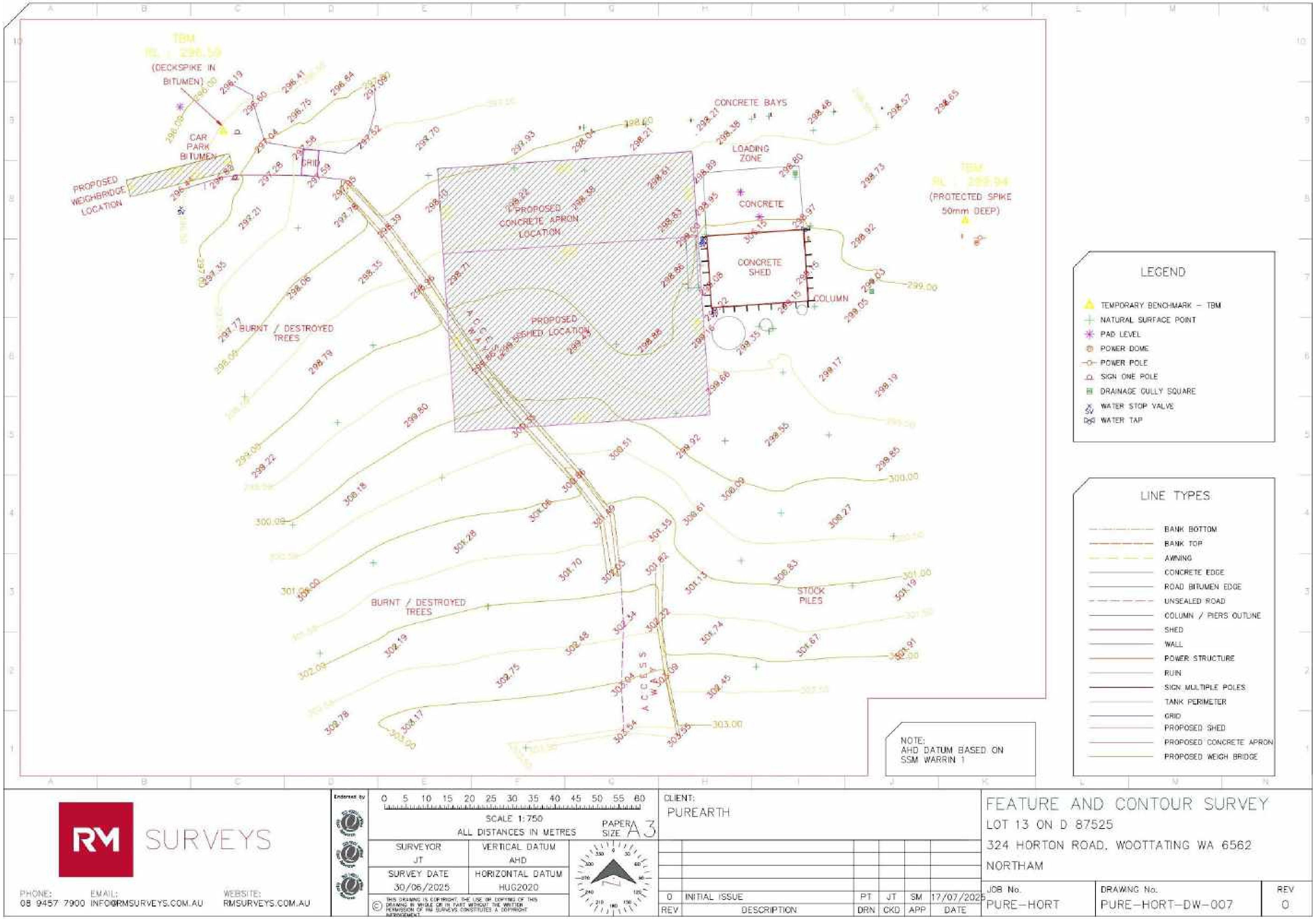


Figure 2-2: Purearth's Woottating Site Proposed Staged Layout

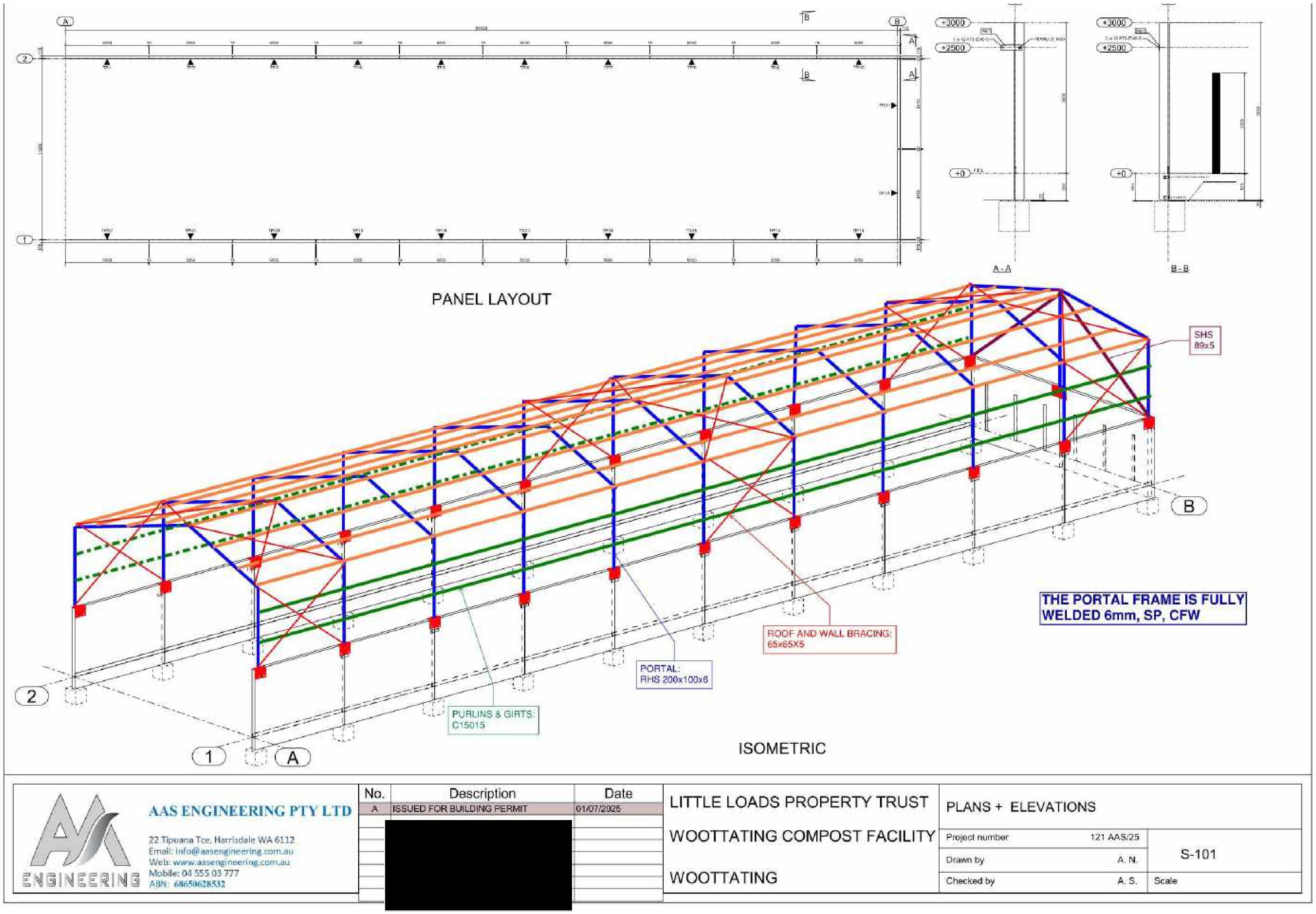


Figure 2-3: Purearth's Woottating Site Proposed Composting Bunker System

3 EPOs & Benchmark Controls

3.1 Feedstock

The Site's waste acceptance procedures for organics recycling comprise commercial arrangements with several providers.

Wastes comprise green wastes, food organics (FO) and garden organics (GO), food and food processing wastes, animal mortalities and liquid putrescible wastes.

The Site's proposed waste type acceptance is listed in **Table 3-1**.

Table 3-1: Purearth Woottating Waste Acceptance

Organic Waste Types	Existing	Current Throughput	Proposed	Percentage
Greenwaste	60,000	35,000	20,000	14.8%
FOGO material	0	25,000	82,500	61.1%
Food waste	5,000	5,000	5,000	3.7%
Poultry mortalities	2,500	2,500	2,500	1.9%
Liquid waste	20,000	20,000	25,000	18.5%
Total	**87,500**	**87,500**	**135,000**	**100.0%**

In accordance with the DWER's feedstock risk categories, Table 3-2 lists feedstocks waste types, risk category and benchmark controls to achieve EPO's for *Emissions to land and water*, and *Odour*.

Feedstock that is not classified as a *known* source or a new source of influent wastes are inspected prior to Site delivery by way of a review of the wastes components to include laboratory analysis of the wastes (where applicable) and subsequent determination of the variability of waste composition, and/or certification of the waste sources' origin with respect to its viability for organics composting.

As part of the Site's operational and compliance systems, the Controlled Waste Tracking System stores all incoming waste volumes, dates of receivals and their respective waste classification types.

The Site will refuse all waste that does not meet the waste classifications required for the Site and/or any contaminated wastes outside of the waste acceptance procedures and individual contaminant limitations.

Table 3-2: EPOs & Benchmark controls

Waste type	Standard feedstock	DWER Risk category	EPO	Benchmark controls
Greenwastes	Greenwaste (low contamination), natural fibrous organics, forestry residues.	Low	Emissions to land and water, Odour	Waste storage containment area/s, receivals and mixing shed (infrastructure), composting areas and hardstand, with hardstand graded to contain and divert leachates to sump and then dams (infrastructure). Clean, bulk sized greenwastes held in separate location to already shredded, small and slightly decayed greenwastes. Large oversize greenwastes ground and shredded as required for inclusion into composting process (operations). Food wastes accepted on an as-needed basis through pre-arranged scheduling to ensure immediacy of waste mixing and odour containment (planning and operations). Mixing shed hardstand is designed and constructed to achieve permeability controls to divert leachate infiltration from terrestrial and groundwater environments.
Garden organics (GO)	Household kerbside collections, source-separated commercial collections.	Moderate		
Food wastes and food organics (FO)	Food, kitchen and garden putrescible wastes from household kerbside collections, source-separated commercial food wastes.	High		
Liquid wastes	Putrescible and organics from animal effluent and residues, grease interceptor and traps, liquid food beverages and processing wastes.	High		Liquid wastes accepted on an as-needed basis via pre-arrangement scheduling. Wastes are received immediately into the mixing shed by combining the liquid wastes into a greenwaste organics bund where the liquids are absorbed into the organics and the bund turned inward upon itself to contain (operations). Composting concrete hardstand/s are designed and constructed to repel leachate infiltration into terrestrial and groundwater environments. Site stormwater runoff and liquid wastes leachates from process are contained on hardstand/s, diverted to catchment drains and containment sumps before final delivery to the Site runoff dam and waste leachate dam/s. Construction Quality Assurance (CQA) plans for dams' infrastructure at the Site has been undertaken and approved (infrastructure). A water balance has been undertaken at each new infrastructure design and construction step. A Survey of the Site's groundwater profile and subsequent bore installations (3 of) for groundwater monitoring has shown that groundwater flows move contrary to the capture, diversion and containment of runoff and leachates with no contamination issues.

3.2 Emissions to land and water

Site waste that may cause emissions to terrestrial lands and water, primarily, are liquid wastes. These liquid wastes can be *lost* to the receiving environment through runoff and leachate flows into surface water sources and/or ingress into the water table.

Surface water runoff and process leachates, to include liquid wastes' spill runoff are retained at the terrestrial surface by appropriately designed and constructed working hardstands.

Hardstand infrastructures comprise of:

- Compacted *in situ* clay-based laterite for Greenwaste storage;
- Enclosed Receivals and Mixing shed above hardstand;
- Concrete composting slabs graded to leachate collection sump/s that again drain to leachate dam/s; and
- Leachate dams (contaminated stormwater and process leachates) lined to achieve a permeability of less than 10^{-9} m/s or equivalent, with:
    - Minimum top embankment freeboard of 600 mm and combined capacity to store a 72-hour duration, 10% AEP critical rainfall event without overflow.

The proposed new infrastructure to support the upgrade of the Site to a controlled bunker composting configuration will achieve the same hardstand permeability and subsequent leachate capture.

As part of the existing Works Approval, the already constructed 40,000 m^2 hardstand has graded runoff to drains and sumps, supported by a new leachate dam in accordance with the required CQA and permeability specifications.

4 Odour

4.1 Screening Analysis

The Site is Categorised under waste classifications 61 and 67A.

- A Category 61 facility (liquid wastes) has a screening distance of 1,000 m from the nearest, or future sensitive receiver or receiving activity; and
- A Category 67A facility (compost manufacturing and soil blending) has a screening distance of 1,600 m from the nearest, or future sensitive receiver or receiving activity for composting activities that are undertaken outdoors, covered windrows and with continuous aeration for a total tonnage of 50,000 tpa. Above 50,000 tpa an assessment is on a case-by-case basis following those processes, controls and odour mitigation activities/technologies that are proposed.

The proposed upgrade to the Purearth Site will comprise enclosed composting activities with odour control, however; the process will throughput > 50,000 tpa and therefore a case-by-case outcome is required. On this basis a Detailed Analysis is required.

4.2 Detailed Analysis

The existing composting processes will not differ materially from what is proposed other than to increase overall throughput. However, the newly proposed composting practices will be undertaken within a more contained composting environment requiring little to no *interference* from Site operators such as the use of loaders to move compost piles to secondary composting areas and/or the removal/covering of windrows with manually handled covers. By removing these manual process steps the compost windrows can be left to process and decompose to their final product without having to be excessively handled during the process.

The design will comprise of composting bunker modules of a specific size, constructed of a mid-height concrete structure with solid structural roofing to ensure bunker enclosure rigidity and thus assurance that structural integrity is not compromised thus vastly improving odour capture within the bunkers.

Modules are arranged side-by-side and mirror each other in an east-west configuration with odour capture, extraction, and treatment via the existing biofilter. Process water/leachate collection is achieved through the floor of the bunkers via the blower pipes, and leachates are removed to a common pit and/or recycled as introduced nutrient rich water to the newly laid compost pile.

Each composting bunker is independent of all others, self-operating through automated parameterised settings, and comprises an air duct system, sub-floor blowers, process/leachate water collection and leachate recycling/addition systems and process control features for temperature, pressure, oxygen levels, moisture etc. The bunker floor design allows the inflow of process water/leachates and outflow of air into the composting material.

When bunkers are operational, the extraction airflow draws upward and along the cover toward the rear of the bunker creating a negative pressure environment. The raw waste material is placed into each bunker individually and removed at the end of the composting timeframe by front-end loader.

Process odours generated from the composting piles, due mainly to forced aeration in timed intervals, are retained within the bunker and under the covers which remain in place for the duration of the composting cycle. As required the existing fit-for-purpose biofilter will receive process odours from dedicated extraction ducts that are installed within each compost bunker.

The Sites' existing Works Approval has already achieved:

- 3.0 m high bunker-type walls on the existing composting windrows' concrete pads, representing the upgraded bunker-style composting process;
- An additional compost maturation and finished product storage area, located on a 40,000 m^2 bitumenised hardstand that accommodates final compost products and product loadout; and
- Additional leachate containment dam/s.

The newly completed structures that support the composting infrastructure, and that of the proposed expansion of throughput will at least double the volume of organics received and subsequent composted final product at the Site. To this end the odour profile of 'exposed' composting processes will increase commensurate with those composting activities most likely to generate malodour. As a result, the risk of odour nuisance at the nearest sensitive receiver may increase, albeit that as part of the existing infrastructure works completed, and proposed expansion to throughout, the Site now has a dedicated odour capture and treatment system for the primary phase composting process. And there are improvements to the handling of raw materials inside the process shed, to include the apron which in effect will provide a 'buffer' structure for wind ingress and subsequent loss of odours during process hours.

4.2.1 Proposed Biochar Plant

As part of the Sites' process upgrades, a Biochar Plant is proposed. This plant will complement the Sites' recycling objectives. The final specifications of the Biochar plant are still being finalized, however; the intent is to achieve a throughput of not more than 30 Kilo tonnes per annum, as specified in Table 4-1.

Table 4-1: Proposed Biochar Plant Specifics

Emissions Type	Volume & Frequency	Proposed Controls
Gaseous	PM: 2,000 kg pa	Incorporated filtration system
Gaseous	VOC: 750 kg pa	Incorporated filtration system
Gaseous	CO: 3,000 kg pa	Optimised pyrolysis conditions: adjustment of temperature and pressure to minimise CO emissions
Gaseous	NOx: 400 kg pa	Optimised pyrolysis conditions: adjustment of temperature and pressure to minimise NOx emissions

4.2.2 Operational Odour Analysis (OOA)

Table 4-2 below lists the existing process activities, controls, pollution responses and contingencies in the form of an Operational Odour Analysis (OOA). The final columns are risk evaluation recommendations for residual odour impacts at the nearest sensitive receiver. The residual odour is the odour emissions that remain following all controls and mitigative measures to reduce odour emissions from the Site. Table 4-3 details the OOA for the proposed activities following approval of the Sites' upgrades to throughput and composting. This OOA Table details the processes surrounding the composting bunkers and biofiltration. Raw materials receivals and leachate management will not change from the existing waste receivals protocols and odour management procedures.

Table 4-2: Operational Odour Analysis of Existing Activities

Odour Source	Source of Odour Emissions	Process Control	Triggers & Corrective Actions	Corrective Action Evaluation	Contingency Actions	Residual Odour Impact Potential			
						Consequence	Likelihood	Impact Potential (onsite)	Impact Potential (receiver)
Raw Materials	Green Waste (shredding and grinding activities).	• Incoming materials are inspected to ensure compliance with licence conditions, stockpiled, then ground/shredded on as needs basis, before being batch processed in the mixing shed; • Greenwaste is held back from the composting process and only incorporated into the batch process as required; and • These batches of material are then immediately moved to the concrete composting slabs to commence the 4-week composting process.	• Incoming liquid wastes, food wastes and K100 wastes are added to shredded greenwaste in mixing shed on arrival; and • Runoff liquids from the composting process are contained within the concrete hardstand runoff and drain to the onsite lined leachate dam system.	• Not required due to: • Greenwaste remains in the stockpile until required, when it is then moved to the mixing shed for batch processing; and • Liquid and food wastes are incorporated into the greenwaste, inside the mixing shed, and the batch immediately moved to the composting hardstand.	• The capacity of the infrastructure onsite has been designed to cater for a significantly higher level of throughput to that which prevails; and • The compost processing and associated control systems have been designed and constructed to cater for larger volumes, currently under-utilised, and therefore large contingency exists within the operational systems where there is a large capacity to handle short-term variations in production; • The nearest sensitive receiver is approximately 1.6kms to the north-west of the odour emissions operations at the mixing shed and active composting hardstand. This separation distance affords a high level of protection with respect to uncontrolled odour emissions impacting on sensitive receivers, and; • There are only 3 sensitive receivers' offsite of the operations.	Moderate Onsite odours observable at the mixing shed and active composting hardstand process areas.	Possible	Medium	Low
	Liquid Wastes (during delivery release malodour due to agitation, and whilst being ab/adsorbed into the awaiting greenwaste swale).	• Unloaded directly into a greenwaste bunded swale inside the mixing shed for immediate incorporation into process; and • These batches of material are then immediately moved to the concrete composting slabs to commence the 4-week composting process.							
	Solid Wastes (odours associated with food wastes and solid waste type 'poultry mortalities.	• Unloaded directly into a greenwaste bunded swale inside the mixing shed for immediate incorporation into the batching process. These batches of material are then immediately moved to the concrete composting slabs to commence the 4-week composting process.							
Raw Materials	K100 Solid Wastes from Metropolitan Poultry Abattoir Waste Liquids.	• Incoming materials are inspected to ensure compliance with license conditions. Materials are then unloaded directly into a greenwaste bunded swale inside the mixing shed for immediate incorporation into the batching process. These batches of material are then immediately moved to the concrete composting slabs to commence the 4-week composting process; and • Nutrient testing conducted on the incoming wastes from the provider.	• Incoming K100 wastes are added to shredded greenwaste in mixing shed on arrival; and • Where capacity cannot accommodate incoming K100 the wastes are denied until the site can accommodate new windrows.	• Not required as incoming waste streams are denied until capacity can accommodate.	• The nearest sensitive receiver is approximately 1.6kms to the north-west of the odour emissions operations at the mixing shed and active composting hardstand. This separation distance affords a high level of protection with respect to uncontrolled odour emissions impacting on sensitive receivers, and; • There are only 3 sensitive receivers' offsite of the operations.	Moderate Onsite odours observable at the mixing shed and leachate on active composting hardstand process areas.	Possible	Medium	Low

Site Run-off	Site Run-off (nil odour due to stormwater runoff).	• Hardstand has been designed and constructed to capture run-off into drains, which then flows to onsite storage dam; • Contoured embankments direct runoff to the onsite storage dam; • All sloping areas onsite are contained by earthen embankments, to ensure that runoff is contained onsite; and • The storage dam is lined to ensure moisture is contained within the dam. The dam has been designed and constructed to cater for a one in one hundred year rainfall event.	• The level of the dam is monitored on a daily basis, to ensure that water levels remain within control. Excess water can be removed from the dam and applied to other uses onsite as required; for example: dust suppression on internal roadways.	• The sloped layout of the operational area of the site is designed such that runoff falls towards the storage dam, to ensure that runoff does not escape the boundaries of the overall site.	• As a contingency, the dam has been constructed to cater for a one in one hundred year rainfall event. Excess water can be removed from the dam and applied to other use onsite, if and when necessary; for example: mixing compost, wetting down piles and for dust suppression on internal roadways.	Slight	Rare	Low	Low
Composting Windrows	Composting of greenwaste and food and/or liquid wastes on forced aerated hardstand – odorous produced during the 4-week composting cycle, which is a covered process.	• Covered active windrows are sub-floor forced aerated and subsequent air extraction from beneath covers during the 4-week composting process, thus ensuring that odours are extracted and treated through a dedicated Biofilter; and • Automated control systems for windrow temperature, oxygen and moisture levels trigger the aeration system to operate, through a PLC, thus adding oxygen to the windrows and extracting odorous air, simultaneously.	• Automated process control system for maintaining windrow temperature, oxygen and moisture levels trigger the aeration & extraction fans, as required.	• Daily checks of covered windrows and aeration/extraction fans; and • Live monitoring and alarms alert onsite operators of any fan or trigger failures where in that instance the fan or probe is replaced with stand-by unit(s).	• Composting windrows are only established when both liquid waste and greenwaste are available; and • Process batches are produced only when there are windrow slabs, covers and control system infrastructure available to accommodate compost production levels.	Minor Fugitive odours from <u>covered</u> windrows unlikely; plume release from moving of windrows possible.	Possible	**Medium**	Low

Leachate Dam	Composting runoff via concrete hardstand drains where all leachate is contained and directed to the onsite lined leachate dams.	• Leachate from the composting process is captured within the concrete windrow pad, before being piped to the onsite leachate dam system;
		• A second dam was added to the system in the pursuit of Best Practice, adding capacity and redundancy;
		• The leachate dam system is oxygenated and monitored on a regular basis, to ensure that the appropriate levels are maintained;
		• For a 72 hour storm and with an Annual Exceedance Probability (AEP) of 63.2% for Chidlow, the expected rainfall is 71.2 mm; where:
		  • Based on the combined catchment area of the Leachate Ponds and the Final Compost Products' hardstand, the volume of water derived from a 72 hour storm event equated to 173 kL; and
		  • As the leachate pond is in most months well below capacity the freeboard will not be used for a 72 hour 63.2% AEP storm event.
			• The leachate dam system is monitored on a daily basis and inflows can be directed towards the secondary leachate dam, in the event that the primary dam reaches capacity.	• The primary leachate dam has an inbuilt design capability, whereby excess inflows are directed to the secondary dam, prior to breaching the design limit of the primary dam; and
				• The secondary dam adds both additional capacity and built-in redundancy as a contingency for external events, such as winter rainfall.
					• Various options are available to maintain the level of leachate within the freeboard of the Leachate Ponds, including pumping leachate back onto the composting windrows and/or ceasing the receivals of liquid waste at the Composting Facility; and
					• In the event that the leachate pond does over top, excess leachate will be collected with the stormwater drains and directed to, and contained, in the lined stormwater dam located on the western side the Composting Facility.
						Slight
						
						There is no observable malodour from beyond the edge of the primary or secondary leachate dams given the low surface area and low volume of leachate produced.
							Rare	Low	Low

Table 4-3: Operational Odour Analysis of Proposed Activities

Odour Source	Source of Odour Emissions	Process Control	Triggers & Corrective Actions	Corrective Action Evaluation	Contingency Actions	Residual Odour Impact Potential			
						Consequence	Likelihood	Impact Potential (onsite)	Impact Potential (receiver)
Bunkered Composting Windrows	Composting of greenwaste and food and/or liquid wastes, including FOGO, inside concrete bunkers with 3.0m high walls that are covered by solid structural roofing to retain process odours. Bunkers are forced aerated through sub-floor fans that are built into the hardstand providing 'pulses' of aeration air through the windrows to encourage composting, microbial growth and control process composting temperatures. Odorous emissions generated during composting inside these bunkers are retained inside the covered bunkers with negligible fugitive losses through small gaps along the cover.	• All compost windrow piles are inside the concrete bunkers and covered. • Windrows are sub-floor forced aerated to control aerobic/anaerobic conditions, compost pH and temperatures to maximise the composting process. • Automated control systems for windrow temperature, oxygen and moisture levels trigger the aeration system to operate, through a PLC, thus adding oxygen to the windrows and extracting odorous air, simultaneously. • Each bunker system is allowed to process the compost from start to finish without the need to manually handle the compost pile during composting i.e., no requirement to manually turn the windows thus removing the bulk fugitive odour losses that occur during turning. • Fit-for-purpose odour extraction attached to each concrete bunker allows the process air to be extracted and treated via the composting biofilter.	• Automated process control system for maintaining windrow temperature, oxygen and moisture levels trigger the aeration & extraction fans, as required. • Shutdown of bunker/s as required and retained containment of the compost pile, with odour extraction to the biofilter, whilst process systems are managed and rectified.	• Daily checks of bunker windrows and aeration/extraction fans; and • Live monitoring and alarms alert onsite operators of any fan or trigger failures where in that instance the fan or probe is replaced with stand-by unit(s).	• Composting windrows are only established inside the bunkers when both liquid waste and greenwaste are available; and • Process batches are produced only when there are available bunkers, covers and control system infrastructure available to accommodate compost production levels.	Minor Fugitive odours from bunkers is possible via small gaps along the main doorway opening into/out of the bunker/s. These fugitive odours are unlikely to generate enough plume concentration and volume of emissions to be observable offsite.	Possible	**Medium**	**Medium** Only under those uncontrolled conditions where a bunker fails and is offline during mid-composting practices whilst the system is rectified and re-engaged.
Biofilter	Treated odour emissions emanate from the surface of the biofilter at an exit velocity less than 0.5 m/s at any given point i.e., negligible vertical velocity. Odours from the biofilter are treated and not considered malodour unless the biofilter inlet condition is poorly maintained.	• Biofilter is monitored via the PLC systems for inlet airflows, temperature, pressure and relative humidity (%RH). • Inlet %RH is controlled by supplementary inline misting sprays (small droplets) to improve humidity into the biofilter to a minimum of 85 %RH or greater. • Inlet temperatures are controlled by the %RH to ensure temperatures are not elevated.	• PLC monitored inlet parameters are alarmed to alert the operations of poor inlet %RH, elevated temperatures and/or increasing pressures indicating, in the case of back pressure, there are blockages, drainage issues, or the biofilter requires refurbishment of the treatment media.	• Daily checks of biofilters and air extraction system. • Live monitoring and alarms alert onsite operators of any fan or trigger failures where in that instance the fan is replaced with stand-by unit(s), or the airflow diverted to another extraction line.	• The biofilter is sized with redundancy to allow for variability of fluctuating daily airflows due to the intermittent aeration timeframes within each of the composting bunkers.	Slight	Rare	Low	Low

Odour Source	Source of Odour Emissions	Process Control	Triggers & Corrective Actions	Corrective Action Evaluation	Contingency Actions	Residual Odour Impact Potential			
						Consequence	Likelihood	Impact Potential (onsite)	Impact Potential (receiver)
Biochar Plant	The heating of biowastes in the absence of oxygen.	• Closed system via purpose-built machine within the raw materials shed. • System has built in triggers and alarms for process control, in particular control of temperature. • Biochar adsorbs odorous gases such as ammonia, volatile sulphurs and other VOCs. • Filtration system for emissions-to-atmosphere to treat and capture gaseous and particulate emissions.	• System designed to receive tonnage/volume via a 'hopper' that feeds into the machine. • Temperature controls ensure the temperature 'ramp' is computer controlled to ensure uniform heating of materials. • A strong odour from the biochar output, resembling soot/tar will indicate incomplete pyrolysis and hence requires longer residence times to ensure complete pyrolysis.	• The 'smell' of the biochar is a key indicator for complete pyrolysis. • Extended residence times may be employed to refine the process.	• Shutdown of biochar plant, and/or longer residence times to achieve complete pyrolysis.	Moderate	Rare	Medium	Low

4.3 Summary of OOA and Risk Determination

The OOA Tables above show that the existing receivals, handling and composting processes onsite are not materially changing, albeit the proposed upgrades will provide a higher level of process control, automation, response and contingency and overall improvement in odour management and subsequent mitigation of offsite odour impacts.

The proposed increase in waste acceptance and subsequently an increase in composting throughput will inevitably increase the odour footprint in the absence of further process controls, however; the increase in the odour footprint is overcome by the high-level upgrades that are proposed, namely the composting bunkers (covered) and process air capture, extraction and treatment via a common biofilter.

Purearth's nearest rural residential sensitive receiver is approximately 1.6 kms to the west, south-west and another receiver approximately 1.7 kms to the south-east of the mixing shed. The next closest receiver is an industrial receiver.

These separation distances are generous given that the primary odour emissions from the site are confined to the mixing shed, composting bunkers and primary leachate capture dams, which together will occupy an area of approximately 15,000 m^2 within the overall site area (existing and proposed) of approximately 115,000 m^2 thus representing approximately 13 % of the total site area where primary odour emissions are emitted.

On this basis, and in consideration of the past years' of operational data for odour emissions as per Purearth's Licence conditions, the risk of odour impacts at the nearest sensitive receiver is unlikely to increase following these process and technological upgrades.

It will be incumbent on Purearth to maintain the Site's existing odour footprint and improve its footprint where required to ensure that the proposed upgrades do not unreasonably cause odour nuisance at the nearest sensitive receiver.

Based on the upgraded processes, system automation and automated responses and the upgraded technologies proposed, Purearth can continue to operate in a manner that will not increase its existing odour footprint at the Site.

5 Local Meteorological Analysis

The nearest Bureau of Meteorology (BoM) Automatic Weather Station (AWS) is located at Bakers Hill, however; this station only records 3-hourly data which lacks completeness for a useful meteorological analysis.

The nearest Department of Primary Industries and Regional Development (DPIRD) AWS is the Morangup (Rolling Green) site. This site is also lacking useful data for weather characteristics given that:

- 22 Jul 2025: Station restarted with new logger and sensors (wind direction still to be calibrated),
- May 2021 to 2023; Not operating consistently. Eventually shut down, and
- 24 Nov 2021: Significant outages at this station since May 2021.

Given these AWS limitations, the DPIRD Muresk (MK) AWS was used as the next representative site for meteorological conditions. Muresk is approximately 33 kms northeast from the Site and represents meteorological characteristics on the Darling Plateau.

Terrain across the Sites' locality is highly complex, and the Sites' meteorological characteristics will vary from those at Bakers Hill or compared to any of the other BoM AWS surrounding the Site.

The Bakers Hill site best represents rainfall and temperature trends closest to the Site. These are illustrated in Figure 5-1 below.

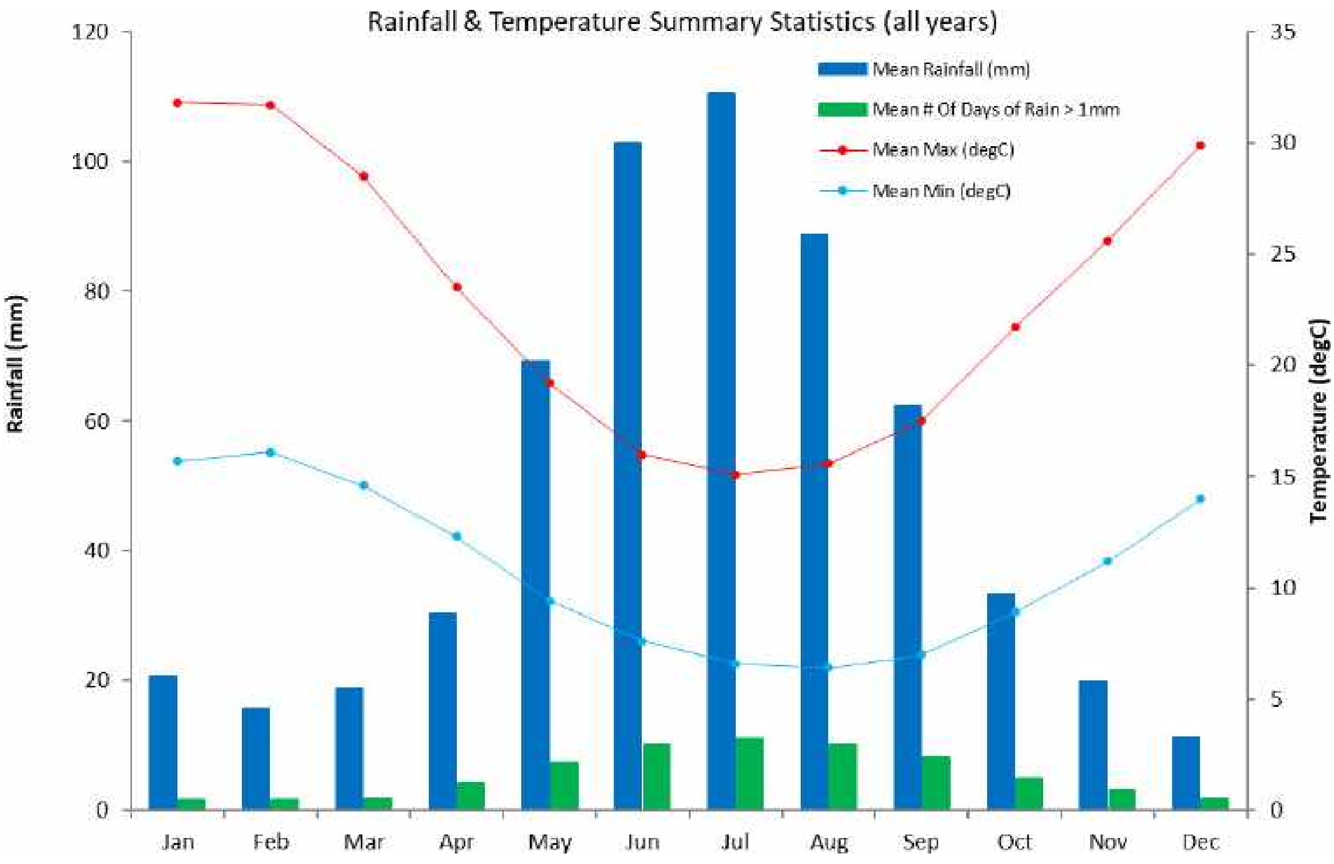


Figure 5-1: Rainfall and Temperature Statistics for Bakers Hill (all years)

5.1.1 Wind Characteristics

Using the Muresk data for macro-trends of wind speed and direction, the following wind analyses are provided.

Figure 5-2 shows seasonal characteristics of winds across the 5-year dataset. Seasonally, winds are prominent from the southeast in summer and autumn, strong west and northwest prevalence in winter, and west and south-southeast winds in spring.

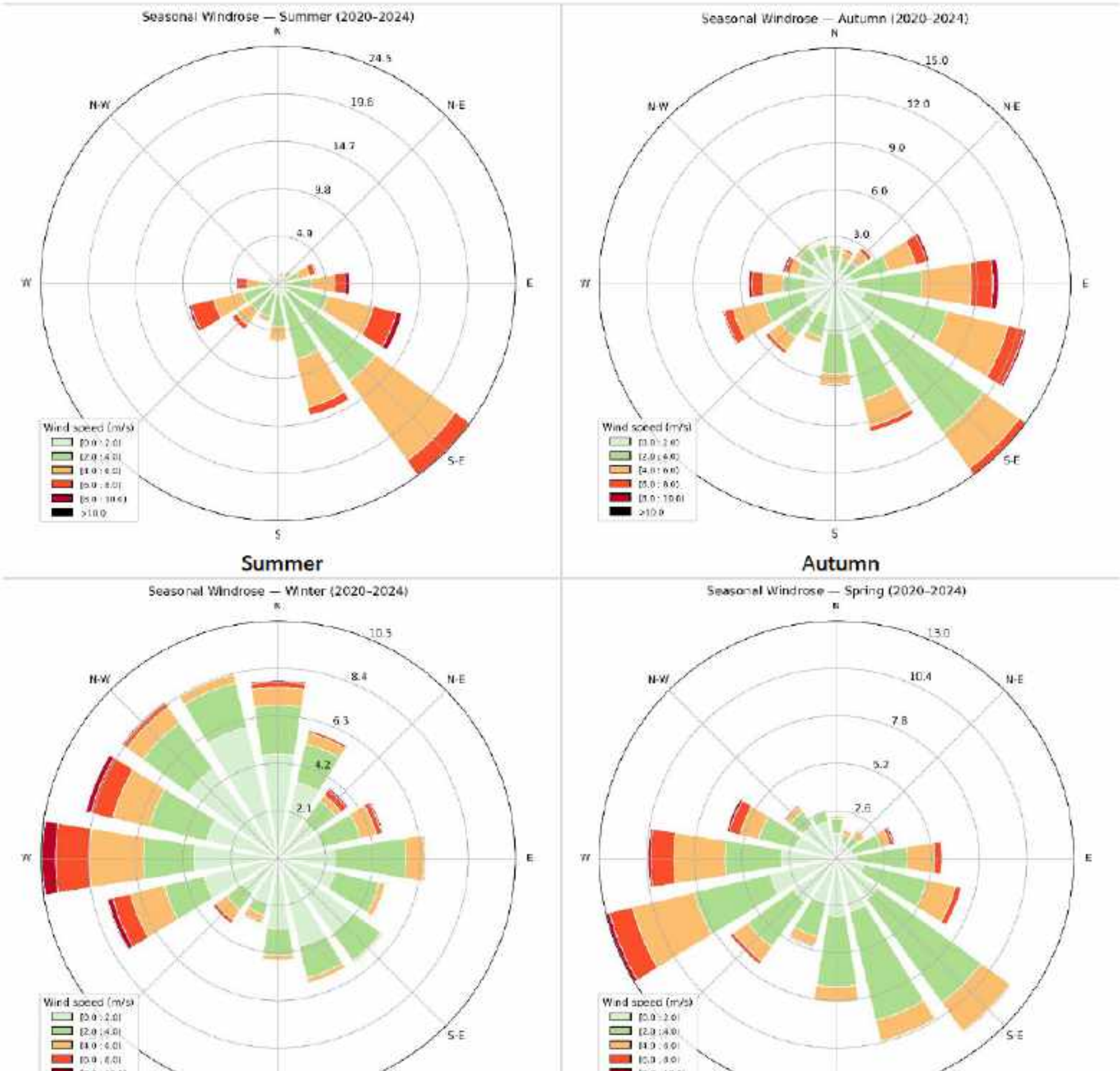


Figure 5-2: Seasonal Wind Characteristics

Figure 5-3 shows the annual windrose characteristics for the past 5 calendar years.

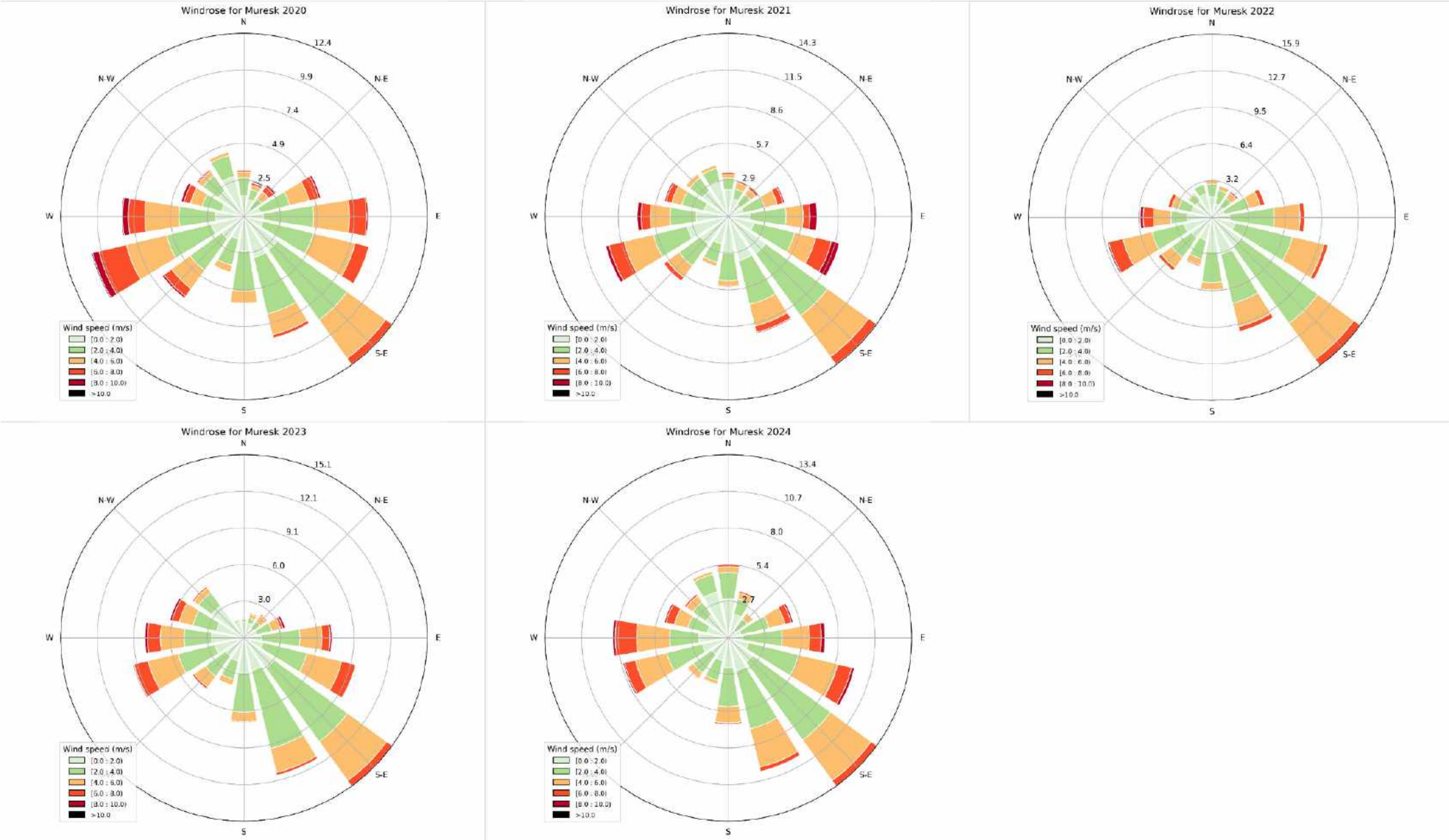


Figure 5-3: Windrose Characteristics for the Calendar Years 2020-2024

It can be seen from the annual windroses above (Figure 5-3) that prevailing winds are characteristically from the east and southeast, with higher speed winds coming from the southwest and westerly vectors, and some early morning strong easterly winds. The seabreeze is less prominent this far inland, albeit characteristics of afternoon winds.

Figure 5-4 further illustrates the distribution of wind direction trends for the location and shows that dominant winds prevail from the E-SE to SE-S, and also from the SW-W to W-NW

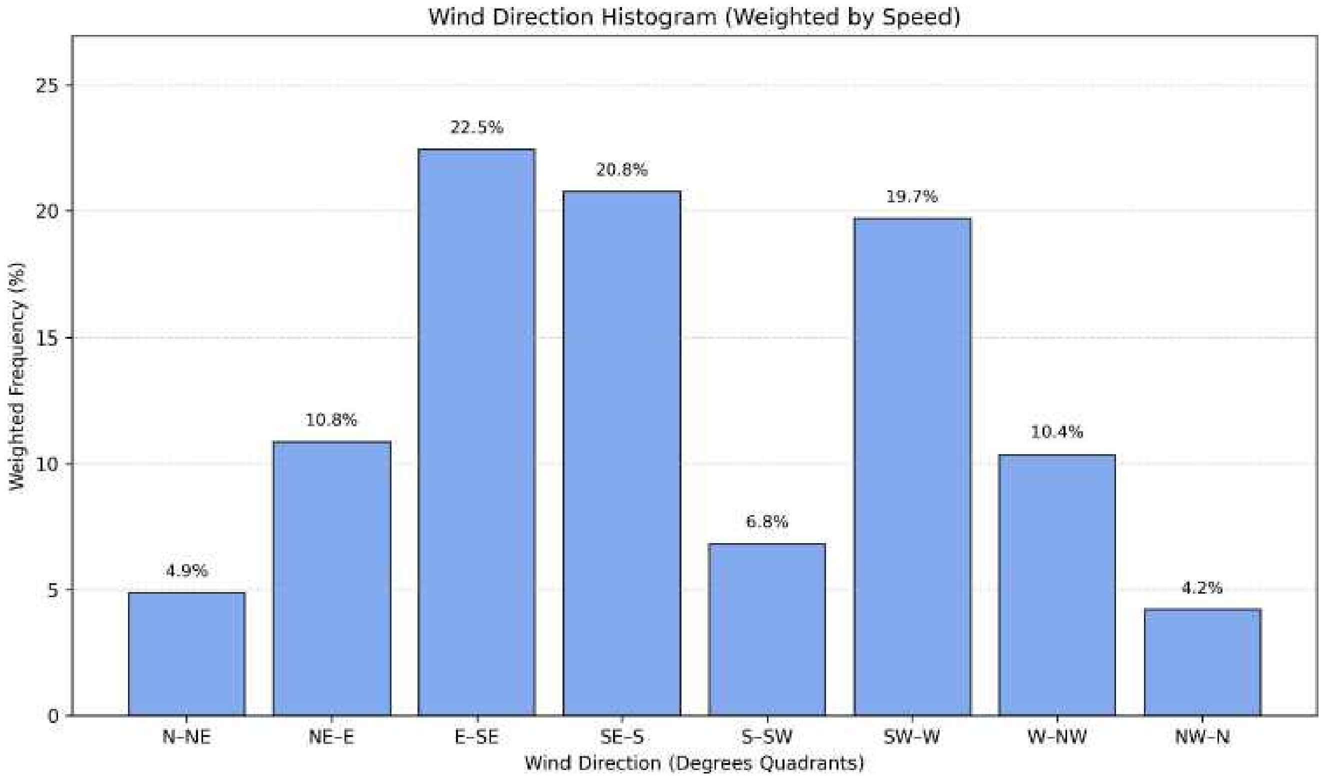


Figure 5-4: Wind Direction Trends for the Calendar Years 2020-2024

Further analysis of wind characteristics is shown by evaluating the U and V wind components, which are the horizontal vector components of wind speed to describe wind direction and magnitude mathematically, where;

- **U Component** = Zonal wind that represents east-west motion of wind, and:
    - Positive U = wind blowing from west to east (i.e., westerly winds), and
    - Negative U = wind blowing from east to west (easterly winds).
- **V Component** = Meridional wind that represents north-south motion of wind, and:
    - Positive V = wind blowing from south to north (i.e., southerly winds), and
    - Negative V = wind blowing from north to south (northerly winds).

Both Figure 5-5 and Figure 5-6 show that the annual wind direction trends shows that easterly winds are slightly more prominent than westerly winds, with a stronger southerly flow of winds compared to winds coming from the north.

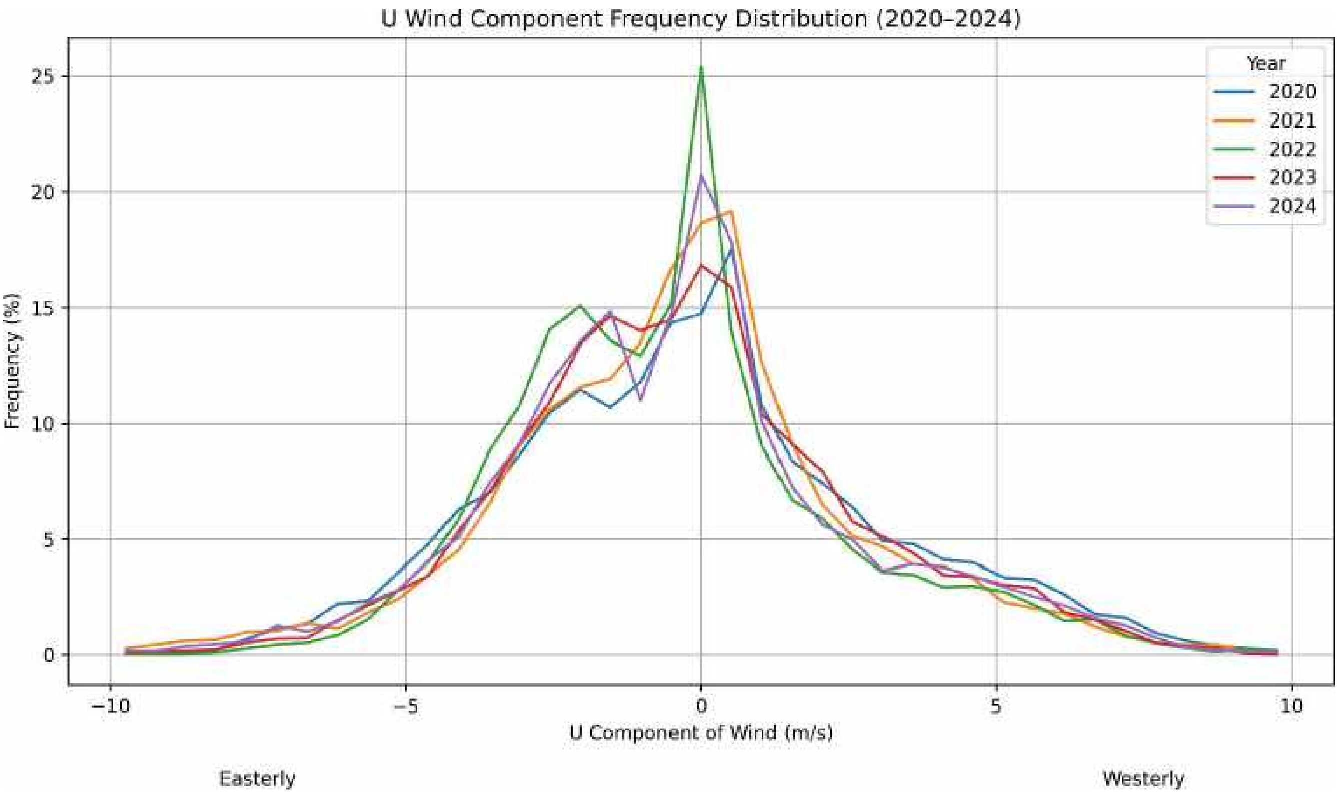


Figure 5-5: U Component of Wind (East-West) 2020-2024

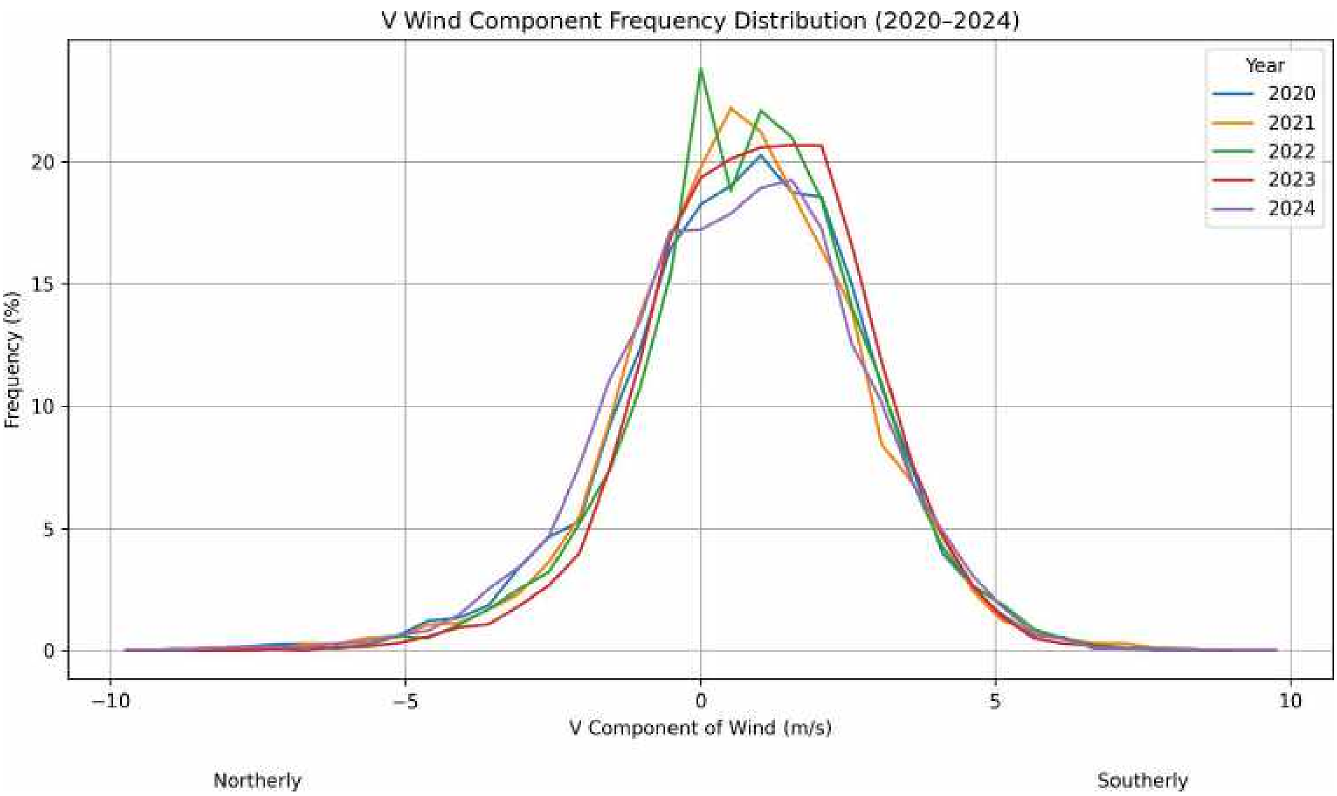


Figure 5-6: V Component of Wind (North-South) 2020-2024

Analysing the 5-year wind trends, the times of day have also been interrogated to determine wind trends during those key operational times for the Site, which are 6:30am – 4:30pm weekdays, and 6:30am – 12:00pm Saturdays, and are illustrated in Figure 5-7.

The dominant winds during AM daytime hours of operations blow from the SE in the early AM periods and retain these characteristics approaching midday, before traversing to winds from the east and then from the west proceeding midday, and retain a westerly flow in the afternoon periods. Winds begin to reduce in speed approaching twilight timeframes (approx.., 6pm onward) and then eventually move toward an AM southeasterly flow throughout the evenings.

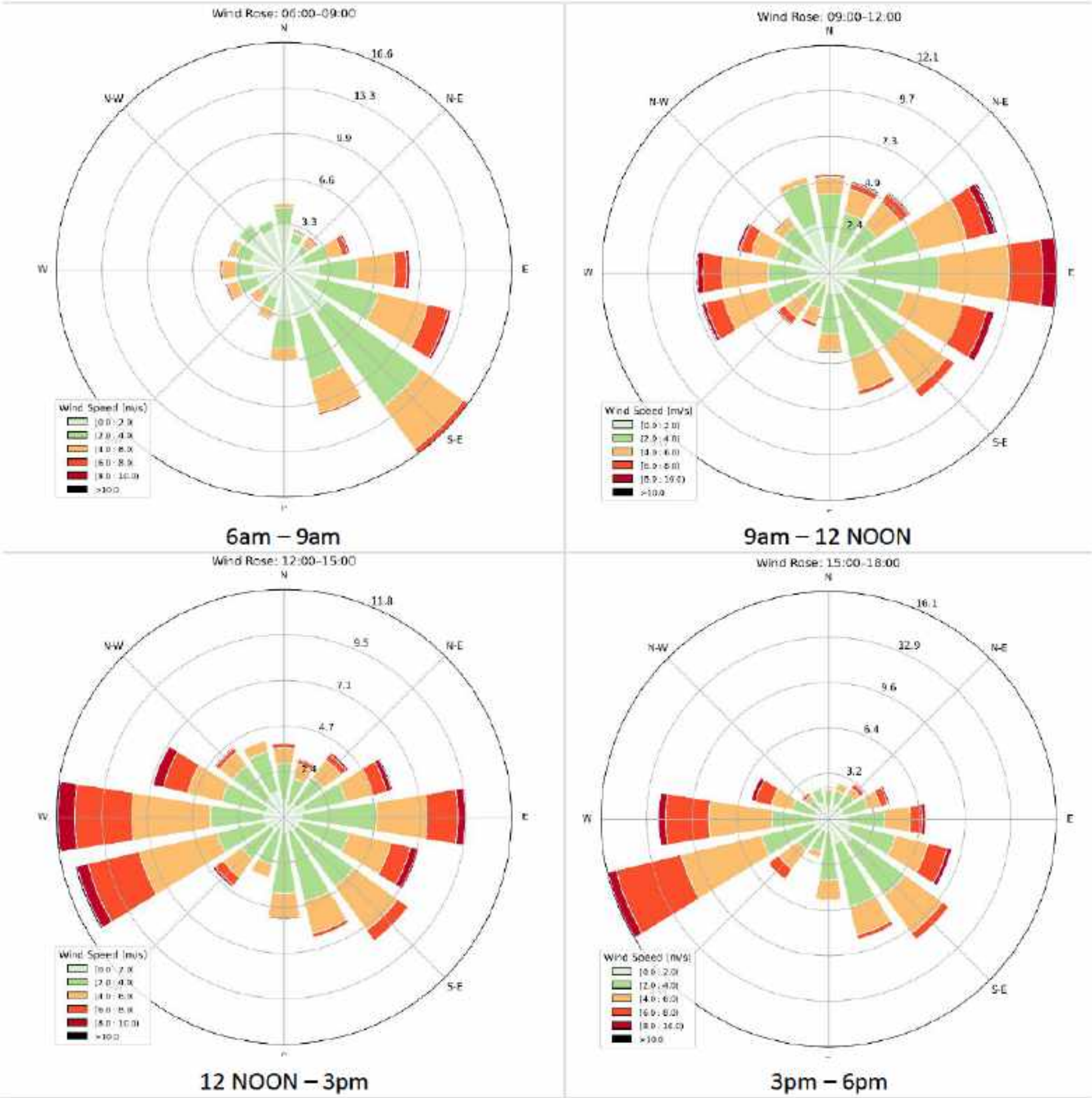


Figure 5-7: Time of Day Windroses for Operational Hours of 6am – 6pm

Based on the annual rainfall and temperature trends (Figure 5-1), the October-April periods are less likely to cause process issues with respect to rainfall and subsequently increased Site runoff and/or leachate containment issue. The May-September periods experience considerably larger rainfall events on a monthly basis. However, within these cooler monthly periods there is also a greater propensity for low wind speeds and dense ambient air. Under these conditions any fugitive odour losses are more likely to be carried offsite as stagnant odour plumes.

During the hotter months the wind speeds increase, and rainfall lessens. This brings about dryer conditions that will increase odour emission strength from the process due to higher volatilisation rates of odorants and may also exacerbate dust emissions. In the summer period the winds generally blow from the southeast.

Prevailing winds across the Site (Figure 5-2, Figure 5-3, Figure 5-7) shows that during the cooler months of late autumn, winter, and early spring, winds exhibit southeasterly flows in autumn, strong northwesterly flows in winter, and southwest to southeasterly flows in spring. These periods will likely pose a larger risk of offsite odour impacts given that within these cooler monthly periods there is a greater propensity for low wind speeds and dense ambient air. Under these conditions any fugitive odour losses are more likely to be carried further offsite as stagnant odour plumes.

However, under storm conditions in winter there is a higher degree of mechanical dispersion along the surface terrain (high wind speeds) as well as scrubbing of odorants via rainfall. These stormy periods pose negligible risk of dour impacts.

5.1.2 Atmospheric Stability

Stability classification is a measure of atmospheric stability determined from wind characteristics and other observations. Classes range from A (very unstable, sunny days) to F (very stable, light winds at night). Unstable conditions (A to C) involve strong solar heating causing turbulent mixing, which can bring elevated airborne emissions to ground level. Class D is dominated by mechanical turbulence from wind interacting with surface features and physical obstructions. At night, conditions are generally stable (E and F).

- Unstable conditions enhance turbulence and subsequent dispersion,
- Neutral stability neither enhances nor reduces turbulence, and
- Stable conditions reduce turbulence and therefore dispersion is reduced.

Atmospheric stability classes were derived from DPIRD’s Muresk automatic weather station data using a modified Pasquill-Gifford scheme based on surface-level wind speed and solar radiation. During daytime, stability was classified using a radiation–wind speed matrix; at night, stability was inferred using wind speed thresholds in the absence of cloud cover data. This method, widely adopted for screening-level dispersion modelling, provides a reliable estimate of stability class under steady-state conditions and is suitable for applications where direct turbulence or vertical profiling data are unavailable.

The DPIRD automatic weather station provides hourly measurements (among others) of:

- Wind speed and direction,

- Temperature,
- Solar radiation (daytime), and
- Relative humidity.

Since it does not provide direct turbulence measurements (e.g. standard deviation of vertical wind speed or Monin-Obukhov length), stability class estimation relies on proxy methods in lieu of further data development and analysis using prognostic models.

The most common method used is a variant of the Pasquill-Gifford-Turner (PGT) classification, adapted to surface-level observational data, and adopting the following assumptions described in Table 5-1.

Table 5-1: Derived Atmospheric Stability Assumptions

Assumption A: Stability is primarily influenced by solar radiation and wind speed (daytime).	• During daylight hours, solar insolation drives thermal turbulence,
	• Stability is then inferred using a matrix of solar radiation intensity vs. wind speed, for example:
	  ○ High radiation + low wind = very unstable (Class A),
	  ○ Moderate radiation + moderate wind = neutral (Class D), and
	  ○ Low radiation + high wind = stable (Class E/F).

Assumption B: At night, stability is governed by wind speed and cloud cover.	• After sunset (when solar radiation = 0 W/m²), the ground cools, and radiative cooling can cause stable stratification,
	• In the absence of cloud cover data, wind speed thresholds are used as a proxy:
	  ○ Calm or low wind (≤2 m/s) → very stable (Class F),
	  ○ Moderate wind → stable (Class E), and
	  ○ High wind (>6 m/s) → neutral (Class D).

Assumption C: Solar radiation is a valid proxy for insolation class.	• DPIRD stations measure incoming solar radiation (W/m²), which is directly usable to classify daylight intensity as:
	  ○ Strong (>600 W/m²) → High insolation,
	  ○ Moderate (300–600 W/m²) → Medium, and
	  ○ Weak (<300 W/m²) → Low.
	• This allows more accurate classification than earlier methods that only used time of day.

Supporting these Assumptions are the following key points:

- The modified Pasquill-Gifford scheme is globally accepted for screening assessments and odour modelling when turbulence data is not available,
- DPIRD's solar radiation and wind speed sensors are high quality and maintained, and
- Stability class derived from local wind and radiation conditions at Muresk better reflects site-specific dispersion potential than generic climatological assumptions.

However, there are limitations, such as:

- The approach assumes homogeneous atmospheric conditions near the surface and does not account for elevated inversions or complex boundary layers,
- Cloudiness, which moderates radiative cooling, is not directly available and must be inferred or ignored in nighttime classification, and

- The method classifies hourly conditions as static, ignoring rapidly changing or transient atmospheric states (i.e., assumed steady-state).

Figure 5-8 illustrates the hourly atmospheric stability trends for the 2020-2024 annual periods.

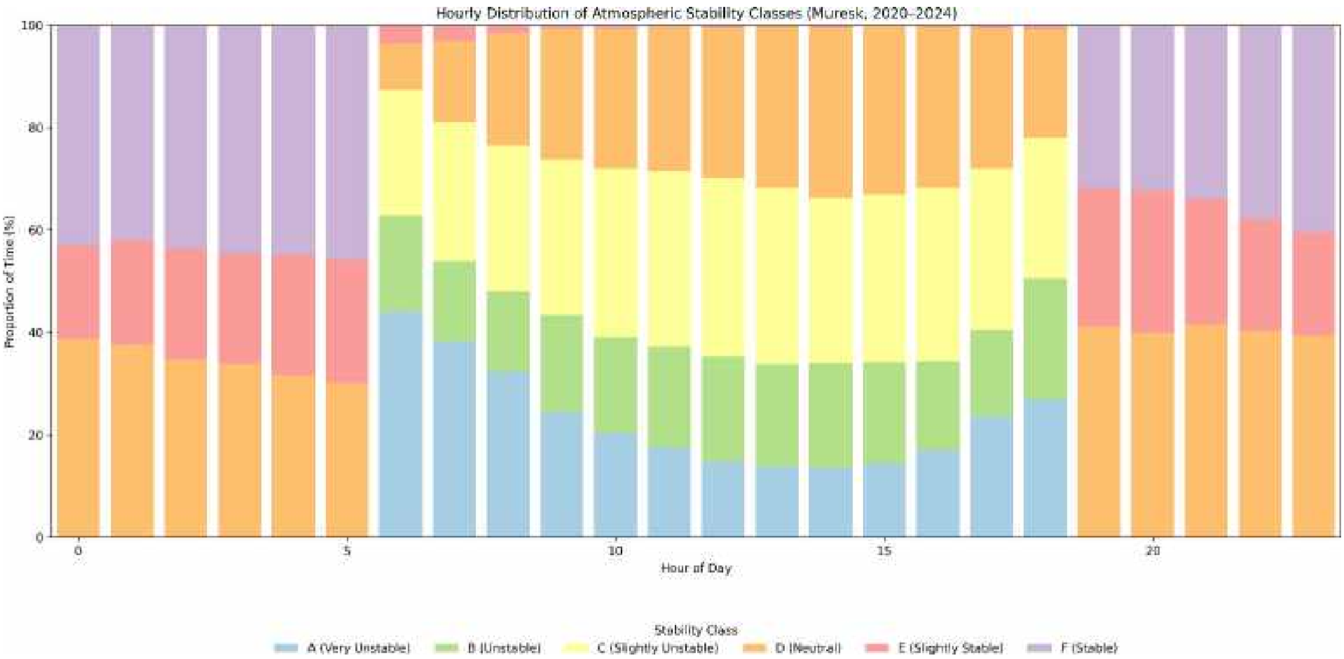


Figure 5-8: Hourly Distribution of Atmospheric Stability (2020-2024)

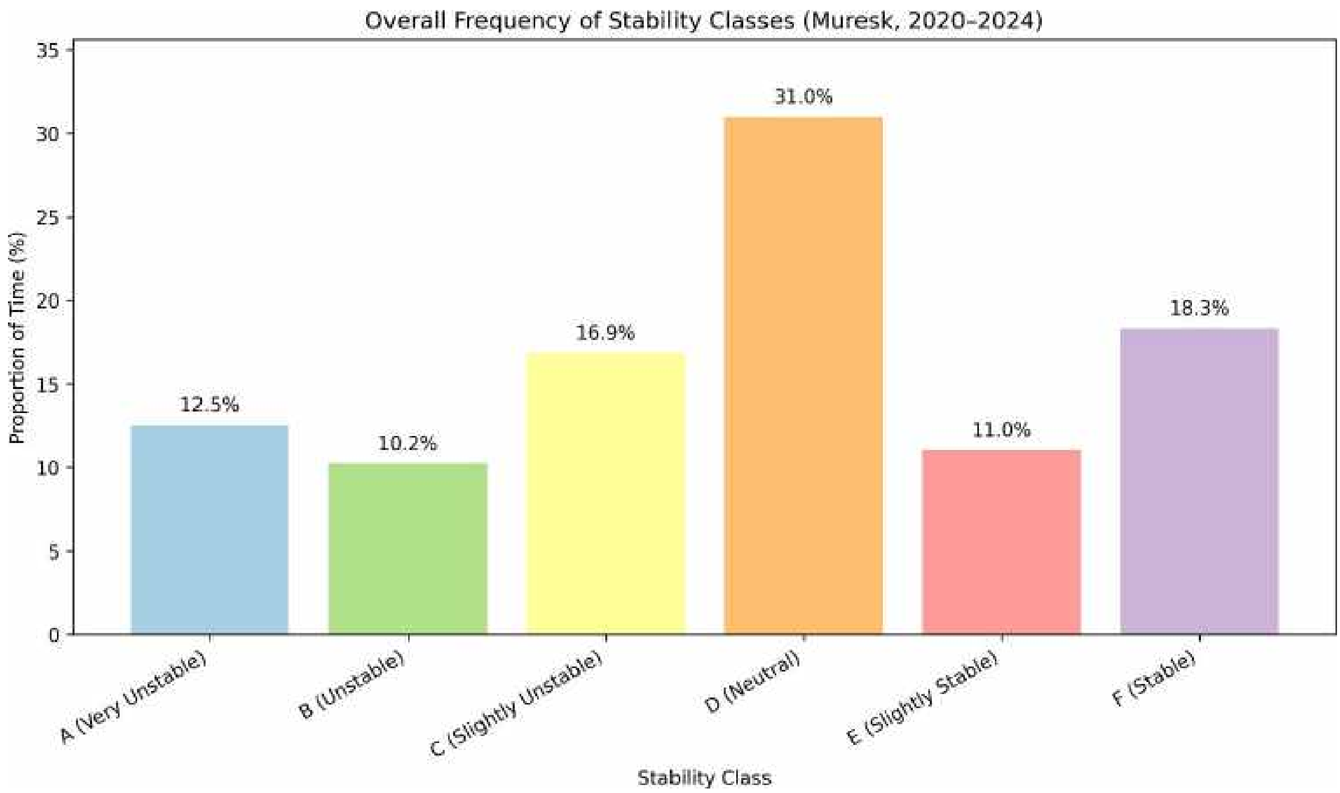


Figure 5-9: Atmospheric Stability (2020-2024)

Figure 5-8 can be summarised as follows:

- From 7PM to 5AM (i.e., overnight) stability across the Site is dominated by stable classes E–F, with F strongest in the small hours, known as nocturnal cooling which promotes weak turbulence and therefore poor dispersion of odours,
- At sunrise and thereafter (6AM – 9AM) stability rapidly breaks-up to characterise A/B (very unstable/unstable) stability, with C stability increasing quickly as surface heating is prominent,
- Late morning to mid-afternoon (10AM – 4PM) C (slightly unstable) is the average stability class, with meaningful stability B and some stability A, which becomes the day's best odour dispersion window (deep convective mixing),
- During late afternoon (4PM – 6PM) atmospheric mixing eases, stability D (neutral) grows while B/C stability's taper off, and
- Evening transitional period (>6PM), stability progresses through D, E, F as the boundary layer stabilises again which diminishes odour dispersion above and downwind of the Site.

The implications for odour dispersion downwind of the Site is that the strongest dilution/vertical mixing is late morning–afternoon, where the highest near-ground impact risk is overnight and around dawn/dusk when stability strengthens.

6 Odour Emissions Evaluation – Modelling

A Gaussian screening model has been used to estimate what ground level odour strengths may 'look like' if there is continuous odour loss from the organics receivals shed and apron, that odour capture from the bunkers is incomplete, and the biofilter is underperforming. This screening model output represents **upset conditions**.

6.1 Gaussian Screening Model

The odour screening model applied in this assessment is based on Gaussian plume dispersion theory. The model uses established physics and empirical relationships to predict the dispersion of odorous compounds in the atmosphere under various meteorological conditions. Notwithstanding, it is a screening method, i.e., fast, conservative, and thus suitable for early risk analysis, siting, option comparison, and communication. It is not a substitute for full regulatory dispersion modelling for compliance purposes.

- It should be noted that given the existing separation distances around the site and the supporting landuse, there is limited need for regulatory dispersion modelling assessment.

The core of the atmospheric dispersion model is passive scalar (odour) in steady wind, which is described by the advection–diffusion equation. The classic Gaussian plume solution (Pasquill–Gifford–Turner approach) gives centreline ground-level concentration that scales as:

$$C(x) \propto Q / (U * \sigma\_y(x) * \sigma\_z(x))$$

Where:

- Q is emission rate (ou s^{-1}),
- U is wind speed, and
- σ_y, σ_z are lateral/vertical plume spreads that grow with distance and depend on atmospheric stability.

The model evaluates odour concentrations for multiple atmospheric stability scenarios, with particular focus on Classes D, E, and F, which are typical of neutral to stable daytime and evening conditions. The model also calculates average concentrations over selected stability classes to represent composite conditions.

Threshold distances are identified where predicted ground-level odour concentrations (GLCs) fall below defined odour thresholds (e.g. 1 OU/m^3 and 5 OU/m^3). These thresholds correspond to the typical human odour detection limit and the onset of potential odour nuisance, respectively. The model determines the distance downwind at which each threshold is first met.

Additionally, the model was used to generate circular odour contour plots, showing threshold exceedance radii around the emission source. Concentrations are in odour units per cubic metre (OU/m^3), consistent with EN 13725 dynamic olfactometry. Reference lines are plotted at 1 OU/m^3 (detection threshold) and 5 OU/m^3 (often used as an amenity/annoyance benchmark in some jurisdictions).

Key assumptions in the model include:

- Steady wind and stability during the averaging period,
- Flat/open terrain (no channelling, complex topography, or shoreline effects),
- Homogeneous meteorology (constant `K, p` with distance),
- Passive odour (no chemistry or deposition),
- Low/moderate release height, building downwash, plume rise, and buoyancy/heat are not explicitly resolved—folded into `K, p`, and
- Estimates represent 'centreline' ground-level conditions (worst-case along wind direction).

The model is suited for preliminary or screening-level odour assessments and provides a practical means to compare alternative emission scenarios, stack configurations, or control strategies in terms of their potential off-site odour impacts.

Alternatively, the use of AERMOD/CALPUFF (etc.) is only required when terrain is complex or land–sea breezes occur, buildings/downwash, plume rise or complex source geometry matter, percentile metrics (e.g., "odour hours", 99.5th) are explicitly required, and/or when performing regulatory compliance assessments.

6.2 Assessed Odour Emission Strengths

For receivals and temporary storage of FOGO, the most comparable site within Western Australia that has regular odour data capture is located south of the river in Canning Vale. For the past 5-years of testing (i.e., Jan 2020 – June 2025) the average strength of odours extracted from the Canning Vale WTS floor was approximately 1,200 ou/m^3, within a range of odour strengths from 390 – 5,400 OU.m^3.

However, the Sites' FOGO receivals and holding at the Site are, on balance, unknown in terms of odour control and therefore require a conservative overestimate of odour losses, and therefore the following odour emissions' assumptions are made:

1) The FOGO receivals and holding shed is assumed to have fugitive odour losses of 10,000 ou/m^3, at a loss velocity of 2 m/s, through a shed void of 25m^2 which represents one of the two main doorways, and assuming volume losses at any one time will not exceed 50% of the total void, the total volumetric loss is therefore 25 m^3/s, and therefore,
   - An odour emission rate of 250,000 ou/s is assumed as worst-case, and this is modelled as a volume source.

2) Odour sampling and testing of the existing biofilter has shown that inlet odour concentrations are always < 3,000 ou/m^3. The fit-for-purpose biofilter has a total treatment area of 150 m^2, with a total flowrate of 15,000 m^3/hr, or 4.71 m^3/s. Based on this, and assuming nil odour destruction representing maximum upset conditions for the biofilter, the biofilter is assumed to:
   - Have a total odour emission rate of 14,130 ou/s (i.e., an odour concentration loss of 3,000 ou/m^3 x 4.71 m^3/s). This is modelled as a short stack.

3) Applying 50% of the total area of the voids in the composting bunkers (noting that <u>not all</u> bunkers are at phase-1 composting), with a combined surface area of approximately 130m^2, assuming a loss velocity of 2 m/s at a concentration of 3,000 ou/m^3, and further assuming volume losses at any one time will not exceed 50% of the total void. the total odour concentration loss as uncontrolled fugitives is assumed to:

- Have an odour emission rate 390,000 ou/s. Which is very high but assumes total loss of odour capture and therefore implies open windrow composting of phase-1 processes, noting that other compost piles within the bunkers are 'further along' than phase-1 and typically have lower odour emission rates.

These three key processes and odour treatment and capture areas have been modelled as a cumulative odour source to estimate the likely ground level odour strengths downwind from the Site in the event that such **upset conditions** prevail.

The following figures present the outcomes of the Gaussian screening odour model **upset conditions** assessment for the Site, with Figure 6-1 illustrating the cumulative odour decay. The wind velocity ('U') for the odour screening model is 1.0 m/s and is a constant velocity. At lower average ambient wind speeds, such as overnight conditions where there can be several calm periods, the downwind odour impacts will increase in distance from the odour source.

Figure 6-2 illustrates the ground level odour strength 'contours' as concentric circles around the odour source, where at 1,030 m from the cumulative odour source the ground level concentration is estimated at 2 ou, for an atmospheric stable class of 'F', which is stable and therefore a worst-case stability scenario where downwind odour emissions are most likely to be observed at ground level.

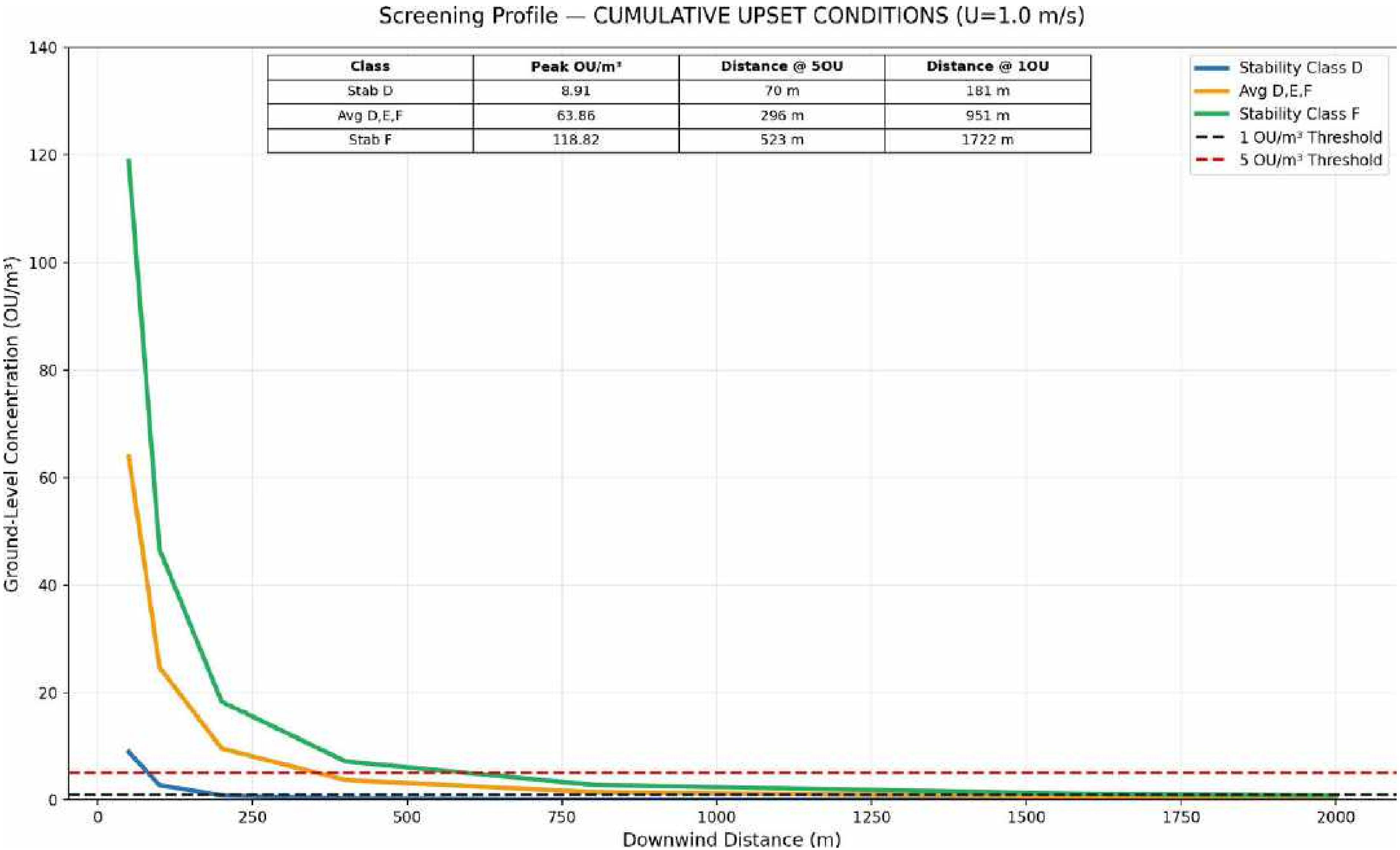
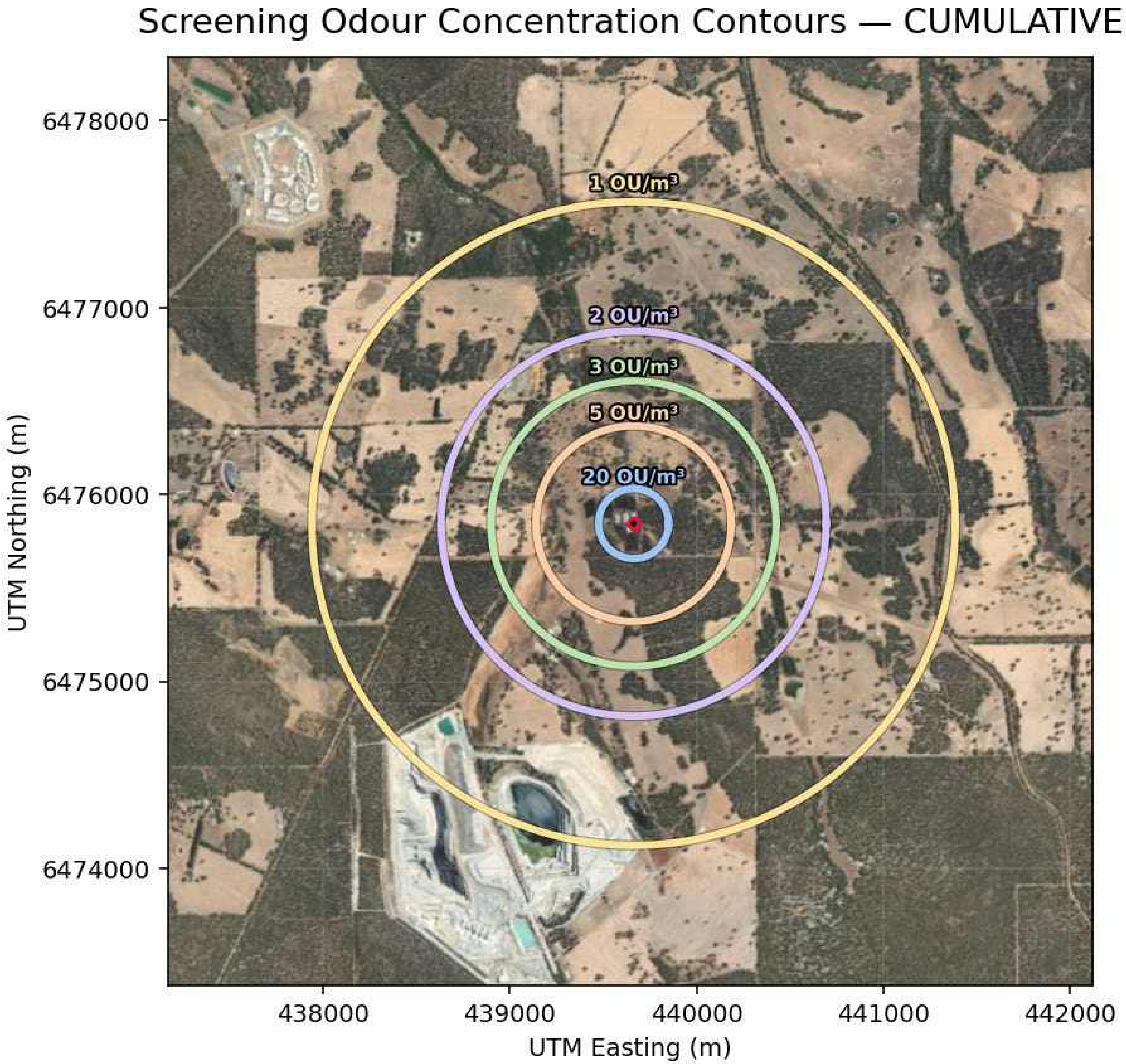


Figure 6-1: Ground Level Odour Concentration (GLC) versus Downwind Distance from Sites' Cumulative Primary Processes



Level (OU/m³)	Dist D (m)	Dist F (m)
20	31	187
5	70	523
3	95	763
2	120	1030
1	181	1722

Figure 6-2: Screening Odour Modelling Result – Concentric Ground Level Odour Concentration Circles @ Distance from Source

7 Summary of Impact Assessment

- Purearth currently operates an organic composting facility at 324 Horton Road Woottating, having commenced operations onsite in 2014,
- Purearth is seeking approval to expand the operations, increasing the volume of liquid & organic materials that can be received and processed and allow for the receival and processing of FOGO (food organics & garden organics) material, in line with the state government strategy where all LGA's are encouraged to implement a FOGO collection system by 2025,
- Purearth has undertaken, and further propose material changes to the Site's infrastructure as follows:
    - An enclosed 2,520m^2 processing shed, with an additional 1,200m^2 concrete apron dedicated to handling FOGO wastes,
    - Processing equipment and machinery installed within the new shed comprising;
        - a de-packaging plant to handle packaged food waste,
        - a shredder to aid in the decontamination process,
        - a trommel screen to remove oversize fraction and direct it to a biochar plant,
        - a biochar plant to convert contaminants and residual waste materials into soil amendment products, where the biochar plant is estimated to process 21,000 tpa of residual waste organic materials and contaminants, and will:
            - serve to reduce waste arising from Purearth's operations to practically zero.
        - a dryer & granulator to enable conversion of fine compost materials into granular form.
    - An onsite weighbridge to capture critical waste data,
    - A 110 kL water tank – primarily for firefighting purposes, but also useful for reducing dust particularly during civil works, and for flushing drains etc.,
    - The conversion of the existing compost hardstand to a bunker composting system with each composting bunker having 3 metre (m) high concrete walls and solid construction structural rooves (Figure 2-3). The bunkers will provide the infrastructure to *contain and cover* the composting process, over a 4-week duration, such that malodours can be captured and treated via the existing biofilter,
    - Additional compost maturation and finished product storage area located on bitumenised hardstand area (40,000 m^2), and
    - Additional leachate containment dam.
- The current Site processes largely rely upon mobile plant for the processing of FOGO and other compost-related materials, including Front End Loaders; Grinding & Shredding Plant; Screens; and Water Trucks; and this will continue to be the case under the proposed changes, although;
    - The composting bunker modules will be controlled and automated processes where manual handling of materials during the process is not undertaken thereby minimising plume release emissions where compost windows are intermittently turned as per existing processes.

- The Site's operations will not materially change except where modernised infrastructure upgrades are installed,
- Waste acceptance types will not change from current practices, albeit an increase in organics,
- Existing management procedures to mitigate offsite odour nuisance and subsequently newly proposed management procedures will ensure the existing odour footprint does not expand following the Site's proposed upgrades to throughput and processing infrastructure; and therefore
    - The residual risk of fugitive, uncontrolled odour losses impacting at the nearest sensitive receiver is assessed herein as **Low**, and only Medium during unforeseen upset conditions such as a breakdown in the bunker-style module composting system/s. In this instance there is sufficient contingency to 'lock-down' the affected module(s) and divert processes accordingly until the module(s) can be effectively brought back online.