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Opal

Long-Term Noise Barrier Plan

Botany Paper Mill

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March 2023 Public

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Long-Term Noise Barrier Plan

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We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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Opal Long Term Noise Barrier Plan + Public Visual Impact Assessment - For submission v5 - for submission March 2023

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1 Purpose of this Plan

This Long-Term Noise Barrier Plan (*Plan*) has been prepared to support ongoing attenuation of operational noise associated with the Opal ANZ Paper Mill facility located at 1891 Botany Road, Matraville (*the site*).

This Plan has been prepared to satisfy Condition 10F, Schedule 3, of 05_0120 MOD 8 dated 29 October 2018.

The purpose of this Plan is to confirm the effectiveness of the proposed long-term noise barrier solution in mitigating the impact of operational noise generated from the site to nearby sensitive receivers (residential properties to the north and east of the site). Technical studies confirming the effectiveness of the subject noise barrier wall are appended to this Plan.

This Plan has been finalised by considering and addressing the outcomes of consultation with the NSW Department of Planning and Environment (*DPE*), the NSW Environmental Protection Authority (*EPA*), and Randwick City Council (*Council*).

1.1 Background

On 25 September 2015, Opal (formerly Orora) was granted consent to modify its original project approval under a Section 75W application (05_0120 MOD 5) which outlined the conditions required to allow the demolition of the B7 building and subsequent construction of a noise wall. Following this approval, Opal submitted a Stage 2 Noise Barrier Design Plan which was subsequently approved by DPE in November 2018.

The premise of the Noise Barrier Plan was to construct noise barriers on a block of land east of the B7 Building (Otherwise known as "the Hanger Block"). However, due to conditions surrounding the sale of the Hanger Block, no agreement was reached to complete the noise barrier before construction. Opal then contacted DPE and advised that demolition of the B7 building would be halted until a suitable and feasible solution for noise mitigation could be developed.

Since the Noise Barrier Plan was submitted and subsequently approved by DPE, Opal has also obtained approval to construct and operate a Secondary Water Treatment plant (MOD 6) on site. The additional site-based activities prompted a review of the off-site noise impacts that needed to be included in any noise mitigation solution proposed for the B7 building demolition. The B7 building has since been demolished and the associated noise barrier constructed.

On the 29 October 2018, Opal obtained approval from DPE for the demolition of the B7 Reel Store (adjoining the site of the old B7 building) and the construction of a 98m extension to the existing 146.4m long noise barrier, on the northeastern boundary of the site for the entire length of the B7 Reel Store building (05_0120 MOD 8).

As a result, the combined length of the completed noise barrier measures a total of approximately 244m. The noise barrier comprises steel shipping containers, partly filled with inert ballast to assist in dampening noise. The containers have been stacked to a continuous height of 11.6m (equal to four shipping containers placed and fixed on top of each other). The architectural drawing (refer to **Appendix B**) shows the dimensions and location of the noise barrier along the north-eastern boundary of the site.

The noise barrier has been painted in 'Deep Ocean' (or equivalent) paint to provide visual continuity with the façade treatment of the Opal Paper Mill buildings visible from Botany Road and McCauley Street.

The noise barrier has been proven to be a cost-effective, durable solution which, based on routine quarterly noise monitoring results, has allowed the site to continue to meet its license limits after the B7 building was removed.

Condition 10B, Schedule 2, of Modification of Minister's Approval (05_0120 MOD 5) requires the preparation of a Long-term Noise Barrier Plan (this Plan), as follows:

10F. The Applicant shall prepare a Long-term Noise Barrier Plan for the project. The Plan shall:

a) identify the Applicant's long-term plan for noise mitigation to nearby sensitive receivers

- *b)* address the planning and implementation strategy for the long-term noise barrier solution, including timeframes for implementation
- c) include a procedure for the removal of all or part of the noise barrier if new structures are erected on the site which would perform a suitable noise attenuation function
- *d) be prepared in consultation with the Department, EPA and Council; and*
- e) be submitted to the Department by 30 June 2021 for approval by the Secretary.

The above condition is then replicated in MOD 8 approval.

This Plan has been prepared to satisfy the above condition imposed under both MOD 5 and MOD 8.

As part of the current version of the Environmental Protection License (*EPL*) for the site (EPL 1594) issued in Oct 2022, quarterly noise monitoring has been undertaken by Hutchison Weller. This includes measurements relating to the ongoing performance of the existing noise barrier and its impacts on sensitive receivers adjoining the north-eastern boundary of the site (refer to **Appendix C**).

The quarterly noise monitoring reports show that:

- the existing noise barrier is achieving its stated purpose;
- the operation continues to meet its noise license conditions;
- the paper mill can continue to operate; and
- nearby residents are not unreasonably impacted by operational noise.

This is further quantified by the Noise Model Validation report (refer to **Appendix D**) which indicates that the noise contribution from the site with current infrastructure is lower than the EPL limits and the current use and activities on the site comply with the applicable EPL conditions.

2 The site

Opal Paper Mill (the site) is located at 1891 Botany Road, Matraville.

It is legally described as Lot 14 in DP 1205936 and Lot 1 in DP 363611.

The site is roughly triangular, relatively flat and approximately 122,560m² (circa 12.2 Ha) in area.

The site is located within the Matraville industrial area. It is zoned IN1 – General Industrial pursuant to Part 5.2 of Chapter 5 *Three ports—Port Botany, Port Kembla and Port of Newcastle* of the *State Environmental Planning Policy* (*Transport and Infrastructure*) 2021 and is within the Randwick Council Local Government Area (LGA).

The site is surrounded by a mix of port, industrial and commercial uses to the south, west, north-west and southeast. The closest residential properties to the site are approximately 30 metres from the north-eastern boundary along Partanna, Murrabin and Australia Avenues (see **Figure 1** below).

In relation to noise monitoring, the locations of the receivers are indicated on the maps contained in quarterly noise monitoring and noise model variation reports, **Appendices C** and **D** to this Plan.

Figure 1 Aerial identification of the site



Source: Nearmap 2022

3 Noise Barrier Plan

3.1 Long-term solution

This Long-Term Noise Barrier Plan (*Plan*) seeks DPE's approval to retain and manage the existing - "in-situ" - noise barrier as the appropriate and effective solution for the long-term noise attenuation measure along the eastern boundary of the site.

The existing noise barrier, originally constructed under MOD 5 and extended as part of MOD 8 (refer to **Section 1.1**), has proven to be an effective means of noise attenuation for surrounding properties and provides acceptable visual impact in its context (refer to **Appendix A**).

This is quantified through the quarterly noise monitoring undertaken by Hutchison Weller which has been issued to NSW EPA as part of procedural (quarterly) noise monitoring (refer to **Appendix C**). This confirms the existing noise barrier in place is effective in achieving compliance with the noise limits in Opals' Environmental Protection License (*EPL*) and overall project approval.

The design of the noise barrier was endorsed by DPE and the NSW EPA through the Stage 2 Noise Barrier Design Plan, dated 5 November 2018.

It should be noted that any changes to operations/development on the site which have the potential to increase noise impacts *may* need to consider alternative noise barrier solutions which are commensurate to that potential impact and will warrant an update to this Plan.

Having said that, the construction methodology of the existing noise barrier is beneficial in this regard by virtue of its modular construction. The existing noise barrier can be readily dismantled (incrementally or in stages) to accommodate alternative noise attenuation solutions. This will help ensure that any proposed increases in noise during dismantling and/or construction is minimised and temporary (in timeframe).

Noise Barrier Design

The existing noise barrier has been designed with a level of safety appropriate to a permanent unoccupied building or structure (i.e. Class 10 per BCA).

As a result, the following design standards apply:

- Wind load AS1170.2
- Annual probability 1/500
- Terrain category 2.5
- Seismic design AS1170.4 Site class DE
- Steel design AS4100
- Concrete Design AS3600
- Container loading capacity, as certified to CSC standards.

The existing noise barrier is constructed of vertical stacks of four shipping containers with connections between containers at the corner legs.

At the base, 'feet' are anchored to new reinforced concrete strip foundations, constructed on top of the existing pavement. Each concrete base (measuring approx. 2.5m x 4.8m) supports one end of two adjacent containers. The size and reinforcement of the bases provides sufficient overturning capacity to resist ultimate load combinations, per AS1170.0.

The top surface of each base is cast level so that the face of the wall is vertical.

The lowest two containers are filled with inert ballast, within their certified capacity, and to a weight sufficient to resist wind overturning from any direction.

Container strength

Each shipping container is designed in accordance with ISO standard 1496-1 - 1990, which allows them to be stacked, loaded, up to 8 high, on a moving ship.

In this situation they are CSC certified for a stacking load of 192,000kg above each container, i.e. 48,000kg per leg, with the rating displayed on each container (see **Figure 2**).

This is a safe working value for loading and allows for an additional x1.8 safety factor due to dynamic effects on a moving ship.

In the existing noise barrier, the ultimate corner bearing loads are <u>less than</u> this safe working load, so there is a considerable margin of additional safety in container strength for this use.

Figure 2 Typical certification plate of shipping container



Source: Enstruct Structural Design Summary, Dated 20/04/2017

Foundations

The site is generally underlain with stiff sandy soils. Geotechnical reports from other projects on the site have advised of bearing pressures of approximately 125kPa for shallow footings. The pressure beneath the strip footings is approximately 60kPa, onto existing pavement, which helps further spread the load onto the soil. As a result, there is sufficient bearing capacity to carry the structures. Each concrete footing has been laid with bolt-on twist locks, embedded to anchor the containers (see **Figure 3**).

Figure 3 Noise barrier base details



Source: HEDD Engineered Design, dated 04/12/2012

3.2 Noise Barrier Drawings

Noise Barrier Drawings (refer to **Appendix B**) show the existing noise barrier relative to the site boundary and existing Opal buildings. Detailed elevations indicate the height of the barrier and its profile width.

3.3 Maintenance

The existing noise barrier has been engineered to deliver a life of <u>greater than ten years</u>. This can be extended indefinitely due to the modular nature of the structure and an active, ongoing maintenance strategy. The existing noise barrier is adequately robust and does not pose any significant amenity impacts to the neighboring industrial and residential properties located north-east of the site.

Construction of the bases, together with the loading and placement of containers has been reviewed by a Structural Engineer.

The entire noise barrier will be routinely inspected and maintained at 12-month intervals to ensure structural integrity and appearance. Rust and associated damage will be noted at that time and repaired appropriately. To record the inspection outcomes, a short pro-forma report will be prepared which sets out the conclusions of each inspection and any issues actioned as necessary. These will be kept on file on site for a minimum of five years.

3.4 Noise attenuation performance and monitoring

A summary of the major findings of the Quarterly Noise Monitoring report and the Noise Verification Model report are provided below.

The Quarterly Noise Monitoring reports for August and November 2022 monitoring periods state:

- The most recent round of compliance measurements has been added to the historical data collected during compliance noise surveys, providing about 10 years of seasonal data. This data includes measurements of the noise environment with the Opal site operational over the whole monitoring period.
- The most recent noise monitoring results indicate that the measured LAeq noise levels are amongst the lowest recorded of the long-term series of data for corresponding seasonal measurement periods. At all measured locations the LA90 noise levels are lower than the EPL criteria for each of the monitoring locations.
- The LAmax and LA1 noise levels for both August and November 2022 noise monitoring periods are consistent with other monitoring periods.
- Although the LAeq and LAmax noise levels recorded during the survey periods of August and November 2022 are higher than the EPL criteria at the monitoring locations but are **not related** to the operation of the **Opal site**.
- Several years of monitoring data consistently indicate that the ambient noise environment in the local area is a product of the combined influence of all noise sources within the Port Botany area including the Opal site when operational (the total measured noise levels at monitoring locations are **only partly** <u>due to Opal operations on site</u>). Therefore, direct measurement of Opal's contribution to the noise environment is not possible because <u>noise</u> emissions from the site are **generally lower** than the ambient measured LAeq noise levels.
- The source of maximum noise level events in the area are typically from the local road network and aircraft flyovers. The nature of the processes within the site means that <u>there are **typically no maximum noise level** events associated with production activities. The exception to this may occur when equipment is not functioning properly during a breakdown or during maintenance activities, both of which are not common scenarios.</u>
- At the time of monitoring the B9 paper machine was operating at normal production capacity. Therefore, noise emissions from the paper mill did not vary significantly as the operation of the plant has been demonstrated to be consistent and reliable.

The above observations and findings of the Quarterly Noise Monitoring reports confirm the existing noise barrier has been functioning as expected and required by standards in mitigating the noise generated on site.

3.5 Noise Model Validation

The Noise Model Validation Report, dated December 2022, provides a review of noise influences with the Opal site and presents the noise modelling outcomes from updated site information against the requirements of the EPL issued by NSW EPA for the site.

These requirements, including updates to the noise model, are explained in detail within the Noise Model Validation report (refer to **Appendix D**). The Noise Model Validation report makes the following observations:

3.5.1 Operational noise limits

The NSW EPA issues EPLs that provide noise criteria for assessing operational noise from industrial premises. The Opal operations at Matraville operate under the EPL. Operational noise limits for the new Opal Paper Mill are detailed in condition L3.1 of the current EPL and Condition 10 of the Ministers Conditions of Approval (MCoA). Section L3 of this

licence details the operational conditions with respect to noise from the site. These have been replicated in **Table 1** below.

Since the inception of the monitoring program dating back to as early as 2012, the same six receiver locations have been used. However, it should be noted that the last two quarterly noise monitoring surveys for August and November 2022 periods only carried out at five locations. The residence located at R3 (Murrabin Avenue) was no longer accessible for the survey.

Location and receiver ID	Day LAeq,15min, dB(A)	Evening LAeq,15min, dB(A)	Night LAeq,15min, dB(A)	Night LAmax, dB(A)
Corner of McCauley Street and Australia Avenue (R1)	46	45	43	55
Australia Avenue (R2)	45	45	43	55
Murrabin Avenue (R3)	46	45	43	55
Partanna Avenue (R4)	42	41	41	55
Corner of Partanna Avenue and Moorina Avenue (R5)	42	42	39	55
Moorina Avenue (R6)	43	43	39	55

Table 1 – Operational Noise Limits

In addition to the original licencing requirements, the NSW EPA have issued the current version of EPL in October 2022 with further conditions relating to the noise model verification. Hutchison Weller consultants reviewed the validation and calibration of the model and the written approval by the NSW EPA. The outcomes of this review has been considered in the preparation of the current Noise Model Validation report (**Appendix D**).

Site noise contribution is discussed in sections 3.5.2 to 3.5.4 below.

The regular quarterly monitoring surveys have demonstrated that direct measurement of Opal's contribution to the noise environment is not possible because noise emissions from the site are generally lower than the ambient measured LAeq noise levels, which masks the actual noise from the site.

3.5.2 Predicted noise levels

The noise model was calibrated against measured noise levels at a few validation locations within the site. In general, noise sources within the site were constant. The noise model provided a good correlation of measured and modelled noise levels with all locations predicting less than +/- 2 dB difference. Based on the close correlation of the modelled and predicted noise levels, the noise model was considered to be acceptable for modelling noise impacts at offsite locations.

After validation of the site noise measurements, the noise model was then used to predict noise levels at the EPL compliance locations. Noise levels are presented for nighttime noise criteria as these are the most stringent for the site operating conditions. Predicted operational noise levels and EPL noise goals are provided in **Table 2** below:

Table 2 – Predicted Noise Levels

		EPL Noise	Goals dB(A)	Predicted Noise Levels dB(A)		
ID	Location	Night LAeq 15 Min	Night L _{Amax}	Night LAeq 15 Min	Night L _{Amax}	
R1	Corner of McCauley Street and Australia Avenue	43	55	38	46 - 48	
R2	Australia Avenue	43	55	39	47 - 49	
R3	Murrabin Avenue	43	55	40	48 -50	
R4	Partanna Avenue (Most affected façade)	41	55	40	48 -50	
R5	Corner of Partanna Avenue and Moorina Avenue	39	55	37	42 -44	
R6	Moorina Avenue	39	55	35	44 - 46	

Predicted noise levels are expected to be within the project noise criteria at all locations. It is worthwhile noting that the predicted noise levels are for periods of worst-case site activity under adverse meteorological conditions, the likelihood of actual impacts under these conditions is expected to be infrequent at best.

Maximum noise levels associated with other noise sources in the vicinity of the site are regularly measured to be in excess of 10 dB(A) above the LAMax criteria provided in the EPL for Opal noise impacts. In general, maximum noise level events are not a function of operations within the site.

3.5.3 Measured operational noise levels at compliance locations

Tables 3 and **4** outline a summary of the measured operational noise levels at compliance locations in the evening periods.

The parameters of LAeq and LA90 presented in **Table 3** and **Table 4** are used to provide information for comparison against the project criteria and the background noise environment.

3.5.3.1 November quarterly monitoring period

Operational noise monitoring for the November 2022 quarterly monitoring period was completed between 24 November and 1 December 2022, using automatic noise loggers deployed at five representative locations (except for R3 that was not accessible). This survey period coincided with typical continuous operations of paper mill.

 Table 3 – Summary of nighttime measured operational noise levels at compliance locations – November 2022 quarterly monitoring (extracted from Appendix C)

	Maximum Noise Environment - Noise Monitoring Location											
Time and date	R1		R2		R3		R4		R5		R6	
Date	L _{Amax}	L _{A1}	LAmax	L _{A1}	L _{Amax}	L _{A1}	LAmax	LA1	L _{Amax}	LA1	LAmax	L _{A1}
Thursday 24 November 2022	-	-	79.3	60.7	-	-	75.3	61.0	73.1	60.5	74.3	62.1
Friday 25 November 2022	-	-	71.8	65.2	-	-	74.9	67.0	87.0	62.4	89.1	67.6
Saturday 26 November 2022	-	-	74.5	58.3	-	-	84.3	61.3	85.3	63.0	80.5	71.4
Sunday 27 November 2022	-	-	87.8	68.9	-	-	87.4	65.6	89.7	66.8	86.6	66.5
Monday 28 November 2022	-	-	76.8	63.8	-	-	76.8	69.2	73.8	62.2	83.0	62.9
Tuesday 29 November 2022	-	-	78.3	66.8	-	-	86.5	71.6	77.0	69.0	73.3	64.6
Wednesday 30 November 2022	-	-	-	-	-	-	91.3	66.6	76.7	71.0	76.8	65.2
Thursday 1 December 2022	-	-	-	-	-	-	75.1	62.0	66.0	51.1	77.2	67.4
Median Open	-	-	77.6	64.5	-	-	80.5	66.1	76.9	62.7	78.9	65.9

The quarterly noise survey data for the November 2022 – January 2023 period indicates that the LAeq long term measured noise levels in the vicinity of the paper mill exceeded the EPL criteria for day, evening, and night-time. The maximum (LA1) recorded noise levels at each monitoring location also exceeded the EPL criteria of 55 dB(A) at all receiver locations.

In summary, the following conclusions have been drawn from the November 2022 quarterly monitoring:

- Several years of monitoring data consistently indicate that the ambient noise environment in the local area is a product of the combined influence of all noise sources within the Port Botany area including the Opal site when operational.
- Measured LA90 and LAeq noise levels for the night-time period during the November 2022 monitoring survey are noticeably lower than the measured noise levels at other times of the year.
- Night-time periods were assessed to provide additional information of the paper mill noise contributions using the median LA90 noise levels as a benchmark as rating background noise levels provide a good proxy for LAeq levels from steady state noise emitters.

3.5.3.2 August quarterly monitoring period

Operational noise monitoring for the August 2022 quarterly monitoring period was completed between 16 September and 23 September 2022, using automatic noise loggers deployed at five representative locations (except for R3 that was not accessible). This survey period coincided with typical continuous operations of paper mill.

Table 4 - Summary of nighttime measured operational noise levels at compliance locations – August 2022 quarterly monitoring (extracted from Appendix C)

	Maximum Noise Environment - Noise Monitoring Location												
Time and date	R1		R2		R	R3		R4		R5		R6	
Date	L _{Amax}	L _{A1}	L _{Amax}	L _{A1}	L _{Amax}	LA1	L _{Amax}	LA1	LAmax	L _{A1}	L _{Amax}	L _{A1}	
Friday 16 September 2022	-	-	71.14	62.7			84	69.7	86.2	74.9	77.2	67.1	
Saturday 17 September 2022	-	-	74.63	58.5			86.9	68.9	84.6	81.6	71.9	62.7	
Sunday 18 September 2022	-	-	84.22	66			83.9	67.5	85.7	81.8	78.6	65.4	
Monday 19 September 2022	-	-	77.15	62.9			88.2	72.8	84.2	81	75.4	66	
Tuesday 20 September 2022	-	-	86.33	66.7			86.3	71.8	86.3	78.5	72.6	61.4	
Wednesday 21 September 2022	-	-	76.45	66			99.9	70.3	86.7	64.2	72.6	68.1	
Thursday 22 September 2022	-	-	87.95	63.7			90.2	73.4	83.5	80.5	74.9	65.9	
Friday 23 September 2022	-	-	74.9	61			89.9	69.6	87.3	80.6	74.2	65.4	
Median Open	-	-	76.8	63.3	-	-	87.6	70.0	86.0	80.6	74.6	65.7	

The quarterly noise survey data for the August 2022 - October 2022 period indicates that the LAeq long term measured noise levels in the vicinity of the paper mill exceeded the EPL criteria for day, evening, and night-time. The maximum (LA1) recorded noise levels at each monitoring location also exceeded the EPL criteria of 55 dB(A) at all receiver locations.

In summary, the August 2022 quarterly monitoring report the following conclusions have been drawn:

- Several years of monitoring data consistently indicate that the ambient noise environment in the local area is a product of the combined influence of all noise sources within the Port Botany area including the Opal site when operational.
- Winds generally from the north are like to reduce impacts from the Opal site and reduce some noise impacts from the port.
- Measured LA90 and LAeq noise levels for the night-time period during the August 2022 monitoring survey are noticeably lower than measured noise levels from previous surveys at corresponding times of the year.
- Night-time periods were assessed to provide additional information of the paper mill noise contributions using the median LA90 noise levels as a benchmark as rating background noise levels provide a good proxy for LAeq levels from steady state noise emitters.

3.5.4 Summary of findings

- As part of the Paper Mill's environmental licencing conditions, target noise levels at nearby residential locations form part of their operational parameters. Noise influences from many sources in the Port Botany area restrict the direct measurement of noise from Opal at these residential locations and in 2014 a site wide study of noise was commissioned to assist in the assessment of noise impacts. This model has been used as a tool for assessing impacts of site equipment and process upgrades since this time.
- Changes to the site layout and additional infrastructure projects over the last few years have necessitated a revised noise model that is calibrated by internal site measurements and external noise monitoring correlation. A review of the noise model to confirm its predictive accuracy has been carried out. This was necessary to establish a new modelling base line for future site improvements and monitoring of site noise against the noise goals detailed in the EPL. The noise model review used measurement data to check the current noise model inputs and spot measurements within the site to establish validation noise levels at key locations. The noise model was used to predict noise levels at these locations and the results were compared for accuracy. In all cases the noise model was able to predict within less than 2 dB for each validation location, indicating that the noise model is acceptable for use in assessing noise impacts at residential locations adjacent to the paper mill.
- The Noise Model Validation Report findings state:
 - Predicted noise levels for the B9 Paper mill have been validated against spot measurements within the site and are expected to remain current unless there are changes to the operations or equipment.
 - Condition U1.2 of the EPL requires that the validation of the noise model remain current when assessing any future developments within the site. To accommodate this requirement, it is proposed that long term noise verification locations are established around the site for routine testing of onsite noise levels for each of the autonomous operational zones (shown on Figure 1 on page 2 of the report Appendix D).
 - These long-term monitoring locations would also be used to confirm compliance monitoring in accordance with other requirements for quarterly monitoring detailed in the note at the end of Condition U of EPL. Future modelling and assessments would proceed in accordance with the Noise Policy for Industry (NPfI) based on the calibration of these points at the time of modelling.
 - Modelling against condition L3.1 of the EPL indicates that the <u>contribution of the Opal site</u> to nearby
 residential receiver locations <u>was within the noise criteria values at all locations</u>. Noise contours showing the
 predicted noise levels for the broader community also meet these criteria.
 - An additional assessment of annoying characteristics of the predicted noise levels demonstrate that no further penalties are required to be added to the predicted noise levels.
 - Based on the completed noise validation the <u>Opal site currently complies with the NSW EPA Environmental</u> <u>Protection Licence conditions and no recommendations for noise remediation are necessary.</u>

As summarised above, the findings of both Quarterly Noise Monitoring reports and the Noise Model Validation report show the existing noise barrier along the north-eastern boundary of the site satisfies the expected noise attenuation requirement for the site and its operations. Therefore, the container wall as currently exists provides the necessary sound attenuation to functions carried out on site and can be used as a long-term noise barrier without any changes.

3.6 Visual treatment

The existing noise barrier is located at a significant distance from residential properties (approximately 32 meters at its closest point to the nearest dwelling) where it lies parallel to a vacant land (easement), Partanna Avenue cul-de-sac and Purcell Park to the northern most portion of the barrier. The existing canopy trees which are planted on the adjacent Ausgrid easement or Purcell Park along the eastern boundary of the site partly screen the noise barrier from the views available from the public domain and neighbouring properties (see **Figure 4**).

The existing noise barrier is painted uniformly in Colourbond Deep Ocean (blue) as shown in **Figure 4** below. This treatment is expected to last for the duration of the noise barriers' life but shall be included in the annual inspection for any required repainting. The existing noise barrier comprises shipping containers stacked four high, providing an appropriate transition between the Opal paper mill and associated buildings to the west / southwest and neighbouring (approved) industrial and residential properties to the north-east. (see **Figure 5**).

The existing noise barrier provides a single continuous structure, industrial in character and general aesthetics (size, bulk, materials and colour), that commensurate with its location and use. It is reflective of a modern industrial building built close to / on the boundary – as can be found in the immediate vicinity to the north and southeast of the site (Refer to **Appendix A**).

Other potential visual aspect / impact issues, such as graffiti and general deterioration over time were considered and addressed for the existing noise barrier in a maintenance strategy.

- Graffiti has not been an issue for the existing noise barrier. The barrier is only accessible from within the site and there is a spatial separation of more than 2m between the face of the barrier and the nearest boundary fence (for maintenance). Notwithstanding, in an unlikely event that the barrier is defaced with graffiti, the graffiti signs would be removed within 24-48 hours.
- General deterioration has also not been an issue for the existing wall. The distance between the noise barrier and the adjacent easement ensures access for routine maintenance and structural assessment as needed.

Refer also to detailed visual impact assessment in Appendix A.

Figure 4 View of existing wall and screening from Western end (cul-de-sac) of Partanna Avenue







4 Stakeholder Engagement

Copies of the draft Plan were sent to Randwick City Council and the NSW EPA for consultation on 16 November 2022. Both Council and NSW EPA provided their feedback by 29 November and 19 December 2022 to WSP. In summary, the outcomes of the stakeholder engagement/consultation are:

- 01. NSW EPA did not provide any specific comments in relation to the Plan. As per they response *the EPA generally does not review, approve or endorse management plans.* The NSW EPA requires the applicant to ensure *that the monitoring program proposed is in line with the conditions of consent to ensure ongoing compliance.* The compliance of the proposed noise barrier wall with the standards and benchmarks applicable to it has been discussed in this Plan and the noise assessment reports appended to it.
- 02. Council comments were mainly concerned with the following matters:
 - The need for additional community consultation,
 - Use of different construction materials for the noise barrier,
 - The development assessment and approval process carried out by the DPE,
 - Bulk and scale, visual and environmental impacts (noise) of the existing noise barrier.

All the comments made by Council are reviewed and responded to in Table 5 below.

Copies of the Council letter and the NSW EPA email in response to the proponent's request for their review and provision of feedback in relation to the Plan are provided at **Appendix E** to this Plan.

Based on our assessment of Council's feedback, as provided in **Table 5**, the existing noise barrier wall does not fail to satisfy any of the technical, structural, aesthetic, or statutory planning requirements and standards that apply to it. Therefore, there are no impediments in extending the life of the existing noise wall for perpetuity.

Randwick City Council (RCC) feedback on the Plan	References to the relevant resources	Proponent's comments and responses
a Modification Application (Modification 2) to the development consent (MP05_0120) was approved in 2010 for, among other things, construction of a 5m high permanent noise barrier along the northern side boundary and a 7m high noise barrier around the wastepaper storage yard to attenuate noise impacts from the paper mill operation (Condition No. 10A)	 Condition 10A under MOD 2 states: 10A. Prior to the commencement of operations of the project, the Proponent shall prepare and implement a detailed Noise Barrier Design Plan. The Plan shall: a) be prepared in consultation with Council; b) be prepared and implemented to the satisfaction of the Director-General; c) demonstrate that the proposed noise barriers are designed with a material density of no less than 15kg/m 2, unless otherwise approved by the Director-General; d) Include a detailed plan of the layout indicating how the noise barriers would traverse along the north-eastern perimeter of the Amcor site and around the waste paper storage yard; and e) Include a detailed design of the barrier, outlining how it would be visually treated to reduce and mitigate any visual impacts, such as the provision of landscaping on its northern side. 	Condition 10A of MOD 2 does not make any references to the construction details of the noise barrier. Item C requires the noise barrier to be built from a material with the density of no less than 15kg/m ² . Council's reference to the height of the noise barrier may be based on their review of another source such as the assessment report for MOD 2, but not conditions of consent of MOD 2, that establish the benchmark for the compliance assessment of the existing noise barrier wall. The existing noise barrier wall satisfies the requirement under item C of condition 10A under MOD 2, as per the structural summary report prepared by Enstruct and attached to the Stage 2 Noise Barrier Design Plan provided to the DPE in 2018. Provision of additional landscaping/tree planting along the eastern face of the wall is not feasible considering the 2m wide hardstand area must be maintained intact to allow for the ongoing maintenance of the wall. The below extract from the site plan shows the referenced 2m wide hardstand area between the wall and the site boundary.

 Table 5 – Randwick City Council feedback in response to the draft Plan and the proponent's responses

Randwick City Council (RCC) feedback on the Plan	References to the relevant resources	Proponent's comments and responses
		As shown on the section below the right of this case is about 2m and it access for the maintenine purposes.
Modification Application (Modification 5) for the demolition of former paper mill building, Building B7, was approved in September 2015 which included relevant conditions of consent (10B and 10C) requiring a noise barrier to be constructed to mitigate operational noise to sensitive receivers within 9 months of demolition being completed.		Council's comment relates to condition 10C of MOD 5. Condition 10B provides the specifications of the noise barrier plan and does not include any details in relation to the physical specifications of the noise barrier wall.
The Modification Report prepared by Jacobs Group Pty Limited on behalf of the Proponent advised that any noise wall erected "would be of similar construction to the noise wall constructed along Australia Avenue, namely piled steel supports with Hebel panels placed between the supports".		Although Jacobs report mentions the wall will be constructed with steel piles and Hebel panels and this report was referenced in the subject approval, there are no references to construction material in the relevant conditions of approval. Condition 10B of Mod 5 requires a noise barrier to satisfy the noise limits listed under conditions 10 (added under MOD 2 to the original approval) without identifying any specific building materials.

Randwick City Council (RCC) feedback on the Plan	References to the relevant resources	Proponent's comments and responses
With the demolition of Building B7, the proponent submitted a temporary Noise Barrier Plan to the Department of Planning and Environment (DPE) comprising a 146.4 metre-long, 12m high container noise barrier. This container noise barrier wall was approved by the DPE in November 2015 as a temporary measure with an expiry date of 14 June 2022. It is important to emphasise that the noise barrier was approved as a temporary measure to offset the loss of the noise screening afforded by Building B7.	 Conditions 10D, 10E and 10F of MOD 8 state: 10D. The Applicant shall update the Stage 2 Noise Barrier Design Plan required by Condition 10B to include details of the proposed extension to the existing noise barrier associated with 05_0120 MOD 8. The updated Stage 2 Noise Barrier Design Plan shall: a) include updated plans and elevation drawings; b) include updated structural and civil engineering design summary; c) provide details of the noise barrier inspection and maintenance strategy; and d) be submitted to the Department at least one week prior to the commencement of works associated with 05_0120 MOD 8. 10E. Within two weeks of completing the demolition of the B7 reel store building, unless otherwise agreed to by the Secretary, the Applicant must complete the construction of the noise barrier proposed under 05_0120 MOD 8. 10F. The Applicant shall prepare a Long-term Noise Barrier Plan for the project. The Plan shall: a) identify the Applicant's long-term plan for noise mitigation to nearby sensitive receivers; b) address the planning and implementation strategy for the long-term noise barrier solution, including timeframes for implementation; c) include a procedure for the removal of all or part of the noise barrier if new structures are erected on the site which would perform a suitable noise attenuation function; 	None of the relevant conditions of consent of MOD 8 referenced in the opposite column, state the noise barrier wall is a 'temporary' solution. Also, the "Noise Barrier Design Plan" did not include the term 'temporary' in its title. The existing noise barrier wall, being either an interim or a temporary solution according to Council's interpretation, was approved by the DPE subject to the requirements listed under conditions 10D, 10E and 10F. Only the assessment report for the MOD 8 approval states: <i>The Department's approval notes that the shipping container noise barrier is temporary, to be removed within five years (i.e. 14 June 2022) unless the Applicant receives approval from the Planning Secretary to continue its use.</i> The above requirements have been satisfied by the actions taken by the proponent in the past few months to ensure the existing noise barrier wall satisfies the relevant conditions of consent, as discussed in this Long-Term Noise Barrier Plan (the Plan).

Randwick City Council (RCC) feedback on the Plan	References to the relevant resources	Proponent's comments and responses
	<i>d) be prepared in consultation with the Department, EPA and Council; and</i>	
	e) be submitted to the Department by 30 June 2021 for approval by the Secretary.	
Council mentioned that it disagreed with this justification for maintaining and extending the temporary noise wall barrier as the permanent noise		As discussed above, the previous approvals do not require the noise barrier wall to be constructed with Hebel panels and steel piles.
wall approved under Modification 2 and 5 had a smaller footprint comprising a Hebel structure with a width thickness of 150mm compared with the container barrier thickness of 2400mm.		The thickness and footprint of the noise barrier wall are not of any relevance to the functionality or visual appearance of the wall from the public domain, considering it is mainly visible from its eastern side.
Council's position has always been that the approval granted to Modification 8 was only for the extension	As provided above, items a) and c) of condition 10F require the Applicant to prepare a Long-term Noise	The approval for MOD 8 does not state that the existing noise barrier wall cannot be used as a permanent solution.
of the existing temporary container noise barrier as an interim measure to address the demolition of the B7 Reel Store Building, not for making it a permanent solution.	Barrier Plan for the project. The Plan shall: <i>a)</i> <u>identify</u> the Applicant's <u>long-term plan for noise</u> <u>mitigation</u> to nearby sensitive receivers;	It requires the applicant to identify the solution and if new structures are erected, then the applicant should provide sufficient evidence that the new structure satisfies the noise attenuation requirements.
	c) include a procedure for the removal of all or part of the noise barrier if new structures are erected on	The proponent is not applying for the erection of a new structure.
	the site which would perform a suitable noise attenuation function;	The noise assessment reports prepared in support of the Plan confirm the existing noise barrier wall provides sufficient noise mitigation to the nearby sensitive receivers.
Condition 10F of Modification 8 contemplates a permanent barrier wall as required under the provisions of the consents previously granted for Modification 2 and Modification 5. The wall under these consents would comprise a permanent barrier		Requirements of Condition F of the approval for MOD 8 and the relevant conditions of approvals for MOD 2 and MOD 5 are discussed above and our assessment showed none of the referenced conditions or modification approvals reference the preferred material for the construction of the noise barrier wall.
essentially comprising piled steel supports with Hebel panels placed between the supports to a height of between 5m 7m. Council contrade that these		Therefore, the existing noise barrier wall can be retained and used as a permanent solution, subject to the DPE's approval.
modification approvals remain in place and are not overridden by the DPE's approval for the temporary container barrier granted in November 2015 which		It should be noted the existing noise barrier wall is an efficient noise attenuation measure and is structurally safe as per the findings of the technical studies prepared and submitted with this Plan.

Randwick City Council (RCC) feedback on the Plan	References to the relevant resources	Proponent's comments and responses
was subject to a time-limit that has now been exceeded.		Extending the use of the existing noise barrier wall in perpetuity does not result in the revocation of the previous approvals.
		The proponent has submitted a request for extending the life of the existing noise barrier wall to the DPE prior to the expiration date and their application is being assessed by the relevant stakeholders since.
The use of the existing container barrier wall as a permanent barrier solution should be subject to a modification or development application assessment process that comprehensively addresses the operational adequacy and environmental impact of the long-term use of such a wall to address noise from a significantly large-scale paper mill operation.		The existing nose barrier wall was approved by the DPE and the continuation of its use in perpetuity does not warrant the submission of a new application to Council considering no changes to the physical attributes, use or other characteristic features of the existing noise barrier wall were proposed as part of the extension application.
		As required by item (d) of condition 10F of MOD 8, EPA and Council were consulted in relation to the potential environmental impacts of the subject wall. Council comments are addressed in this table.
		The EPA has not made any comments or complaints in relation to the existing noise barrier wall as provided in the Plan. This confirm that in the EPA's expert opinion the existing noise barrier wall does not generate any environmental concerns.
		The operational adequacy of the noise barrier has been assessed by the noise assessment reports prepared in support of the Plan. The studies found the wall performance satisfactory in relation to noise attenuation measures.
Furthermore, the potentially significant visual and design impacts as well as the long-term suitability of the existing container wall cannot be adequately addressed via an assessment report (that is, the submitted Long Term Noise Barrier Plan) that responds to a condition of consent (that is, Condition 10F of Modification 8). Rather, it should be assessed as part of a modification or development application process together with expert assessment on visual amenity and structural integrity.		Council does not clarify what the significant visual and design impacts of the existing noise barrier wall are. Council does not provide any benchmarks for measuring the long-term suitability of the existing wall either.
		Council states the above referenced impacts cannot be addressed adequately by the Plan. While the Plan references all the relevant conditions of previous approvals in the assessment of the existing noise barrier wall and supports the outcomes of this assessment by referencing the findings of the noise
		assessment reports and the visual impact assessment that are appended to the Plan.
		In relation to the submission of a modification or a new development application by the proponent, Council does not provide any clear justification as why such applications are required.

Randwick City Council (RCC) feedback on the Plan	References to the relevant resources	Proponent's comments and responses
This process would afford surrounding residents the right to be properly consulted on any issues they may have concerning the long term visual, bulk and scale impacts of the stacked container barrier wall, and the ability to properly apply conditions of consent, if necessary, to protect residential amenity including from further creep in wall height. This consultation may include discussions about the need for potential increase in tree plantings for screening along the border of the wall under a comprehensive landscaping scheme to further obscure the visual, bulk and scale impacts of the wall.		A visual impact assessment, provided as an appendix to the Plan, assesses the various aspects of any potential visual impacts that the existing noise barrier wall may have on its surrounding context. The visual impact assessment justifies why the existing wall is a qualified and suitable solution for long term use on the subject site. Council has not provided any feedback in relation to this visual impact assessment to inform the proponent or the DPE of the potential adverse visual impacts of the existing noise barrier wall in their opinion.
		The existing noise wall satisfies the relevant requirements for the structural integrity of noise barrier wall as per the structural summary report prepared by Enstruct and attached to the Stage 2 Noise Barrier Design Plan provided to the DPE in 2018.
		Not the MOD 8 approval nor the approval for the noise barrier wall require the proponent to carry out further community consultation for extending the life of the existing noise barrier wall. It should be noted that extensive community consultation was carried out as part of the application for MOD 8 that showed the community did not raise any concerns with the existing noise wall that was partly erected on site at the time. The current noise barrier wall is similar in shape, height, material and colour to the part existed at the time of previous community consultation.
		Bulk and scale of the existing wall is mainly defined by its height and length that are the outcomes of the noise assessment studies and the wall was required to be built with these specifications to satisfy the expected technical standards for a noise barrier. Also, as discussed in the visual impact assessment the existing noise barrier wall is not significantly higher than the surrounding structures.
		A significant number of trees already exist on Ausgrid easement and Purcell Park along the eastern boundary of the site to screen the noise barrier wall. The site photos provided in the visual impact assessment report clearly show the tree coverage along the eastern boundary of the site. Considering these trees are on either Purcell Park or Ausgrid easement it is not possible for Opal to plant more trees to provide more screening.
		Provision of new trees on the site and along the eastern boundary is not feasible either, considering the current 2m wide hardstand area east of the

Randwick City Council (RCC) feedback on the Plan	References to the relevant resources	Proponent's comments and responses
		noise barrier wall must be maintained to allow for the ongoing maintenance of the wall.
		As shown on the section below the width of this area is about 2m and it provides access for the mantemance purposes waster PAPER YARD WASTE PAPER WASTE PAPER WASTE PAPER WASTE PAPER WASTE PAPER
Under the State Environmental Planning Policy (Transport and Infrastructure) storage of containers	The site is not affected by the requirements of clause 5.18, as it is excluded from the <i>Container Depots Prohibition Area</i> shown hatched red in the following screenshot from the control map:	It should be noted that the containers are not "stored" on the subject site, but they were used as structure parts/material to create the noise barrier wall.
are prohibited in certain areas of IN1 including the		<i>Container Depot</i> is defined as follows under section 5.18 of the SEPP:
where, under Clause 5.18 of the SEPP, the repair,		(2) In this section, a container depot means a building or place that is used
refitting or storage of shipping containers is		for—
prohibited. The use of stacked containers as a wall would potentially constitute the storage of shipping containers on-site and hence may be prohibited under		(a) the unloading or unpacking (or both) of shipping containers for delivery to individual consignees, or
the SEPP. This matter has not been addressed in the current Long Term Noise Barrier Plan, and even if it		(b) the consolidation of goods from different consignors into full shipping container loads for despatch, or
the cover of a modification or development		(c) the repair, refitting or storage of shipping containers.



In the summary section, Council reiterates that the construction of the noise barrier with Hebel and steel piles will deliver a better visual outcome without providing any evidence.

Noise validation assessment In the summary of the noise validation report prepared by Hutchison Weller (DOC no.16002-NV- RP-12-0), it states, "Based on the completed noise validation it is expected that Opal ANZ site currently complies with the EPA Environmental Protection Licence conditions and no recommendations for noise remediation are necessary". Can you please confirm the acoustic assessment has validated that the site currently complies and not "expected to comply" with the EPA Environmental Protection Licence conditions. Validation noise monitoring should confirm noise emissions comply with the required criteria or not. The rest of the report appears to indicate compliance with the relevant noise criteria so this maybe an error.	The noise validation report has been updated by Hutchison Weller to state: Based on the completed noise validation the Opal site currently complies with the EPA Environmental Protection Licence conditions and no recommendations for noise remediation are necessary. Any references to "expected to comply" have been removed from the report. A copy of the updated report is appended to the Plan.
Ongoing noise complaints	EPA's feedback in response to the draft Long Term Noise Barrier Plan is:
Recently, Council has received noise concerns in relation to the Opal development from residents	The EPA has no comment to provide on the report as the EPA generally does not review, approve or endorse management plans. The applicant

Randwick City Council (RCC) feedback on the Plan	References to the relevant resources	Proponent's comments and responses
living on Harold Street, Matraville which were forwarded to the NSW EPA as the Regulatory		should ensure that the monitoring program proposed is in line with the conditions of consent to ensure ongoing compliance.
Authority for the development. Council notes Harold street is not a designated location for the quarterly noise assessments. Whilst Council acknowledges this noise barrier plan does not include specifics for management of noise complaints, it is important to		Based on the assessment provided in the Plan, the applicant satisfies the requirements of conditions of consent in relation to noise monitoring program. And the noise assessment reports confirm the noise barrier wall achieves ongoing compliance with the applicable requirements.
highlight that noise from the development can often be observed on many streets surrounding the	en	The EPA did not mention that they have received any public complaints in relation to noise impacts generated from the Opal site.
development of which the barrier may not be as effective. In this regard it is recommended that should complaints be received from other		The EPA has not indicated in their review of the draft Plan that the area covered by quarterly noise monitoring should be expanded or modified.
surrounding street locations (i.e. street locations not specified on the NSW EPA Environmental Protection Licence), the quarterly noise monitoring should include additional monitoring locations to validate that the noise barrier is effective in noise management at these locations. Opal may also wish to discuss reviewing the required locations for quarterly assessments with the NSW EPA to reflect any concerns that have been raised by local residents from other locations.		Also, the below extract from the quarterly noise monitoring reports for Aug and Nov 2022 clarifies that the noise impact felt by residents in nearby streets is not only due to industrial operation on Opal site but other ambient sources and expanding the monitoring area will not change this observation.
		Several years of monitoring data consistently indicate that the ambient noise environment in the local area is a product of the combined influence of all noise sources within the Port Botany area including the Opal site when operationalthe total measured noise levels at monitoring locations are only partly due to Opal operations on site, direct measurement of Opal's contribution to the noise environment is not possible because noise emissions from the site are generally lower than the ambient measured LAeq noise levels.
		Further to the above extracts, the general findings of the noise monitoring reports confirm the noise barrier wall has been functioning as expected and required by standards to mitigate the noise generated on site.

5 Recommendations

The Quarterly Noise Monitoring reports for August and November 2022 and the Noise Validation report prove the existing noise barrier is an effective, robust, cost-effective, and durable solution which has allowed the Opal paper mill site to continue to operate effectively and efficiently within its license limits.

In its context and its use, the existing noise barrier is considered to be appropriate in scale, character and aesthetics. It does not result in any tangible adverse amenity impacts to the neighboring properties or the public domain. In fact, it is not unreasonable to conclude that it comprises positive visual qualities on the boundary between industrial and residential lands.

This Plan recommends:

- An annual maintenance inspection of the existing noise barrier will be conducted once every 12 months.
- Based on the findings of the annual inspection, the existing noise barrier will continue to be maintained at 12-month intervals to ensure structural integrity and physical appearance.
- Rust and any physical damage to the barrier will be noted at that time and repaired appropriately.
- To record the inspection outcomes, a short pro-forma report will be prepared which sets out the conclusions of the annual inspections and any issues actioned as necessary. These will be kept on file, on site, for a minimum of five years.
- Any changes to operations/development on the site which have the potential to increase noise impacts may need to consider alternative noise barrier solutions.
- Any significant variations to the existing noise barrier will warrant an update to this Plan.

Appendix A Visual Impact Assessment



Visual Impact Assessment

The following visual impact assessment has been prepared to support this Long-Term Noise Barrier Plan to extend the use of the existing noise barrier along the north-eastern boundary of the site for the long term.

Figure 1 below shows the location of the noise barrier in relation to other buildings on site.



Figure 1. Aerial image showing the existing noise barrier along the eastern boundary of the site. Image courtesy of Nearmap, Oct 2022

Our assessment is based on:

- the information provided in the previous planning approvals and assessment reports prepared by the DPE (primarily the assessment report for modification application 8 (05-0120 MOD 8) that was approved in October 2018); and
- a visual survey of the current site conditions and views from the surrounding area through a site visit carried out by WSP on 03 October 2022. Photos taken during this site visit are provided in this assessment.

Our assessment shows the visual impact of the existing noise barrier on the surrounding context is minimal and acceptable in its context. This conclusion is reached from the following observations:

01. The appearance of the existing noise barrier wall is very similar in colour, materials and form to the facades of the other industrial buildings on the site and surrounding industrial lands that are visible from Botany Road and McCauley Street frontages. The façades of existing industrial buildings along these streets comprise metal

cladding and are painted mainly in ocean blue (see **Figures 2** and **3** below). The exception to this is the disused B8 Paper Mill building on the southern corner of the site, which is built of brick.



Figure 2. façade of the other site buildings on the corner of McCauley St and Botany Rd. Photo taken by WSP, Oct 2022



Figure 3. façade of the other site buildings along McCauley St frontage. Photo taken by WSP, Oct 2022

02. The visual presentation of the existing noise barrier is consistent with industrial character of the site and the larger surrounding context as shown on **Figure 4** below. The existing noise barrier establishes an appropriate interface between the more noise sensitive residential uses to the north-east of the site and the less noise sensitive industrial uses and activities to the southwest.



Figure 4. Aerial image showing the site in its immediate industrial context. Photo provided by Opal.

- 03. The existing noise barrier appears to be approx. 10m high when viewed from Purcell Park despite its actual height of 11.6m (measured form the existing ground level below it). This difference is due to a change in level of between 1.5m to 1.8m between the site and the boundary. Therefore, the existing noise barrier appears to be generally the same height as the former B7 group of Opal paper mill buildings that use to be located along the north-eastern boundary of the site.
- 04. The B7 group of buildings were between 10m and 12m high and were demolished by 2017. However, it should be noted these buildings did not present as positive a visual backdrop along the north-eastern boundary, nor did they provide the same level of noise attenuation (given the fact there were (limited) operations between the buildings and the part brick / part wire fence boundary. Refer to **Figures 5**, **6** and **7** below, especially the exhausts and ventilation stacks located on external walls and the damaged brick facades. The brick façades of these redundant buildings were no longer consistent with the metal cladding used on the façade of the more recent buildings on site, as discussed above.



Figure 5. View of pre-existing B7 paper mill and reel store on site, visible along the eastern boundary of the site. Photo provided by Opal.



Figure 6. View of pre-existing B7 paper mill on site, visible along the eastern boundary of the site. Photo provided by Opal.



Figure 7. View of the pre-existing B7 paper mill and reel store on site, visible from Purcell Park. Photo contained in the noise management report by Hutchison Weller dated 19 Sep 2016.

05. The existing noise barrier is mainly visible from a single cul-de-sac at the western end of Partanna Avenue, and the western boundary of Purcell Park. However, the views of the noise barrier in these locations are partly obscured by existing vegetation (see **Figure 8**).



Figure 8. View of the existing noise barrier from the southern end of Purcell Park. Image courtesy of Google Map, Oct 2022.

Figures 9 and **10** show the previous B7 Reel Store building on the site, as viewed from Purcell Park and the western end of Partanna Road. Although not taken from the exact same locations, these photographs provide a general visual comparison between the views created by existing noise barrier and what was previously visible on site from the adjoining public domain.



Figure 9. View of the pre-existing B7 reel store from the southern end of Purcell Park. Photo contained in the modification assessment report for MOD 8 application by DPE.



Figure 10. View of the pre-existing B7 reel store from the western end of Partanna Avenue. Photo contained in the SEE prepared by Elton consulting in support of MOD 8 application, June 2018

The most noticeable views of the noise barrier are experienced from a total of six residential properties at the western end of Partanna Avenue, when looking south and south-west. Previously the brick walls of the B7 building group were visible from these locations, as shown on **Figures 5**, **6** and **7** above. Views of the existing noise barrier as currently seen from these properties are provided in **Figures 12**, **13** and **14**.

Figure 11 contains a screenshot from google maps with the angles and view lines of Figures 12-14 and the location of the noise barrier shown on it.



Figure 11. Map showing the location and viewing angel of Figures 11 - 13. Prepared by WSP, Oct 2022



Figure 12. View of the existing noise barrier from western end of Partanna Avenue looking south. Photo taken by WSP, Oct 2022.



Figure 13. View of the existing noise barrier from western end of Partanna Avenue looking east. Photo taken by WSP, Oct 2022.



Figure 14. View of the existing noise barrier from western end of Partanna Avenue looking north-east. Photo taken by WSP, Oct 2022.

The view of the existing noise barrier is more consistent with the other industrial buildings on the site and the rendered hebel block fence along the north-eastern boundary of the adjoining industrial site immediately north and northeast of the main Opal operations (**Figures 15** and **16** below).



Figure 15. View of the existing noise barrier and the hebel block fence along the eastern boundary of the adjoining industrial site to the north, viewed form Purcell Park. Photo taken by WSP, Oct 2022.



Figure 16. A closer view of the hebel block fence along the eastern boundary of the adjoining industrial site to the north, viewed form Purcell Park. Photo taken by WSP, Oct 2022.

There are no signs of graffiti, rust and/or damage on the wall as shown on **Figure 17** below to necessitate any maintenance or replacement of the structure. It is important to note that **Figure 17** which shows a lack of graffiti on the existing noise barrier was taken from the very end of Partanna Ave as opposed to from in front of any individual dwelling along that road. As a result, it is not a view that would [often] be seen by adjoining properties.



Figure 17. View of the existing noise barrier from the western end of Partanna Avenue. Photo taken by WSP, Oct 2022.

As it can be seen from the above images, the existing noise barrier is in a good condition, does not block any prominent views or result in any significant adverse visual impacts on the surrounding area due to its proportionate distance from the closest residential properties (at approx. 32m) that is approximately three times its visible height (10m). It should be noted that the existing noise barrier also blocks the views into the site, that might not be considered as visually pleasant by some.

Alternative noise barrier options

To be effective, a noise barrier needs to be of solid construction and of a certain size and height to block and/or mitigate the transmission of noise from its primary source. In the case of this site, the existing noise barrier is almost the same height of the recently demolished B7 group of buildings that acted as a physical barrier to much of the industrial activity generated on site and helped minimise and mitigate many of the noise between (and from beyond) the site and the more sensitive land uses to the north-east.

Alternative noise attenuation measures could be provided on site through the construction of:

- a new factory building.
- a new warehouse.
- a new walled storage yard; and/or
- a standalone structure similar to the existing container wall (e.g. a Hebel wall).

Any new building or structure that might act as a noise barrier would probably need to be constructed to the same height and length as the existing noise barrier to satisfy the relevant noise attenuation requirements.

The visual appearance of any new building / structure - when viewed from the public domain - is of relevance to the purpose of this assessment. The visual appearance of any new building / structure is mainly defined by (but not limited to) the material/s (texture), colour/s, and pattern/s created.

To provide a comparison between the existing noise barrier and an alternative building / structure, the factors that can define the aesthetic qualities of a noise barrier are reviewed below:

01. **Material**/s: considering the industrial context of the site, an alternative noise barrier would probably be constructed from concrete panels, steel structure covered with metal cladding, or other materials such as Hebel blocks. Brick is possible but considered unlikely due to faster and more efficient construction methods.

Comparing the existing noise barrier with the Hebel block fence further along the north-eastern boundary of the site, or the metal clad buildings existing on the site, there is not much difference between them in visual terms.

Erecting a new brick wall, similar to what previously existed on this boundary, does not deliver a visually better outcome to the existing barrier, as it would be in consistent with the predominant surrounding modern industrial context. It should be noted that the existing building (B8) on the southern corner of the site is disused and may be replaced with a new building in the future.

Given the minor difference between the visual representation of likely alternative barrier options discussed above and the existing noise barrier, replacing the existing containers (that are in good shape and have projected longevity) with an alternative building or structure of a different material does not appear justifiable on the basis of materials alone nor is it a sustainable or economically feasible option.

02. **Pattern/s:** Can be created by the material/s used for the construction of the noise barrier or added through additional works for aesthetic, structural or functional purposes.

The pattern of the existing noise barrier is very similar to the metal cladding used for the façade of the main Opal paper mill building, other existing buildings on the site, as well as other industrial buildings in the vicinity of the site. This aesthetic is quite common / not unusual for buildings in an industrial area and the simplicity and strength of flat / corrugated sheet metal cladding add to the overall aesthetic of an industrial process: one where "form follows function".

Considering the abundance of industrial buildings with a similar pattern/s to their facades, altering the existing noise barrier to something different from this would not result in a superior visual outcome, nor would it necessarily relate as well to its use and context.

03. **Colour/s**: the existing noise barrier is painted in Colourbond Ocean Blue to maintain a visual consistency with the main Opal paper mill building on the site, together with other associated buildings and structures on site.

Considering the metal cladding on the facades of the other buildings on site are also painted in Colourbond Ocean Blue and white, the other logical alternative would be to paint the existing noise barrier white. However, this would result in significant reflection and could make them far more visually prominent structures when viewed from the public domain and nearby residences. Therefore, changing the colour of the existing noise barrier from ocean blue to white would intensify their visual impact and is not considered a preferred alternative.

Additional aesthetic treatments of the façade of the noise barrier, such as murals or cladding, could have been considered if the barrier was facing a prominent public realm or a major sensitive development – such as a major public road, a school or similar land use. But given it is only visible from the end of a cul-de-sac of a local street, affecting partial views from 4-5 single dwellings, and one side of a small local park that is not serving large events, the value of addition of such aesthetic treatment for the whole or part of such a large area (approx. 2,500 sqm.) is not justified.

Conclusions

Based on the outcomes of the above assessment, the historical data (including planning assessment reports) available to WSP for the purpose of this assessment, site observations and the alternative option analysis, the existing noise barrier is considered to be suitable as a long-term solution considering the <u>existing noise barrier</u>:

- satisfies the noise attenuation standard expected from such a structure.
- is structurally safe and can be maintained as required through the inspection and maintenance strategy prepared for the noise barrier; and,
- is well maintained, and its visual presence is both acceptable and appropriate for its context.

As stated in the *State Significant Development Modification Assessment* report prepared by the DPE in response to the modification application (05_0120 MOD 8) dated October 2018, "While the installation of the shipping container noise barrier would change the vistas from the surrounding area, the visual impact is justified given the noise attenuation associated with the installation of the barrier and the context of the area. Additionally, the Department notes that no submissions were received from nearby residents regarding visual impacts". The DPE report then recommends the

applicant to prepare a *Long-term Noise Barrier Plan* to address any visual amenity impacts associated with the noise barrier, as provided in this section of the plan.

It should be noted that demolition and reconstruction of a well-functioning and visually suitable noise barrier with an alternative structure to deliver a similar outcome but slightly different look, is a significant waste of materials and cannot be justified on any grounds.

Appendix B Noise Barrier Wall Drawing



Appendix C Quarterly Noise Monitoring reports



Appendix D Noise Model Validation report

Appendix E Council and EPA responses to the consultation

