5 December 2016

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Kerry Hamann
NSW Department of Planning & Environment
Level 22, 320 Pitt Street
Sydney NSW 2000

Dear Kerry,

Response to Submissions – State Significant Development 6820, Proposed Light Weight Aggregate Facility
780 Wallgrove Road, Horsley Park

This Response to Submissions has been prepared by Willowtree Planning Pty Ltd on behalf of Lumetum Pty Ltd, and relates to the proposed construction and operation of a Light Weight Aggregate Facility (LWA Facility) at 780 Wallgrove Road, Horsley Park (Plant No.1).

State Significant Development 6820 was lodged in October 2015, on behalf of Lumetum (a wholly owned subsidiary of Brickworks), and was publicly exhibited from 5 November 2015 until 7 December 2015.

There were no public submissions received during the exhibition period, however written responses from various agencies and Fairfield City Council were received. These included:

a) Fairfield City Council
b) NSW Roads and Maritime Service
c) NSW Office of Environment and Heritage
d) NSW Department of Primary Industries - Water
e) Water NSW
f) NSW Environment Protection Authority
g) NSW Department of Planning and Environment

A separate meeting was also held with the NSW EPA regarding Noise concerns related to the proposal on 15 December 2015.

The first Response to Submissions Report was submitted on 6 April 2016, which was referred to the above agencies and Fairfield Council for further review and comment. The following agencies requested further information and clarification to the matters raised. These agencies include:

a) NSW Environment Protection Authority
b) Water NSW

Key Matters for Consideration

In response to the matters raised by the EPA, a meeting was held on 9 September 2016 that included representatives of the EPA, Brickworks and Air Labs. At this meeting, it was resolved to prepare an addendum to the revised Air Quality Impact Assessment (issued on the 31st March, 2016) which dealt with all matters raised in relation by the EPA to Air Quality to enable the SSDA to be determined.

The matters raised by the EPA are itemised in **Table 1** which include:

- The preparation of an Air Quality Management Plan
- Installation of a proposed wet scrubber prior to commencement and operation of Stage 1 of the proposed LWA Facility
- Emission performance of Regenerative Thermal Oxidiser (RTO)
- Additional information of oxides of nitrogen and ozone

Water NSW have requested that the Management & Mitigation Measures in the EIS be updated with respect to the measures listed in Table 24 of the revised air quality impact assessment to ensure the effective management of air quality from all sources.

Summary of Changes

The main changes proposed in response to the submissions made primarily relate to Air Quality Control Measures as summarised below:

Table 1: Summary of Changes			
Scenario	**Plant**	**Air Pollution Control Measures as presented in the Revised Air Quality Assessment (FEB16028.1), dated: 31st March, 2016**	**Revised Air Pollution Control Measures as presented in the Response to Submission (RTS) document, dated: 5th November, 2016**
Existing Operations – Hydrogen Fluoride (HF) Emissions *(focus on HF as it is the key pollutant for the existing operations)*	Plant 1	No controls	No controls
	Plant 2	**Wet scrubber** to minimise HF emissions to be installed only **prior to Stage 2 LWA operations**	**Cascade Scrubber System** to minimise HF emissions (approximately by 90-95%) to be installed on Plant 2 **prior to undertaking construction and operation works for Stage 1 LWA operations**
LWA Stage 1 Operations	LWA Stage 1 Rotary Kiln	• Bagfilter for particulates • **Wet scrubber** for reducing acid gas emissions • Integrated RTO and **SCR** system for reducing CO, VOC and NOx emissions	• Bagfilter for particulates • **Calcium Hydroxide (Lime)** injection system for reducing acid gas emissions, including HF by approximately 95% (as per supplier specifications) • Integrated RTO and **SNCR** system for reducing CO, VOC and NOx emissions
LWA Stage 2 Operations	LWA Stage 2 Rotary Kiln	• Bagfilter for particulates • **Wet scrubber** for reducing acid gas emissions (incl. HF) • Integrated RTO and **SCR** system for reducing CO, VOC and NOx emissions	• Bagfilter for particulates • **Calcium Hydroxide (Lime)** injection system for reducing acid gas emissions, including HF by approximately 95% (as per supplier specifications) • Integrated RTO and **SNCR** system for reducing CO, VOC and NOx emissions

The following supporting reports/documents have been prepared which are to be read in conjunction with the responses provided in **Table 2**:

- **Appendix 1** – Addendum to the Revised Air Quality Impact Assessment
- **Appendix 2** – Management & Mitigation Measures

Based on the responses provided, it is kindly considered that the Department of Planning and Environment finalise the Assessment Report and issue draft conditions for the proposal.

We look forward to receiving your comments and confirmation of the attached information.

Should you have any questions in relation to the above, please contact me directly on 0413 555 638.

Regards,

Andrew Cowan
Director
Willowtree Planning Pty Ltd

	Table 2: Response Matrix	
	NSW EPA Comment	***Applicant Response***
1.	*Particulates* *The EPA notes that the revised assessment predicts cumulative impacts above NEPM standards for $PM_{2.5}$ (annual) at discrete receptors assessed. The predicted concentrations are largely attributable to background concentrations, with particulate emissions from the proposal likely to be attributed to fugitive sources related to material handling.* *The EPA considers that the Proponent should adopt proactive and reactive management measures for particulate matter and include the management measures within an Air Quality Management Plan for the site.*	As required by the NSW-EPA, an Air Quality Management Plan (AQMP) has been prepared through consultation with Brickworks to effectively adopt and implement proactive and reactive management measures for particulate emissions. The AQMP is outlined in Section 2.1 of the Response to NSW-EPA Comments Document prepared by Air Labs at **Appendix 1**.
2.	*Emission Control Measures – Wet Scrubber* *The assessment outlines the installation of a wet scrubber during phase 2 of the proposed LWA facility to reduce particulate, fluoride, hydrogen chloride and sulphur dioxide emissions. However, the EPA notes that existing operations represent a large portion of emissions for compounds that the wet scrubber would aim to mitigate. The EPA considers that the Proponent should commit to installing the proposed wet scrubber prior to undertaking construction and operation of Stage 1 of the proposal, on the basis that:* *a) Existing sources represent the highest emission load for HF;* *b) The assessment only considers existing operations for Plant 2 at half capacity. There is no guarantee that this operation will continue to operate at half capacity;* *c) The assessment predicts concentrations equal to the impact assessment criteria for Stage 1; and* *d) Reasonable and feasible controls have been identified by the proponent as available for implementation.* *The EPA recommends that the Proponent commit to installing the proposed wet scrubber prior to undertaking construction and operation of Stage 1 of the proposed LWA facility.*	NSW-EPA in their comments note that the existing operations represent a large portion of Hydrogen Fluoride (HF) emissions and as-such requires Brickworks to install a scrubber system prior to undertaking construction and operation of the Stage 1 LWA operations. Considering NSW-EPA's position on existing operations, Brickworks have agreed to install a Cascade Scrubber system for the existing Plant 2 operations to reduce HF emissions. Brickworks commit to install the Cascade Scrubber system on the existing Plant 2 operations prior to undertaking construction and operation works for the Stage 1 LWA project. A detailed description of the Cascade Scrubber system proposed for Plant 2, it's expected control efficiencies in reducing HF emissions, revised HF emission rates for Plant 2 and the subsequent ground level concentrations at the

		sensitive receptors determined through dispersion modelling are documented in Section 2.2 of the Response to NSW-EPA Comments Document at **Appendix 1**.
3.	*Emission Performance of Regenerative Thermal Oxidiser (RTO)* *A detailed description of the RTO has not been included within the assessment, notably the purpose of the "integrated SCR" component. If the SCR component has been incorporated to reduce NOx emissions, control efficiencies should be included within the assessment.* *Additionally the EPA notes that the emission estimates for the proposal are based on emission factors that are represented as quantity of pollutant per quantity of material produced. On this basis it is not clear if the assessment includes emissions from the fuel used for operation of the RTO (if required), any NOx generation from the RTO (if it occurs), or any NOx reduction from the SCR component (if it occurs).* *The process diagram also outlines the injection of Ammonium Hydroxide within the RTO. Further information is required to clarify the use of Ammonium Hydroxide, including an assessment of ammonia emissions from the proposal.* *The EPA requests further information to:* • *Clarify the SCR component of the proposed emission controls;* • *Outline any control efficiencies and emissions associated with the SCR component of the RTO, specifically for NOx and ammonia;* • *Include an assessment of ammonia discharges from the process;* • *Clarify that the assessment has adequately considered emissions from fuel used for all operations (including the RTO); and* • *Revise the Air Quality Impact Assessment where required, to address the comments above.*	Brickworks are proposing to install a Regenerative Thermal Oxidiser in the emissions control system for both Stage 1 and Stage 2 operations of the LWA project for treating organic emissions (VOCs and CO). Brickworks are also proposing to install a Selective Non-Catalytic Reduction (SNCR) system integrated into the RTO for both Stage 1 and Stage 2 operations of the LWA project for effectively reducing NO_X emissions generated from LWA manufacturing, including NO_X emissions generated from the RTO itself. A detailed description of the integrated RTO-SNCR system (including expected control efficiencies) is provided in Section 2.3 of the Response to NSW-EPA Comments Document. Ammonium Hydroxide (NH_4OH) is injected for the non-catalytic reduction of NO_X emissions. NSW-EPA in their comments required clarification on the use of NH_4OH, including an assessment of ammonia emissions. An explanation of the injection of NH_4OH and an assessment of ammonia slip emission and the corresponding ground level concentrations has been provided in Section 2.3 of the Response to NSW-EPA Comments Document. NOx emissions generated from the fuel used by the RTO have also been quantified and presented in Section 2.3 of the Response to

		NSW-EPA Comments Document at **Appendix 1**.
4.	*Oxides of Nitrogen and Ozone* *The assessment adopts emission factors for estimating emissions of oxides of nitrogen (NOx), referenced from National Pollutant Inventory Estimation Technique Manual for Brick, Ceramics and Clay Product Manufacturing which are reproduced below:* - *Emission factor adopted for natural gas combustion: 0.175kg/tonne;* - *Emission factor adopted for pulverised coal combustion: 0.255kg/tonne.* *The EPA notes that the referenced emission factors are for different operations, and not specifically Light Weight Aggregate Plants. The US EPA publish emission factors for Light Weight Aggregate Production facilities with their AP-42 emission factor database. An emission factor for NOx emissions of 1kg/Mg (or 1kg/tonne) for a Rotary Kiln (with scrubber) is noted from the US EPA database. This is higher than the emission factors adopted within the assessment, and indicates a degree of uncertainty with predicted NOx emission rates, and hence predicted NO_2 impacts.* *The EPA considers that based on the emission factor published by the US EPA, that the proposal could potentially be a significant source of NOx that requires further consideration with respect to proposed emission controls for NOx, and also with respect to the potential for ozone impacts. The EPA has published a framework for assessing significant sources of NOx emissions (Tiered Procedure for Estimating Ground-Level Ozone Impacts from Stationary Sources). Additionally no detail on emission controls for NOx are included within the assessment.* *The EPA recommends that the proponent be requested to provide further information to:* • *Demonstrate that the emissions are representative of the proposal;* • *Provide further clarity on any proposed controls for Oxides of Nitrogen;* • *Provide an assessment of Ozone, with reference to the EPA's Tiered Procedure for Estimating Ground-Level Ozone Impacts from Stationary Sources; and* • *Revise the Air Quality Impact Assessment where required, to address the comments above.* *If the DPE approves the proposed LWA facility, the EPA will require proof of performance in regards the effectiveness and efficiencies of the emissions control equipment and monitoring conditions in regards the emissions discharged from the LWA facility. If the facility is to be included in the existing*	During the meeting with the NSW-EPA on 9th September, 2016, there was a discussion on the usage of appropriate NO_x emission factors to determine NO_X emission rates and the subsequent NO_2 ground level concentrations. During the meeting, reference was made to emissions monitoring data from *Techniclay* - a lightweight expanded clay aggregate similar to the LWA product proposed by Brickworks. Emissions monitoring data for *Techniclay* was supplied to Airlabs by Brickworks. Considering the operational similarities, NOx emissions for Stage 1 and Stage 2 LWA project were determined using the emissions monitoring data from *Techniclay*. A justification of usage of the *Techniclay* emissions monitoring data and the NOx emissions determined for Stage 1 and Stage 2 LWA operations are presented in Section 2.4 of the Response to NSW-EPA Comments Document at **Appendix 1**. The revised NO_x emission rates and the subsequent NO_2 ground level concentrations predicted at the sensitive receptors are presented in Section 2.4 of the Response to NSW-EPA Comments Document at **Appendix 1**. Furthermore, NSW-EPA required a desktop assessment of ozone (O_3) impacts from Stage 1 and Stage 2 LWA operations. An ozone assessment was undertaken in accordance with the NSW-EPA *Tiered Procedure for Estimating Ground Level Ozone Impacts from Stationary*

<table>
<tr>
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<td>EPL 546, a licence variation application will need to be submitted by the Proponent and amendments to EPL 546 will include, but not necessarily be limited to, new discharge points, pollutant concentration limits and frequency of monitoring.</td>
<td>Sources. The NSW-EPA Level 1 Screening Procedure Tool was utilised to determine O_3 impacts. A description of the assessment methodology and the results from the Level 1 Screening Tool are provided in Section 2.4 of the Response to NSW-EPA Comments Document at Appendix 1.</td>
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<td>5.</td>
<td>Limit Conditions

L6.1 Noise generated from the LWA facility must not exceed the noise limits in the Table 1 below. The locations referred to in the table below are indicated by Table 3-1 and Figure 3-1 of Noise Impact Assessment for Brickworks Ltd. Report No: 151005_Noise_Rep_Rev5 October 2015 and Addendum Letter Report Ref: 151005_Addendum Noise Impact Assessment_5 Jan 2016, both prepared by Benbow Environmental Pty Ltd.

Table 1
<table>
<tr><td colspan="2"></td><td colspan="3">NOISE LIMITS dB(A)</td></tr>
<tr><td>Locality</td><td>Location</td><td>Day, Evening, Night</td><td colspan="2">Night</td></tr>
<tr><td></td><td></td><td>$L_{Aeq\ (15\ minute)}$</td><td>$L_{Aeq\ (night)}$</td><td>$L_{A1\ (1\ minute)}$</td></tr>
<tr><td>Horsley Park</td><td>R1. 785-811 Wallgrove Road</td><td>51</td><td>Not Applicable</td><td>51</td></tr>
<tr><td>Horsley Park</td><td>R2. 763-783 Wallgrove Road</td><td>46</td><td>Not Applicable</td><td>46</td></tr>
<tr><td>Horsley Park</td><td>R3. 259-273 Chandos Road</td><td>40</td><td>Not Applicable</td><td>40</td></tr>
<tr><td>Horsley Park</td><td>R4. 203-209 Chandos Road, Horsley Park</td><td>43</td><td>41</td><td></td></tr>
<tr><td>Horsley Park</td><td>R5. 168-174 Chandos Road, Horsley Park</td><td>45</td><td>43</td><td></td></tr>
<tr><td>Horsley Park</td><td>R6. 150-154 Chandos Road, Horsley Park</td><td>45</td><td>Not Applicable</td><td>45</td></tr>
</table>
</td>
<td>Noted and agreed.</td>
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</table>

	Horsley Park	*R7. 126-130 Chandos Road, Horsley Park*	*45*	*Not Applicable*	*45*	
	Horsley Park	*R8. 108-112 Chandos Road, Horsley Park*	*45*	*Not Applicable*	*45*	
	Horsley Park	*R9. 127-131 Ferrers Road, Horsley Park*	*43*	*Not Applicable*	*43*	
	Horsley Park	*Prospect Nature Reserve*	*50 When in use.*			
6.	***L6.2*** *For the purpose of condition L6.1;* • *Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.* • *Evening is defined as the period 6pm to 10pm.* • *Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.*					Noted and agreed.
7.	***L6.3*** *The noise limits set out in condition L6.1 apply under all meteorological conditions except for the following:* *a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or* *b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or* *c) Stability category G temperature inversion conditions.*					Noted and agreed.
8.	***L6.4*** *For the purposes of condition L6.3:* *a) Data recorded by the meteorological station identified as EPA Identification Point 8 must be used to determine meteorological conditions; and* *b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.*					Noted and agreed.
9.	***L6.5*** *To determine compliance:* *a) With the $L_{eq(15\ minute)}$ noise limits in condition L6.1, the noise measurement equipment must be located:* • *Approximately on the property boundary, where any dwelling is situated 30*					Noted and agreed.

	metres or less from the property boundary closest to the premises; or • *Within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable* • *Within approximately 50 metres of the boundary of a National Park or a Nature Reserve.* *b) With the $L_{A1(1\ minute)}$ noise limits in condition L6.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.* *c) With the noise limits in condition L6.1, the noise measurement equipment must be located:* • *At the most affected point at a location where there is no dwelling at the location; or* • *At the most affected point within an area at a location prescribed by conditions L6.5(a) or L6.5(b).*	
10.	***L6.6*** *A non-compliance of condition L6.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:* • *At a location other than an area prescribed by conditions L6.5(a) and L6.5(b); and/or* • *At a point other than the most affected point at a location.*	Noted and agreed.
11.	***L6.7*** *For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.*	Noted and agreed.
12.	*<u>Other Conditions</u>* ***O6.1*** *Construction activity is permitted between the hours of 7:00 am to 6:00pm Monday to Friday and Saturday 8:00 am to 1:00pm, with no construction activity on Sundays and Public Holidays. Construction activity is permitted outside these hours that does not generate more than 35dBLAeq(15 minute) at any of the locations listed in Table 1.*	Noted and agreed.

	O6.2 *Activities that may also be undertaken outside the hours specified in the Condition above are:* *a) The delivery of oversized plant or structures that police or other authorised authorities determine require special arrangements to transport along public roads;* *b) Emergency activities to avoid the loss of life or property, or to prevent environmental harm.*	
13.	***Additions to Definition of Terms of the licence*** • *NSW Industrial Noise Policy – the document entitled "New South Wales industrial Noise Policy published by the Environmental Protection Authority in January 2000."* • *Noise – sound pressure levels' for the purposes of conditions L6.1 to L6.7.*	Noted and agreed.
	Water NSW Comment	***Applicant Response***
1.	*WaterNSW notes that the suggested Draft Management and Mitigation measures in the EIS only relate to the new development and do not reflect the measures suggested in the air quality assessment report required in order to effectively manage air emissions from all sources. WaterNSW requests that the Management & Mitigation measures contained in the EIS should be amended to mirror those in the Air Quality Assessment recommendations. Specifically for those fugitive emissions identified during the construction phase WaterNSW requests that the measures outlined in Table 24 be referenced to update the measures listed in the EIS Draft conditions 11,13-15.*	Refer to the updated Management and Mitigation Measures at **Appendix 2**.

Appendix 1
Air Quality Impact Assessment (Addendum)

Appendix 2
Management & Mitigation Measures