

Appendix 1

Secretary's Environmental Assessment Requirements and Agency Comments



Mr Charbel Bounassif
Boral Recycling Pty Ltd
Widemere Road
Wetherill Park NSW 2164

Our ref: SSD 15_7038

Dear Mr Bounassif

**Secretary's Environmental Assessment Requirements
Boral Kooragang Recycling Facility (SSD 15_7038)**

Thank you for your request for the Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the proposed expansion of the Boral Kooragang Recycling Facility. I have attached a copy of these requirements.

These requirements are based on the information you have provided to date and have been prepared in consultation with the relevant government agencies. Their comments which you should address appropriately in preparing the EIS are attached (see **Attachment 2**).

Please note that the Department may alter the SEARs at any time, and that you must consult further with the Department if you do not lodge a development application and EIS for the development within two years of the date of issue of these SEARs. The Department will review the EIS for the development carefully before putting it on public exhibition, and will require you to submit an amended EIS if it does not adequately address the SEARs.

The Department prefers operations like the proposed Boral facility to operate under a single, modern planning approval. Consequently, you are advised that the Department expects the company to surrender all existing planning approvals if the development is approved. The EIS for the proposal should be developed with this preference in mind.

I wish to emphasise the importance of effective and genuine community consultation and the need for proposals to proactively respond to the community's concerns. Accordingly a comprehensive, detailed and genuine community consultation and engagement process must be undertaken during preparation of the EIS. This process must ensure that the community is both informed of the proposal and is actively engaged in issues of concern to them. Sufficient information must be provided to the community so that it has a good understanding of what is being proposed and of the potential impacts.

If your development is likely to have a significant impact on matters of National Environmental Significance, it will require an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval would be in addition to any approvals required under NSW legislation and it is your responsibility to contact the Department of Environment to determine if an approval under the EPBC Act is required (<http://www.environment.gov.au> or 6274 1111).

I would appreciate it if you would contact the Department at least two weeks before you propose to submit your EIS. This will enable the Department to:

- confirm the applicable fee (see Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*); and

- determine the number of copies (hard-copy and CD-ROM) of the EIS that will be required for reviewing purposes.

If you have any enquiries about these requirements, please contact Kerry Hamann on (02) 9228 6516 or via email at kerry.hamann@planning.nsw.gov.au

Yours sincerely



Chris Ritchie

Manager

Industry Assessments

as delegate of the Secretary

27/5/15

Secretary's Environmental Assessment Requirements

Section 78A(8A) of the *Environmental Planning and Assessment Act 1979*

State Significant Development

Application Number	SSD 15_7015
Development	Expansion of an existing recycling facility to process up to 350,000 tonnes per annum (tpa) of non-putrescible waste including building and construction waste.
Location	Cnr Egret St and Raven St, Kooragang (Lot 12/1032146)
Applicant	Boral Recycling Pty Ltd
Date of Issue	May 2015
General Requirements	<p>The Environmental Impact Statement (EIS) must meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i>. The EIS must include:</p> <ul style="list-style-type: none"> • details of the existing operations on the site, including <ul style="list-style-type: none"> – existing and approved operations/facilities, including any statutory approvals that apply to these operations/facilities; – a summary of existing conditions of consent that are relevant to on-going operation and management; – a summary of the conditions that are no longer relevant and justification for modifying or removing such conditions for the expanded facility; – the existing environmental management and monitoring regime. • a detailed description of the proposed development including: <ul style="list-style-type: none"> – plans of any proposed works; – justification for the proposed development; – consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments; – risk assessment of the potential environmental impacts of the development; identifying key issues for further assessment; • detailed assessment, where relevant, of the key issues below, and any other potential significant issues identified in the risk assessment, including: <ul style="list-style-type: none"> – a description of the existing environment, using adequate baseline data; – consideration of potential cumulative impacts due to other development in the vicinity; – measures to avoid, minimise and if necessary, offset the predicted impacts, including detailed contingency plans for managing any significant risks to the environment; – consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. <p>The EIS must also be accompanied by a report from a qualified quantity surveyor providing:</p> <ul style="list-style-type: none"> – a detailed calculation of the capital investment value (as defined in clause 3 of the <i>Environmental Planning and Assessment Regulation 2000</i>) of the proposal, including details of all assumptions and components from which the CIV calculation is derived; – an estimate of the jobs that will be created during the construction and operational phases of the proposed development; and <ul style="list-style-type: none"> • certification that the information provided is accurate at the date of preparation. <p>The EIS should also include a table summarising where each element of these requirements has been addressed.</p>

<p>Key issues</p>	<p>The EIS must address the following specific matters:</p> <ul style="list-style-type: none"> • Strategic Landuse Planning – including: <ul style="list-style-type: none"> – demonstration that the proposal is consistent with the aims and objectives of all relevant environmental planning instruments, policies and strategies including, but not limited to <i>State Environmental Planning Policy (Infrastructure) 2007</i>, and relevant Development Control Plans; – justification for any inconsistency between the proposed development and these plans; – consideration of opportunities under the NSW government's <i>Waste Less, Recycle More</i> initiative; and – an appraisal of the suitability of the site for the proposed development. • Waste Management – including: <ul style="list-style-type: none"> – details of the type, source, quantity and classification of waste to be received at the site; – details of the resource outputs and any additional processes for disposal and/or reuse of residual waste; – the proposed size, location and management of stockpiles of unprocessed and processed waste; – details of waste handling including transport, identification, receipt and quality control; and – an assessment of the proposal against the aim, objectives and guidance in the <i>NSW Waste Avoidance and Resource Recovery Strategy 2014-2021</i>. • Air Quality and Odour – including: <ul style="list-style-type: none"> – a description of all types and sources of air and odour emissions; – a quantitative assessment of the potential air quality, dust and odour impacts of the project on surrounding landowners in accordance with relevant Environment Protection Authority guidelines; and – a description and appraisal of proposed mitigation, management and monitoring measures. • Traffic and Transport – including: <ul style="list-style-type: none"> – details of road transport routes, access to the site, proposed layout of internal roads and parking on site in accordance with the relevant Australian standards; – road traffic predictions for the development during construction and operation; – an assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model; and – detailed plans of any proposed road upgrades, infrastructure works or new roads required for the development. • Noise and Vibration – including: <ul style="list-style-type: none"> – a description of all noise and vibration sources during construction and operation including road traffic noise; – a quantitative assessment of potential construction, operational and transport noise and vibration impacts, including potential impacts on nearby sensitive receivers in accordance with relevant Environment Protection Authority guidelines; and – a description and appraisal of proposed mitigation, management and monitoring measures. • Soil and Water – including: <ul style="list-style-type: none"> – a description of local soils, topography, landscapes, drainage, watercourses, riparian lands and groundwater dependent ecosystems; – a site water balance, including details on water supply, licence requirements and a description of the measures to minimise the water use at the site; – a description of the proposed leachate, stormwater and wastewater management systems including the capacity of onsite detention
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	<p>systems, and measures to treat, reuse or dispose of water.</p> <ul style="list-style-type: none"> - a description of the proposed erosion and sediment controls during construction and operation; - an appraisal of the development against the rules of any relevant Water Sharing Plan (WSP) and legislation; - an assessment of impacts to surface and groundwater resources, soils and flooding; and - a description and appraisal of proposed mitigation, management and monitoring measures.
	<ul style="list-style-type: none"> • Hazards and risk – including: <ul style="list-style-type: none"> - a preliminary risk screening completed in accordance with <i>State Environmental Planning Policy No. 33 – Hazardous and Offensive Development</i> and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development; and - should preliminary screening indicate that the project is “potentially hazardous” a Preliminary Hazard Analysis must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-level Risk Assessment (DoP, 2011). • Flora and Fauna – including: <ul style="list-style-type: none"> - a biodiversity assessment in accordance with the Framework for Biodiversity Assessment, unless otherwise agreed by OEH; by a person accredited in accordance with s142B(1)(c) of the <i>Threatened Species Conservation Act 1995</i>; and - targeted species surveys as specified by OEH. • Greenhouse Gas – including: <ul style="list-style-type: none"> - a quantitative assessment of the potential scope 1 and 2 greenhouse gas emissions of the project, and a qualitative assessment of the potential impacts of these emissions on the environment; and - a detailed description of the measures that would be implemented on site to ensure that the development is energy efficient. • Visual – including an assessment of the potential visual impacts of the project on the amenity of the surrounding area. • Heritage – including potential Aboriginal and non-Aboriginal heritage impacts of the project. • Socio-economic – including and assessment of the economic and social impacts of the development, particularly of any benefits to the community.
Plans and Documents	<p>The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the <i>Environmental Planning and Assessment Regulation 2000</i>. You should provide these as part of the EIS rather than as separate documents.</p>
Consultation	<p>During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners.</p> <p>In particular you must consult with:</p> <ul style="list-style-type: none"> • Environmental Protection Authority; • Department of Primary Industries; • Office of Environment and Heritage; • Port of Newcastle; • Newcastle City Council; • NSW Roads and Maritime Service; and • the surrounding land owners and occupiers that may be affected by the proposal. <p>The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.</p>

Further consultation after 2 years	If you do not lodge an EIS for the development within 2 years of the issue date of these SEARs, you must consult with the Secretary in relation to any further requirements for lodgement.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this development.

ATTACHMENT 1 Technical and Policy Guidelines

The following guidelines may assist in the preparation of the Environmental Impact Statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:

<http://www.planning.nsw.gov.au>

<http://www.bookshop.nsw.gov.au>

<http://www.publications.gov.au>

Policies, Guidelines & Plans

Plans and Documents

The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. Provide these as part of the EIS rather than as separate documents.

In addition, the EIS must include the following:

1. An existing site survey plan drawn at an appropriate scale illustrating:
 - the location of the land, boundary measurements, area (sq. m) and north point;
 - the existing levels of the land in relation to buildings and roads;
 - location and height of existing structures on the site;
 - location and height of adjacent buildings and private open space; and
 - all levels to be to Australian Height Datum (AHD).
2. A locality/context plan drawn at an appropriate scale should be submitted indicating:
 - watercourses including nearby rivers and creeks, and dams;
 - significant local features such as heritage items;
 - the location and uses of nearby buildings, shopping and employment areas, hospitals and schools; and
 - traffic and road patterns, pedestrian routes and public transport nodes.
3. An indication of the location of the site with respect to the relevant Land Zoning Map within the *Shoalhaven Local Environment Plan 2014*.
4. Drawings at an appropriate scale illustrating:
 - detailed plans, sections and elevations of the existing building, which clearly show all proposed internal and external alterations and additions.

Documents to be submitted

Documents to submit include:

- 1 hard copy and 1 electronic copy of all the documents and plans for review prior to exhibition; and
- other copies as determined by the Department once the development application is lodged.

Technical and Policy Guidelines

The following guidelines may assist in the preparation of the Environmental Impact Statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:

<http://www.planning.nsw.gov.au>

<http://www.bookshop.nsw.gov.au>

<http://www.publications.gov.au>

Policies, Guidelines & Plans

Aspect	Policy /Methodology
Waste	<p>Waste Avoidance and Resource Recovery Strategy 2010-2021 (EPA)</p> <p>The National Waste Policy: Less Waste More Resources 2009</p> <p>Waste Classification Guidelines (EPA, 2014)</p> <p>Resource Recovery Exemptions (www.epa.nsw.gov.au)</p> <p>Environmental guidelines: Composting and Related Organics Processing Facilities (DEC)</p> <p>Environmental guidelines: Use and Disposal of Biosolid Products (NSW EPA)</p> <p>Composts, soil conditioners and mulches (Standards Australia, AS 4454)</p>
Transport	<p>Guide to Traffic Generating Development (RTA)</p> <p>Road Design Guide (RTA)</p>
Noise	<p>NSW Industrial Noise Policy (DECC)</p> <p>NSW Road Noise Policy (EPA, 2011)</p> <p>Environmental Criteria for Road Traffic Noise (NSW EPA)</p> <p>Interim Construction Noise Guideline (2009)</p>
Air Quality	<p>Protection of the Environment Operations (Clean Air) Regulation 2010</p> <p>Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC)</p> <p>Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC)</p>
Odour	<p>Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW (DEC)</p> <p>Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC)</p>
Greenhouse Gas	<p>The National Greenhouse and Energy Reporting (Measurement) Technical Guidelines (NGER Technical Guidelines)</p> <p>Guidelines for Energy Savings Action Plans (DEUS, 2005)</p>
Soil and Water	<p>Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC)</p> <p>National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC)</p> <p>Draft Guidelines for the Assessment & Management of Groundwater Contamination (DECC)</p>
<i>Soil</i>	

	<p>State Environmental Planning Policy No. 55 – Remediation of Land Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land (DOP)</p> <p>Acid Sulfate Soils Manual (Stone et al. 1998)</p>	
<i>Surface Water</i>	<p>National Water Quality Management Strategy: Water quality management - an outline of the policies (ANZECC/ARMCANZ)</p> <p>NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012)</p> <p>National Water Quality Management Strategy: Policies and principles - a reference document (ANZECC/ARMCANZ)</p> <p>National Water Quality Management Strategy: Implementation guidelines (ANZECC/ARMCANZ)</p> <p>National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ)</p> <p>National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ)</p> <p>Using the ANZECC Guideline and Water Quality Objectives in NSW (DEC)</p> <p>NSW State Rivers and Estuaries Policy(1993)</p> <p>State Water Management Outcomes Plan</p> <p>NSW Government Water Quality and River Flow Environmental Objectives (DECC)</p> <p>Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC)</p> <p>Managing Urban Stormwater: Soils & Construction (Landcom)</p> <p>Managing Urban Stormwater: Treatment Techniques (DECC)</p> <p>Managing Urban Stormwater: Source Control (DECC)</p> <p>Technical Guidelines: Bunding & Spill Management (DECC)</p> <p>NSW Floodplain Development Manual 2005</p>	
	<i>Groundwater</i>	<p>National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC)</p> <p>Australian Groundwater Modelling Guidelines (NWC, 2012)</p> <p>NSW State Groundwater Policy Framework Document (DLWC)</p> <p>NSW State Groundwater Quality Protection Policy (DLWC)</p> <p>NSW State Groundwater Dependent Ecosystems Policy (2002)</p> <p>NSW State Groundwater Quantity Management Policy (DLWC) Draft Guidelines for the Assessment and Management of Groundwater Contamination (DEC, 2007)</p>
		Hazards
		<p>State Environmental Planning Policy No. 33 – Hazardous and Offensive Development</p> <p>Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DUAP)</p> <p>Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis</p>
		Visual
		<p>Control of Obtrusive Effects of Outdoor Lighting (Standards Australia, AS 4282)</p> <p>State Environmental Planning Policy No 64 - Advertising and Signage</p>
		Aboriginal Heritage
	<p>Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)</p> <p>Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW)</p>	
	Cultural Heritage	
	<p>NSW Heritage Manual (1996)</p>	

	The Burra Charter 2013
	Statements of Heritage Impact 2002
Biodiversity	
	NSW Framework for Biodiversity Assessment
	Policy & Guidelines - Aquatic Habitat Management and Fish Conservation (NSW Fisheries)
	The NSW State Groundwater Dependent Ecosystem Policy (DLWC)

ATTACHMENT 2

Public Authority Responses to Request for Key Issues

Kerry Hamann

From: Wayne Jones <wayne.jones@dpi.nsw.gov.au>
Sent: Wednesday, 20 May 2015 4:35 PM
To: Kerry Hamann
Cc: Water Referrals
Subject: Boral Recycling Facility [SSD15_7038]

Hi Kerry

Please see following draft DPI comments on the above project. Formal response should follow shortly.

Regards
Wayne

Wayne Jones | Land Use Planning Coordinating Officer
Department of Primary Industries
Level 48, MLC Centre, 19 Martin Place Sydney NSW 2000
T:02 9338 6708 | E:wayne.jones@dpi.nsw.gov.au

OUT15/12142

Mr Kerry Hamann
Infrastructure and Industry Assessments
NSW Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Kerry.Hamann@planning.nsw.gov.au

Dear Mr Hamann,

**Boral Recycling Facility [SSD15_7038]
Request for input into Secretary's Environmental Assessment Requirements**

I refer to your email dated 4 May 2015 to the Department of Primary Industries in respect to the above matter.

Comment by NSW Office of Water

The NSW Office of Water (Office of Water) has reviewed the supporting documentation accompanying the request for Secretary's Environmental Assessment Requirements (SEARs) and provides the comments below, and further detail in **Attachment A**.

It is recommended that the EIS be required to include:

- Details of water proposed to be taken (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.
- Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).
- The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable

supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.

- A detailed and consolidated site water balance.
- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.
- Full technical details and data of all surface and groundwater modelling.
- Proposed surface and groundwater monitoring activities and methodologies.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.
- Consideration of relevant policies and guidelines.

A statement of where each element of the SEARs is addressed in the EIS (i.e. in the form of a table).

For further information please contact Kerry Lee, Water Regulation Officer (Newcastle Office) on 4904 2666 or at kerry.lee@dpi.nsw.gov.au.

There are no Fisheries NSW, Agriculture NSW or Crown Lands issues.

Attachment A

Boral Recycling Facility [SSD15_7038] Request for Input into Secretary's Environment Assessment Requirements Additional Comment by the NSW Office of Water

The following detailed assessment requirements are provided to assist in adequately addressing the assessment requirements for this proposal.

For further information visit the NSW Office of Water website, www.water.nsw.gov.au

Key Relevant Legislative Instruments

This section provides a basic summary to aid proponents in the development of an Environmental Impact Statement (EIS), and should not be considered a complete list or comprehensive summary of relevant legislative instruments that may apply to the regulation of water resources for a project.

The EIS should take into account the objects and regulatory requirements of the *Water Act 1912* (WA 1912) and *Water Management Act 2000* (WMA 2000), and associated regulations and instruments, as applicable.

Water Management Act 2000 (WMA 2000)

Key points:

- Volumetric licensing in areas covered by water sharing plans.
- Works within 40m of waterfront land.
- SSD & SSI projects are exempt from requiring water supply work approvals and controlled activity approvals as a result of the *Environmental Planning & Assessment Act 1979* (EP&A Act).
- No exemptions for volumetric licensing apply as a result of the EP&A Act.
- Basic landholder rights, including harvestable rights dams.
- Aquifer interference activity approval and flood management work approval provisions have not yet commenced and are regulated by the *Water Act 1912*.
- Maximum penalties of \$2.2 million plus \$264,000 for each day an offence continues apply under the *WMA 2000*.

Water Act 1912 (WA 1912)

Key points:

- Volumetric licensing in areas where no water sharing plan applies.
- Monitoring bores.
- Aquifer interference activities that are not regulated as a water supply work under the *WMA 2000*.
- Flood management works.
- No exemptions apply to licences or permits under the *WA 1912* as a result of the *EP&A Act*.
- Regulation of water bore driller licensing.

Water Management (General) Regulation 2011

Key points:

- Provides various exemptions for volumetric licensing and activity approvals.
- Provides further detail on requirements for dealings and applications.

Water Sharing Plans – these are considered regulations under the *WMA 2000*

Access Licence Dealing Principles Order 2004

Harvestable Rights Orders

Water Sharing Plans

The proposal is located within the area covered by the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources. The EIS is required to:

- Demonstrate how the proposal is consistent with the relevant rules of the Water Sharing Plan including rules for access licences, distance restrictions for water supply works and rules for the management of local impacts in respect of surface water and groundwater sources, ecosystem protection (including groundwater dependent ecosystems), water quality and surface-groundwater connectivity.
- Provide a description of any site water use (amount of water to be taken from each water source) and management including all sediment dams, clear water diversion structures with detail on the location, design specifications and storage capacities for all the existing and proposed water management structures.
- Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP, including:
 - Sufficient market depth to acquire the necessary entitlements for each water source.
 - Ability to carry out a “dealing” to transfer the water to relevant location under the rules of the WSP.
 - Daily and long-term access rules.
 - Account management and carryover provisions.
- Provide a detailed and consolidated site water balance.
- Further detail on licensing requirements is provided below.

Relevant Policies and Guidelines

The EIS should take into account the following policies (as applicable):

- NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012)
- NSW Aquifer Interference Policy (NOW, 2012)
- Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW, 2012)
- Australian Groundwater Modelling Guidelines (NWC, 2012)

- NSW State Rivers and Estuary Policy (1993)
- NSW State Groundwater Policy Framework Document (1997)
- NSW State Groundwater Quality Protection Policy (1998)
- NSW State Groundwater Dependent Ecosystems Policy (2002)
 - NSW Water Extraction Monitoring Policy (2007)

Office of Water policies can be accessed at the following links:

<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/default.aspx>

<http://www.water.nsw.gov.au/Water-licensing/Approvals/Controlled-activities/default.aspx>

An assessment framework for the NSW Aquifer Interference Policy can be found online at: <http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/Aquifer-interference>.

Licensing Considerations

The EIS is required to provide:

- Identification of water requirements for the life of the project in terms of both volume and timing (including predictions of potential ongoing groundwater take following the cessation of operations at the site – such as evaporative loss from open voids or inflows).
- Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction from each water source as defined in the relevant Water Sharing Plan/s and all water supply works to take water.
- Explanation of how the required water entitlements will be obtained (i.e. through a new or existing licence/s, trading on the water market, controlled allocations etc).
- Information on the purpose, location, construction and expected annual extraction volumes including details on all existing and proposed water supply works which take surface water, (pumps, dams, diversions, etc).
- Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring. All predicted groundwater take must be accounted for through adequate licensing.
- Details on existing dams/storages (including the date of construction, location, purpose, size and capacity) and any proposal to change the purpose of existing dams/storages
- Details on the location, purpose, size and capacity of any new proposed dams/storages.
- Applicability of any exemptions under the *Water Management (General) Regulation 2011* to the project.

Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered.

The Harvestable Right gives landholders the right to capture and use for any purpose 10% of the average annual runoff from their property. The Harvestable Right has been defined in terms of an equivalent dam capacity called the Maximum Harvestable Right Dam Capacity (MHRDC). The MHRDC is determined by the area of the property (in hectares) and a site-specific run-off factor. The MHRDC includes the capacity of all existing dams on the property that do not have a current water licence. Storages capturing up to the harvestable right capacity are not required to be licensed but any capacity of the total of all storages/dams on the property greater than the MHRDC may require a licence.

For more information on Harvestable Right dams, including a calculator, visit:

<http://www.water.nsw.gov.au/Water-licensing/Basic-water-rights/Harvesting-runoff/Harvesting-runoff>

Dam Safety

Where new or modified dams are proposed or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety issues that may arise. Conditions of approval may be recommended to ensure safety in relation to any new or existing dams.

See www.damsafety.nsw.gov.au for further information.

Surface Water Assessment

The predictive assessment of the impact of the proposed project on surface water sources should include the following:

- Identification of all surface water features including watercourses, wetlands and floodplains transected by or adjacent to the proposed project.
- Identification of all surface water sources as described by the relevant water sharing plan.
- Detailed description of dependent ecosystems and existing surface water users within the area, including basic landholder rights to water and adjacent/downstream licensed water users.
- Description of all works and surface infrastructure that will intercept, store, convey, or otherwise interact with surface water resources.
- Assessment of predicted impacts on the following:
 - flow of surface water, sediment movement, channel stability, and hydraulic regime,
 - water quality,
 - flood regime,
 - dependent ecosystems,
 - existing surface water users, and
 - planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.

Groundwater Assessment

To ensure the sustainable and integrated management of groundwater sources, the EIS needs to include adequate details to assess the impact of the project on all groundwater sources.

Where it is considered unlikely that groundwater will be intercepted or impacted (for example by infiltration), a brief site assessment and justification for the minimal impacts may be sufficient, accompanied by suitable contingency measures in place in the event that groundwater is intercepted, and appropriate measures to ensure that groundwater is not contaminated.

Where groundwater is expected to be intercepted or impacted, the following requirements should be used to assist the groundwater assessment for the proposal.

- Works likely to intercept, connect with or infiltrate the groundwater sources.
- Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes.
- Bore construction information is to be supplied to the Office of Water by submitting a "Form A" template. The Office of Water will supply "GW" registration numbers (and licence/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting.
- A description of the watertable and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources).
- Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and GDEs to establish a baseline incorporating typical temporal and spatial variations.
- The predicted impacts of any final landform on the groundwater regime.
- The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts.
- An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality.

- An assessment of the potential for groundwater contamination (considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal).
- Measures proposed to protect groundwater quality, both in the short and long term.
- Measures for preventing groundwater pollution so that remediation is not required.
- Protective measures for any groundwater dependent ecosystems (GDEs).
- Proposed methods of the disposal of waste water and approval from the relevant authority.
- The results of any models or predictive tools used.

Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:

- Any proposed monitoring programs, including water levels and quality data.
- Reporting procedures for any monitoring program including mechanism for transfer of information.
- An assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of the proposal.
- Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category).
- Description of the remedial measures or contingency plans proposed.
- Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.

Groundwater Dependent Ecosystems

The EIS must consider the potential impacts on any Groundwater Dependent Ecosystems (GDEs) at the site and in the vicinity of the site and:

- Identify any potential impacts on GDEs as a result of the proposal including:
 - the effect of the proposal on the recharge to groundwater systems;
 - the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections; and
 - the effect on the function of GDEs (habitat, groundwater levels, connectivity).
- Provide safeguard measures for any GDEs.

Watercourses, Wetlands and Riparian Land

The EIS should address the potential impacts of the project on all watercourses likely to be affected by the project, existing riparian vegetation and the rehabilitation of riparian land. It is recommended the EIS provides details on all watercourses potentially affected by the proposal, including:

- Scaled plans showing the location of:
 - wetlands/swamps, watercourses and top of bank;
 - riparian corridor widths to be established along the creeks;
 - existing riparian vegetation surrounding the watercourses (identify any areas to be protected and any riparian vegetation proposed to be removed);
 - the site boundary, the footprint of the proposal in relation to the watercourses and riparian areas; and
 - proposed location of any asset protection zones.
- Photographs of the watercourses/wetlands and a map showing the point from which the photos were taken.

- A detailed description of all potential impacts on the watercourses/riparian land.
- A detailed description of all potential impacts on the wetlands, including potential impacts to the wetlands hydrologic regime; groundwater recharge; habitat and any species that depend on the wetlands.
- A description of the design features and measures to be incorporated to mitigate potential impacts.
- Geomorphic and hydrological assessment of water courses including details of stream order (Strahler System), river style and energy regimes both in channel and on adjacent floodplains.

Landform rehabilitation

Where significant landforming is proposed, the EIS should include:

- Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems;
- A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape;
- Outline of proposed construction and restoration of topography and surface drainage features if affected by the project; and
- An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation.

End Attachment A

This message is intended for the addressee named and may contain confidential information. If you are not the intended recipient, please delete it and notify the sender. Views expressed in this message are those of the individual sender, and are not necessarily the views of their organisation.



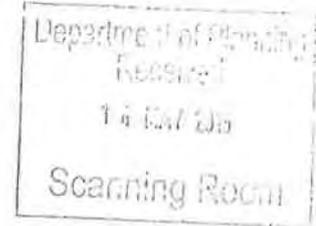
PCU059556



Department of Planning and Environment
SYDNEY NSW 2001

DEPARTMENT OF PLANNING AND INFRASTRUCTURE
ABN 40 996 710 314

Attention: Mr Kerry Hamann



Notice Number 1530541
File Number EF13/4779
Date 12-May-2015

Dear Mr Kerry Hamann

Secretary's Environment Assessment Requirements ID No.15-7038
Proposed Expansion, Boral Recycling, Kooragang Island

I refer to your request for the Environment Protection Authority's (EPA) requirements for the environmental assessment (EA) in regard to the above proposal received by EPA on 4 May 2015.

The EPA has considered the details of the proposal as provided by the Department of Planning and Environment and the accompanying report titled "Kooragang Recycling Facility State Significant Development Preliminary Environmental Assessment" Prepared by Environmental Property Services and dated April 2015, and has identified the information it requires to issue its general terms of approval in Attachment A. In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. The management, processing and storage of waste received at the Premises;
2. Options for disposal and/or reuse of residual waste generated at the Premises;
3. Impacts on water quality and site water management;
4. Potential noise impacts during construction and operations;
5. Potential odour issues during operations at the Premises; and
6. Impacts on air quality.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in Attachment B and any relevant industry codes of practice and best practice management guidelines.

Please note that this response does not cover biodiversity or Aboriginal cultural heritage issues, which are the responsibility of the Office of Environment and Heritage.



The Proponent should be made aware that any commitments made in the EA may be formalised as approval conditions and may also be placed as formal licence conditions.

The Proponent should be made aware that, consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997* ("the Act") the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an Environment Protection Licence ("EPL").

In addition, as a requirement of an EPL, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or Plans in accordance with Section 153A of the Act.

If you have any enquiries regarding this matter please contact Cristina Maroc on (02) 4908 6826.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Jenny Lange', positioned above a horizontal dotted line.

Jenny Lange

Acting Unit Head

Waste & Resources - Waste Management

(by Delegation)



ATTACHMENT A: EIS REQUIREMENTS FOR Resource Recovery Facility, 1/24 Egret Street, Kooragang

How to use these requirements

The EPA requirements have been structured in accordance with the DIPNR EIS Guidelines, as follows. It is suggested that the EIS follow the same structure:

- A. Executive summary
- B. The proposal
- C. The location
- D. Identification and prioritisation of issues
- E. The environmental issues
- F. List of approvals and licences
- G. Compilation of mitigation measures
- H. Justification for the proposal
- I. Specific requirements for the Resource Recovery Facility

A Executive summary

The executive summary should include a brief discussion of the extent to which the proposal achieves identified environmental outcomes.

B The proposal

1. Objectives of the proposal

- The objectives of the proposal should be clearly stated and refer to:
 - a) the size and type of the operation, the nature of the processes and the products, by-products and wastes produced
 - b) a life cycle approach to the production, use or disposal of products
 - c) the anticipated level of performance in meeting required environmental standards and cleaner production principles
 - d) the staging and timing of the proposal and any plans for future expansion
 - e) the proposal's relationship to any other industry or facility.

2. Description of the proposal

General

- Outline the production process including:
 - a) the environmental "mass balance" for the process – quantify in-flow and out-flow of materials, any points of discharge to the environment and their respective destinations (sewer, stormwater, atmosphere, recycling, landfill etc)
 - b) any life-cycle strategies for the products.
- Outline cleaner production actions, including:
 - a) measures to minimise waste (typically through addressing source reduction)
 - b) proposals for use or recycling of by-products
 - c) proposed disposal methods for solid and liquid waste
 - d) air management systems including all potential sources of air emissions, proposals to re-use or treat emissions, emission levels relative to relevant standards in regulations, discharge points
 - e) water management system including all potential sources of water pollution, proposals for re-use, treatment etc, emission levels of any wastewater discharged, discharge points, summary of options explored to avoid a discharge, reduce its frequency or reduce its impacts, and rationale for selection of option to discharge.
 - f) soil contamination treatment and prevention systems.
- Outline construction works including:
 - a) actions to address any existing soil contamination

- b) any earthworks or site clearing; re-use and disposal of cleared material (including use of spoil on-site)
- c) construction timetable and staging; hours of construction; proposed construction methods
- d) environment protection measures, including noise mitigation measures, dust control measures and erosion and sediment control measures.

Air

- Identify all sources of air emissions from the development.

Note: emissions can be classed as either:

- *point (eg emissions from stack or vent) or*
- *fugitive (from wind erosion, leakages or spillages, associated with loading or unloading, conveyors, storage facilities, plant and yard operation, vehicle movements (dust from road, exhausts, loss from load), land clearing and construction works).*
- Provide details of the project that are essential for predicting and assessing air impacts including:
 - a) the quantities and physio-chemical parameters (eg concentration, moisture content, bulk density, particle sizes etc) of materials to be used, transported, produced or stored
 - b) an outline of procedures for handling, transport, production and storage
 - c) the management of solid, liquid and gaseous waste streams with potential for significant air impacts.

Noise and vibration

- Identify all noise sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.
- Specify the times of operation for all phases of the development and for all noise producing activities.
- For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks.

Water

- Provide details of the project that are essential for predicting and assessing impacts to waters:
 - a) including the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on <http://www.environment.nsw.gov.au/ieo/index.htm>, using technical criteria derived from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000)
 - b) the management of discharges with potential for water impacts
 - c) drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal.



- Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts eg effluent ponds) and showing potential areas of modification of contours, drainage etc.
- Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

Waste and chemicals

- Provide details of the quantity and type of both liquid waste and non-liquid waste generated, handled, processed or disposed of at the premises. Waste must be classified according to the *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes* (NSW EPA, 1999).
- Provide details of liquid waste and non-liquid waste management at the facility, including:
 - a) the transportation, assessment and handling of waste arriving at or generated at the site
 - b) any stockpiling of wastes or recovered materials at the site
 - c) any waste processing related to the facility, including reuse, recycling, reprocessing (including composting) or treatment both on- and off-site
 - d) the method for disposing of all wastes or recovered materials at the facility
 - e) the emissions arising from the handling, storage, processing and reprocessing of waste at the facility
 - f) the proposed controls for managing the environmental impacts of these activities.
- Provide details of spoil disposal with particular attention to:
 - a) the quantity of spoil material likely to be generated
 - b) proposed strategies for the handling, stockpiling, reuse/recycling and disposal of spoil
the need to maximise reuse of spoil material in the construction industry
 - c) identification of the history of spoil material and whether there is any likelihood of contaminated material, and if so, measures for the management of any contaminated material
 - d) designation of transportation routes for transport of spoil.
- Provide details of procedures for the assessment, handling, storage, transport and disposal of all hazardous and dangerous materials used, stored, processed or disposed of at the site, in addition to the requirements for liquid and non-liquid wastes.

Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage.

- Reference should be made to the guidelines: *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes* (NSW EPA, 1999).

Ecological Sustainable Development (ESD)

- Demonstrate that the planning process and any subsequent development incorporates objectives and mechanisms for achieving ESD, including:



an assessment of a range of options available for use of the resource, including the benefits of each option to future generations

proper valuation and pricing of environmental resources

- identification of who will bear the environmental costs of the proposal.

3. Rehabilitation

- Outline considerations of site maintenance, and proposed plans for the final condition of the site (ensuring its suitability for future uses).

4. Consideration of alternatives and justification for the proposal

- Consider the environmental consequences of adopting alternatives, including alternative:
 - a) sites and site layouts
 - b) access modes and routes
 - c) materials handling and production processes
 - d) waste and water management
 - e) impact mitigation measures
 - f) energy sources
- Selection of the preferred option should be justified in terms of:
 - a) ability to satisfy the objectives of the proposal
 - b) relative environmental and other costs of each alternative
 - c) acceptability of environmental impacts and contribution to identified environmental objectives
 - d) acceptability of any environmental risks or uncertainties
 - e) reliability of proposed environmental impact mitigation measures
 - f) efficient use (including maximising re-use) of land, raw materials, energy and other resources.

C The location

1. General

- Provide an overview of the affected environment to place the proposal in its local and regional environmental context including:
 - a) meteorological data (eg rainfall, temperature and evaporation, wind speed and direction)
 - b) topography (landform element, slope type, gradient and length)
 - c) surrounding land uses (potential synergies and conflicts)
 - d) geomorphology (rates of landform change and current erosion and deposition processes)



- e) soil types and properties (including erodibility; engineering and structural properties; dispersibility; permeability; presence of acid sulfate soils and potential acid sulfate soils)
- f) ecological information (water system habitat, vegetation, fauna)
- g) availability of services and the accessibility of the site for passenger and freight transport.

2. Air

- Describe the topography and surrounding land uses. Provide details of the exact locations of dwellings, schools and hospitals. Where appropriate provide a perspective view of the study area such as the terrain file used in dispersion models.
- Describe surrounding buildings that may effect plume dispersion.
- Provide and analyse site representative data on following meteorological parameters:
 - a) temperature and humidity
 - b) rainfall, evaporation and cloud cover
 - c) wind speed and direction
 - d) atmospheric stability class
 - e) mixing height (the height that emissions will be ultimately mixed in the atmosphere)
 - f) katabatic air drainage
 - g) air re-circulation.

3. Noise and vibration

- Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically the location of any noise sensitive locations in relation to the site should be included on a map of the locality.
- Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas.

4. Water

- Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: <http://www.environment.nsw.gov.au/ieo/index.htm> should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area.

5. Soil Contamination Issues

- Provide details of site history – if earthworks are proposed, this needs to be considered with regard to possible soil contamination, for example if the site was previously a landfill site or if irrigation of effluent has occurred.

D Identification and prioritisation of issues / scoping of impact assessment

- Provide an overview of the methodology used to identify and prioritise issues. The methodology should take into account:
 - a) relevant NSW government guidelines
 - b) industry guidelines
 - c) EISs for similar projects
 - d) relevant research and reference material
 - e) relevant preliminary studies or reports for the proposal
 - f) consultation with stakeholders.
- Provide a summary of the outcomes of the process including:
 - a) all issues identified including local, regional and global impacts (eg increased/ decreased greenhouse emissions)
 - b) key issues which will require a full analysis (including comprehensive baseline assessment)
 - c) issues not needing full analysis though they may be addressed in the mitigation strategy
 - d) justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment).

E The environmental issues

1. General

- The potential impacts identified in the scoping study need to be assessed to determine their significance, particularly in terms of achieving environmental outcomes, and minimising environmental pollution.
- Identify gaps in information and data relevant to significant impacts of the proposal and any actions proposed to fill those information gaps so as to enable development of appropriate management and mitigation measures. This is in accordance with ESD requirements.

Note: The level of detail should match the level of importance of the issue in decision making which is dependent on the environmental risk.

Describe baseline conditions

- Provide a description of existing environmental conditions for any potential impacts.



Assess impacts

- For any potential impacts relevant for the assessment of the proposal provide a detailed analysis of the impacts of the proposal on the environment including the cumulative impact of the proposal on the receiving environment especially where there are sensitive receivers.
- Describe the methodology used and assumptions made in undertaking this analysis (including any modelling or monitoring undertaken) and indicate the level of confidence in the predicted outcomes and the resilience of the environment to cope with the predicted impacts.
- The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts eg assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc.
- The assessment needs to consider impacts at all phases of the project cycle including: exploration (if relevant or significant), construction, routine operation, start-up operations, upset operations and decommissioning if relevant.
- The level of assessment should be commensurate with the risk to the environment.

Describe management and mitigation measures

- Describe any mitigation measures and management options proposed to prevent, control, abate or mitigate identified environmental impacts associated with the proposal and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.
- Proponents are expected to implement a 'reasonable level of performance' to minimise environmental impacts. The proponent must indicate how the proposal meets reasonable levels of performance. For example, reference technology based criteria if available, or identify good practice for this type of activity or development. A 'reasonable level of performance' involves adopting and implementing technology and management practices to achieve certain pollutant emissions levels in economically viable operations. Technology-based criteria evolve gradually over time as technologies and practices change.
- Use environmental impacts as key criteria in selecting between alternative sites, designs and technologies, and to avoid options having the highest environmental impacts.
- Outline any proposed approach (such as an Environmental Management Plan) that will demonstrate how commitments made in the EIS will be implemented. Areas that should be described include:
 - a) operational procedures to manage environmental impacts
 - b) monitoring procedures
 - c) training programs
 - d) community consultation
 - e) complaint mechanisms including site contacts
 - f) strategies to use monitoring information to improve performance
 - g) strategies to achieve acceptable environmental impacts and to respond in event of exceedences.

4. Air

Describe baseline conditions

- Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data.

Assess impacts

- Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.
- Estimate the resulting ground level concentrations of all pollutants. Where necessary (eg potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with the DECCW.
- Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.
- Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.
- For potentially odorous emissions provide the emission rates in terms of odour units (determined by techniques compatible with EPA / DECCW procedures). Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate.

Note: With dust and odour, it may be possible to use data from existing similar activities to generate emission rates.

- Reference should be made to *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (DEC, 2001); *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW* (DEC, 2007); *Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006); *Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006); *Load Calculation Protocol for use by holders of NSW Environment Protection Licences when calculating Assessable Pollutant Loads* (DECC, 2009).

Describe management and mitigation measures

- Outline specifications of pollution control equipment (including manufacturer's performance guarantees where available) and management protocols for both point and fugitive emissions. Where possible, this should include cleaner production processes.

5. Noise and vibration

Describe baseline conditions

- Determine the existing background (LA90) and ambient (LAeq) noise levels in accordance with the *NSW Industrial Noise Policy*.



- Determine the existing road traffic noise levels in accordance with the *NSW Environmental Criteria for Road Traffic Noise*, where road traffic noise impacts may occur.
- The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including:
 - a) details of equipment used for the measurements
 - b) a brief description of where the equipment was positioned
 - c) a statement justifying the choice of monitoring site, including the procedure used to choose the site, having regards to the definition of 'noise sensitive locations(s)' and 'most affected locations(s)' described in Section 3.1.2 of the *NSW Industrial Noise Policy*
 - d) details of the exact location of the monitoring site and a description of land uses in surrounding areas
 - e) a description of the dominant and background noise sources at the site
 - f) day, evening and night assessment background levels for each day of the monitoring period
 - g) the final Rating Background Level (RBL) value
 - h) graphs of the measured noise levels for each day should be provided
 - i) a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring under Step 1 in Section B1.3 of the *NSW Industrial Noise Policy*
 - j) determination of LAeq noise levels from existing industry.

Assess impacts

- Determine the project specific noise levels for the site. For each identified potentially affected receiver, this should include:
 - a) determination of the intrusive criterion for each identified potentially affected receiver
 - b) selection and justification of the appropriate amenity category for each identified potentially affected receiver
 - c) determination of the amenity criterion for each receiver
 - d) determination of the appropriate sleep disturbance limit.
- Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible affects on sleep. Where LA1(1min) noise levels from the site are less than 15 dB above the background LA90 noise level, sleep disturbance impacts are unlikely. Where this is not the case, further analysis is required. Additional guidance is provided in Appendix B of the *NSW Environmental Criteria for Road Traffic Noise*.
- Determine expected noise level and noise character (eg tonality, impulsiveness, vibration, etc) likely to be generated from noise sources during:
 - a) site establishment
 - b) construction
 - c) operational phases
 - d) transport including traffic noise generated by the proposal
 - e) other services.

Note: The noise impact assessment report should include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods for references used to determine noise source levels. Noise source levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).

- Determine the noise levels likely to be received at the most sensitive locations (these may vary for different activities at each phase of the development). Potential impacts should be determined for any identified significant adverse meteorological conditions. Predicted noise levels under calm conditions may also aid in quantifying the extent of impact where this is not the most adverse condition.
- The noise impact assessment report should include:
 - a) a plan showing the assumed location of each noise source for each prediction scenario
 - b) a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site
 - c) any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc
 - d) methods used to predict noise impacts including identification of any noise models used. Where modelling approaches other than the use of the ENM or SoundPlan computer models are adopted, the approach should be appropriately justified and validated
 - e) an assessment of appropriate weather conditions for the noise predictions including reference to any weather data used to justify the assumed conditions
 - f) the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario under any identified significant adverse weather conditions as well as calm conditions where appropriate
 - g) for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived
 - h) an assessment of the need to include modification factors as detailed in Section 4 of the *NSW Industrial Noise Policy*.
- Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional mitigation measures.
- The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation.
- Where relevant noise/vibration criteria cannot be met after application of all feasible and cost effective mitigation measures the residual level of noise impact needs to be quantified by identifying:
 - a) locations where the noise level exceeds the criteria and extent of exceedence
 - b) numbers of people (or areas) affected
 - c) times when criteria will be exceeded
 - d) likely impact on activities (speech, sleep, relaxation, listening, etc)
 - e) change on ambient conditions
 - f) the result of any community consultation or negotiated agreement.
- For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.



- Where blasting is intended an assessment in accordance with the *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (ANZECC, 1990) should be undertaken. The following details of the blast design should be included in the noise assessment:
 - a) bench height, burden spacing, spacing burden ratio
 - b) blast hole diameter, inclination and spacing
 - c) type of explosive, maximum instantaneous charge, initiation, blast block size, blast frequency.

Describe management and mitigation measures

- Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc.
- For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include:
 - a) use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage
 - b) control of traffic (eg: limiting times of access or speed limitations)
 - c) resurfacing of the road using a quiet surface
 - d) use of (additional) noise barriers or bunds
 - e) treatment of the façade to reduce internal noise levels buildings where the night-time criteria is a major concern
 - f) more stringent limits for noise emission from vehicles (i.e. using specially designed 'quite' trucks and/or trucks to use air bag suspension
 - g) driver education
 - h) appropriate truck routes
 - i) limit usage of exhaust breaks
 - j) use of premium muffles on trucks
 - k) reducing speed limits for trucks
 - l) ongoing community liaison and monitoring of complaints
 - m) phasing in the increased road use.



1. Water

Describe baseline conditions

- Describe existing surface and groundwater quality – an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts).
Note: Methods of sampling and analysis need to conform with an accepted standard (e.g. Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC 2004) or be approved and analyses undertaken by accredited laboratories).
- Provide site drainage details and surface runoff yield.
- State the ambient Water Quality and River Flow Objectives for the receiving waters. These refer to the community's agreed environmental values and human uses endorsed by the Government as goals for the ambient waters. These environmental values are published on the website: <http://www.environment.nsw.gov.au/ieo/index.htm>. The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. NB: A consolidated and approved list of environmental values are not available for groundwater resources. Where groundwater may be affected the EIS should identify appropriate groundwater environmental values and justify the choice.
- State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 *Guidelines for Fresh and Marine Water Quality* (<http://www.environment.gov.au/water/publications/quality/nwqms-guidelines-4-vol1.html>) (Note that, as at 2004, the NSW Water Quality Objectives booklets and website contain technical criteria derived from the 1992 version of the ANZECC Guidelines. The Water Quality Objectives remain as Government Policy, reflecting the community's environmental values and long-term goals, but the technical criteria are replaced by the more recent ANZECC 2000 Guidelines). NB: While specific guidelines for groundwater are not available, the ANZECC 2000 Guidelines endorse the application of the trigger values and decision trees as a tool to assess risk to environmental values in groundwater.
- State any locally specific objectives, criteria or targets, which have been endorsed by the government e.g. the Healthy Rivers Commission Inquiries or the NSW Salinity Strategy (DLWC, 2000) (<http://www.environment.nsw.gov.au/salinity/government/nswstrategy.htm>).
- Where site specific studies are proposed to revise the trigger values supporting the ambient Water Quality and River Flow Objectives, and the results are to be used for regulatory purposes (e.g. to assess whether a licensed discharge impacts on water quality objectives), then prior agreement from the EPA on the approach and study design must be obtained.
- Describe the state of the receiving waters and relate this to the relevant Water Quality and River Flow Objectives (i.e. are Water Quality and River Flow Objectives being achieved?). Proponents are generally only expected to source available data and information. However, proponents of large or high risk developments may be required to collect some ambient water quality / river flow / groundwater data to enable a suitable level of impact assessment. Issues to include in the description of the receiving waters could include:
 - a) lake or estuary flushing characteristics
 - b) specific human uses (e.g. exact location of drinking water offtake)
 - c) sensitive ecosystems or species conservation values
 - d) a description of the condition of the local catchment e.g. erosion levels, soils, vegetation cover, etc



- e) an outline of baseline groundwater information, including, but not restricted to, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment
- f) historic river flow data where available for the catchment.

Assess impacts

- No proposal should breach clause 120 of the *Protection of the Environment Operations Act 1997* (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).
- Identify and estimate the quantity of all pollutants that may be introduced into the water cycle by source and discharge point including residual discharges after mitigation measures are implemented.
- Include a rationale, along with relevant calculations, supporting the prediction of the discharges.
- Describe the effects and significance of any pollutant loads on the receiving environment. This should include impacts of residual discharges through modelling, monitoring or both, depending on the scale of the proposal. Determine changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, wetland hydrologic regimes and groundwater).
- Describe water quality impacts resulting from changes to hydrologic flow regimes (such as nutrient enrichment or turbidity resulting from changes in frequency and magnitude of stream flow).
- Identify any potential impacts on quality or quantity of groundwater describing their source.
- Identify potential impacts associated with geomorphological activities with potential to increase surface water and sediment runoff or to reduce surface runoff and sediment transport. Also consider possible impacts such as bed lowering, bank lowering, instream siltation, floodplain erosion and floodplain siltation.
- Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.
- Containment of spills and leaks shall be in accordance with the technical guidelines section 'Bunding and Spill Management' of the *Authorised Officers Manual* (EPA, 1995) (<http://www.epa.nsw.gov.au/mao/bundingspill.htm>) and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge.
- The significance of the impacts listed above should be predicted. When doing this it is important to predict the ambient water quality and river flow outcomes associated with the proposal and to demonstrate whether these are acceptable in terms of achieving protection of the Water Quality and River Flow Objectives. In particular the following questions should be answered:
 - a) will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and
 - b) will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters.
- Consult with the EPA as soon as possible if a mixing zone is proposed (a mixing zone could exist where effluent is discharged into a receiving water body, where the quality of the water being discharged does not immediately meet water quality objectives. The mixing zone could result in dilution, assimilation and decay of the effluent to allow water quality objectives to be met further downstream, at the edge of the mixing zone). The EPA will advise the proponent under what conditions a mixing zone will and will not be acceptable, as well as the information and modelling requirements for assessment.

Note: The assessment of water quality impacts needs to be undertaken in a total catchment management context to provide a wide perspective on development impacts, in particular cumulative impacts.

- Where a licensed discharge is proposed, provide the rationale as to why it cannot be avoided through application of a reasonable level of performance, using available technology, management practice and industry guidelines.
- Where a licensed discharge is proposed, provide the rationale as to why it represents the best environmental outcome and what measures can be taken to reduce its environmental impact.
- Reference should be made to *Managing Urban Stormwater: Soils and Construction* (DECC, 2008), *Guidelines for Fresh and Marine Water Quality* ANZECC 2000), *Environmental Guidelines: Use of effluent by Irrigation* (DEC, 2004).

Describe management and mitigation measures

- Outline stormwater management to control pollutants at the source and contain them within the site. Also describe measures for maintaining and monitoring any stormwater controls.
- Outline erosion and sediment control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies.
- Describe waste water treatment measures that are appropriate to the type and volume of waste water and are based on a hierarchy of avoiding generation of waste water; capturing all contaminated water (including stormwater) on the site; reusing/recycling waste water; and treating any unavoidable discharge from the site to meet specified water quality requirements.
- Outline pollution control measures relating to storage of materials, possibility of accidental spills (eg preparation of contingency plans), appropriate disposal methods, and generation of leachate.
- Describe hydrological impact mitigation measures including:
 - a) site selection (avoiding sites prone to flooding and waterlogging, actively eroding or affected by deposition)
 - b) minimising runoff
 - c) minimising reductions or modifications to flow regimes
 - d) avoiding modifications to groundwater.
- Describe groundwater impact mitigation measures including:
 - a) site selection
 - b) retention of native vegetation and revegetation
 - c) artificial recharge
 - d) providing surface storages with impervious linings
 - e) monitoring program.
- Describe geomorphological impact mitigation measures including:
 - a) site selection
 - b) erosion and sediment controls
 - c) minimising instream works
 - d) treating existing accelerated erosion and deposition
 - e) monitoring program.
- Any proposed monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DEC 2004).

5. Soils and contamination

Describe baseline conditions

- Provide any details (in addition to those provided in the location description - Section C) that are needed to describe the existing situation in terms of soil types and properties and soil contamination.

Assess impacts

- Identify any likely impacts resulting from the construction or operation of the proposal, including the likelihood of:
 - a) disturbing any existing contaminated soil
 - b) contamination of soil by operation of the activity
 - c) subsidence or instability
 - d) soil erosion
 - e) disturbing acid sulfate or potential acid sulfate soils.
- Reference should be made to *Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011); *Contaminated Sites – Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report* (EPA, 2003).

Describe management and mitigation measures

- Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including:
 - a) erosion and sediment control measures
 - b) proposals for site remediation – see *Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)
 - c) proposals for the management of these soils – see *Assessing and Managing Acid Sulfate Soils*, Environment Protection Authority, 1995 (note that this is the only methodology accepted by the EPA).

6. Waste and chemicals

Describe baseline conditions

- Describe any existing waste or chemicals operations related to the proposal.

Assess impacts

- Assess the adequacy of proposed measures to minimise natural resource consumption and minimise impacts from the handling, transporting, storage, processing and reprocessing of waste and/or chemicals.
- Reference should be made to *Waste Classification Guidelines (EPA, 2014)*.

Describe management and mitigation measures

- Outline measures to minimise the consumption of natural resources.
- Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.
- Outline measures to support any approved regional or industry waste plans.

7. Cumulative impacts

- Identify the extent that the receiving environment is already stressed by existing development and background levels of emissions to which this proposal will contribute.
- Assess the impact of the proposal against the long term air, noise and water quality objectives for the area or region.
- Identify infrastructure requirements flowing from the proposal (eg water and sewerage services, transport infrastructure upgrades).
- Assess likely impacts from such additional infrastructure and measures reasonably available to the proponent to contain such requirements or mitigate their impacts (eg travel demand management strategies).

F. List of approvals and licences

- Identify all approvals and licences required under environment protection legislation including details of all scheduled activities, types of ancillary activities and types of discharges (to air, land, water).

G. Compilation of mitigation measures

- Outline how the proposal and its environmental protection measures would be implemented and managed in an integrated manner so as to demonstrate that the proposal is capable of complying with statutory obligations under EPA licences or approvals (eg outline of an environmental management plan).
- The mitigation strategy should include the environmental management and cleaner production principles which would be followed when planning, designing, establishing and operating the proposal. It should include two sections, one setting out the program for managing the proposal and the other outlining the monitoring program with a feedback loop to the management program.

H. Justification for the Proposal

- Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts.

I. Specific Requirements for Proposed Waste Transfer and Recycling Facility

The Proponent should address all requirements listed in Sections A-H above (where applicable) in respect to the proposal. If not already addressed in the Sections A-H, the EPA requires the following specific issues to be addressed in the EIS:

Location

- The Proponent must provide detail on the boundaries of the proposed expanded area to be included within the licence

Construction

- Detailed description of all stages of construction including timeframes for completion.
- If any waste is proposed to be brought on site during the construction periods (ie for "fill" purposes), the proponent must provide details of the classification of the waste; quantities of the waste and the source location of that waste

Note: the application of waste-derived material to land is an activity that may require a licence under the Protection of the Environment Operations Act 1997. However, a licence is not required by the occupier of the land if the only material applied to land is virgin excavated natural material or waste-derived material that is subject of a resource recovery order and resource recover exemption under clause 93, 91 and 92 of the Protection of the Environment Operations (Waste) Regulations 2014

- If any waste is proposed to be transported off the site during the construction phase, the EIS must provide details
 - The types of waste leaving the site;
 - The quantities of waste leaving the site
 - The transporters of waste; and
 - The final disposal or re-use location for the waste

Note: Receipts or invoices demonstrating lawful disposal of the waste must be retained by the proponent and be made available to EPA on request.



ATTACHMENT B: GUIDANCE MATERIAL

Title	Web address
Relevant Legislation	
<i>Contaminated Land Management Act 1997</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+140+1997+cd+0+N
<i>Environmentally Hazardous Chemicals Act 1985</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+14+1985+cd+0+N
<i>Environmental Planning and Assessment Act 1979</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
<i>Protection of the Environment Operations Act 1997</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
<i>Water Management Act 2000</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
Licensing	
Guide to Licensing	www.epa.nsw.gov.au/licensing/licenceguide.htm
Air Issues	
Air Quality	
Approved methods for modelling and assessment of air pollutants in NSW (2005)	http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf
POEO (Clean Air) Regulation 2010	http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+428+2010+cd+0+N
Noise and Vibration	
Interim Construction Noise Guideline (DECC, 2009)	http://www.epa.nsw.gov.au/noise/constructnoise.htm
Assessing Vibration: a technical guideline (DEC, 2006)	http://www.epa.nsw.gov.au/noise/vibrationguide.htm
Industrial Noise Policy Application Notes	http://www.epa.nsw.gov.au/noise/applicnotesindustnoise.htm
Environmental Criteria for Road Traffic Noise (EPA, 1999)	http://www.epa.nsw.gov.au/resources/noise/roadnoise.pdf
Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects (DECC, 2007)	http://www.epa.nsw.gov.au/noise/railinfranoise.htm
Environmental assessment requirements for rail traffic-generating developments	http://www.epa.nsw.gov.au/noise/railnoise.htm

Waste, Chemicals and Hazardous Materials and Radiation	
Waste	
Environmental Guidelines: Solid Waste Landfills (EPA, 1996)	http://www.epa.nsw.gov.au/resources/waste/envguidlns/solidlandfill.pdf
Draft Environmental Guidelines - Industrial Waste Landfilling (April 1998)	http://www.epa.nsw.gov.au/resources/waste/envguidlns/industrialfill.pdf
Waste Classification Guidelines (EPA, 2014)	http://www.epa.nsw.gov.au/waste/envguidlns/index.htm
Resource recovery exemption	http://www.epa.nsw.gov.au/waste/RRcoveryExemptions.htm
Chemicals subject to Chemical Control Orders	
Chemical Control Orders (regulated through the EHC Act)	http://www.epa.nsw.gov.au/pesticides/CCOs.htm
National Protocol - Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
National Protocol for Approval/Licensing of Commercial Scale Facilities for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
Water and Soils	
Acid sulphate soils	
Coastal acid sulfate soils guidance material	http://www.environment.nsw.gov.au/acidsulfatesoil/
Acid Sulfate Soils Planning Maps	http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm
Contaminated Sites Assessment and Remediation	
Managing land contamination: Planning Guidelines – SEPP 55 Remediation of Land	http://www.planning.nsw.gov.au/assessingdev/pdf/qu_contam.pdf
Guidelines for Consultants Reporting on Contaminated Sites (EPA, 2000)	http://www.epa.nsw.gov.au/resources/clm/20110650consultantsguidelines.pdf
Guidelines for the NSW Site Auditor Scheme - 2nd edition (DEC, 2006)	http://www.epa.nsw.gov.au/resources/clm/auditorguidelines06121.pdf
Sampling Design Guidelines (EPA, 1995)	Available by request from EPA's Environment Line

National Environment Protection (Assessment of Site Contamination) Measure 1999 (or update)	http://www.scew.gov.au/nepms/assessment-site-contamination
Soils – general	
Managing land and soil	http://www.environment.nsw.gov.au/soils/landandsoil.htm
Managing urban stormwater for the protection of soils	http://www.environment.nsw.gov.au/stormwater/publications.htm
Landslide risk management guidelines	http://www.australiangeomechanics.org/resources/downloads/
Site Investigations for Urban Salinity (DLWC, 2002)	http://www.environment.nsw.gov.au/resources/salinity/booklet3siteinvestigationsforurbansalinity.pdf
Local Government Salinity Initiative Booklets	http://www.environment.nsw.gov.au/salinity/solutions/urban.htm
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	http://www.environment.gov.au/water/publications/quality/nwqms-guidelines-4-vol1.html
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	Contact the EPA on 131555
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approved-methods-water.pdf

From: Rebecca Johnston <Rebecca.Johnston@portofnewcastle.com.au>
Sent: Friday, 15 May 2015 2:10 PM
To: Kerry Hamann
Subject: Request for Assessment Requirements SSD 15_7038

I refer to Department of Planning's request for Secretary's Environmental Assessment Requirements for the proposed expansion of the Boral Recycling Facility - Kooragang Island (Newcastle LGA) (SSD 15_7038).

Thank you for the opportunity to provide input into the environmental assessment requirements of the proposal. Port of Newcastle (PON) is a key stakeholder and manager of the adjoining lands, including Raven and Egret Streets. The following issues are matters that PON would like to see addressed through the development of the EIS and SSD assessment process:

(i) Consultation:

The following adjoining properties are managed by Port of Newcastle and form land included in Port Lease(AI631867J):

- Lot 2, DP 1195449 Egret Street
- Lot 15, DP 1119752 Raven Street;
- Lot 1, DP 1119752 NCIG Terminal Site
- Lot 16, DP 1119752 North South drain
- Lot 1 DP 1195449 Approved service station

It is requested that consultation with both PON as the manager of the land, and the occupiers of the land, being PONs tenants occurs as part of the consultation processes in the EIS. PON can assist in providing contact details for tenants if required.

(ii) Current Site Operations:

There is currently a significant loss of material from the current stockpiles on the site through poor sediment and erosion control along the western boundary of Lot 12 . The adjoining north –south drain on Lot 16 has a high level of sediment and subsequent vegetation growth restricting the flow of water in the drain. PON is taking steps to remove the vegetation and sediment from the drain, however it is requested that improved erosion and sedimentation controls for the current operations be designed and implemented, before an increase in operations at the site occurs.

The entry a/ exit points to the site from Egret Street are currently unformed crossings from the Egret Street pavement across a large unsealed area to the truck entrance to Lot 12. The current driveway layback works (constructed by Boral) do not comply with PON standards of construction, and are causing localised pooling of water and impacts on stormwater flow. This should be rectified and the area sealed, prior to an increase in operations at the site occurs.

(iii) Issues to address in EIS:

- All material from stockpiles (existing and proposed) should be contained on site, and appropriate erosion and sedimentation controls be designed and implemented.
- Stormwater management: -Surface water should be managed on-site through the design and implementation of appropriate stormwater management controls. Any discharge of stormwater into the North –South drain on Lot 16 or Egret Street should meet ANZECC water quality guideline standards, particularly for TSS and metals
- The air quality assessment to be undertaken as part of the EIS, should also consider contribution to cumulative dust within the Port and wider catchment.
- Traffic Management - Access to the site is via Egret Street, a private road managed by Port of Newcastle. A 10 year 'Licence to transverse' with 10 year option (to expire 2032) permits carriageway of this land. PON should be included in discussion along with Newcastle Council and RMS regarding the scope and known

issues for the Traffic and Transport assessment in the EIS. In particular, the proposed traffic exit and entry arrangement onto / from Egret and Raven Street and the interaction with the adjacent NICG driveway entrance.

If you require any further information regarding the above matters, please contact me as below.

regards

Rebecca Johnston

Planning Officer

Port of Newcastle

6 Newcomen Street (PO Box 790) Newcastle NSW 2300 Australia

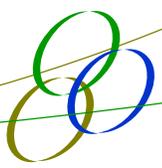
Tel: 61 24908 8219

Email: Rebecca.johnston@portofnewcastle.com.au

Website: www.portofnewcastle.com.au

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Please consider the environment before you print this e-mail...



Appendix 2

Existing Development Consent

D&E
**NOTICE OF DETERMINATION
DEVELOPMENT APPLICATION**

Section 81 Environmental Planning and Assessment Act 1979

To: BORAL RESOURCES COUNTRY P/L
Of: PO BOX 42
WENTWORTHVILLE NSW 2145



PO Box 489, Newcastle
NSW 2300 Australia
Phone 02 4974 2000
Facsimile 02 4974 2222

Email mail@ncc.nsw.gov.au

Development Application No: 01/2716

Land to which the Application relates: LOT 1 DP 594332
100 CORMORANT RD
KOORAGANG NSW 2304

Proposed Development: ESTABLISHMENT OF A WASTE
MANAGEMENT FACILITY INVOLVING
MOBILE CRUSHING PLANT
& ASSOCIATED EQUIPMENT FOR
THE RECYCLING OF SLAG, BLG &
DEMOLITION WASTE

Building Classification: 8

Determination

The Development Application has been determined by granting of **CONSENT** subject to the conditions specified in the attached Schedule

Date from which consent operates: 20 Feb 2003

Date on which the consent expires: 20 Feb 2008

No commission of inquiry has been held.

No approvals have been granted under the Local Government Act 1993.

Right of Appeal:

Applicant.

You can appeal against this decision in the Land & Environment Court within 12 months of the date of this notice. You cannot appeal, however, if a Commission of Inquiry was held and the development is designated development or state significant development.

Objectors.

If this application is for designated development and an objection in writing has been received by Council an objector who is dissatisfied with the determination can:

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SCHEDULE 1

1 Conditions Restricting the Terms of Consent

- 1.1 The proposed development being carried out strictly in accordance with the details set out on the amended plans dated 14 June 2002 (KOO11CC1), the Applicant's and their consultants written submissions dated 17 October 2001, 5 June 2002, in accordance with the Air Quality Assessment by ERM dated June 2002, in the Environmental Impact Statement prepared by ERM dated December 2001 and on the Application form, except as otherwise provided by the conditions of this consent.

Note: Any proposal to modify the terms or conditions of this consent whilst still maintaining substantially the same development to that approved, will require the submission of a formal application for Council's consideration in accordance with the provisions of Section 96 of the Environmental Planning and Assessment Act, 1979.

Reason: To confirm and clarify the terms of Council's approval.

2 Conditions Requiring Carrying Out of Off Site Works

- 2.1 Any necessary alterations to public utility installations being at the Developer/Demolisher's expense and to the requirements of both Council and the appropriate authorities.

Reason: To ensure that any required alterations to public utility infrastructure are undertaken to acceptable standards and without demands on public sector resources.

- 2.2 Any proposed work within the public road, including pipe or vehicular crossings, being the subject of the separate approval of Council prior to the commencement of such works.

(Note: The required approval can be obtained by telephoning Council's Depot on 4974 6000 to request a Road Opening Approval. A fee will be payable for such approval).

Reason: To ensure that works within a public road are suitably authorised and constructed to appropriate standards.

- 2.3 A temporary protective crossing being provided over the footway for vehicular traffic before building operations are commenced. This approval does not permit access to the property over any adjacent private or public land.

Reason: To ensure public safety and protection of public assets.

3 Conditions Requiring Inclusion of Details in Documentation for a Construction Certificate Application

- 3.1 An Environmental Management Plan (EMP) being prepared for the proposed facility and submitted for Council's approval prior to the issue of a Construction

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Certificate or occupation of the site for the purposes herein approved. Such Plan is to be designed and implemented to manage all environmental aspects associated with the construction and operation of the facility, including off site impacts such as transport to and from the site. The Plan is to be made available for inspection upon request by authorised Council or EPA Officers.

(Note: The required EMP is to include but not be limited to:

- a) A site management program, identifying and addressing issues such as environmental health and safety, site security, and traffic management.
- b) A water management program, detailing erosion and sediment control; management of material stockpiles; control and management of surface water, ground water and process water. The Plan should also include detail of the proposed sprinkler system and define conditions under which it should be used.
- c) A dust management program, detailing procedures to minimise dust generation, with particular reference to control techniques, operational limits under adverse meteorological conditions and measures to prevent tracking of dust off site. The dust management program is to be cross-referenced with the water management program.
- d) A noise management program, detailing measures to minimise the impact of the development on neighbouring amenity. Noise monitoring during the operational phase is to be incorporated into the program.
- e) A contamination contingency program, detailing measures to be implemented to manage the identification, control and disposal of any contaminated materials encountered during site operations.
- f) A waste management program, outlining waste screening procedures and measures to avoid production of waste and maximise reuse, recycling or reprocessing of potential waste material.

Reason: To prevent environmental pollution and ensure observance of appropriate public health standards.

- 3.2 All dust mitigation measures as set out in the submitted Air Quality Assessment prepared by ERM, being implemented and operational prior to occupation or use of the premises.

Reason: To ensure the appropriate air quality control measures are implemented in order to protect the existing amenity of the area and safeguard the nearby habitat of endangered species.

- 3.3 The proposed fixed sprinkler system extending to all trafficked and open stockpile areas, full details to be included with the Construction Certificate application.

Reason: To minimise the potential for dust generation arising as a result of site operations.

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- 3.4 All proposed driveways, parking bays, loading bays and vehicular turning areas being constructed with a basecourse of adequate depth to suit design traffic, being sealed with either bitumen seal, asphaltic concrete, concrete or interlocking pavers and being properly maintained. Full details are to be included in documentation for a Construction Certificate application.

Reason: To facilitate the use of vehicular access and parking facilities and to minimise any associated noise and dust nuisance.

- 3.5 Any alteration to natural surface levels on the site being undertaken in such a manner as to ensure that no surface water is drained onto or impounded on adjoining properties. Full details are to be included in documentation for a Construction Certificate application.

Reason: To ensure that any such proposed works do not disrupt existing natural stormwater flows in the vicinity.

- 3.6 An appropriate flood emergency response plan being prepared by independent consulting engineers, experienced in flood management and put in place by the applicant prior to occupation of this site for the intended use. Such plan to be effectively updated and maintained by the occupiers; to include an education and awareness component for the workforce and detailed evacuation procedures to interface with the Bureau of Meteorology's flood warning system and the local State Emergency Services plan (where appropriate) and to include provisions for any third parties likely to be involved.

A flood emergency response plan should describe the following components:

- a) Likely flood behaviour
- b) Flood warning systems
- c) Education awareness program
- d) Evacuation and evasion procedures
- e) Evacuation routes and flood refuges
- f) Flood preparedness and awareness procedures for residents and visitors

Considerations should include the full range of flood risks, the proposed use of the site, site access constraints and local area evacuation routes to high ground. As much as possible, the plan should be aimed at self-directed evacuation or evasion to minimise the draw on limited State Emergency Services resources. Full details to be included in documentation for a Construction Certificate application

Reason: To adequately manage the risk of life, property and all potential adverse flood impacts within the flood environment.

- 3.7 The Developer instituting appropriate erosion protection and soil stabilisation measures in association with the proposed site works. Such measures to be

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designed in accordance with the requirement of the Department of Land and Water Conservation. Full details to be included in the documentation for a Construction Certificate application.

Reason: To control soil erosion and prevent sedimentation of surrounding lands both private and public.

- 3.8 The proposed development being carried out in accordance with the advice/undertakings/recommendations set out in the submitted Statement of Environmental Effects/Environmental Impact Statement prepared by ERM dated December 2001, which party is to certify in writing to the Principal Certifying Authority upon completion of the proposed works and prior to the commencement of operations that all pollution control measures specified in the said Statement have been implemented and comply in all respects with relevant standards and legislative requirements.

Reason: To confirm the terms of consent, to safeguard the amenity of the locality and to prevent environmental pollution.

- 3.9 All proposed planting and landscape elements indicated on the submitted landscape concept plan or otherwise required under the conditions of this consent being implemented and a comprehensive landscape design plan and specification in respect thereof being prepared by a qualified landscape designer and being submitted with a Construction Certificate application.

Note 1 The required comprehensive landscape design plan and specifications is to be in accordance with the provisions of Council's adopted Development Control Plan No 33 and is to include cross sections through the site where appropriate, proposed contours or spot levels, botanical names, quantities and container size of all proposed trees, shrubs and ground cover, details of proposed soil preparation, mulching and staking as well as treatment of external surfaces and retaining walls where proposed, drainage, location of taps and the nominated maintenance periods. Refer to attached checklist.

Note 2 The Plant Matrix 3.2 in the Newcastle Landscape Structure Plan adopted by Council on 28 November 1989 may be used as a guide in the selection of suitable tree and shrub species. A copy of Planting Guideline P.1 from the Landscape Structure Plan and the relevant Plant Matrix have been included with this consent.

Note 3 A Landscape Practical Completion Report is required to be submitted to the Principal Certifying Authority by the consultant responsible for the landscape design plan prior to occupation of the premises or any portion of the premises that is the subject of this consent. The report is to verify that all landscape works have been carried out in accordance with the approved landscape design plan to a high professional standard and that an effective maintenance program has been commenced.

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Reason: To ensure that adequate and appropriate provision is made for landscaping of the site in association with the proposed development, to enhance the external appearance of the premises and to contribute to the overall landscape quality of the locality.

- 3.10 A Landscape Practical Completion Report is to be submitted to the Principal Certifying Authority prior to occupation of the premises; copy of report format attached.

Reason: To ensure that landscape works are carried out in accordance with the approval.

- 3.11 The applicant complying with all requirements of the Hunter Water Corporation Ltd regarding the connection of water supply and sewerage services, including the payment of any required cash contribution towards necessary amplification of service mains in the locality as a result of the increased intensity of land use proposed. A copy of the Corporation's certificate of compliance is to be included in documentation for a Construction Certificate application.

Reason: To ensure that water supply and sewerage services are properly connected to the proposed development in the public interest.

4 Conditions Requiring the Submission of Future Applications to Council or The Approval of Other Authorities

- 4.1 Any proposed business identification sign or advertising sign, being designed in accordance with the provisions of Council's adopted Outdoor Advertising Sign Code and being the subject of a separate Development Application approved prior to erection or placement in position.

Reason: To advise of the necessity to submit further applications to Council in respect of proposed signage in order that any such proposals may be properly assessed in accordance with relevant heads of consideration under the Environmental Planning and Assessment Act, 1979.

- 4.2 Compliance with the requirements of the Hunter Water Corporation Ltd in respect of any building or structure proposed to be erected over any services or stormwater drain under the Corporation's control.

Reason: To protect the Corporation's infrastructure from site development works.

5 General Conditions

- 5.1 All building work must be carried out in accordance with the provisions of the Building Code of Australia.

Reason: To confirm a condition of consent prescribed by the Environmental Planning & Assessment Regulation 2000.

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- 5.2 The vehicular entrance and exit driveways and the direction of traffic movement within the site being clearly indicated by means of reflectorised signs and pavement markings.

Reason: To ensure that clear direction is provided to the drivers of vehicles entering and leaving the premises in order to facilitate the orderly and efficient use of on-site parking spaces and driveway access and in the interest of traffic safety and convenience.

- 5.3 All vehicular movement to and from the site being in a forward direction.

Reason: To ensure that the proposed development does not give rise to vehicle reversing movements on or off the public road with consequent traffic accident potential and reduction in road efficiency.

- 5.4 Soil erosion and sedimentation being controlled and contained within the allotment boundaries to the standards of the Department of Land and Water Conservation.

Control measures are to be maintained at maximum operational capacity until the land is effectively rehabilitated and stabilised after construction.

Note: All roof drainage systems are to be connected to the required discharge point prior to the fixing of any internal linings or finishes.

Reason: To control erosion and prevent sedimentation, flooding and pollution of land and waters downstream from the property.

- 5.5 The use and occupation of the premises including all plant and equipment installed thereon, not giving rise to any "offensive noise", as defined under the Noise Control Act, 1975, as amended.

Note: Should Council consider that offensive noise has emanated from the premises, the owner/occupier of the premises will be required to submit an acoustic consultant's report recommending appropriate acoustic measures necessary to ensure future compliance with this condition and will be required to implement such measures within a nominated period. Furthermore, written certification from the said consultant confirming that the recommended acoustic measures have been satisfactorily implemented will be required to be submitted to Council before the expiration of the nominated period.

Reason: To ensure that appropriate noise control measures are implemented in order to protect the existing amenity of the neighbourhood.

- 5.6 There being no interference with the amenity of the neighbourhood by reason of the emission of any "offensive noise", vibration, smell, fumes, smoke, vapour, steam, soot, ash or dust, or otherwise as a result of the proposed development.

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Reason: To prevent environmental pollution, to ensure observance of appropriate public health standards and to protect the existing amenity of the neighbourhood.

5.7 Construction / demolition work noise that is audible at other premises is to be restricted to the following times:

- Monday to Friday, 7.00 am to 6.00 pm
- Saturday, 8.00 am to 1.00 pm

No construction/demolition work noise is permitted on Sundays or Public Holidays

Reason: To prevent 'offensive noise' from construction/demolition sites in accordance with the Environmental Protection Authority Guidelines.

5.8 Any black glassy slag excavated during earthworks and which will not be covered by building structures or reburied on site, is to be removed for disposal at the Summerhill Waste Management Centre or another approved waste disposal site. Any such action is to be confirmed by the submission of evidence of disposal to the Principal Certifying Authority, eg. copy of docket from disposal centre.

Reason: Council has information that indicates this building site may be within an area which was once low lying and may have been filled. Limited investigation indicates that the filling material may contain a black glassy industrial slag containing some heavy metals including lead. For public health reasons this material, if excavated, should not be left exposed on the surface of the ground. For any further information please telephone Council's Environmental Protection Unit on (02) 4929 9323.

5.9 A Landscape Establishment Report is to be submitted to the Principal Certifying Authority following completion of a three (3) month maintenance period, verifying that satisfactory maintenance of the landscape works has been undertaken and any necessary rectification measures have been carried out to a high professional standard; copy of report format attached.

Reason: To ensure that the landscape works are conserved and properly maintained in accordance with approved plans so as to improve the appearance of the premises and the visual quality of the locality.

5.10 All public footways, footpaving, kerbs, gutters and road pavement damaged during the works being restored to match existing conditions at the Developer's/Demolisher's expense.

Reason: To ensure that the required restoration is undertaken to acceptable standards and without demands on public sector resources.

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- 5.11 Where the proposed development involves the destruction or disturbance of any existing survey monuments, those monuments affected being relocated at no cost to Council by a surveyor registered under the Surveyor's Act.

Reason: To ensure that existing permanent survey marks which may be affected by the development are appropriately reinstated.

- 5.12 The owner/demolisher ensuring that all services (ie water, telecommunications, gas, electricity, sewerage etc, are disconnected in accordance with the relevant authority's requirements prior to demolition.

Reason: To prevent damage to reticulation systems and ensure maintenance of public health standards.

- 5.13 The premises being identified by the provision of house numbers on the building exterior and mailbox such that they are clearly visible from the road frontage.

The minimum numeral height shall be 75 mm.

Reason: To ensure that the property can be readily identified by visitors, motorists, emergency services and the community generally.

- 5.14 Toilet facilities are to be provided, at or in the vicinity of the site on which work is being carried out, at the rate of one toilet for every 20 persons or part of 20 persons employed at the site.

Each toilet provided:

- a) must be a standard flushing toilet, and
- b) must be connected:
 - i) to a public sewer, or
 - ii) if connection to a public sewer is not practicable, to an accredited sewage management facility approved by Council, or
 - iii) if connection to a public sewer or an accredited sewage management facility is not practicable, to some other sewage management facility approved by Council.

The provision of such toilet facilities must be completed before any other work is commenced.

Reason: To confirm a condition of consent prescribed by the Environmental Planning and Assessment Regulation 1994.

- 5.15 Any demolition/waste building materials being disposed of at Council's Waste Disposal Depot or other approved site.

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Reason: To prevent indiscriminate dumping or use of demolition/waste building material for purposes of unauthorised land fill.

- 5.16 All building or site works or other written undertaking or obligation indicated in the submitted plans and supporting documentation or otherwise required under the terms of this consent being carried out or implemented prior to occupation of the premises.

Reason: To ensure compliance with the provisions of the Environmental Planning and Assessment Act 1979.

- 5.17 No slag material or flyash being stored in an uncovered/open position.

Reason: To prevent environmental pollution and ensure observance of appropriate public health standards.

- 5.18 All surface waters from the site being drained to the proposed sediment trap and then by means of underground pipeline to the proposed stormwater connection in Egret Street.

Reason: To prevent environmental pollution and ensure observance of appropriate public health standards.

- 5.19 All waste products from the site, including sediment trap waste, being disposed of in accordance with EPA guidelines.

Reason: To prevent environmental pollution and ensure observance of appropriate public health standards.

- 5.20 The Worimi Local Aboriginal Land Council being notified by the applicant when works are to commence on the subject property so that their Field Officer can be in attendance.

Reason: To minimise the risk of Aboriginal relics or artefacts being damaged or destroyed during the initial construction phase of the proposed development.

- 5.21 Should any Aboriginal relics or artefacts be discovered during the course of any works on-site such works are to cease immediately and the Principal Certifying Authority is to be informed. Work may only be recommenced following written consent from the National Parks and Wildlife Service. Copies of any such consent is to be provided to the Principal Certifying Authority.

(Note: An information sheet is to be available on site which details relevant contact telephone numbers for a suitably qualified archaeologist, Worimi Local Aboriginal Land Council and the National Parks and Wildlife Service Archaeologist.)

Reason: To confirm the terms of consent and to ensure compliance with the provisions of the National Parks and Wildlife Act 1974.

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- 5.22 The proposed wash management facility only accepting waste materials indicated in the submitted EIS and in accordance with the EPA licence requirements, with suitable waste screening procedures being implemented to ensure that all waste loads are checked prior to entry to the site. Any waste loads found to be contaminated with forms of waste not accepted by the facility being refused entry.

Reason: To confirm the conditions of consent and prevent environmental pollution.

6 General Terms of Approval to be Obtained from Other Authorities

- 6.1 Full compliance with the General Terms of Approval stipulated by the NSW Environment Protection Authority in their letter dated 17 April 2002, including the obtaining of any required licence/permit under the Protection of the Environment Operations Act, 1997. Full details in this regard are to be submitted to the Principal Certifying Authority with the required Construction Certificate application.

Reason: To advise of the requirements of other relevant statutory authorities.

7 Advisory Matters

- 7.1 Prior to commencing any construction works, the following provisions of the Environmental Planning and Assessment Act 1979 (the 'Act') are to be complied with:

- a) A Construction Certificate is to be obtained in accordance with Section 81A(2)(a) of the Act.
- b) A Principal Certifying Authority is to be appointed and Council is to be notified of the appointment in accordance with Section 81A(2)(b) of the Act and form 7 of schedule 1 to the Regulations.
- c) Council is to be given at least two days notice of the date intended for commencement of building works, in accordance with Section 81A(2)(c) of the Act and Form 7 of Schedule 1 to the Regulations.

Reason: To advise of matters to be resolved prior to the commencement of work.

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24 FEB 2003

**NOTICE TO APPLICANT OF
DETERMINATION OF APPLICATION
TO MODIFY DETAILS OF
DEVELOPMENT CONSENT**

Section 96(8) Environmental Planning and Assessment Act 1979

To: BORAL RESOURCES COUNTRY P/L
Of: PO BOX 42
WENTWORTHVILLE NSW 2145

Being the applicant in respect of Development Application No. 01/2716 for consent to:

- ESTABLISHMENT OF A WASTE MANAGEMENT FACILITY INVOLVING MOBILE CRUSHING PLANT & ASSOCIATED EQUIPMENT FOR THE RECYCLING OF SLAG, BUILDING & DEMOLITION WASTE AT LOT 1 DP 594332 100 CORMORANT RD KOORAGANG.

With reference to your application of it is advised that, pursuant to the provisions of Section 96 of the Act, the details of development consent granted by Council as per Notice of Determination dated are hereby modified.

Condition 3.4 within Schedule 1 being modified as follows:

- 3.4 All proposed driveways, parking bays, loading bays and vehicular turning areas being constructed with a base course of adequate depth to suit design traffic and being properly maintained. Full details are to be included in documentation for a Construction Certificate application.

Reason: To facilitate the use of vehicular access and parking facilities and to minimise any associated noise and dust nuisance.

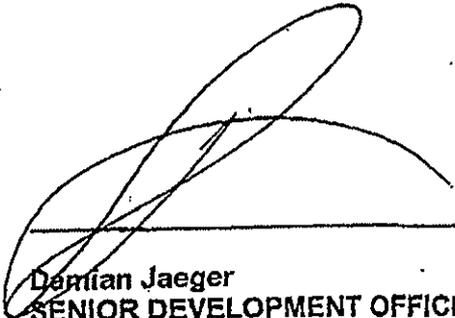
Condition 5.18 within Schedule 1 being modified as follows:

- 5.18 All surface waters from the site being drained via the proposed infiltration trench into the sediment trap.

Reason: To prevent environmental pollution and ensure observance of appropriate public health standards.

Note:

- (i) This Notice should be retained with Council's original Notice of Determination in respect of the subject Development Application and should henceforth be read in conjunction therewith. Any reference in the Environmental Planning and Assessment Act, 1979 or any other Act to a development consent shall, in the case of this matter, be a reference to the original development consent as modified herein.
- (ii) Section 96(6) of the Environmental Planning and Assessment Act, 1979 gives an applicant who is dissatisfied with Council's determination the right to appeal to the Land and Environment Court exercisable within 12 months after the date on which the Notice of Determination is received.



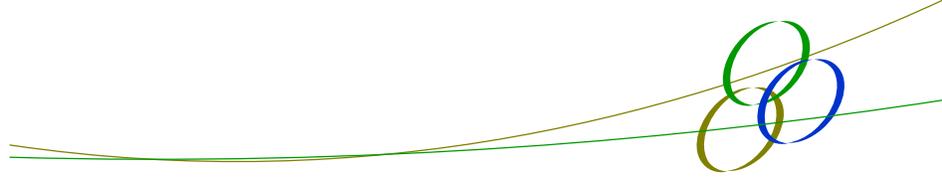
Damian Jaeger
SENIOR DEVELOPMENT OFFICER
CITY WEST

Date: 20 June 2003

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Appendix 3

Capital Investment Value Report

Trade Breakup

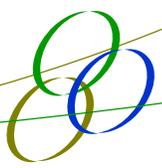
Job name: Kooragang Recycling Plant

Description: CIV Estimate for creating additional recycling and stockpiling areas

Client's name:

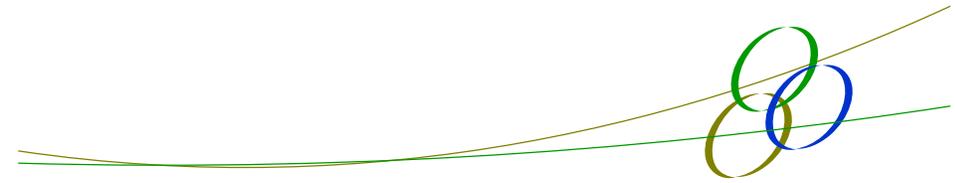
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Description	Quantity	Unit	Rate	Markup %	Total
Assumptions					
No DGB or hard standing in the new recycling and stockpile areas					
All excavated materials are stockpiled on site and no off site disposal					
No additional road allowed					
No lining allowed for the basins, traps					
Site Costs					\$134,142.80
General site clearance of vegetation, debris etc (no rubbish, no topsoil, light to medium vegetation)	10,000	m2	\$0.53		\$5,300.00
Excavate topsoil and stockpiling for future use in landscaping	10,000	m3	\$3.71		\$37,100.00
Regrade and fill to achieve smooth contours	10,000	m2	\$1.91		\$19,080.00
Excavate pits for basins stockpile excavated materials on site	2,460	m3	\$17.10		\$42,066.00
Trim & compact (Grade) OTR	10,000	m2	\$2.40		\$24,000.00
'SF' type fencing	88	m	\$63.60		\$5,596.80
Signage	1	item	\$1,000.00		\$1,000.00
Subtotal:					\$134,142.80
Adjustment:					\$0.00
Subtotal:					\$134,142.80
G.S.T [10%]:					\$13,414.28
Total:					\$147,557.08



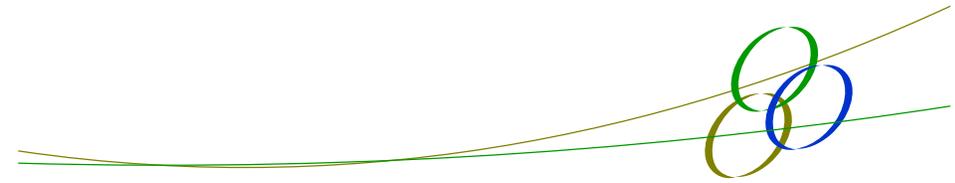
Appendix 4

Relevance of Existing Consent Conditions

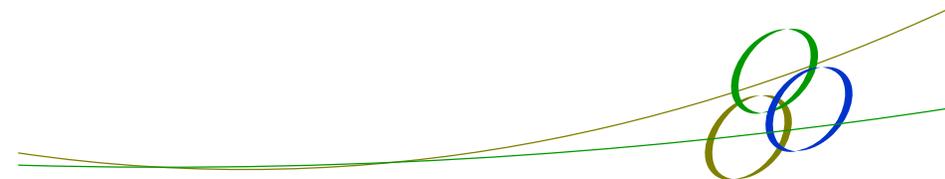


Relevance of Existing Consent Conditions

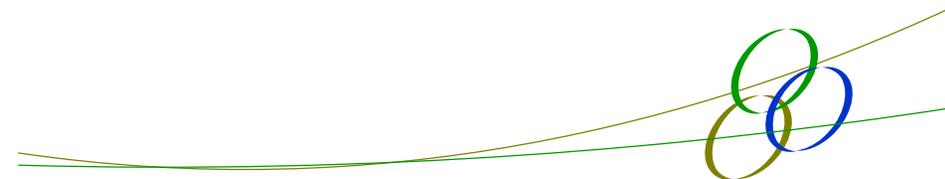
Condition	Description	Relevance to Project
1.1	Carry out development strictly in accordance with EIS.	Irrelevant.
2.1	Any utility alterations to be at developer's cost.	Irrelevant as no additional utilities are required.
2.2	Any works within the public road reserve to be the subject of separate Council approval.	Irrelevant as no such works proposed.
2.3	Use of a temporary protective crossing during construction.	Irrelevant as no such access will be required apart from over existing driveways.
3.1	Preparation of an environmental management plan (EMP) for council approval.	Partially relevant. EMP will require revisions and issue to DP&E.
3.2	Implement dust mitigation measures as per supplementary Air Quality Assessment.	Irrelevant. New dust mitigation measures are provided in the EIS.
3.3	Extend the fixed sprinkler system to all trafficked areas and stockpiles.	Partially relevant. The fixed sprinkler system will be extended.
3.4	All driveways, parking bays, turning areas and loading bays constructed with a base course to suit design traffic.	Partially relevant. These structures have been built, and the proposed additional internal roadways will be constructed from compacted base suitable for design traffic.
3.5	"Any alteration to natural surface levels on the site being undertaken in such a manner as to ensure that no surface water is drained onto or impounded on adjoining properties."	Irrelevant. This condition is problematic as it can be read to require the disturbance of existing flow paths, continuance of which is the stated reason for the condition. The EIS provides details of the planned water management systems and mitigation measures.
3.6	Preparation of a flood emergency response plan.	Irrelevant. Kooragang Island is above the 1% annual exceedance probability predictions in the Newcastle Floodplain Risk Management Study (Map Series 2) (BMT WBM, 2012). This same report categorizes the site as PMF flood fringe, which is the least severe of the three categories analysed. Given the low risk of flooding, there seems to be little reason to maintain the existing flood emergency response plan.



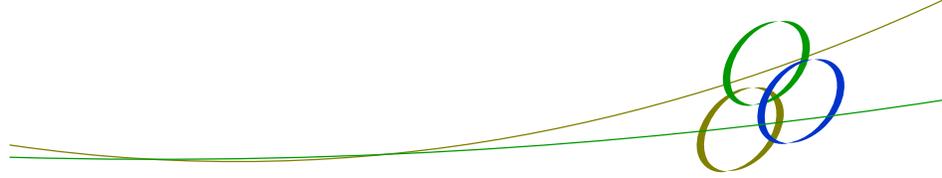
Condition	Description	Relevance to Project
3.7	Provide erosion and sediment measures.	Relevant.
3.8	Development to be carried out in accordance with the 2001 EIS.	Irrelevant and repeat of 1.1
3.9	Prepare and Implement landscape plan.	Irrelevant, as the existing landscaping is sufficient to shield the Project.
3.10	Prepare and issue a landscape practical completion report to Council.	Irrelevant, as the existing landscaping is sufficient to shield the Project.
3.11	Comply with HWC sewer and water supply requirements.	Irrelevant, as all required connections have been made.
4.1	Any advertising or business identification signage will require a separate approval.	Irrelevant, as no new signage is required.
4.2	Comply with HWC with regards the construction of any building or structure over any services or stormwater drain under HWC's control.	Relevant although searches indicate no HWC infrastructure on site.
5.1	Comply with Building Code of Australia.	Relevant.
5.2	Mark entry and exit driveways.	Relevant.
5.3	All vehicular movements in and out of the site to be in a forward direction.	Relevant.
5.4	Soil erosion and sedimentation to be controlled to the standards of the Department of Land and Water Conservation.	Irrelevant, as addressed in 3.7.
5.5	Prevent the emission of "offensive noise" as defined by the <i>Noise Control Act, 1975</i> .	Irrelevant. Section 8.3.3 provides noise predictions which are within relevant criteria.
5.6	"There being no interference with the amenity of the neighbourhood by reason of the emission of any offensive noise, vibration, smell, fumes, smoke, vapour, steam, soot , ash or dust, or otherwise as a result of the proposed development."	Irrelevant. The EIS provides predictions of emissions against the relevant criteria. Standard noise, vibration, odour and dust criteria will apply.



Condition	Description	Relevance to Project
5.7	Construction that is audible at other premises is to be restricted to Monday to Friday 700 am to 600 pm, and Saturday 800 am to 100 pm. No construction work noise is permitted on Sundays or public holidays.	Relevant with regards to minor construction works.
5.8	“Any black glassy slag” excavated during works to be removed and disposed of at the Summerhill Waste Management Centre.	Irrelevant. While it is not expected, any contaminated material that is inadvertently brought onto the site will be dealt with in accordance with waste management regulations.
5.9	Prepare and issue a landscape establishment report.	Irrelevant, as no additional landscaping is required.
5.10	Repair any damage to public footpath, kerbs, gutters, etc.	Relevant.
5.11	Relocate any survey monuments affected by construction.	Relevant.
5.12	Disconnect all services prior to demolition.	Irrelevant.
5.13	Provide a letterbox and building number.	Irrelevant as already provided.
5.14	Provide a flushing sewerer toilet for every 20 people of part thereof employed at the site.	Irrelevant as toilets are provided already.
5.15	Dispose of any demolition or waste building materials at Council’s waste disposal site.	Irrelevant as any such wastes will be processed on site.
5.16	All building or site works to be completed prior to occupation.	Irrelevant.
5.17	No slag or flyash to be stored uncovered.	Partially relevant. Flyash used in the stabilisation plant will be stored in a silo as detailed in the EIS. While it is not currently planned to accept slag, it should be noted that most slags are not inherently dusty nor are they easily blown.
5.18	“All surface waters from the site being drained via the proposed infiltration trench into the sediment trap.”	Irrelevant. Proposed water control measures are detailed in Section 8.5.8
5.19	All wastes to be disposed of in accordance with EPA guidelines.	Relevant.
5.20	Notify Worimi Aboriginal Land Council prior to works so that they can attend.	Irrelevant as there is very limited potential for the uncovering of Aboriginal artefacts on this part of Kooragang Island.



Condition	Description	Relevance to Project
5.21	Apply chance find protocols for Aboriginal artefacts.	Relevant.
5.22	Accept only waste types specified in the EIS.	Partially relevant. The types of waste to be accepted and their definitions have changed over the years, and it is appropriate that incoming wastes are as per specified in the 2015 EIS.
6.1	Comply with EPA's general terms of approval including the requirement to obtain an EPL.	Partially relevant. The general terms of approval process is no longer current, but the existing EPL will be modified to account for the Project.
7.1	A construction certificate is to be obtained; a principal certifying authority is to be appointed; and Council is to be given 2 days' notice of the commencement of works.	No longer relevant to the existing operation, but a construction certificate will be required for construction and drainage works for the Project.



Appendix 5

Air Quality Assessment



global environmental solutions

Boral Kooragang Recycling Facility
Air Quality Impact Assessment

Report Number 610.15009-R1

28 July 2015

Environmental Property Services
9 Yacaaba Street
NELSON BAY NSW 2315

Version: Revision 0

Boral Kooragang Recycling Facility

Air Quality Impact Assessment

PREPARED BY:

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

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

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

DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
610.15009-R1	Revision 0	28 July 2015	Alison Radford / Martin Doyle	Gary Graham	Martin Doyle

Non-Technical Summary

This Air Quality Impact Assessment has assessed the potential emissions of dust to air resulting from the operation of an expanded materials recycling facility to be located at the existing Boral Recycling Facility located on the corner of Egret Street and Raven Street, Kooragang Island, NSW. A detailed atmospheric dispersion modelling exercise has been performed to assess the potential impacts of emitted dust on the surrounding community. The assessment has also taken into account the current levels of air pollution in the area.

Pollutant Emissions

Emissions of dust resulting from the delivery, unloading, handling and loading of materials to be recycled have been quantified using emissions estimation techniques usually adopted for the aggregate processing industry. These techniques have been adopted within this assessment in the absence of specific factors relevant to the waste industry. Given the non-specific nature of these factors the resulting emissions can be considered to represent a worst case for the Project, with emissions resulting from operation assumed to be considerably lower.

Existing Meteorology

Five years of meteorological data for the Bureau of Meteorology Williamtown RAAF weather station was examined and a year most representative of the long term features was chosen for use within the assessment. A site specific meteorological file was constructed for use in the detailed dispersion modelling assessment using approved modelling techniques. The modelled data was compared with observations made at both Williamtown RAAF and the Bureau of Meteorology Newcastle Nobbys weather stations.

Existing Air Quality

Air quality experienced within the local area was determined using data collected by NSW OEH at six sites in the local area as part of the Lower Hunter and Newcastle Local air quality monitoring networks. These data were considered to include the impacts of regional influences on air quality, such as bushfires and dust storms. Data collected at the Mayfield, Carrington and Stockton sites could not be used directly within this assessment as the data was only available from August 2014 rather than January, although a comparison of the data collected at these three stations with data collected at Newcastle, Wallsend and Beresfield was made.

Atmospheric Dispersion Modelling

Detailed atmospheric dispersion modelling was performed which assessed the influence of meteorology on the dispersion of dust generated at the Project site and the resulting impacts upon a number of selected receptor locations in Mayfield, Carrington and Stockton. The results of the assessment indicated that the contribution of the proposed Project activities were predicted to be very minor at all sensitive receptor locations assessed. The predicted concentrations at all sensitive receptors from Project activities only were:

- $<0.7 \mu\text{g}/\text{m}^3$ maximum 24 hour average PM_{10} concentration.
- $<0.2 \mu\text{g}/\text{m}^3$ annual average PM_{10} concentration.
- $<0.2 \mu\text{g}/\text{m}^3$ maximum 24 hour average $\text{PM}_{2.5}$ concentration.
- $<0.1 \mu\text{g}/\text{m}^3$ annual average $\text{PM}_{2.5}$ concentration.
- $<0.2 \mu\text{g}/\text{m}^3$ annual average TSP concentration.
- $<0.1 \text{g}/\text{m}^2/\text{month}$ annual average dust deposition.

Non-Technical Summary

When taking into account the existing air quality of the area, the predicted cumulative concentrations (Project plus background) were shown to be in exceedance of the maximum 24 hour average criterion for PM_{10} and the annual average criterion for $PM_{2.5}$. These criteria were shown to already be in exceedance without the addition of the predicted contribution from the Project. The contributions of the predicted increments are demonstrated to not result in any additional exceedances of the Project criteria.

Air Quality Management and Monitoring

The assessment has considered the application of a number of air quality management techniques including the use of water sprays on stockpiles, unsealed haul roads and the crusher operation and the use of wheel washes at the site entrance. Dispersion modelling indicates that these measures are more than sufficient to minimise the impacts of particulate pollution on the surrounding sensitive receptor locations.

Given the distance between the Project site and the nearest sensitive receptors (>2 km), the predicted minor impacts of the Projects on these sensitive receptors, the high number of existing air quality monitoring stations in the area (currently six) and the nature of the area immediately surrounding the Project site (ie coal stockpile operations), it is not considered that an air quality monitoring program operated by Boral would be required to be implemented as a condition of consent for this Project.

The areas in which sensitive receptors are located (Stockton, Mayfield and Carrington) each have a NSW OEH operated continuous PM_{10} and $PM_{2.5}$ monitoring station, data from which can be interrogated (as is currently being performed through the Newcastle Community Consultative Committee on the Environment) to determine the likely sources during periods of elevated air pollution. Addition of extra sites to monitor the same parameters would not be considered to provide any additional information of any use.

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APPENDICES

Appendix A Selection of Appropriate Meteorological Year

1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Environmental Property Services (EPS) on behalf of Boral Recycling Pty Ltd (Boral) to perform an Air Quality Impact Assessment (AQIA) for the proposed expansion to the existing materials recycling facility located on the corner of Egret St and Raven St, Kooragang Island (the Project site). This assessment forms a part of the Environmental Impact Statement (EIS) for the Project.

The Environmental Planning and Assessment Act 1979 (EP&A Act) forms the statutory framework for planning approval and environmental assessment in NSW. The project is considered 'State Significant Development' (SSD 15_7015) in accordance with Division 4.1 of Part 4 of the EP&A Act, as it is a type listed in Schedule 1 of the State Environmental Planning Policy (SEPP) - State and Regional Development.

The existing operations at the site (outlined in **Section 2**) are licenced as a waste storage and resource recovery operation (Environment Protection Licence (EPL) number 11968) as issued by the Environmental Protection Authority (EPA) under Schedule 1 of the Protection of the Environment Operations (POEO) Act 1997.

1.1 Secretary's Environmental Assessment Requirements

NSW Department of Planning and Environment (DPE) issued Secretary's Environmental Assessment Requirements (SEARs) for the Project in May 2015. **Table 1** below identifies the SEARs relevant to this Air Quality Assessment report and the relevant sections of the report in which they have been addressed.

Table 1 Secretary's Environmental Assessment Requirements – Boral Recycling Pty Ltd Recycling Facility Expansion (Application number SSD 15_7015)

Key Issue	Assessment Requirement	Addressed in Section
Air Quality and Odour	A description of all types and sources of air and odour emissions.	Section 2.1
	A quantitative assessment of the potential air quality, dust and odour impacts of the project on surrounding landowners in accordance with relevant Environmental Protection Authority guidelines.	Section 8
	A description and appraisal of proposed mitigation, management and monitoring measures.	Section 7.1.1

Issued: May 2015; Department of Planning & Environment, NSW Government, File Reference: SSD 15_7038.

The SEARs require that the assessment be performed in accordance with relevant policies, guidelines and plans including:

- Protection of Environment Operations (Clean Air) Regulation 2010;
- Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2005);
- Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (2006);
- Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW (2006a); and,
- Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (2006b).

This assessment addresses the key issues raised within the SEARs and is performed in accordance with the relevant policies and guidelines.

1.2 Outline of Assessment

The NSW Office of Environment and Heritage (OEH) "*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*" (DEC 2005) (the Approved Methods) outline the requirements for conducting an AQIA, as follows (with identification of where each requirement has been met):

- Description of local topographic features and sensitive receptor locations (**Section 3.1 & Section 3.2** respectively).
- Establishment of air quality assessment criteria (**Section 4.2**).
- Analysis of climate and dispersion meteorology for the region (**Section 5**).
- Description of existing air quality environment (**Section 6**).
- Compilation of a comprehensive emissions inventory for existing and proposed operations (**Section 7**).
- Completion of atmospheric dispersion modelling and analysis of results (**Section 8**).
- Preparation of an air quality impact assessment report comprising the above.

2 PROJECT OVERVIEW

Boral is proposing to expand an existing construction and demolition materials recycling facility within the site of an existing operation located at Kooragang Island.

The facility will have a capacity to receive, process and despatch recycling materials of up to 350,000 tonnes per annum (tpa) of non-putrescible waste for reuse in secondary markets.

A detailed description of the Project, the Project location, process description and site layout can be found within the main body of the EIS.

2.1 Identification of Emission Sources

Atmospheric pollutants likely to be generated by existing and proposed activities at the Project site include fugitive emissions of particulates (assessed as PM₁₀, PM_{2.5} and TSP¹). Given that no putrescible or green waste will be accepted at the Project site, it is not anticipated that any odour would be generated and therefore this AQIA focuses on emissions and impacts of particulate matter only.

From the information provided, the major pollutants and emission sources identified at the Project site are summarised in **Table 2**.

Table 2 Summary of Identified Emission Sources and Associated Pollutants

Area	Potential Emissions to Air
Materials Handling	Particulates from dumping and handling of inert raw material Particulates from crushing and screening of inert raw material Particulates from loading of trucks with final inert product for re-use
Wind Erosion	Particulates from wind erosion of stockpiles of inert materials
Haulage	Particulates due to movement of vehicles on sealed roads

2.2 Emission Controls

It is understood that the following dust controls are and will be continued to be applied at the Project site.

- Water sprays are located across the site to keep stockpiles moist;
- Mist is applied to transfer points on the crusher and screens;
- Unsealed roads and hardstand areas used for vehicle movement are regularly watered;
- Wheel washes are performed on outbound vehicles;
- The stabilisation plant silo will be fitted with a baghouse/filter; and
- Roads are sealed from the wheel wash at the site exit with rumble grids on approach.

Further details on the application of control measures within the dispersion modelling assessment is provided in **Section 7**.

¹ PM₁₀ is used to describe particulate matter with an aerodynamic diameter of 10 microns (µm) or less. PM_{2.5} is used to describe particulate matter with an aerodynamic diameter of 2.5 µm or less. TSP (Total Suspended Particulate) describes particulate matter which is less than 50 µm in diameter.

2.3 Equipment Inventory

A summary of the proposed inventory for mobile and stationary equipment is shown below:

- 2 x front end loaders;
- 2 x excavators (with loading buckets, pulverisers, cutters and screening attachments);
- Mobile crushing and screening plant;
- Mobile stabilisation plant (with associated horizontal or vertical silo) that will be moved around the site as required; and
- Road trucks (generally, there will be no more than four road trucks on site at one time. Two being loaded, one leaving and one tipping. Other trucks may queue on the incoming driveway).

2.4 Hours of Operation

It is proposed to operate the site 24 hours per day Monday to Saturday with only maintenance occurring between 6 am to 6 pm Sundays and public holidays.

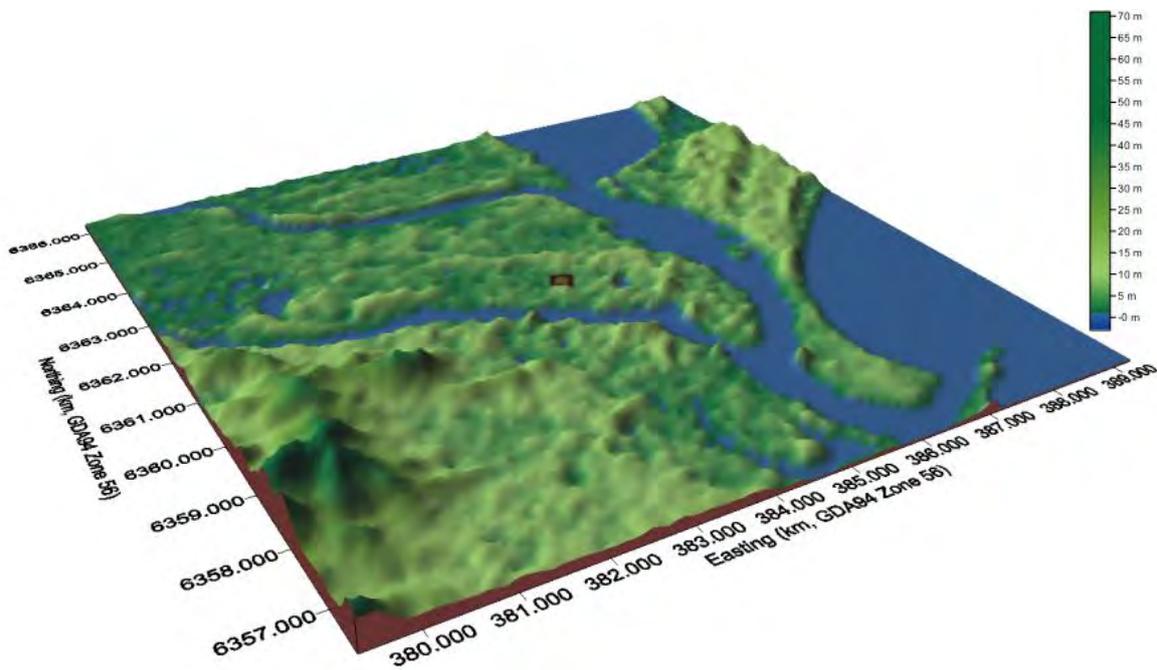
3 STUDY AREA

3.1 Local Topography

The topographical data used in the modelling assessment was sourced from the United States Geological Service's Shuttle Radar Topography Mission database that has recorded topography across Australia with a 3 arc second (~90 m) spacing.

Figure 1 illustrates the topography of the region surrounding the Project site. The Project site is located in a relatively flat terrain with maximum terrain height of 71 m Australian Height Datum (AHD) in the region shown.

Figure 1 Topography Surrounding the Project Site



Note:

1. The Project site is outlined in red.

3.2 Sensitive Receptors

A number of residences have been identified as sensitive receptor locations in the area surrounding the Project site. The locations of the closest identified sensitive receptors to the Project site are presented in **Table 3** and shown in **Figure 2**.

Table 3 Locations of the Identified Sensitive Receptors

Receptor ID	UTM Zone 56H		Elevation (m, AHD)	Approximate Distance from Project site (m)
	Easting (m)	Northing (m)		
R1	381,363	6,360,499	14.4	3,050
R2	381,991	6,360,367	17.0	2,500
R3	382,676	6,359,955	6.8	2,100
R4	383,233	6,359,536	9.6	2,070
R5	383,421	6,358,681	5.0	2,760
R6	384,625	6,358,289	3.8	3,010
R7	386,974	6,362,710	3.1	3,020
R8	387,206	6,362,007	6.4	2,950
R9	387,298	6,361,169	8.9	2,970
R10	386,644	6,359,438	4.2	2,960
R11	386,426	6,358,993	4.0	3,100
R12	386,155	6,358,612	3.0	3,200
R13	385,928	6,358,273	10.3	3,400

AHD – Australian Height Datum

It is noted that the closest identified sensitive receptor to the Project site is situated within Mayfield which is located a distance of approximately 2 km to the southwest of the Project site.

Figure 2 Locations of the Identified Sensitive Receptors



4 ASSESSMENT CRITERIA

NSW State air quality guidelines formulated by the NSW Office of Environment and Heritage (OEH) are published in DEC 2005, Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, Department of Environment and Conservation NSW, August 2005, hereafter 'the Approved Methods'.

4.1 Particulate Matter

4.1.1 Particulates (as TSP)

Airborne contaminants that can be inhaled directly into the lungs can be classified on the basis of their physical properties as gases, vapours or particulate matter. In common usage, the terms "dust" and "particulates" are often used interchangeably. The term "particulate matter" refers to a category of airborne particles, typically less than 50 microns (μm) in diameter and ranging down to 0.1 μm and is termed total suspended particulate (TSP). The annual goal for TSP recommended by the NSW OEH is 90 micrograms per cubic metre of air ($\mu\text{g}/\text{m}^3$).

The TSP goal was developed before the more recent results of epidemiological studies which suggested a relationship between health impacts and exposure to concentrations of finer particulate matter.

4.1.2 Particulates (as PM_{10} and $\text{PM}_{2.5}$)

Emissions of particulate matter less than 10 μm and 2.5 μm in diameter (referred to as PM_{10} and $\text{PM}_{2.5}$ respectively) are considered important pollutants due to their ability to penetrate into the respiratory system. In the case of the $\text{PM}_{2.5}$ category, recent health research has shown that this penetration can occur deep into the lungs. Potential adverse health impacts associated with exposure to PM_{10} and $\text{PM}_{2.5}$ include increased mortality from cardiovascular and respiratory diseases, chronic obstructive pulmonary disease and heart disease, and reduced lung capacity in asthmatic children.

The NSW OEH PM_{10} assessment goals set out in the Approved Methods are as follows:

- a 24-hour maximum of 50 $\mu\text{g}/\text{m}^3$; and
- an annual average of 30 $\mu\text{g}/\text{m}^3$.

The Approved Methods do not set any assessment goals for $\text{PM}_{2.5}$. In December 2000, the National Environment Protection Council (NEPC) initiated a review to determine whether a national ambient air quality criterion for $\text{PM}_{2.5}$ was required in Australia, and the feasibility of developing such a criterion. The review found that:

- there are health effects associated with these fine particles;
- the health effects observed overseas are supported by Australian studies; and
- fine particle standards have been set in Canada and the USA, and an interim criterion is proposed for New Zealand.

The review concluded that there is sufficient community concern regarding $\text{PM}_{2.5}$ to consider it an entity separate from PM_{10} .

As such, in July 2003, a variation to the Ambient Air Quality NEPM was made to extend its coverage to $\text{PM}_{2.5}$, setting the following *Interim Advisory Reporting Standards* for $\text{PM}_{2.5}$:

- a 24-hour average concentration of 25 $\mu\text{g}/\text{m}^3$; and
- an annual average concentration of 8 $\mu\text{g}/\text{m}^3$.

It is noted that the advisory reporting standards relating to PM_{2.5} particles are interim guidelines only at the present time and *are not intended to represent air quality criteria*.

4.1.3 Potential Changes to the Ambient Air Quality NEPM

On 29 April 2014, Commonwealth, State and Territory Environment Ministers signalled their intent to vary the Ambient Air Quality NEPM based on the latest scientific understanding of the health risks resulting from airborne particulate pollution. On 15 July 2015 Ministers agreed in-principle to adopt reporting standards for annual average and 24-hour PM_{2.5} as outlined in **Table 4** with a move to 7 µg/m³ and 20 µg/m³ over the longer term. Ministers agreed to finalise their consideration of the matter by 31 December 2015, including appropriate standards for PM₁₀.

Table 4 Proposed Variation to the Ambient Air Quality NEPM

Metric	Averaging Period	Current Standard	Options for Standard	Allowed Exceedances
PM ₁₀	Annual average	None	No standards with consideration of 20 µg/m ³	N/A
	24-hour mean	50 µg/m ³	50 µg/m ³ , with consideration of 45 µg/m ³ and 40 µg/m ³	See note below
PM _{2.5}	Annual average	8 µg/m ³ (in-principle)	8 µg/m ³	N/A
	24-hour mean	25 µg/m ³ (in-principle)	25 µg/m ³	See note below

The four options for the form of the 24-hour standards, and specifically the treatment of exceedances, for both PM₁₀ and PM_{2.5} are as follows:

- Business as usual option; a rule that allows a fixed number of exceedances of a PM standard in a given year, with no exclusion of data for exceptional events.
- A rule that allows a fixed number of exceedances of a PM standard in a given year, but with exclusion of data for exceptional events.
- A rule in which the 98th percentile PM concentration in a given year is compared with a standard, with no exclusion of data for exceptional events.
- A rule in which the 98th percentile PM concentration in a given year is compared with a standard, but with exclusion of data for exceptional events.

It has been identified by the NEPC that it is likely that jurisdictions will want to identify local issues that affect the form of the standards and therefore the options for this standard have been left open.

For the purposes of this assessment, the currently adopted standards for PM₁₀ are referenced and the standards for PM_{2.5} are referenced assuming that these will be adopted.

4.1.4 Particulates (as Deposited Dust)

The preceding section is concerned in large part with the health impacts of airborne particulate matter. Nuisance impacts need also to be considered in relation to deposited dust. In NSW, accepted practice regarding the nuisance impact of dust is that dust-related nuisance can be expected to impact on residential areas when annual average dust deposition levels exceed 4 g/m²/month.

Table 5 presents the impact assessment goals set out in the Approved Methods for dust deposition, showing the allowable increase in dust deposition level over the ambient (background) level to avoid dust nuisance.

Table 5 OEH Goals for Allowable Dust Deposition

Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Annual	2 g/m ² /month	4 g/m ² /month

Source: Approved Methods, NSW DEC 2005.

4.2 Summary of Project Air Quality Goals

The air quality goals adopted for this assessment, which conform to current OEH and Commonwealth air quality criteria, are summarised in **Table 6**.

Table 6 Project Air Quality Goals

Pollutant	Averaging Time	Goal
TSP	Annual	90 µg/m ³
PM ₁₀	Maximum 24 Hours	50 µg/m ³
	Annual	30 µg/m ³
PM _{2.5}	Maximum 24 Hours	25 µg/m ³ (interim advisory reporting standard at the present time)
	Annual	8 µg/m ³ (interim advisory reporting standard at the present time)
Dust Deposition	Annual	Maximum Incremental increase of 2 g/m ² /month
		Maximum Cumulative of 4 g/m ² /month (Project and other sources)

Source: Approved Methods, NSW DEC 2005.

5 PREVAILING DISPERSION METEOROLOGY

5.1 Dispersion Modelling Approach

Emissions from the proposed operations at the Project site identified as having the potential to impact upon the nearby residences have been modelled using the US EPA's CALPUFF (Version 6.267) modelling system. CALPUFF is a transport and dispersion model that ejects "puffs" of material emitted from modelled sources, simulating dispersion and transformation processes along the way. In doing so it typically uses the fields generated by a meteorological pre-processor CALMET, discussed further in **Section 5.2**. Temporal and spatial variations in the meteorological fields selected are explicitly incorporated in the resulting distribution of puffs throughout a simulation period. The primary output files from CALPUFF contain hourly concentrations or deposition values evaluated at selected receptor locations. The CALPOST post-processor is then used to process these files, producing tabulations that summarise results of the simulation for user-selected averaging periods.

The advantages of using CALPUFF (rather than using a steady state Gaussian dispersion model such as AUSPLUME) is its ability to handle calm wind speeds (<0.5 m/s) and the effects of complicated terrain on plume dispersion. Steady state models assume that meteorology is unchanged by topography over the modelling domain and may result in significant over or under estimation of air quality impacts.

More advanced dispersion models (such as CALPUFF) are approved for use by many regulatory authorities in situations where these models may be more appropriate than steady-state Gaussian dispersion models. Such situations include those noted above (i.e. high frequency of calm wind conditions and/or complicated terrain).

5.2 Meteorological Modelling

Meteorological mechanisms govern the dispersion, transformation and eventual removal of pollutants from the atmosphere. The extent to which pollution will accumulate or disperse in the atmosphere is dependent on the degree of thermal and mechanical turbulence within the earth's boundary layer. Dispersion comprises vertical and horizontal components of motion. The stability of the atmosphere and the depth of the surface-mixing layer define the vertical component. The horizontal dispersion of pollution in the boundary layer is primarily a function of the wind field. The wind speed determines both the distance of downwind transport and the rate of dilution as a result of plume 'stretching'. The generation of mechanical turbulence is similarly a function of the wind speed, in combination with the surface roughness. The wind direction, and the variability in wind direction, determines the general path pollutants will follow, and the extent of crosswind spreading.

Pollution concentration levels therefore fluctuate in response to changes in atmospheric stability, to concurrent variations in the mixing depth, and to shifts in the wind field (Oke 2004).

To adequately characterise the dispersion meteorology of the study site, information is needed on the prevailing wind regime, mixing depth and atmospheric stability and other parameters such as ambient temperature, rainfall and relative humidity.

Meteorological data collected over the period 2010-2014 at the nearest BOM station (Williamtown RAAF [station number 061078] refer **Figure 10**) were analysed to select a representative year for dispersion modelling. The analysis showed that data collected during the 2014 calendar year are in reasonably good agreement with long term averages compared to other years and were therefore selected for use in this assessment (refer **Appendix A**).

5.2.1 TAPM

In order to calculate all required meteorological parameters required by the dispersion modelling process, meteorological modelling using The Air Pollution Model (TAPM, v 4.0.4) has been performed. TAPM, developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) is a prognostic model which may be used to predict three-dimensional meteorological data and air pollution concentrations.

TAPM model predicts wind speed and direction, temperature, pressure, water vapour, cloud, rain water and turbulence. The program allows the user to generate synthetic observations by referencing databases (covering terrain, vegetation and soil type, sea surface temperature and synoptic scale meteorological analyses) which are subsequently used in the model input to generate site-specific hourly meteorological observations at user-defined levels within the atmosphere.

TAPM model may assimilate actual local wind observations so that they can optionally be included in a model solution. However, given that TAPM is known to under-predict calm wind conditions, the wind speed and direction observations obtained from the nearest BoM stations have also been used in the subsequent CALMET component of the modelling as described in **Section 5.2.2** below.

Table 7 Meteorological Parameters used for this Study (TAPM v 4.0.4)

Modelling Period	1 January 2014 to 31 December 2014
Centre of analysis	384,317 mE, 6,361,275 mN (UTM Coordinates)
Number of grid points	25 × 25 × 25
Number of grids (spacing)	4 (30 km, 10 km, 3 km, 1 km)
Terrain	AUSLIG 9 second DEM

The three dimensional upper air data from TAPM output was used as input for the diagnostic meteorological model (CALMET).

5.2.2 CALMET

In the simplest terms, CALMET is a meteorological model that develops wind and temperature fields on a three-dimensional gridded modelling domain. Associated two-dimensional fields such as mixing height, surface characteristics, and dispersion properties are also included in the file produced by CALMET. The interpolated wind field is then modified within the model to account for the influences of topography, as well as differential heating and surface roughness associated with different land uses across the modelling domain. These modifications are applied to the winds at each grid point to develop a final wind field. The final wind field thus reflects the influences of local topography and current land uses.

CALMET modelling was conducted using two approaches; using the 'with OBS' (ie with surface meteorological observations) and 'no OBS' (ie without surface meteorological observations) methods. In the case of the 'with OBS' method, TAPM generated upper air data and available surface weather observations in the area were used to refine the wind field predetermined by TAPM data. Hourly surface meteorological data from the nearest BoM stations (i.e. Williamtown RAAF AWS and Newcastle Nobbys Signal Station AWS [station number 061055]) were incorporated in the CALMET modelling. In the 'no OBS' method, no surface meteorological observations were incorporated.

For both approaches, a horizontal grid spacing of 100 m was used to adequately represent the important local terrain features and land use. **Table 8** details the parameters used in the meteorological modelling.

Comparison of the predicted wind speeds and directions resulting from the 'with OBS' and 'no OBS' CALMET model runs indicated that the 'no OBS' run produced predictions more representative of observations and these data were taken forward for dispersion modelling. The 'no OBS' approach also enabled verification of the modelled meteorological data file in two separate locations (ie Williamtown and Newcastle Nobbys) providing additional veracity to the method.

Table 8 CALMET Configuration Used for this Study

Modelling Period	1 January 2014 to 31 December 2014
Centre of analysis	384,317 mE, 6,361,275 mN (UTM Coordinates)
Meteorological grid domain	10 km x 10 km
Meteorological grid resolution	100 m
Vertical Resolution (Cell Heights)	10 (0 m, 20 m, 40 m, 80 m, 160 m, 320 m, 640 m, 1200 m, 2000 m, 3000 m, 4000 m)
Data Assimilation	Williamtown and Newcastle Nobbys ('with OBS') / None ('no OBS')

5.2.3 Meteorological Data Used in Modelling

5.2.3.1 Wind Speed and Direction

A summary of the annual wind behaviour observed at Williamtown RAAF AWS for the year 2014 is presented in **Figure 3**. This is shown as a comparison to the annual wind behaviour predicted by CALMET for the year 2014, presented in **Figure 4**. The annual wind behaviour observed and predicted at Nobbys Signal Station AWS for 2014 are also presented in **Figure 5** and **Figure 6**, respectively.

The wind roses in **Figure 3** indicate that winds experienced at the Williamtown RAAF AWS in 2014 were predominantly moderate with a small percentage of strong winds (>8 m/s). Calm wind conditions (wind speed less than 0.5 m/s) were observed to occur 1.7% of the time. Wind direction is shown to be seasonally dependent with winds occurring predominantly from the west north-west direction, with an additional significant contribution from the east north-east and north-east directions. Meteorological modelling at this location (**Figure 4**) predicted winds from similar directions but the frequency of high winds was sufficiently less and calm winds were predicted to occur 0.7% of the time. This may lead to less dust emissions from wind erosion on-site being predicted at R10-R13, which are located downwind of the predominant west north-westerlies.

The wind roses for winds experienced at the Nobby's Signal Station AWS in 2014 indicate that wind speeds were higher than predicted in all directions, likely due to the coastal location. This is also illustrated by the incidence of calm wind conditions (wind speed less than 0.5 m/s) observed for only 0.3% of the year. Winds occur predominantly from the north-west direction, with an additional significant contribution from the east north-east and southerly directions.

Meteorological modelling at this location under-predicts the wind speeds and under-predicts the prevalence of winds from the north-west. However, the prevalence of north-easterly winds is over-predicted. This may lead to less dust emissions from wind erosion on-site being generated and a higher incidence of impacts to R1-R5 and a lower incidence at R10-R13.

Figure 3 Seasonal Wind Roses at Williamtown RAAF AWS (BoM, 2014)

Williamtown RAAF
 (BoM)
 01/01/2014 - 31/12/2014
 610.15009

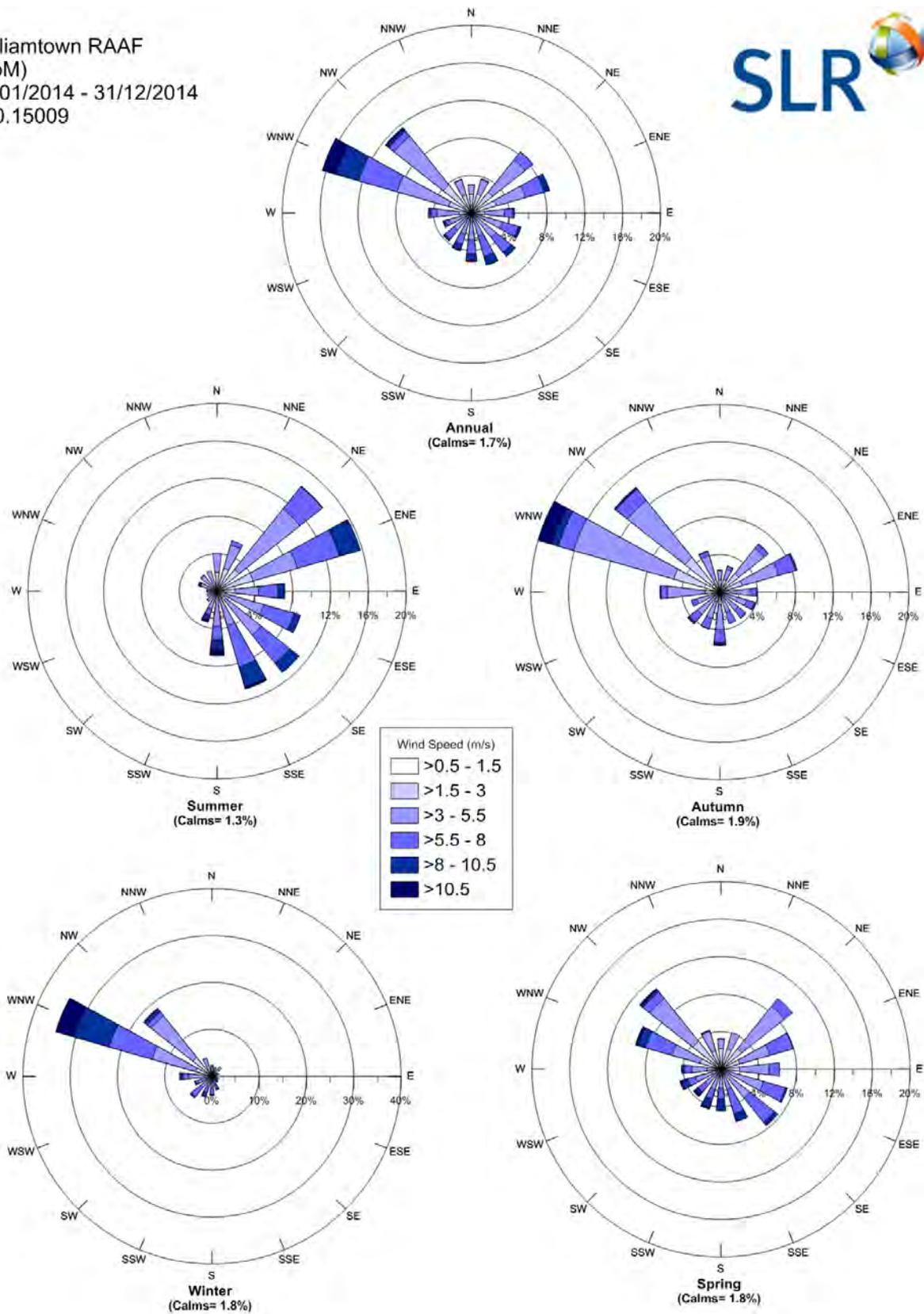


Figure 4 Predicted Seasonal Wind Roses at Williamtown RAAF AWS (CALMET - NOOBS, 2014)

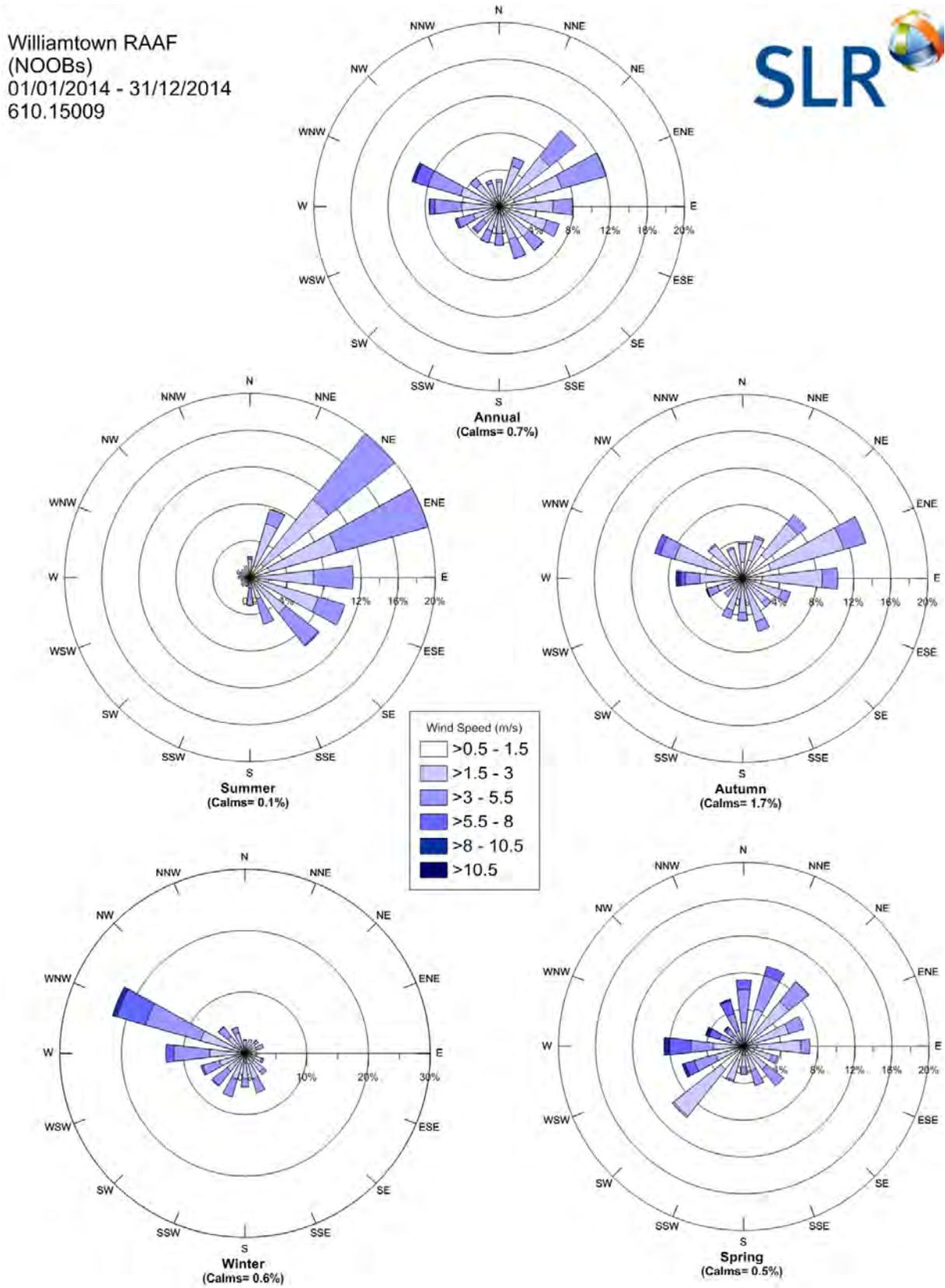


Figure 5 Seasonal Wind Roses at Nobbys Signal Station AWS (BoM, 2014)

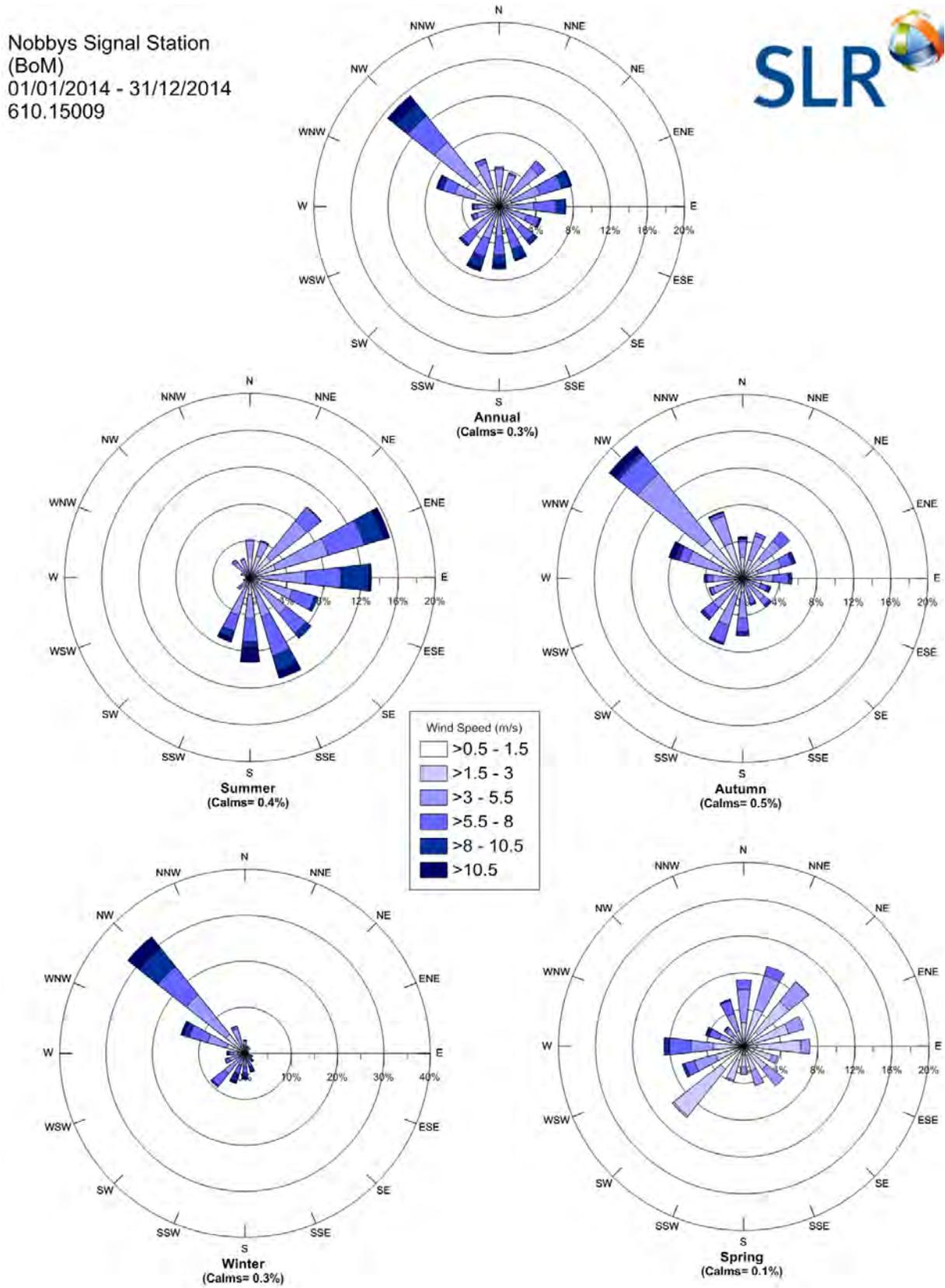
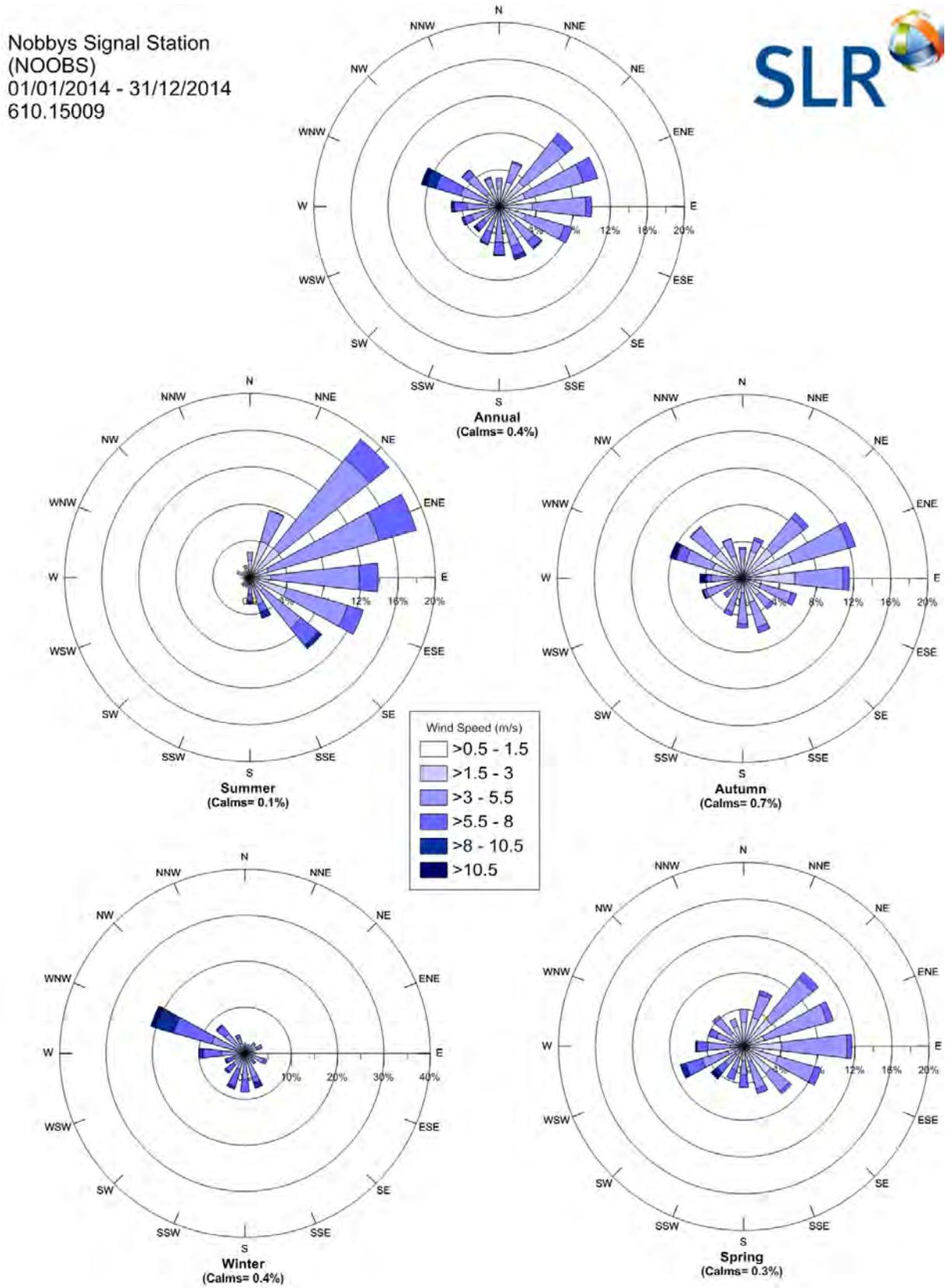


Figure 6 Predicted Seasonal Wind Roses at Nobbys Signal Station AWS (CALMET - NOOBS, 2014)



5.2.3.2 Atmospheric Stability

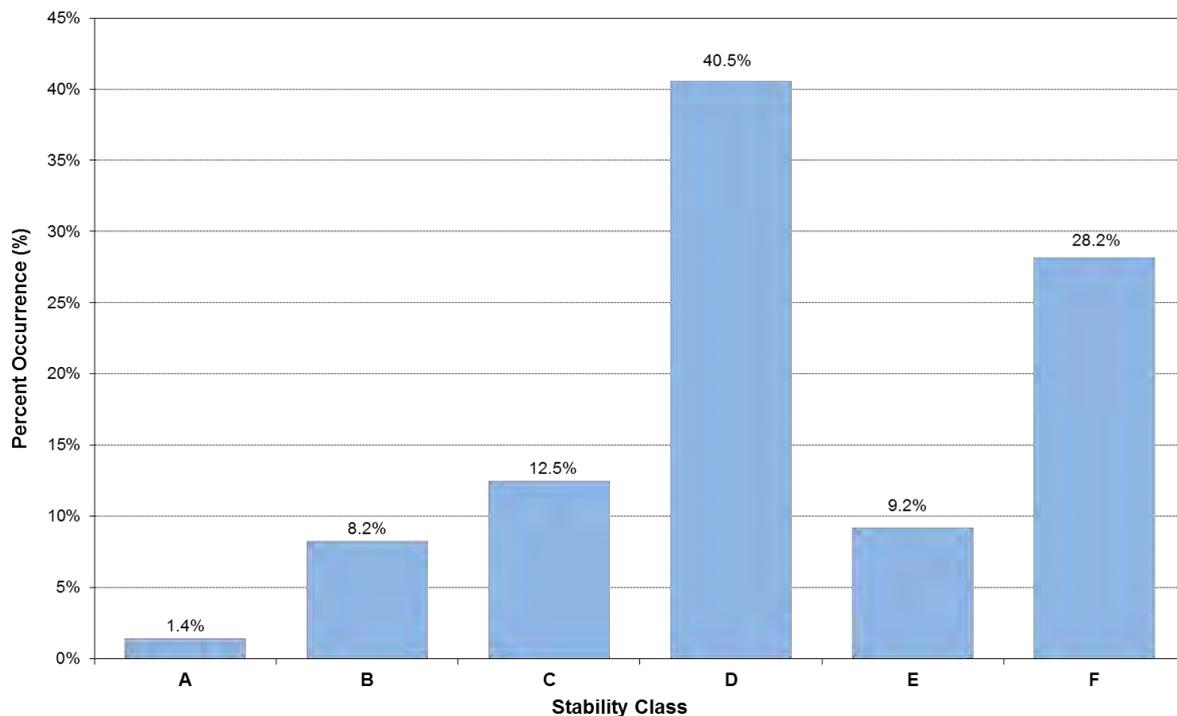
Atmospheric stability refers to the tendency of the atmosphere to resist or enhance vertical motion. The Pasquill-Turner assignment scheme identifies six Stability Classes (A to F) to categorise the degree of atmospheric stability (see **Table 9**). These classes indicate the characteristics of the prevailing meteorological conditions and are used as input into various air dispersion models.

Table 9 Description of Atmospheric Stability Classes

Atmospheric Stability Class	Category Description
A	Very unstable, Low wind, clear skies, hot daytime conditions
B	Unstable, Clear skies, daytime conditions
C	Moderately unstable, Moderate wind, slightly overcast daytime conditions
D	Neutral, High winds or cloudy days and nights
E	Stable, Moderate wind, slightly overcast night-time conditions
F	Very stable, Low winds, clear skies, cold night-time conditions

The frequency of each stability class predicted by CALMET during the modelling period, extracted at the centre of the Project site, is presented in **Figure 7**. The results indicate a high frequency of conditions typical to Stability Class D. Stability Class D is indicative of neutral conditions described as high winds or cloudy days and nights. There are also a large proportion of Stability Class F conditions, which will inhibit pollutant dispersion resulting in higher pollutant concentrations.

Figure 7 Predicted Stability Class Frequencies at Williamtown RAAF (CALMET predictions, 2014)

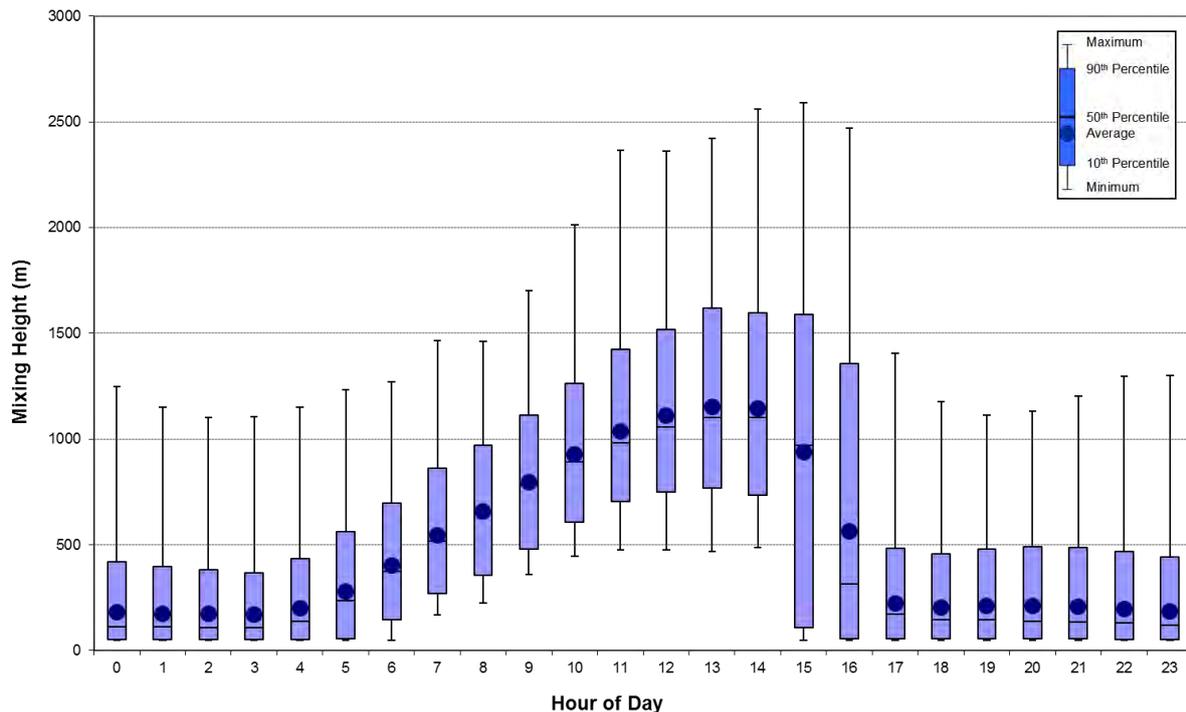


5.2.3.3 Mixing Heights

Diurnal variations in maximum and average mixing height predicted by CALMET at the Project site during the 2014 modelling period are illustrated in **Figure 8**.

As would be expected, an increase in mixing height during the morning is apparent, arising due to the onset of vertical mixing following sunrise. Maximum mixing heights occur in the mid to late afternoon, due to the dissipation of ground based temperature inversions and growth of the convective mixing layer.

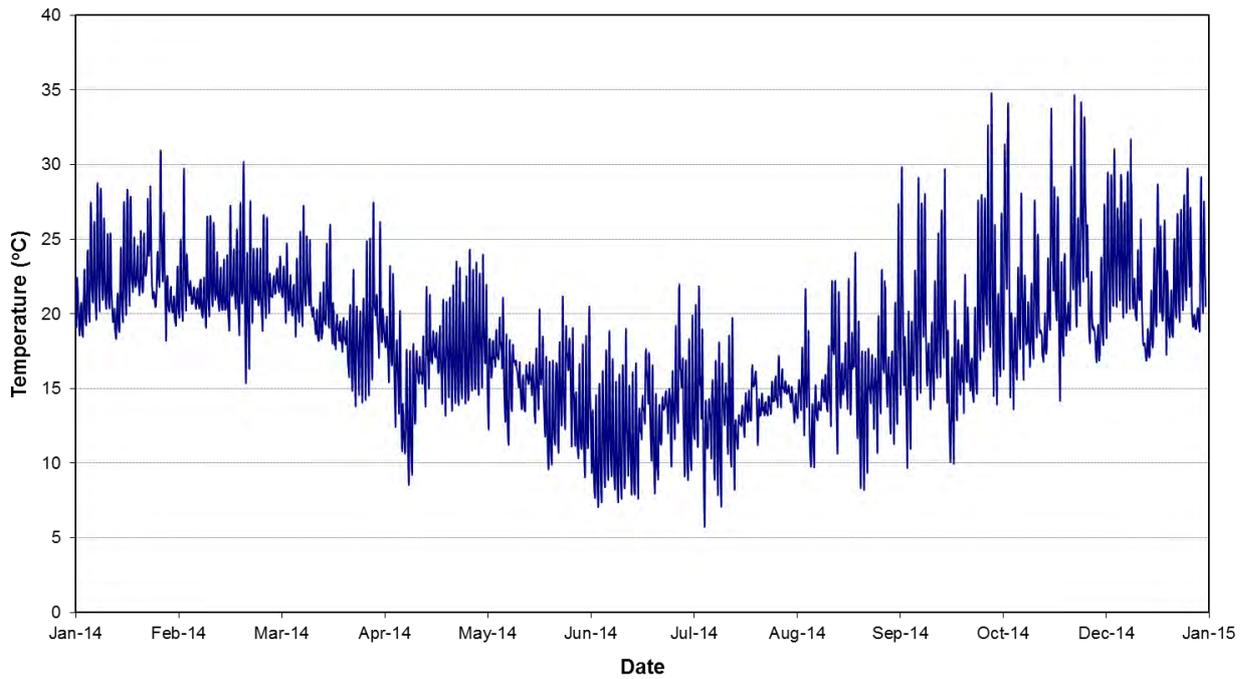
Figure 8 Predicted Mixing Heights at the Williamstown RAAF (CALMET predictions, 2014)



5.2.3.4 Temperature

The modelled temperature variations as predicted at the Project site during 2014 are illustrated in **Figure 9**. The maximum temperature (36.1°C) was predicted on 2 January 2014 and the minimum temperature (5.6°C) was predicted on 2 August 2014.

Figure 9 Predicted Temperatures at the Williamtown RAAF (CALMET predictions, 2014)



6 EXISTING AIR QUALITY

The quantification of cumulative air pollution concentrations and the assessment of compliance with ambient air quality limits necessitates the characterisation of baseline air quality. Given that particulate matter is anticipated to be emitted from the handling, transport and processing activities at the Project site and that air quality limits are given for TSP, PM₁₀, PM_{2.5} and dust deposition, it is relevant that existing suspended particulate concentrations including dust deposition rates be assessed.

In regards to the background concentrations of particulate, NSW OEH regulates and maintains a number of monitoring stations across NSW. Six Air Quality Monitoring Stations (AQMS) are currently operated within 15 km of the Project site with three being operational since 1992/1993 (the Lower Hunter Air Quality Monitoring Network [LHAQMN]) and three having being commissioned in August 2014 (the Newcastle Local Air Quality Monitoring Network [NLAQMN]). The LHAQMN was established to help determine the levels of pollution to which residents of the area are exposed. Following studies by the NSW EPA and OEH and on advice from the NSW Health's Air Pollution Expert Advisory Committee, the EPA determined that a continuous local monitoring program would be beneficial to the Newcastle community. The Newcastle Community Consultative Committee on the Environment (NCCCE) provided input into the selection of the three locations at Mayfield, Carrington and Stockton. Details of the LHAQMN and NLAQMN are presented in **Table 10** and **Figure 10**.

Air quality in Newcastle is also being studied through the Lower Hunter Particle Characterisation Study (Hibberd et al, 2015) which was initiated in 2013. The aim of the study is to provide scientific information on the composition and likely sources of fine airborne pollution in the local area. Four progress reports have been published to date with the final report due for publication in early 2016. Relevant information from the available progress reports and minutes of the NCCCE are discussed in **Section 6.1**.

As discussed in **Section 5** the selected year of meteorology for use in this assessment was 2014. The Approved Methods requires the use of a full year of contemporaneous background air quality data in an AQIA and therefore data from 2014 has been selected for use within the assessment.

Although concentrations of particulate matter measured at Mayfield, Carrington and Stockton are highly representative of those areas assessed within this AQIA (refer **Figure 2**), a full calendar year of data from these AQMS is not currently available. An alternative approach is to adopt data measured at Newcastle, Beresfield or Wallsend after assessing how these data compare to those actually measured in the immediate area surrounding the receptors closest to the Project site.

A detailed examination of measured PM₁₀ and PM_{2.5} data is presented in **Section 6**.

Table 10 Details of AQMS Surrounding the Project Site

AQMS Name	Distance / Direction from Project Site	Location (km, Australian Map Grid, zone 56)		Parameters Measured	AQMS Commissioned
		Easting	Northing		
Lower Hunter Air Quality Monitoring Network					
Wallsend	9 km / W	375.5	6359.5	Ozone (O ₃) NO, NO ₂ , NO _x SO ₂ Fine particles (by nephelometry) Fine particles (PM _{2.5} and PM ₁₀ using a TEOM) Wind speed, wind direction and sigma theta Ambient temperature Relative humidity Nett radiation	November 1992
Swimming Pool, off Frances St					
Newcastle	5.8 km / S	383.9	6355.5	O ₃ NO, NO ₂ , NO _x CO SO ₂ Fine particles (by nephelometry) Fine particles (PM ₁₀ using a TEOM) Wind speed, wind direction and sigma theta Ambient temperature Relative humidity	November 1992
Newcastle Sportsground, off Dumaresq St					
Beresfield	13.3 km / NW	374.5	6370.3	O ₃ NO, NO ₂ , NO _x SO ₂ Fine particles (by nephelometry) Fine particles (PM _{2.5} and PM ₁₀ using a TEOM) Wind speed, wind direction and sigma theta Ambient temperature Relative humidity	May 1993
Frances Greenway High School, Lawson Avenue					
Newcastle Local Air Quality Monitoring Network					
Carrington	3.2 km / S	384.4	6358.0	NO, NO ₂ , NO _x SO ₂ Fine particles (PM _{2.5} using an EBAM) Fine particles (PM ₁₀ using a TEOM) Wind speed, wind direction and sigma theta Ambient temperature Relative humidity	August 2014
Intersection of Hargrave and Garrett Streets					
Mayfield	3.3 km / W	381.1	6360.7	NO, NO ₂ , NO _x SO ₂ Fine particles (PM _{2.5} using an EBAM) Fine particles (PM ₁₀ using a TEOM) Wind speed, wind direction and sigma theta Ambient temperature Relative humidity	August 2014
Murray Dwyer Circuit					
Stockton	5.5 km / SE	386.3	6358.9	NO, NO ₂ , NO _x NH ₃ SO ₂ Fine particles (PM _{2.5} using an EBAM) Fine particles (PM ₁₀ using a TEOM) Wind speed, wind direction and sigma theta Ambient temperature Relative humidity	August 2014
Intersection of Fullerton and Flint Streets					

Note: TEOM – Tapered Element Oscillating Microbalance, EBAM – Beta Attenuation Monitor

Figure 10 Availability of Air Quality and Meteorological Monitoring surrounding the Project site



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Project Number:	610.15009
Location:	Kooragang, NSW
Other Information:	
Projection:	GDA 1994 MGA Zone 56
Date:	01/05/2015

Environmental Property Services
Boral Kooragang Waste Recycling Facility
Air Quality Impact Assessment
AQ and Met Monitoring
Locations

Note: Beresfield not shown

6.1 Particulate Matter (PM₁₀ & PM_{2.5})

A summary of air quality data as measured at the six AQMS during 2014 is provided in **Table 11** for PM₁₀ and **Table 12** for PM_{2.5}.

Table 11 Statistical Analysis of 2014 PM₁₀ Data

Parameter	2014					
	LHAQMN			NLAQMN		
	Newcastle	Beresfield	WallSEND	Carrington	Mayfield	Stockton
Data Availability	99%	95%	97%	41%	40%	17%
Mean 24-hr Conc. (µg/m ³)	21.4	19.4	16.9	24.8	23.5	44.2
Standard Deviation	±8.1	±7.4	±6.3	±10.4	±9.6	±17.6
Skew (<i>dimensionless</i>)	+0.8	+0.9	+1.1	+0.9	+0.9	+1.4
Kurtosis (<i>dimensionless</i>)	+1.2	+0.9	+2.0	+1.2	+1.0	+2.1
Minimum 24-hr Conc. (µg/m ³)	6.6	4.9	5.3	5.6	6.6	20.0
1 Percentiles (µg/m ³)	7.6	7.4	6.8	7.5	7.3	21.8
2 Percentiles (µg/m ³)	8.1	8.1	7.6	9.7	8.9	23.5
3 Percentiles (µg/m ³)	9.0	8.8	8.0	9.8	9.4	24.8
5 Percentiles (µg/m ³)	10.4	9.7	8.3	10.3	11.1	25.2
10 Percentiles (µg/m ³)	11.7	11.4	10.2	13.0	12.4	26.8
25 Percentiles (µg/m ³)	15.8	14.0	12.6	16.9	16.4	32.1
50 Percentiles (µg/m ³)	20.5	18.3	16.1	23.8	22.1	39.2
75 Percentiles (µg/m ³)	25.6	23.2	19.9	30.2	28.7	51.7
90 Percentiles (µg/m ³)	31.7	29.9	24.7	38.8	36.7	69.4
95 Percentiles (µg/m ³)	35.7	33.7	28.2	42.8	40.6	72.6
97 Percentiles (µg/m ³)	39.2	37.8	30.7	46.8	44.5	87.1
98 Percentiles (µg/m ³)	40.4	38.9	32.9	49.9	49.0	94.4
99 Percentiles (µg/m ³)	44.7	41.1	38.8	53.1	52.5	99.8
99.9 Percentiles (µg/m ³)	53.6	44.9	42.4	64.7	56.9	103.9
Maximum 24-hr Conc. (µg/m ³)	53.7	45.4	43.4	66.6	57.4	104.3

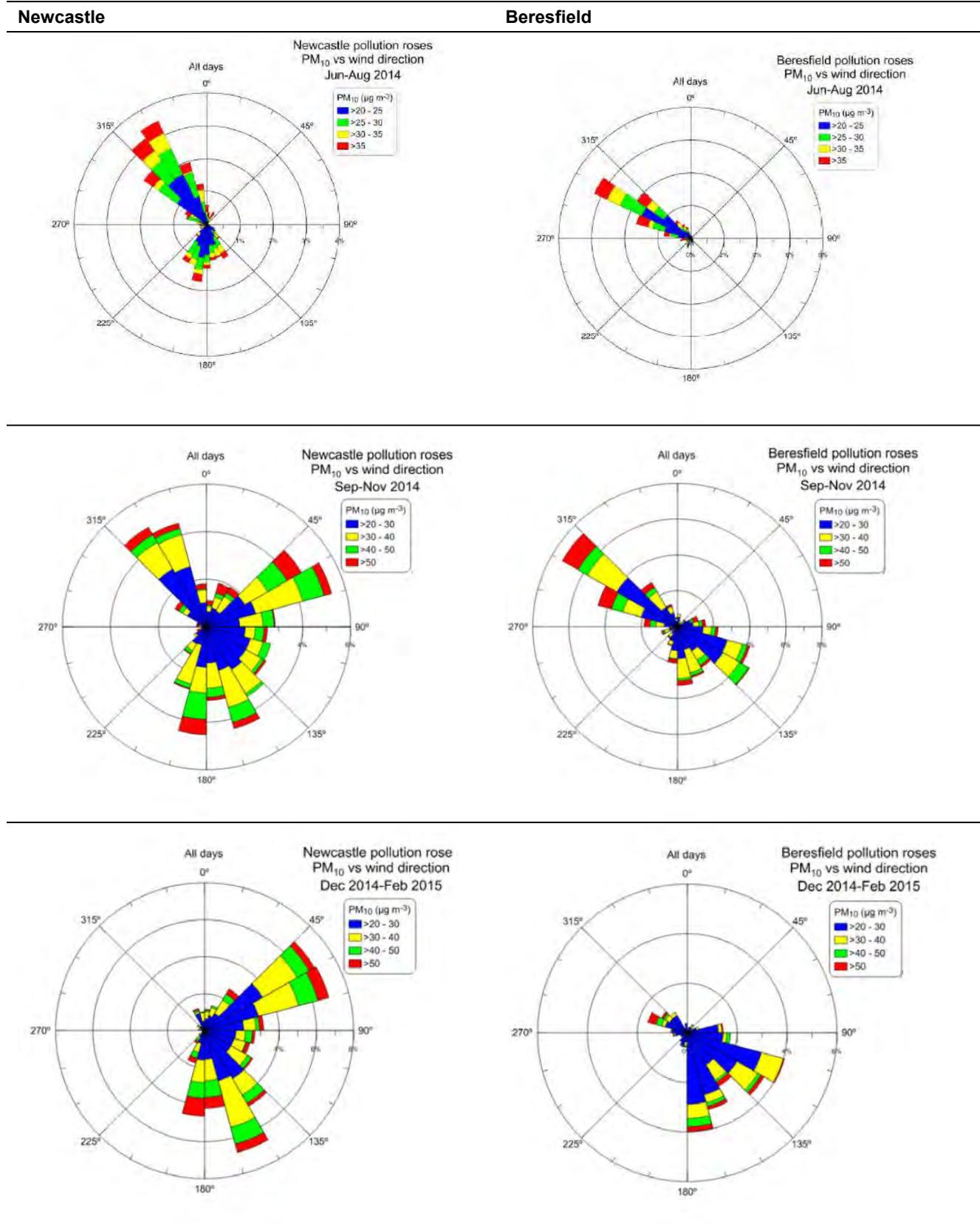
Table 12 Statistical Analysis of 2014 PM_{2.5} Data

Parameter	2014					
	LHAQMN			NLAQMN		
	Newcastle	Beresfield	WallSEND	Carrington	Mayfield	Stockton
Data Availability	95%	96%	96%	40%	40%	17%
Mean 24-hr Conc. (µg/m ³)	8.1	7.5	6.7	8.3	8.0	10.2
Standard Deviation	±3.6	±3.5	±2.8	±3.5	±3.2	±3.9
Skew (<i>dimensionless</i>)	+1.0	+1.1	+0.9	+0.9	+1.0	+1.6
Kurtosis (<i>dimensionless</i>)	+0.8	+2.2	+1.0	+1.1	+1.4	+3.4
Minimum 24-hr Conc. (µg/m ³)	2.0	1.3	1.4	1.8	2.7	4.0
1 Percentiles (µg/m ³)	2.4	2.2	2.3	2.8	3.0	4.2
2 Percentiles (µg/m ³)	2.8	2.6	2.5	3.1	3.3	4.5
3 Percentiles (µg/m ³)	3.2	2.7	2.6	3.2	3.3	5.0
5 Percentiles (µg/m ³)	3.5	3.1	2.9	3.5	3.8	5.9
10 Percentiles (µg/m ³)	4.3	3.7	3.4	4.7	4.6	6.4
25 Percentiles (µg/m ³)	5.6	5.0	4.6	5.7	5.9	8.0
50 Percentiles (µg/m ³)	7.4	6.9	6.3	7.7	7.6	9.5
75 Percentiles (µg/m ³)	10.3	9.4	8.5	10.3	9.7	11.3
90 Percentiles (µg/m ³)	13.2	12.1	10.1	12.8	12.4	14.9
95 Percentiles (µg/m ³)	15.5	13.9	12.3	14.3	14.7	17.8
97 Percentiles (µg/m ³)	16.8	15.5	13.4	15.2	16.0	18.9
98 Percentiles (µg/m ³)	17.2	16.3	13.5	17.5	16.6	19.9
99 Percentiles (µg/m ³)	19.1	17.0	14.7	18.2	16.9	22.3
99.9 Percentiles (µg/m ³)	21.0	23.7	17.7	20.9	19.8	25.2
Maximum 24-hr Conc. (µg/m ³)	21.2	26.2	18.0	21.3	20.3	25.5

Notwithstanding that a significantly higher data capture was experienced across the LHAQMN sites in 2014 (>95%) given the August 2014 commissioning of the NLAQMN, the maximum concentrations monitored at the NLAQMN are shown to be higher than those measured at the LHAQMN in the case of PM₁₀ and broadly similar in the case of PM_{2.5}. Concentrations of PM₁₀ and PM_{2.5} measured at the Stockton AQMS are shown to be consistently higher than all other sites although the maximum PM_{2.5} concentration was measured at the Beresfield AQMS. The highest PM₁₀ and PM_{2.5} concentrations measured at Stockton were measured on 10 October 2014 (104.3 µg/m³ and 25.5 µg/m³, respectively) and were associated with significantly lower concentrations across the LHAQMN.

In the case of PM₁₀, the Lower Hunter Particle Characterisation Study Report (Hibberd et al, 2015) has examined the pollution roses (PM₁₀ concentration by wind direction) for the Newcastle, Beresfield, Mayfield and Stockton AQMS for the June 2014 to February 2015 period. These pollution roses are presented in **Figure 11** and **Figure 12**.

Figure 11 PM₁₀ Pollution Roses – Newcastle and Beresfield June 2014 to February 2015



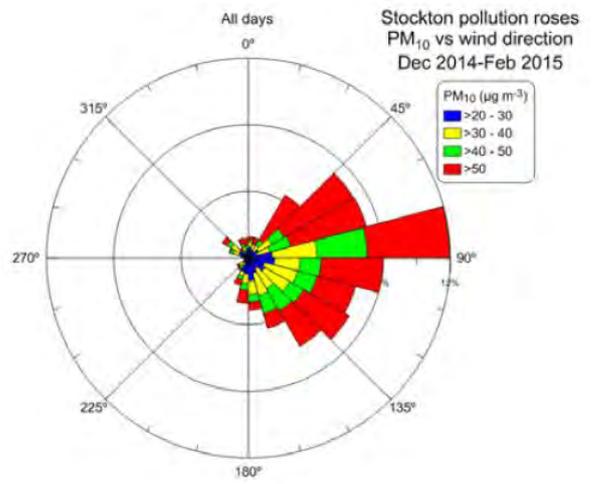
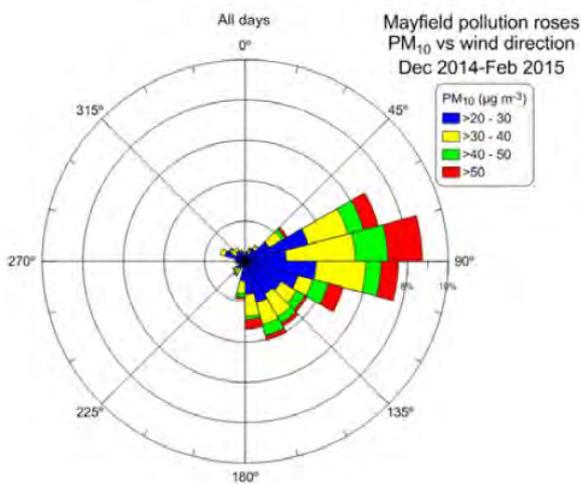
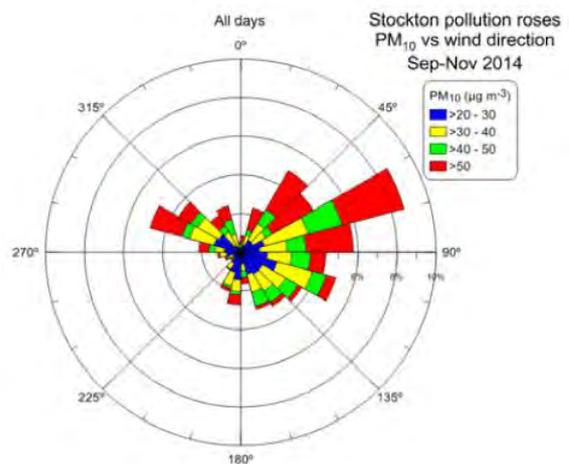
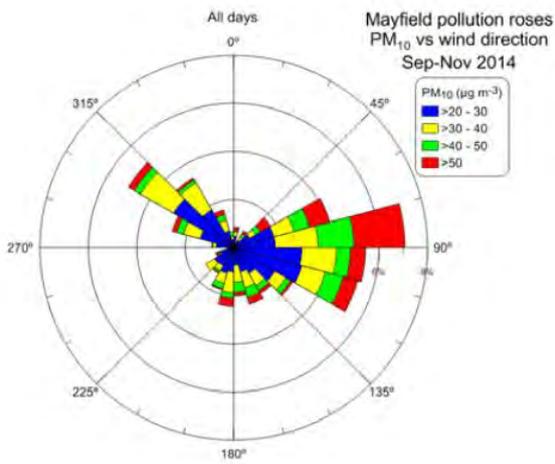
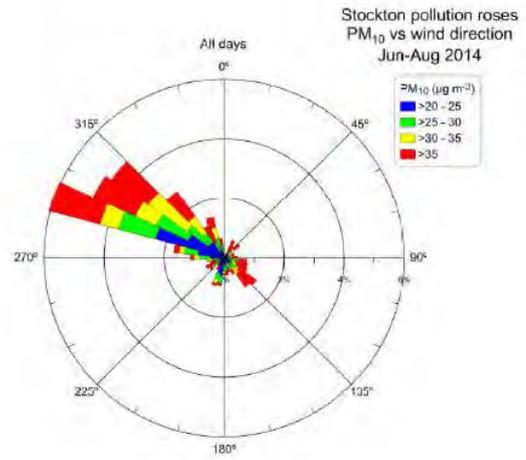
Source: Lower Hunter Particle Characterisation Study (Hibberd et al, 2014, 2015)

Figure 12 PM₁₀ Pollution Roses – Mayfield and Stockton June 2014 to February 2015

Mayfield

Stockton

No data available



Source: Lower Hunter Particle Characterisation Study (Hibberd et al, 2014, 2015)

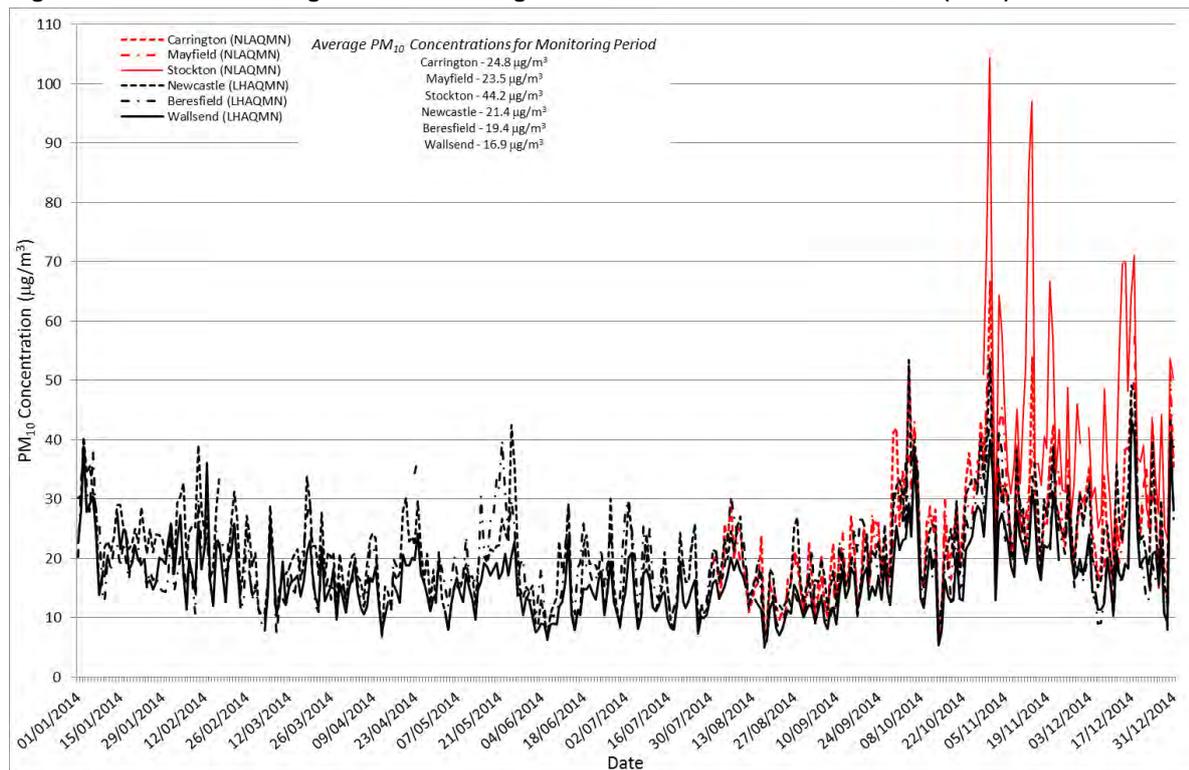
Wind direction shows a strong seasonal dependence across all AQMS, also demonstrated at the Project site (refer **Section 5**). For all of the AQMS for which pollution roses are available, elevated concentrations of PM₁₀ are observed in all wind directions, as would be expected given the often regional nature of certain particulate episodes. At both the Mayfield and Stockton AQMS, a higher frequency of higher concentrations of PM₁₀ are measured during winds from the east and (in the case of Stockton), the north west.

The reasons for the higher concentrations of PM₁₀ measured at the Stockton AQMS, and the increased frequency of higher concentrations originating in generally easterly windflows will likely be fully discussed once the Lower Hunter Particle Characterisation Study has been completed. However, initial commentary by the NSW EPA (through the minutes of the NCCCE) indicates that this is likely due to a high concentration of sea salt particles.

The 24-hour average PM₁₀ concentrations recorded at all six AQMS in 2014 are presented in **Figure 13** for the entire 2014 period and in **Figure 14** for the period in which all six AQMS were operational (August to December 2014).

It is noted that there were no exceedances of the 24-hour PM₁₀ assessment criteria at the Beresfield or Newcastle AQMS during 2014 but exceedances were experienced at all other AQMS.

Figure 13 24-Hour Average PM₁₀ Monitoring Results for NLAQMN and LHAQMN (2014)



Note: Criterion 50 µg/m³

An assessment of the correlation and covariance between PM₁₀ data collected at each AQMS (presented in **Table 13**) shows that the PM₁₀ data collected at the Newcastle AQMS is more closely correlated with the data collected at Carrington (0.92) and Stockton (0.7) and PM₁₀ data collected at Wallsend is more closely correlated with data collected at Mayfield (0.93).

Table 13 Correlation and Covariance of PM₁₀ Data – NLAQMN and LHAQMN

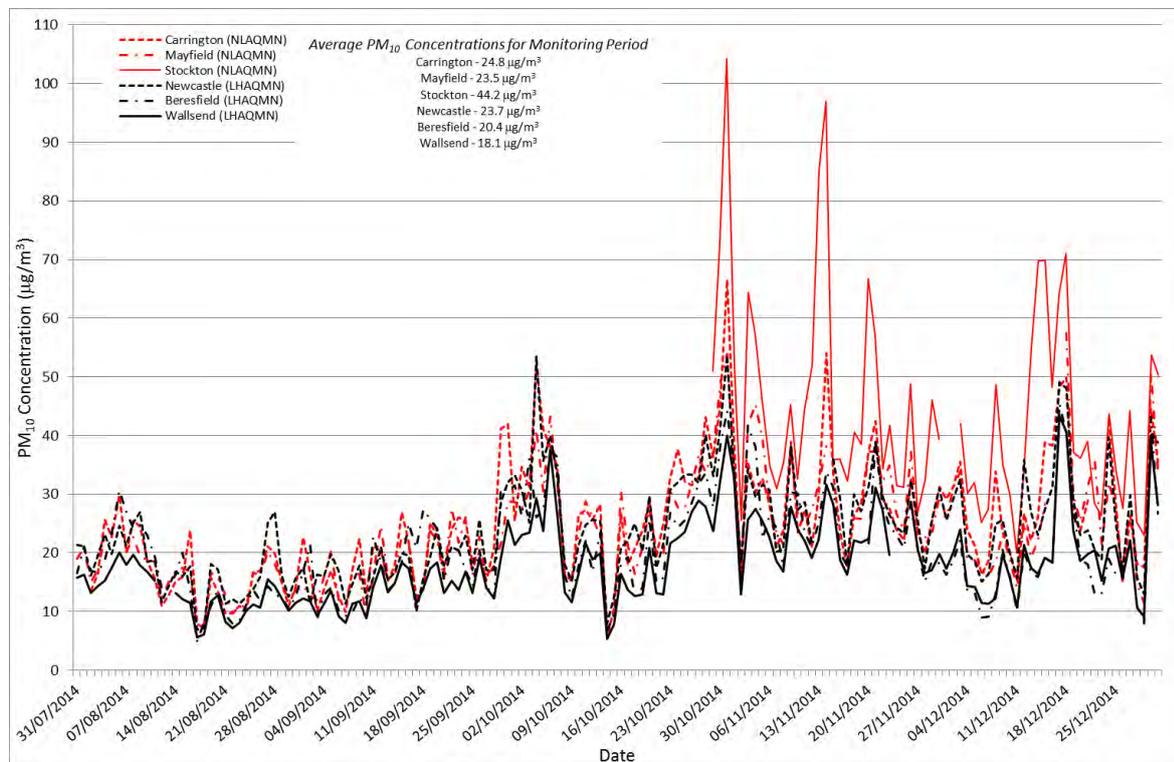
CORRELATION	Carrington (N)	Mayfield (N)	Stockton (N)	Newcastle (LH)	Beresfield (LH)	Wallsend (LH)
Carrington (N)	1.00					
Mayfield (N)	0.90	1.00				
Stockton (N)	0.76	0.71	1.00			
Newcastle (LH)	0.92	0.89	0.70	1.00		
Beresfield (LH)	0.75	0.81	0.49	0.70	1.00	
Wallsend (LH)	0.87	0.93	0.58	0.88	0.79	1.00
COVARIANCE	Carrington (N)	Mayfield (N)	Stockton (N)	Newcastle (LH)	Beresfield (LH)	Wallsend (LH)
Carrington (N)	95.3					
Mayfield (N)	78.7	81.3				
Stockton (N)	129.1	116.5	315.7			
Newcastle (LH)	75.9	67.9	101.6	71.3		
Beresfield (LH)	56.6	54.8	68.4	45.8	61.5	
Wallsend (LH)	58.3	56.2	70.9	46.5	38.2	38.9

Note: N = NLAQMN, LH = LHAQMN

To accurately characterise the impacts from the Project, the emissions of particulate matter have been assessed through a dispersion modelling exercise as described further in **Section 8**. To adequately characterise the cumulative impact of the Project at each of the sensitive receptor locations (refer **Table 3**) the modelled incremental concentrations need to be added to an appropriate 'background' concentration of particulate.

As the foregoing discussion has shown, there is significant variation in the current particulate environment within the Newcastle area, and across the areas of specific interest for this Project (ie Stockton, Mayfield and Carrington). On average, concentrations of PM₁₀ are higher at the NLAQMN AQMS when compared to the LHAQMN AQMS, although as shown in **Figure 14** there is significant daily variation in both absolute and relative concentrations measured at each AQMS.

Figure 14 24-Hour Average PM₁₀ Monitoring Results for NLAQMN and LHAQMN (Aug to Dec 2014)



Given that the year 2014 has been selected for dispersion modelling, and that a full year of air quality monitoring data for the Carrington, Mayfield and Stockton AQMS is not available, data from the Newcastle AQMS has been adopted as background for PM₁₀ and PM_{2.5} given that it is statistically shown to record higher PM₁₀ and PM_{2.5} concentrations than the Wallsend and Beresfield AQMS.

Data from the Newcastle AQMS have not been scaled to reflect the generally higher PM₁₀ concentrations or peak PM₁₀ episodes shown in the data recorded by the NLAQMN (especially for Stockton) given that the peak PM₁₀ concentrations are shown to be a result of easterly winds, when impacts and contribution from the Project will be negligible.

6.2 Total Suspended Particulates (TSP)

No TSP monitoring data is available for the Project site or for the wider region. However, it is assumed that the ambient PM₁₀ concentrations represent 50% of the total TSP concentrations. This may vary between locations depending on the sources of particulate matter, although it is noted that the conclusions of this assessment are not sensitive to the PM₁₀ to TSP multiplier adopted (refer to **Section 8.3**). The annual average TSP concentration adopted for the purposes of this assessment is 42.8 µg/m³, based on an annual average PM₁₀ concentration of 21.4 µg/m³ as measured at the Newcastle AQMS during 2014.

Dispersion modelling of the contribution to annual average TSP from Project activities has been performed to appropriately account for these impacts upon surrounding receptors.

6.3 Background Dust Deposition

No dust monitoring data is available for the Project site or for the wider region. A background dust level of 2 g/m²/month has been assumed for the region. This results in the cumulative assessment criterion of 4 g/m²/month being the defining criterion for the Project.

6.4 Summary of Background Air Quality for Assessment Purposes

For the purposes of assessing the potential air quality impacts from the Project, an estimation of ambient air quality levels is required. The site-specific ambient air quality levels adopted for this assessment are summarised in **Table 14**.

It is noted that the concentrations of PM₁₀ and PM_{2.5} are approaching or at criteria concentrations without the contribution of the Project. The AQIA seeks to demonstrate that no additional exceedances of the relevant criteria will be experienced as a result of the Project operation, and that the absolute contribution from the Project will be minimal.

Table 14 Ambient Air Quality Environment for Assessment Purposes

Air Quality Parameter	Averaging Period	Assumed Background Ambient Level	Data Source
TSP	Annual	42.8 µg/m ³	Calculated from NSW OEH (Newcastle and Wallsend)
PM ₁₀	24-Hour	Daily varying	NSW OEH (Newcastle)
	Annual	21.4 µg/m ³	
PM _{2.5}	24-Hour	Daily varying	NSW OEH (Newcastle)
	Annual	8.1 µg/m ³	
Dust Deposition	Annual	2 g/m ² /month	Assumed

7 EMISSIONS ESTIMATION

Estimations of the potential emissions of particulate matter from each source identified in **Section 2.1** have been performed for input into the dispersion modelling exercise as outlined in **Section 5.1**.

7.1 Particulate Matter Emissions

A review has been carried out of the potential for particulate generation during the operation of the Project (refer **Section 2.1**). In summary, the activities which may give rise to particulate emissions into the ambient environment from Project operation include:

- Materials Handling:
 - Truck dumping of raw material onto stockpiles.
 - Handling of raw material.
 - Loading the crusher with raw material.
 - Crushing and screening.
 - Handling of material from the crushing/screening process.
 - Stockpiling material.
 - Loading trucks with final product for transportation off-site.
- Wind Erosion:
 - Wind erosion from raw material and final product stockpiles.
- Haulage:
 - Hauling raw materials onto site on sealed hard-stand.
 - Hauling final product off-site on sealed roads.

Emission factor equations for material loading, unloading and handling have been taken from US EPA AP42 emissions inventory document for Aggregate Handling and Storage Piles (Chapter 13.2.4). Emission factors for crushing and screening of material have been taken from the US EPA AP42 emissions inventory document for crushed stone processing (Chapter 11.19.2).

Emission factors contained within the USEPA AP42 documents have been adopted in the absence of industry specific factors relating to recycled waste handling. National Pollutant Inventory (NPI) emissions estimations techniques for non-mineral sands, or mining were not used as the emission rates would have not been applicable to the operations occurring on site and the US EPA AP42 factors were considered to be more representative (if still conservative).

The assumptions outlined in **Table 15** have been used in the construction of the particulate emissions inventory for the Project.

Table 15 Assumptions adopted for Air Quality Impact Assessment - Particulates

Parameter	Value	Units	Comments
General			
Operating hours	156	hours/week	24 hours Mon-Sat 6 am to 6 pm Sun
Operating days	303	days/year	-
Materials Handling			
Total material processed	350,000	tonnes/year	Annually
Area of stockpiles	2.9	ha	-
Haulage			
Incoming			
Total length of internal road	0.2	km	Estimated from aerial photograph
Total vehicle movements	40	vehicles/day	Assuming 28 tonne truck
Silt loading of paved road	0.6	g/m ²	Assumed (USEPA AP42 13.2.1 – relevant to daily traffic flow <500 vehicles per day)
Average weight of vehicles	48.5	tonnes	Assumed based on 62.5 tonne GVM truck carrying 28 tonne loads
Outgoing			
Total length of internal road	0.8	km	Estimated from aerial photograph
Total vehicle movements	40	vehicles/day	Assuming 28 tonne truck
Silt loading of hardstand (paved) road	0.6	g/m ²	Assumed (USEPA AP42 13.2.1 – relevant to daily traffic flow <500 vehicles per day)
Average weight of vehicles	48.5	tonnes	Assumed based on 62.5 tonne GVM truck carrying 28 tonne loads

Table 16 presents the emission factors for the key atmospheric pollutants used in the dispersion modelling carried out for this assessment. These estimate the emissions expected under normal operating conditions.

Table 16 Particulate Emission Factors for Air Quality Dispersion Modelling

Emission Factor	Representative of Operations	TSP Emission Factor ¹	PM ₁₀ Emission Factor	PM _{2.5} Emission Factor ²	Emission Factor Units
Truck unloading / Truck loading	Unloading/loading of all material types	0.004	0.0002	0.00003	kg/t
Excavators/Front End Loaders (FEL)	FEL handling of all material types	0.004	0.0002	0.00003	kg/t
Screening and Crushing (primary)	Screening and crushing of all material types	0.0011	0.0004	0.00003	kg/t
Wind erosion	Wind erosion of all material types	0.4	0.2	0.03	kg/ha/hr

Note 1: Total Particulate emission factor is used to derive the rate of dust deposition

Emissions resulting from heavy vehicles travelling on paved roads (considered to be paved and hardstand areas on the site) have been derived using the USEPA AP42 emission factors (Wheel Generated Dust from Paved Roads [2006]) as outlined in **Equation 1**.

$$EF = k \times (sL)^{0.91} \times (W)^{1.02} \quad (\text{kg/VKT}) \quad \text{Equation 1}$$

where

$k = 3.23$ (TSP)

$k = 0.62$ (PM₁₀)

$k = 0.15$ (PM_{2.5})

sL = silt loading (g/m²) taken to be 0.6 g/m² (from Table 13.2.1-2)

W = average vehicle gross mass (tonnes)

VKT = Vehicle Kilometre Travelled

7.1.1 Particulate Emissions Control

Emissions controls to be applied during the operation of the Project include (as outlined in brief in **Section 2.2**):

- Water sprays are located across the site to keep stockpiles moist.
 - An emission control of 50% (as per the NPI Emission Estimation technique for Mining Version 3.1) has been adopted to reflect this practice.
- Mist is applied to material transfer points on the crusher.
 - Given that material will be misted at transfer points and will be moist when crushed, the emission factor for controlled screening and crushing has been adopted (refer **Table 16**) and no additional controls have been applied within the modelling assessment to reflect this practice.
- Sealed roads will be regularly watered.
 - Level 1 watering (application of <2 litres/m²/hour) has been assumed which affords an emission control of 50% (as per the NPI Emission Estimation technique for Mining Version 3.1) which has been applied within the modelling assessment to reflect this practice.
- Wheel washes are performed on outbound vehicles.
 - Although this is good site practice, no emission control factor is available in the literature for this practice and therefore no emission reduction has been assumed within the modelling assessment to reflect this practice.

8 AIR QUALITY IMPACT ASSESSMENT

8.1 Particulate Matter as PM₁₀

Table 17 shows the results of the CALPUFF predictions for the maximum 24-hour average PM₁₀ concentrations at the nearest sensitive receptors to the Project site resulting from the operation of the Project. The background PM₁₀ concentration has been adopted as outlined in **Section 6**. The contribution of the Project to the maximum 24 hour PM₁₀ concentration has been quantitatively assessed as discussed in **Section 7.1**.

A contour plot of the maximum incremental 24-hour average PM₁₀ concentrations is presented in **Figure 15** (Project increment only). The contour plot does not represent the dispersion pattern at any particular instant in time, but shows the predicted maximum 24-hour average PM₁₀ concentrations that occurred at each location. They therefore represent the concentrations that can possibly be reached under the conditions modelled.

Table 17 Background and Predicted 24-Hour Average PM₁₀ Concentrations

Receptor	Assessment of Maximum 24-hour Average PM ₁₀ Cumulative Impact (µg/m ³)				Assessment of Maximum 24-hour Average PM ₁₀ Incremental Impact (µg/m ³)			
	Date	B/G	Inc.	Max Cumu.	Date	B/G	Max Inc.	Cumu.
R1	31/10/2014	53.7	<0.1	<53.8	04/08/2014	23.2	0.4	23.6
R2	31/10/2014	53.7	<0.1	<53.8	07/02/2014	24.3	0.4	24.7
R3	31/10/2014	53.7	0.1	53.8	14/05/2014	18.3	0.5	18.8
R4	31/10/2014	53.7	0.2	53.9	09/04/2014	24.2	0.6	24.8
R5	31/10/2014	53.7	0.1	53.8	06/03/2014	28.9	0.3	29.2
R6	31/10/2014	53.7	0.1	53.8	27/02/2014	24.6	0.3	24.9
R7	31/10/2014	53.7	<0.1	<53.8	25/08/2014	13.8	0.2	14.0
R8	31/10/2014	53.7	<0.1	<53.8	22/09/2014	21.1	0.2	21.3
R9	31/10/2014	53.7	<0.1	<53.8	08/11/2014	20.6	0.3	20.9
R10	31/10/2014	53.7	<0.1	<53.8	18/05/2014	21.5	0.2	21.7
R11	31/10/2014	53.7	<0.1	<53.8	02/06/2014	9.0	0.2	9.2
R12	31/10/2014	53.7	<0.1	<53.8	15/07/2014	21.0	0.2	21.2
R13	31/10/2014	53.7	<0.1	<53.8	15/07/2014	21.0	0.3	21.3

Note: Criterion 50 µg/m³

Exceedances of the 50 µg/m³ criterion are observed, although are entirely due to exceedances of the existing background conditions. Two exceedances are evident within the background dataset (53.7 µg/m³ and 53.5 µg/m³) with the third highest PM₁₀ concentration measured at the Newcastle AQMS in 2014 being 49.1 µg/m³. Addition of the predicted maximum increments as presented in **Table 17** (ie less than 0.1 µg/m³) would not result in any additional exceedances of the 50 µg/m³ criterion at the identified receptors.

Incremental impacts of 24 hour average PM₁₀ at the nearest sensitive receptors are predicted to be very minor, with maximum concentrations of 0.6 µg/m³ anticipated (at Receptor R4). All cumulative concentrations predicted are shown to be dominated by the existing background conditions. The contour plot in **Figure 15** shows that concentrations surrounding the Project site are predicted to be minor (<~10 µg/m³ offsite incremental impact), with the maximum impacted residential area being the eastern area of Mayfield (Receptor 3 and Receptor 4, 0.5 µg/m³ to 1 µg/m³).

Figure 15 Predicted Maximum 24-hour Average Incremental PM₁₀ Concentration (µg/m³) – Project Increment Only



2014 Meteorology, Emission Rates adopted from **Section 7.1** Adopted Criterion – 50 µg/m³

Table 18 shows the results of the CALPUFF predictions for annual average PM₁₀ resulting from the operation of the Project. The results show the predicted annual average PM₁₀ concentration at the nearest receptor locations surrounding the Project site over a one-year time frame.

A contour plot of the annual average PM₁₀ concentrations is presented in **Figure 16**.

Table 18 Background and Predicted Annual Average PM₁₀ Concentrations

Receptor	Assessment of Annual Average PM ₁₀ Cumulative Impact (µg/m ³)		
	Background	Increment	Cumulative
R1	21.4	<0.1	<21.5
R2	21.4	<0.1	<21.5
R3	21.4	<0.1	<21.5
R4	21.4	<0.1	<21.5
R5	21.4	<0.1	<21.5
R6	21.4	<0.1	<21.5
R7	21.4	<0.1	<21.5
R8	21.4	<0.1	<21.5
R9	21.4	<0.1	<21.5
R10	21.4	<0.1	<21.5
R11	21.4	<0.1	<21.5
R12	21.4	<0.1	<21.5
R13	21.4	<0.1	<21.5

Note: Criterion 30 µg/m³

Figure 16 Predicted Annual Average PM₁₀ Incremental Concentration (µg/m³) – Project Increment Only



2014 Meteorology, Emission Rates adopted from **Section 7.1** Adopted Criterion – 30 µg/m³

The results presented in **Table 18** indicate that at each receptor location, the maximum annual average concentration of PM₁₀ (background plus increment) associated with the Project is predicted to be well below the project goal of 30 µg/m³. The contribution of the Project to the total annual average PM₁₀ concentrations is predicted to be insignificant with a maximum incremental annual average PM₁₀ concentration of <0.1 µg/m³ at all receptors.

8.2 Particulate Matter as PM_{2.5}

Table 19 shows the results of the CALPUFF predictions for the maximum 24-hour average PM_{2.5} concentrations at the nearest sensitive receptors to the Project site resulting from the operation of the Project. The background PM_{2.5} concentration has been adopted as outlined in **Section 6**. The contribution of the Project to the maximum 24 hour PM_{2.5} concentration has been quantitatively assessed as discussed in **Section 7.1**.

A contour plot of the maximum incremental 24-hour average PM_{2.5} concentrations is presented in **Figure 17** (Project increment only). The contour plots do not represent the dispersion pattern at any particular instant in time, but show the predicted maximum 24-hour average PM_{2.5} concentrations that occurred at each location. They therefore represent the concentrations that can possibly be reached under the conditions modelled.

Table 19 Background and Predicted 24-Hour Average PM_{2.5} Concentrations

Receptor	Assessment of Maximum 24-hour Average PM _{2.5} Cumulative Impact (µg/m ³)				Assessment of Maximum 24-hour Average PM _{2.5} Incremental Impact (µg/m ³)			
	Date	B/G	Inc.	Max Cumu.	Date	B/G	Max Inc.	Cumu.
R1	04/07/2014	21.2	<0.1	<21.3	04/08/2014	13.0	0.1	13.1
R2	04/07/2014	21.2	<0.1	<21.3	07/02/2014	4.6	0.1	4.7
R3	04/07/2014	21.2	<0.1	<21.3	21/03/2014	5.6	0.1	5.7
R4	04/07/2014	21.2	<0.1	<21.3	09/04/2014	5.7	0.1	5.8
R5	04/07/2014	21.2	<0.1	<21.3	06/03/2014	7.8	<0.1	<7.9
R6	04/07/2014	21.2	<0.1	<21.3	27/02/2014	8.2	<0.1	<8.3
R7	04/07/2014	21.2	<0.1	<21.3	25/08/2014	10.0	<0.1	<10.1
R8	04/07/2014	21.2	<0.1	<21.3	22/09/2014	6.6	<0.1	<6.7
R9	04/07/2014	21.2	<0.1	<21.3	08/11/2014	5.5	<0.1	<5.6
R10	04/07/2014	21.2	<0.1	<21.3	18/05/2014	10.9	<0.1	<11.0
R11	04/07/2014	21.2	<0.1	<21.3	02/06/2014	7.0	<0.1	<7.1
R12	04/07/2014	21.2	<0.1	<21.3	15/07/2014	7.2	<0.1	<7.3
R13	04/07/2014	21.2	<0.1	<21.3	15/07/2014	7.2	<0.1	<7.3

Note: Criterion 25 µg/m³

The predictions show that the operation of the Project will result in no exceedances of the 24-hour PM_{2.5} criterion at any receptor location. Incremental impacts of 24 hour average PM_{2.5} are predicted to be very minor, with maximum concentrations of 0.1 µg/m³ anticipated. All cumulative concentrations predicted are shown to be dominated by the existing background conditions. The contour plot in **Figure 17** shows that incremental concentrations are predicted to be 0.1 µg/m³ or below in all residential areas.

Figure 17 Predicted Maximum 24-hour Average Incremental PM_{2.5} Concentration (µg/m³) – Project Increment Only



2014 Meteorology, Emission Rates adopted from **Section 7.1** Adopted Criterion – 25 µg/m³

Table 20 shows the results of the CALPUFF predictions for annual average PM_{2.5} resulting from the operation of the Project. The results show the predicted annual average PM_{2.5} concentration at the nearest receptor locations surrounding the Project site over a one-year time frame.

A contour plot of the annual average PM_{2.5} concentrations is not presented, given the low concentrations predicted.

Table 20 Background and Predicted Annual Average PM_{2.5} Concentrations

Receptor	Assessment of Annual Average PM _{2.5} Cumulative Impact (µg/m ³)		
	Background	Increment	Cumulative
R1	8.1	<0.1	<8.2
R2	8.1	<0.1	<8.2
R3	8.1	<0.1	<8.2
R4	8.1	<0.1	<8.2
R5	8.1	<0.1	<8.2
R6	8.1	<0.1	<8.2
R7	8.1	<0.1	<8.2
R8	8.1	<0.1	<8.2
R9	8.1	<0.1	<8.2
R10	8.1	<0.1	<8.2
R11	8.1	<0.1	<8.2
R12	8.1	<0.1	<8.2
R13	8.1	<0.1	<8.2

Note: Criterion 8 µg/m³

The results presented in **Table 20** indicate that at each receptor location, the maximum annual average concentration of PM_{2.5} (background plus increment) associated with the Project is predicted to be very slightly above the project goal of 8 µg/m³. The contribution of the Project to the total annual average PM_{2.5} concentrations is predicted to be insignificant with a maximum incremental annual average PM_{2.5} concentration of <0.1 µg/m³ at all receptors.

Background concentrations used in the assessment are already in exceedance of the annual average criterion for PM_{2.5} without the addition of the minor incremental contributions from the Project.

8.3 Particulate Matter as TSP

Table 21 shows the results of the CALPUFF predictions for annual average TSP resulting from the operation of the Project. The results show the average concentrations predicted at the nearest receptor locations over a one year time frame. Background concentrations of TSP are assumed to be $42.8 \mu\text{g}/\text{m}^3$ (refer **Section 6.4**).

Table 21 Background and Predicted Incremental Total Suspended Particulate

Receptor	Assessment of Annual Average TSP Cumulative Impact ($\mu\text{g}/\text{m}^3$)		
	Background	Increment	Cumulative
R1	42.8	<0.1	<42.9
R2	42.8	0.1	42.9
R3	42.8	0.1	42.9
R4	42.8	0.1	42.9
R5	42.8	<0.1	<42.9
R6	42.8	<0.1	<42.9
R7	42.8	<0.1	<42.9
R8	42.8	<0.1	<42.9
R9	42.8	<0.1	<42.9
R10	42.8	<0.1	<42.9
R11	42.8	<0.1	<42.9
R12	42.8	<0.1	<42.9
R13	42.8	<0.1	<42.9

Note: Criterion $90 \mu\text{g}/\text{m}^3$

The results presented in **Table 21** show that increases in the annual average TSP concentration associated with the operation of the Project are predicted to be insignificant in comparison with current average background levels. Annual average TSP concentrations are predicted to easily comply with the project goal of $90 \mu\text{g}/\text{m}^3$.

8.4 Particulate Matter as Dust Deposition

Table 22 shows the results of the modelling predictions for dust deposition resulting from the operation of the Project. The results show the average deposition rates predicted at the nearest receptor locations over a one year time frame. Background levels of dust deposition at these locations have been assumed to be 2 g/m²/month (refer **Section 6.4**).

A contour plot of the modelled dust deposition values obtained around the Project site is not presented given the low concentrations predicted.

Table 22 Background and Predicted Incremental Dust Deposition

Receptor	Assessment of Annual Average Dust Deposition Rates (g/m ² /month)		
	Background (assumed)	Increment	Cumulative
R1	2.0	<0.1	<2.1
R2	2.0	<0.1	<2.1
R3	2.0	<0.1	<2.1
R4	2.0	<0.1	<2.1
R5	2.0	<0.1	<2.1
R6	2.0	<0.1	<2.1
R7	2.0	<0.1	<2.1
R8	2.0	<0.1	<2.1
R9	2.0	<0.1	<2.1
R10	2.0	<0.1	<2.1
R11	2.0	<0.1	<2.1
R12	2.0	<0.1	<2.1
R13	2.0	<0.1	<2.1

Note: Criterion 4 g/m²/month

The results presented in **Table 22** show that increases in the annual average monthly dust deposition associated with the operation of the Project are predicted to be insignificant in comparison with assumed average background dust deposition levels. Annual average monthly dust deposition levels are predicted to comply with the project goal of 4 g/m²/month even assuming worst case existing background dust levels.

9 CONCLUSIONS

This AQIA has assessed the potential emissions to air of particulates resulting from the proposed operation of an expanded materials recycling facility to be located at the existing Boral Recycling Facility located on the corner of Egret St and Raven St, Kooragang Island, NSW. A detailed atmospheric dispersion modelling exercise has been performed to assess the potential impacts of particulate matter on the surrounding community, including an assessment of the Project and other sources of air pollution in the area.

9.1 Pollutant Emissions

Emissions of particulate matter resulting from the delivery, unloading, handling and loading of materials to be recycled have been quantified using emissions estimation techniques usually adopted for the mining or aggregate processing industries. These emission factors have been adopted within this assessment in the absence of specific factors relevant to the waste industry. Given the non-specific nature of these factors the resulting emissions can be considered to represent a worst case for the Project, with emissions resulting from operation assumed to be considerably lower.

9.2 Existing Meteorology

A site specific meteorological file was constructed for use in the detailed dispersion modelling assessment which used modelled data as input which has been compared to observational data for the area. The year chosen for assessment was based on a review of representative conditions in the local area over a five year period.

9.3 Existing Air Quality

Air quality experienced within the local area was determined using data collected by NSW OEH at six sites in the local area. These data were considered to include the impacts of regional influences on air quality, such as bushfires and dust storms etc.

9.4 Atmospheric Dispersion Modelling

Detailed atmospheric dispersion modelling was performed which assessed the influence of meteorology on the dispersion of generated pollutants from the Project site and the resulting impacts upon a number of selected receptor locations. The results of the assessment indicated that the contribution of Project activities to predicted impacts of dust deposition, total suspended particulates and PM₁₀ and PM_{2.5} were predicted to be very minor at all sensitive receptor locations assessed. The predicted incremental concentrations at all sensitive receptors were:

- <0.7 µg/m³ maximum 24 hour average PM₁₀ concentration.
- <0.2 µg/m³ annual average PM₁₀ concentration.
- <0.2 µg/m³ maximum 24 hour average PM_{2.5} concentration.
- <0.1 µg/m³ annual average PM_{2.5} concentration.
- <0.2 µg/m³ annual average TSP concentration.
- <0.1 g/m²/month annual average dust deposition.

When taking into account the existing air quality of the area, the predicted cumulative concentrations (Project plus background) were shown to be in exceedance of the maximum 24 hour average criterion for PM₁₀ and the annual average criterion for PM_{2.5}. These criteria were shown to already be in exceedance without the addition of the predicted contribution from the Project. The contributions of the predicted increments are demonstrated to not result in any additional exceedances of the Project criteria.

9.5 Air Quality Management and Monitoring

The assessment has considered the application of a number of air quality management techniques including the use of water sprays on stockpiles, unsealed haul roads and the crusher operation and the use of wheel washes at the site entrance. Dispersion modelling indicates that these measures are more than sufficient to minimise the impacts of particulate pollution on the surrounding sensitive receptor locations.

Given the distance between the Project site and the nearest sensitive receptors (>2 km), the predicted minor impacts of the Projects on these sensitive receptors, the high number of existing air quality monitoring stations in the area (currently six) and the nature of the area immediately surrounding the Project site (ie coal stockpile operations), it is not considered that an air quality monitoring program operated by Boral would be required to be implemented as a condition of consent for this Project.

The areas in which sensitive receptors are located (Stockton, Mayfield and Carrington) each have a NSW OEH operated continuous PM₁₀ and PM_{2.5} monitoring station, data from which can be interrogated (as is currently being performed through the NCCCE) to determine the likely sources during periods of elevated air pollution. Addition of extra sites to monitor the same parameters would not be considered to provide any additional information of any use.

10 REFERENCES

Oke 2004. *Boundary Layer Climates*, Second Edition, Routledge, London and New York, 435 pp.

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DEC 2005, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*, 2005, Department of Environment and Conservation NSW, August 2005.

DEC 2006, *Technical framework: assessment and management of odour from stationary sources in NSW*, Department of Environment and Conservation NSW, November 2006.

TAPM 2008, *TAPM v4 User Manual*, CSIRO Marine and Atmospheric Research Internal Report No.5, Peter Hurley, October 2008.

Selection of Representative Meteorological Data

In dispersion modelling, one of the key considerations is the representative nature of the meteorological data used. Once emitted to atmosphere, emissions will:

- rise according to the momentum and buoyancy of the emission at the discharge point relative to the prevailing atmospheric conditions;
- be advected from the source according to the strength and direction of the wind at the height which the plume has risen in the atmosphere;
- be diluted due to mixing with the ambient air, according to the intensity of turbulence; and
- possibly be chemically transformed and/or depleted by deposition processes.

Dispersion is the combined effect of these processes.

Dispersion modelling is used as a tool to simulate the air quality effects of specific emission sources, given the meteorology typical for a local area together with the expected emissions. Selection of a year when the meteorological data is atypical means that the resultant predictions may not appropriately represent the corresponding air quality impacts.

The year of meteorological data used for the dispersion modelling was selected by reviewing the most recent five years of historical surface observations at Williamstown RAAF [station number 061078] (2010 to 2014 inclusive) to determine the most representative year of long-term conditions. Wind speed, ambient temperature and relative humidity were compared to long term averages for the region to determine the most representative year.

Data collected from 2010 to 2014 is summarised in **Figure A1** to **Figure A6**. Examination of the data indicates the following:

- **Figure A1** and **Figure A2** indicate that 2012 and 2014 exhibit wind speeds that are closest to the long term average.
- **Figure A3** and **Figure A4** show that temperatures in 2012 and 2014 more appropriately reflect the long term average. Temperatures in 2012 are slightly lower than the long term average at 9 am in autumn/winter however 2014 temperatures are slightly higher than the long term average at 3 pm in autumn/winter.
- **Figure A5** and **Figure A6** indicate that relative humidity at 9 am in late winter 2014 is higher than the long term average and the summer time relative humidity at 9 am is slightly lower than the long term average. Relative humidity during February of 2012 is higher than the long term average.

Figure A1 Wind Speed at 9 am at Williamtown RAAF for 2010 – 2014

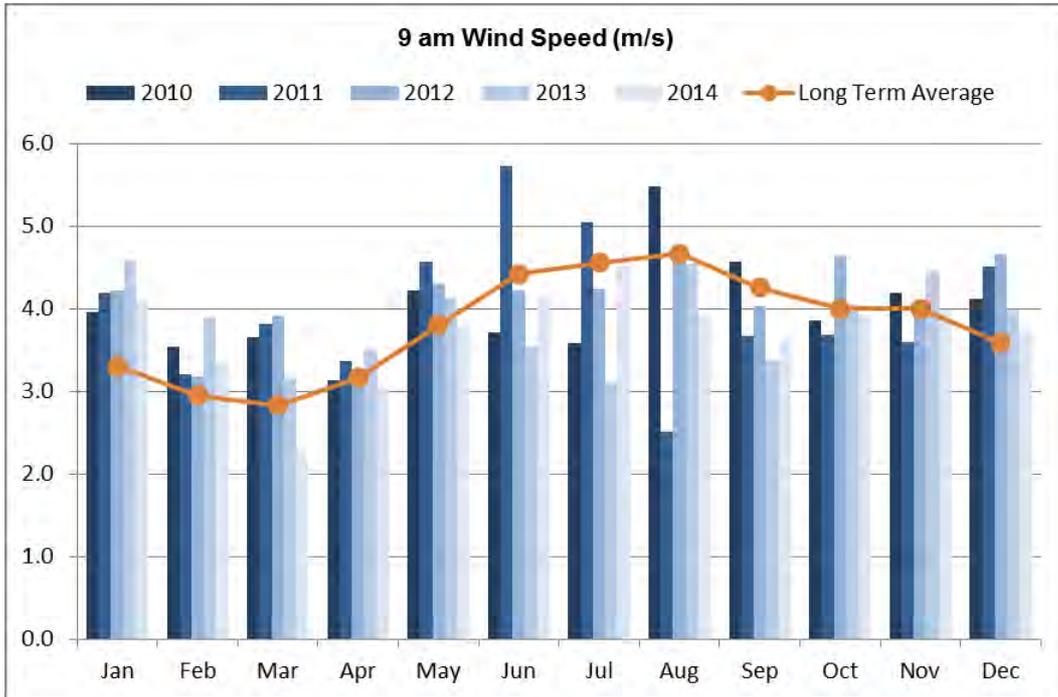


Figure A2 Wind Speed at 3 pm at Williamtown RAAF for 2010 – 2014

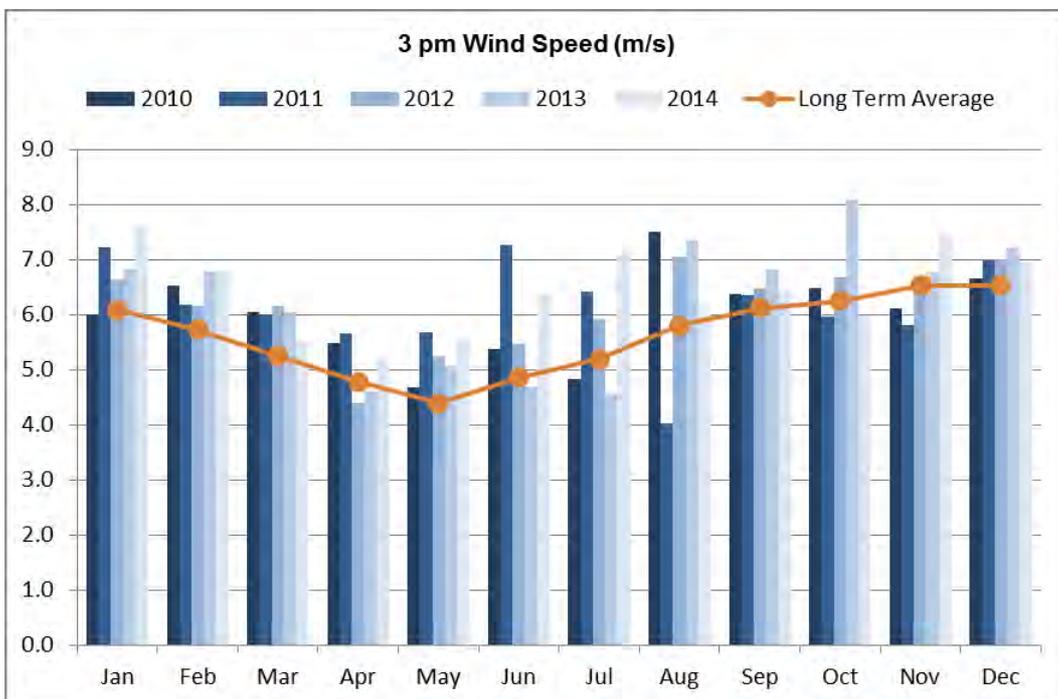


Figure A3 Temperature at 9 am at Williamtown RAAF for 2010 – 2014

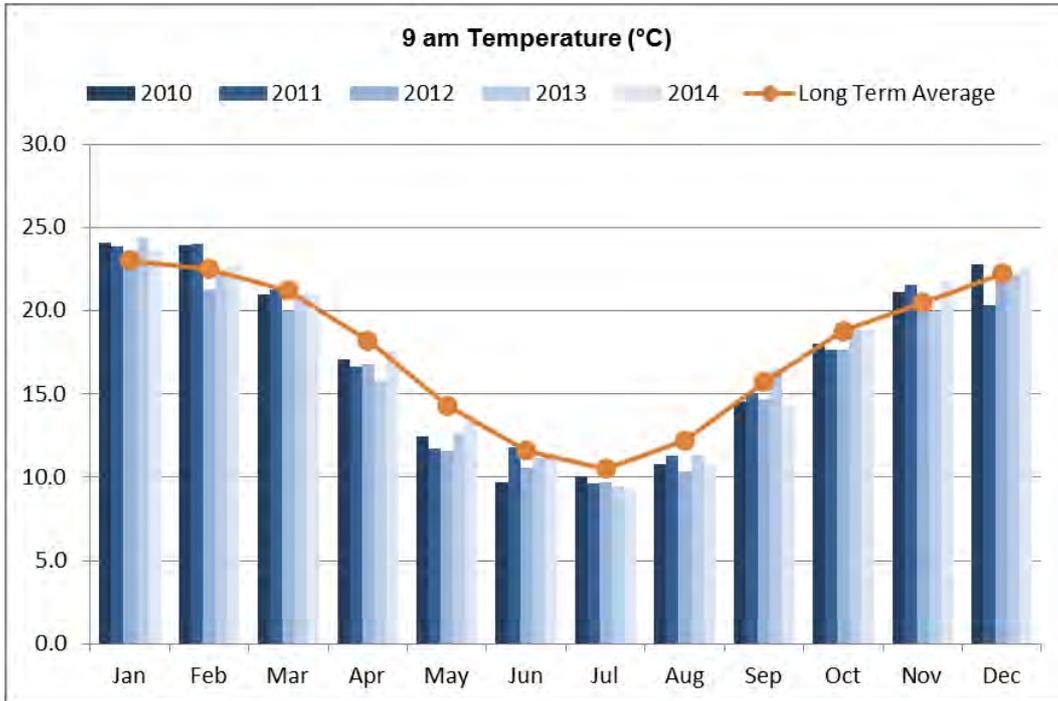


Figure A4 Temperature at 3 pm at Williamtown RAAF for 2010 – 2014

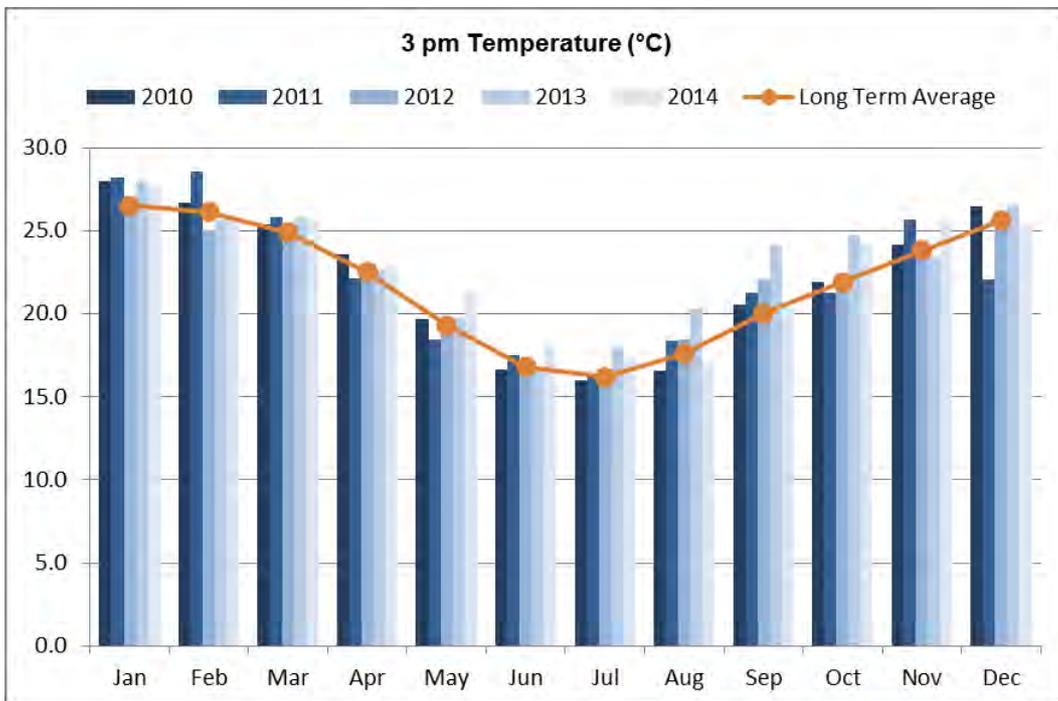


Figure A5 Relative Humidity at 9 am Williamtown RAAF for 2010 – 2014

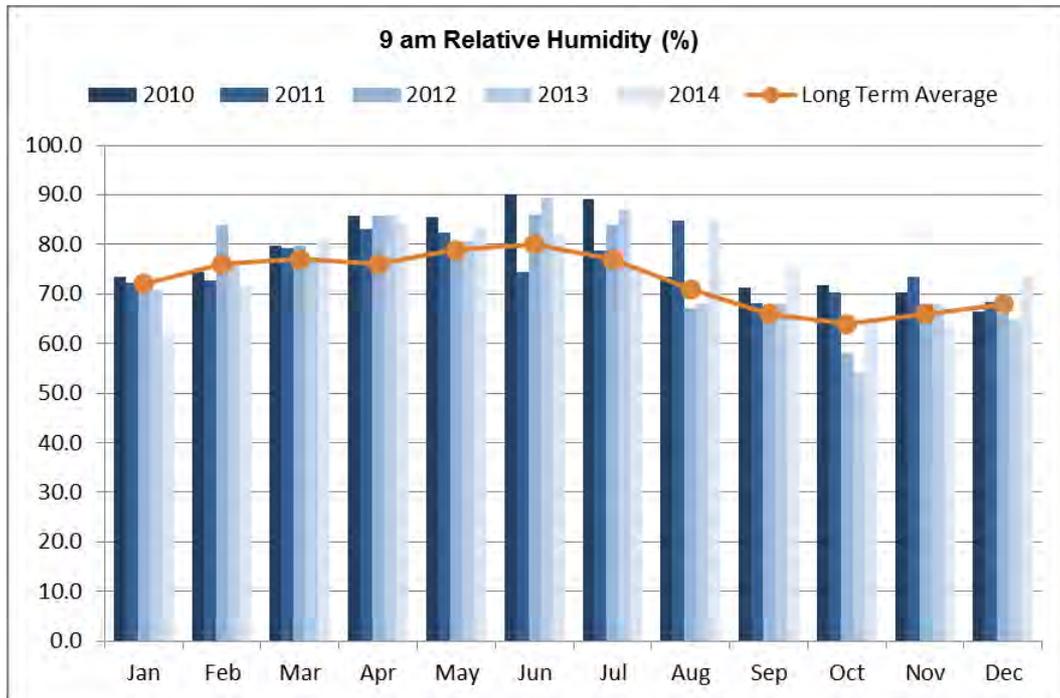
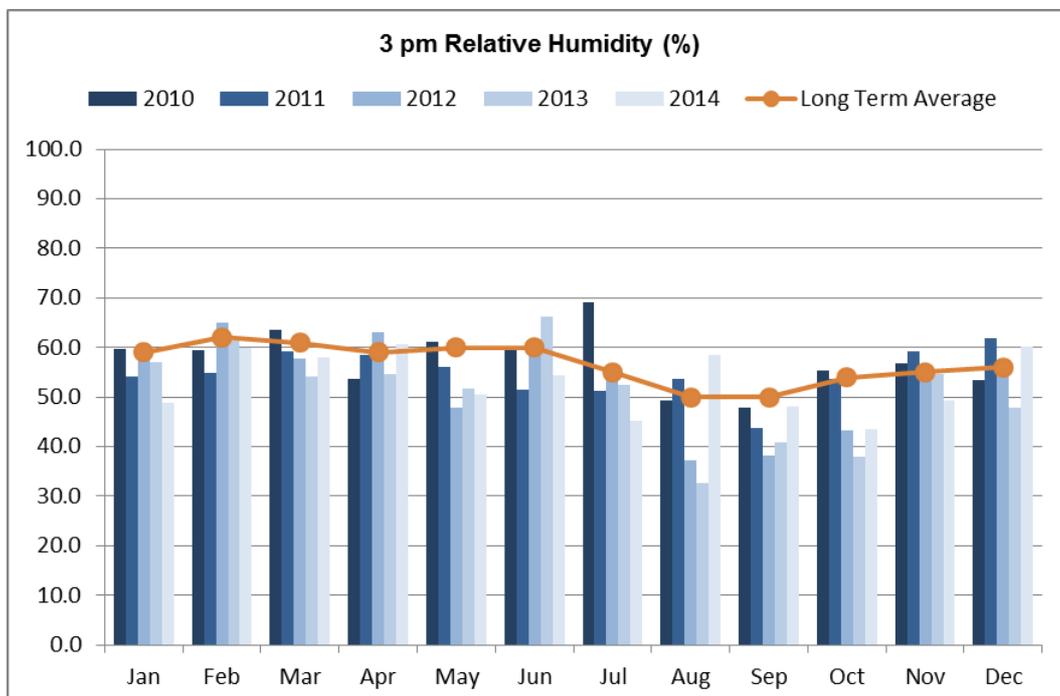


Figure A6 Relative Humidity at 3 pm Williamtown RAAF for 2010 – 2014



Years 2012 and 2014 indicate average wind speeds that are slightly lower than the long term average, especially at 9 am. Using these years as the representative year would be a conservative approach because low wind speeds are associated with less effective plume dispersion. No other parameters significantly deter the use of any one of these years of data. Where data sets are deemed equally representative, the most recent data set is selected. Consequently, 2014 was selected as a suitably representative year of meteorology.