

Ormiston College

Amended MID Noise Impact Assessment

BRISBANE
Level 1
82 Arthur Street
FORTITUDE VALLEY QLD 4006
(07) 3211 5591

ABN 98 145 324 714
www.acousticlogic.com.au

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1 INTRODUCTION

Acoustic Logic has been engaged to conduct a noise impact assessment of the proposed MID Ormiston College Master Plan. As part of the assessment unattended noise monitoring was conducted and the following was assessed:

- Road traffic noise impacts; and
- Noise from general onsite activities to the closest noise sensitive residential receivers.

The scope of this document excludes the review of the noise impacts from the amendments/additions/existing uses to existing/new/changed usages within the College itself. We recommend further acoustic studies during schematic and detailed design phase which shall address building envelopes, plant, additional structures, and internal areas, as well as management controls required to achieve DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

2 ACOUSTIC REVIEW OF PROPOSAL

Figure 1 indicates site location and the closest surrounding residential receivers.



Figure 1 – Site and Surrounding Residential Receivers

The proposed amendments to the existing College are included in Appendix A, whilst noting the following in relation to Acoustics which is relevant for the MID submission to Council:

D01 – new full perimeter boundary security fence with automatic vehicular sliding gates. Noise emissions from automatic gates are not predicted to lead to adverse noise impacts on the proviso that no audible gate opening signal/PA is used and smooth rollers with other treatments are added which avoid metal rattling noise to be exceed Acoustic Quality objectives of Environmental Protection (Noise) Policy at the residential developments.

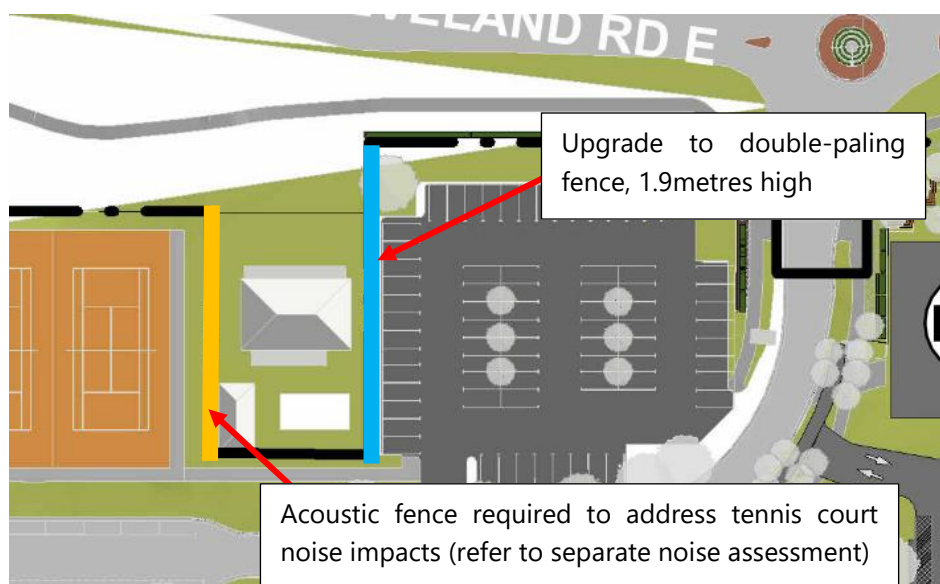
D02 – new 2 storey multi use building (teaching spaces) are proposed to be located adjacent to the existing playing field and in vicinity to the Grandstand. Due to separation distance of 130metres to residential

buildings, and general noise generated from other areas of the College, we note that general noise emissions would not lead to adverse impacts, as impacts from study activities would be equivalent or quieter than the existing noise generation from other areas of the College. Having fully enclosed building, the noise emissions from teaching activities internally would have to substantially exceed 90dB(A) to lead to (i.e. 50dB(A) noise reduction due to distance and 20dB(A) enclosed building envelope performance) noise exceedances at the residential buildings. Such noise generation in this college teaching space would not occur, given that substantial amplified music generation is not proposed in this teaching space. On that basis, and on the proviso that mechanical plant noise emissions are compliant with noise limits, the study space can operate between 7am and 10pm, as well as after 10pm and prior to 7am if required, given compliance for general activity noise has been predicted. Comments on the mechanical plant noise emissions are included in Section 5.

D03 – new maintenance and archive (2 storey building) is proposed next to the playing fields. We expect the major noise activities to be related to tool usage (e.g. drop saw) and mechanical plant. Refer to other sections in the report for detailed acoustic review.

D04 – New tennis courts with spectator areas and landscape. These areas are addressed in a separate DA submission. We note that as part of the tennis court assessment, Acoustic Fence to the eastern side, among other controls (e.g. operating between 7am and 10pm), have been proposed. MID acoustic assessment is not addressing noise emissions from the tennis courts and any noise controls required must be referenced from the separate report.

D05 – Car parking is proposed at the Sturgeon Street entrance, with 72 spots. We note that this is an existing car parking area which will be paved and extended (currently approximately 20 parking bays). Due to the increased car movements in the area and the proximity to the existing residential site to the West, we recommend upgrading the separating fencing to a double paling fence (minimum 10kg/m² overall surface weight). Detailed review of noise emissions is presented in other sections of this report.



D06 – New Grounds/Green Keepers' Shed which is expected to be operational between 6:30am to 10pm. Typically, noise emissions are associated with the usage of a light vehicle (e.g. mini ATV) sporadically. Noise generation by similar vehicles have been measured at 71dB(A) $L_{eq,T}$ during passby events, however, we note that light vehicles are already being used at the College currently and therefore, no additional noise sources would be introduced. No usage of hand tools or other noise generating equipment is proposed. To control general noise emissions from the shed and the usage of the vehicle, we propose to ensure entry to the sheds from the West.

D07 – New 2 storey boarding facility and drop off/parking. These are proposed to be located in an existing sports field with considerable noise emissions and on that basis, we do not anticipate any new adverse noise impacts to be generated. Noise emissions associated with the boarding facility are addressed in other sections of the report.

D08 – New Aquatic Centre (50m Pool) & Multi-Use Educational Building (2 storey). Given the existing and same usage, we do not expect any new noise generating activities, except new plant which may be required. The area is located approximately 80 metres from closest residential receiver outside of the College (46dB(A) noise reduction due to distance) and conservatively, not considering any structures leading to noise reductions and not enclosing the Aquatic centre, even in excess of 150 people (Note: based on loud crowds in venues, as per 'Prediction of Noise from Small to Medium Sized Crowds' by M.J. Hayne et al, 2011) using the pool are still predicted to lead to compliance with Redland comparison of parameters noise emission targets during day, evening and night periods.

Detailed assessment of the acoustic qualities of the building and swimming areas would be required at a later stage to ensure impacts from the new Aquatic Centre to other areas within the College, and the reverberation time within the Centre is acceptable, and to achieve DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

D09 – New Sturgeon Street connection path and landscape. No additional noise emissions compared to existing activities will be generated and, on that basis, the connection path is considered acceptable.

D10 – Lingo Lin Performing Arts Theatre extension. This is an existing performing arts theatre with an existing auditorium and small extension is proposed to the south (approximately 110metres from closest residents). Appropriate building design and operational management would ensure noise emissions from the site will be kept appropriate and not increase impacts currently experienced. Having fully enclosed building, the noise emissions from new internal areas would have to substantially exceed 90dB(A) to lead to (i.e. min.49dB(A) noise reduction due to distance and 20dB(A) enclosed building envelope performance) noise exceedances at the residential buildings at night. Such noise generation in this extension would not occur, given that substantial amplified music generation is not proposed in this area. On that basis, and on the proviso that mechanical plant noise emissions are compliant with noise limits, no further noise controls are recommended. Comments on the mechanical plant noise emissions are included in Section 5.

Detailed assessment of the acoustic qualities of the extension would be required at a later stage to ensure impacts from the new Aquatic Centre, as well as New Business studies and Arts Precinct, as well as other existing uses impacting the Theatre are acceptable, and the reverberation time in the building is acceptable. Where new mechanical plant is proposed, this must achieve noise emission limits for the site (refer to other sections of this report).

D11 – new outdoor play area is proposed adjacent to the boarding facility. These play areas are proposed to be located within existing play field. Considering new proposed building (boarding facility) ability to provide additional noise shielding and the location of the play area being located within existing play field/oval, noise emissions from the proposed changes are not leading to increased noise impacts on the proviso that the operational hours are kept same.

D12-Covered area to existing multi-purpose courts (basketball courts). Given that the activities and operational hours are not proposed to be changed, noise emissions will not be increased. For the purposes of maintaining acceptable amenity within the courts, we recommend addressing rain induced noise and reverberation times in the areas (latter addressed by sound absorptive treatment) and to achieve DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

D13 – New Concrete connection pathway. Given that the proposal is only to change current pathway/outdoor area surface to concrete, no acoustic assessment has been carried out.

D14 – Sports Court Extension and New Grandstand (1 storey). Current viewing area is amended which indicates that noise emissions will be equivalent. For the purposes of this assessment, noise emissions assessment has been carried out in Section 5.

D15 – Car park extension to Dundas Street, i.e. approximately 25% capacity increase. Considering same rate of vehicular movement than currently experienced, such increase leads to less than 1dB(A) change in noise environment which is inaudible difference. On that basis, the minor extension is not leading to adverse noise impacts.

D16-Somerset Sports Centre covered entries. Given that no new noise sources are introduced, these changes are acoustically acceptable and have not been further addressed.

D17- New indoor multipurpose courts with enclosed cricket pitch and nets. Given that new noise source is introduced, these additions are acoustically addressed in a separate section of the report (refer to Section 5).

D18 – New Storage sheds are proposed as supplementary additions to the multi-purpose courts. No considerable noise emissions are generated.

D20 – Junior School Sports Fields. Given that new noise source is introduced, these additions are acoustically addressed in a separate section of the report (Section 5).

D21 –Shading over seating is proposed to existing circulation/seating areas. Given that no new noise sources are introduced, these changes are acoustically acceptable.

D22 – New concrete covered connection. Given that no new noise sources are introduced, these changes are acoustically acceptable and have not been further addressed.

D23 – New council street parking. These are proposed to be located in excess of 50 metres from the nearest residential receivers to the south and on that basis, we do not anticipate any new adverse noise impacts to be generated.

D24 – Extension to existing carpark. i.e. approximately 50% capacity increase. Considering same rate of vehicular movement than currently experienced, such increase leads to less than 1.5dB(A) change in noise environment which is inaudible difference. On that basis, the minor extension is not leading to adverse noise impacts.

D25 – New field lighting to existing field. Given that no new noise sources are introduced, these changes are acoustically acceptable and have not been further addressed.

J01 – Building extension (Year 4, 1 storey). Given that no new noise sources are introduced, these changes are acoustically acceptable, on the proviso that new mechanical plant is selected and acoustically treated to achieve noise emission limits. Building envelope and internal areas shall be designed to achieve DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

J02 – Building extension (Year 5, 1 storey). Given that no new noise sources are introduced, these changes are acoustically acceptable, on the proviso that new mechanical plant is selected and acoustically treated to achieve noise emission limits. Building envelope and internal areas shall be designed to achieve DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

J03 – New changeroom/amenities (1 storey) are proposed as supplementary additions to the existing uses. No considerable noise emissions are generated and on that basis, the addition is acoustically acceptable.

J04 – Extension to existing changeroom/amenities (1 storey). Given that no new noise sources are introduced, these changes are acoustically acceptable, on the proviso that new mechanical plant is selected and acoustically treated to achieve noise emission limits.

J05 – Extension to existing changeroom/amenities (1 storey). Given that no new noise sources are introduced, these changes are acoustically acceptable, on the proviso that new mechanical plant is selected and acoustically treated to achieve noise emission limits.

J06 – Repurpose and extend existing prep for Grade 1 Class (1 storey). Given that no new noise sources are introduced, these changes are acoustically acceptable, on the proviso that any new mechanical plant is selected and acoustically treated to achieve noise emission limits. Building envelope and internal areas shall be designed to achieve DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

J07 – Repurpose existing ELC for Prep precinct (1 storey). Given that no new noise sources are introduced, these changes are acoustically acceptable, on the proviso that any new mechanical plant is selected and acoustically treated to achieve noise emission limits. Building envelope and internal areas shall be designed to achieve DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

J08 – New early learning centre and connected car park. Given that new noise source is introduced, these additions are acoustically addressed in a separate section of the report (Section 5).

J09 – Junior school drop off zone cover/shade is added to the existing driveway/drop off zone. Given that no new noise sources are introduced, these changes are acoustically acceptable

J10 – New administration building (2 storey). Given that new noise source is introduced, these additions are acoustically addressed in a separate section of the report (Section 5).

S01 – New business studies and arts precinct (3 storey). Given that new noise source is introduced, these additions are acoustically addressed in a separate section of the report (Section 5).

S02 – New multi-use building – Educational teaching spaces (2 storey). Given that new noise source is introduced, these additions are acoustically addressed in a separate section of the report (Section 5).

3 EXISTING ACOUSTIC ENVIRONMENT

The site and immediately surrounding area are primarily affected by the following:

- Road traffic noise from surrounding street; and
- Activities within College.

Background noise measurements have been carried out at a representative and safe location near the college, to determine current noise environment. The location is further from the road than the closest sensitive receiver to the development and on that basis, is considered conservative. Noise monitoring of the ambient noise in the area was conducted in accordance with Australian Standard AS1055:2018 *Acoustics – Description and measurement of environmental noise*. Monitoring was conducted using a Rion NL-42 environmental noise monitor which was programmed to store 15-minute statistical noise levels throughout the noise monitoring period. The monitors were calibrated at the beginning and end of the measurement period with no significant drift detected.

The monitoring period considered for the assessment is from Monday the 8th of August to Monday the 15th of August 2022 (incl.).



Table 1 – Measured Average Background Noise Levels

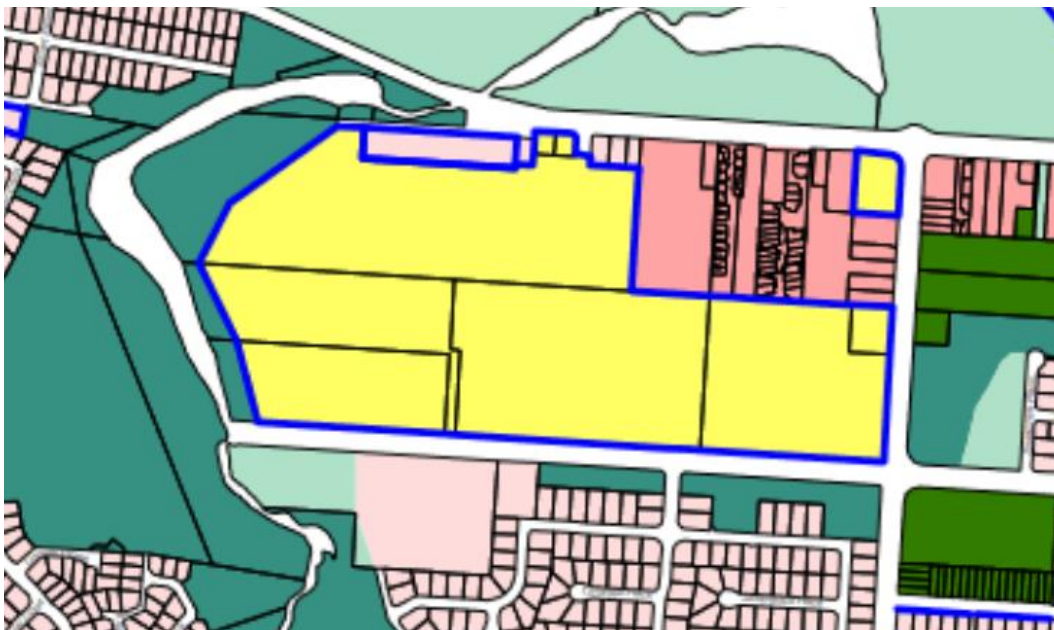
Descriptor	Noise Levels dB(A)		
	Day (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am)
L ₉₀	48	43	36
L _{eq}	53	48	42
L ₁₀	55	50	45
L ₁	62	55	51

4 CRITERIA REVIEW AND CONSIDERATIONS

4.1 REDLAND CITY ZONING

Redland City Zoning Map indicates the following immediate surrounding uses:

1. North is indicated as Conservation and Recreation/Open Space zones.
2. Low and Low-Medium density zones are indicated at the locations of Northern, Southern and Eastern closest residential receivers.



4.2 REDLAND PLANNING SCHEME POLICY

Redland Planning Scheme Policy 6: Environmental Emissions refer to the Environmental Protection (Noise) Policy 2008 objectives. The Noise Policy allows to determine impacts based on background creep but also reference Acoustic Quality objectives in order to assess the impacts on health and wellbeing in case of residential receivers; and in case of parks and protected areas and the like, to maintain the level of noise that preserves the amenity of the existing area or place. No adverse impacts are considered to occur within the Conservation and Recreation/Open Space zones based on the following:

1. Intense traffic flow along the adjacent roads lead to elevated noise levels;
2. MID amendments, compared to the existing large ovals and soccer fields in close proximity would not be adverse and generally lead to lower noise impacts.

In accordance to the Policy, background creep associated with the new noise sources as part of MID would have either continuous (mechanical plant) characteristics, or vary over time and on that basis, the following background creep noise limit would be relevant based on noise levels measured (refer to Table 1).

Descriptor	Variable Background Creep Noise Limit dB(A)		
	Day (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am)
General Activities $L_{eq,Adj,T}$	52	48	41
Continuous, $L_{90,T}$	48	43	36

Policy 6 allows the exceedance of noise limits, comparison of like parameters can be applied, considering the changes in the sound pressure level as follows:

- +3dB Just perceptible change in apparent loudness
- +5dB Just clearly noticeable change in apparent loudness
- +10dB twice as loud change in apparent loudness

We note that doubling the loudness is not preferred and, on that basis, consider the targets not to exceed +3dB or +5dB as more suitable.

The following table summarizes the noise limit associated with the new noise sources as part of the MID.

Table 2 – Noise Emission Limits During Day and Evening for New Proposed Activities/Sources (excl. Mechanical Plant)

Target	Noise Levels dB(A)								
	L_{eq}			L_{10}			L_1		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Background Creep, Time-varying noise, adj,T	52	48	41	N/A	N/A	N/A	N/A	N/A	N/A
Acoustic Quality Objectives, $adj,1hr$	50	50	45 ²	55	55	50 ²	65	65	60 ²
Target based on Redland Comparison Of Like Parameters ¹	56	51	45	58	53	48	65	58	54

Note ¹: based on just perceptible change of +3dB

Note ²: Applying the difference of indoor noise limits of evening and night to the external limits.

4.3 MECHANICAL PLANT AND EQUIPMENT CONSIDERATIONS

Redland City Council has previously (review of Roseland Tennis Courts) referenced Environmental Protection Act 1994 in addition to the Environmental Protection (Noise) Policy 2008. The following limits are applied in this assessment for new noise sources within the College, measured at the noise sensitive residential buildings based on background noise measurements carried out.

Table 3 – Noise Emission Limits During for New Proposed Plant and Equipment

Target for New Plant and Equipment	Noise Levels dB(A)		
	Day	Evening	Night
Pumps (440T or EPA1994)	53	53	53
Air-conditioning equipment (440U of EPA1994)	53	48	39
Refrigeration equipment (440V of EPA1994)	53	48	39
Background Creep (applied for other plant and equipment), L _{90,T}	48	43	36

4.4 LOW-DENSITY RESIDENTIAL ZONE CODE PO39

Previous assessments have requested to demonstrate compliance with performance outcome PO39 of the low-density residential zone code as this identifies that the proposed development must minimise impacts associated with noise. The following are addressed for any new noise sources

1. Identify noise sources and activities likely to cause nuisance
The proposal under this application is summarized in Section 2.
2. Aims and objectives
The aim is to ensure that noise emissions associated with the new proposed uses are appropriately managed in accordance with the Redland Planning Scheme Policy 6: Environmental Emissions. For the purpose of the assessment, the Environmental Protection (Noise) Policy 2008 objectives have been referenced among others, e.g. EPA 1994.
3. Reference to the applicable legislation (Environmental Protection Act 1994)
Environmental Protection (Noise) Policy 2008 objectives have been referenced in Section 2, among others, e.g. EPA 1994
4. Performance indicators
Assessment of noise associated, and the recommended noise reduction measures and management controls are provided in Section 2 and other Sections of this report.
5. Actions required to minimise the noise impacts
All recommendations are highlighted in Section 2 and Section 5. In addition to general management controls, engineering controls, we commend a noise barrier to control noise associated with the use of the extended car parking.
6. Responsible person(s) for achieving the aim of the plan
In case of leasing out any space, a responsible person(s) must be assigned by the lessee as well as the lessor must be agreed with the college to ensure that the aim of a noise management plan as well as

adhering to noise controls is achieved. In case of not being leased out, the college must assign a responsible person must be assigned from within the college.

7. Review schedule

A noise management review schedule will be determined by the college based on complaints received, if any. The review of the management will be carried in line with other reviews currently scheduled by the college.

5 REVIEW OF SPECIFIC NEW NOISE EMISSIONS

The acoustic review in Section 2 identified general noise emissions and controls, with detailed assessment of considerable new noise sources addressed below.

5.1 TENNIS COURTS

Not assessed as part of this submission. These areas are addressed in a separate DA submission.

5.2 PLANT AND EQUIPMENT

As identified in Section 2, new/upgraded mechanical plant would be introduced to several areas. Due to the considerable distance of most buildings from noise sensitive sites (except D17 – New Indoor Multi-Purpose Courts with Enclosed Cricket Pitch and Nets), compliance with noise emission limits (Section 4.3) can be achieved by the following general methods:

1. Selecting quiet plant and locating away from noise sensitive uses within the College and outside of the college;
2. Adding attenuators and internally lined ducts as required.
3. Adding appropriate vibration isolation treatment to avoid structure borne noise generation and vibration transfer.
4. Acoustically treating plantrooms and other building elements.

Plant and equipment selection has not occurred and requires full assessment to ensure that noise objectives are achieved. Council sets approval conditions which require plant and equipment certification.

In addition to the requirement of achieving noise emission limits (Section 4.3), full assessment of all plant and equipment is required to achieve acceptable noise levels withing external areas of the College (nominally 48dB(A) at external recreation, pedestrian and external to other buildings within College, except at night external to sleeping areas where lower noise impacts must be targeted to achieve acceptable indoor noise levels at night) as well as within College indoor areas to satisfy DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

5.3 MAINTENANCE BUILDING (D03) TOOL USAGE

Acoustic Logic has carried out measurements of noise emissions 20 metres from maintenance sheds whilst drop saw was used with sporadic hammering (colorbond construction with foil faced glasswool thermal layers) with roller doors opened – 56dB(A)_{Leq,T}.

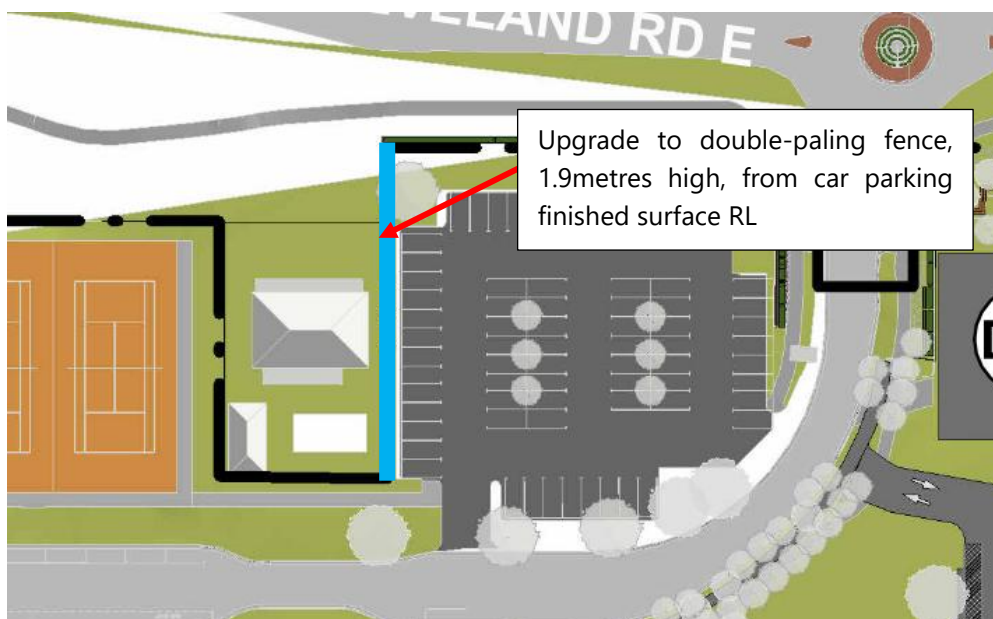
The shed is located in excess of 200 metres from surrounding residential buildings, which allows at least additional 20dB noise reduction and results in impacts of 36dB(A)_{Leq,T}. Such impacts are substantially below noise emission limits and on that basis, on the proviso that plant noise emissions are achieving compliance, the maintenance shed noise emissions are not predicted to lead to adverse noise impacts. The shed construction is recommended to be min. colorbond with foil face glasswool internally on walls. Doors of the maintenance shed are recommended to be kept closed after 10pm and prior to 6.30am.

5.4 STURGEON CAR PARKING REVIEW

Car parking is proposed at the Sturgeon Street entrance, with 72 spots. We note that this is an existing car parking area which will be paved and extended (currently approximately 20 parking bays).

Our analysis is based on a turnaround of half of the parking spots in every hour, with 9 metre separation distance to the residence (i.e. entry driveway to car parking) and 5km/h speed. This equates to generally 36 second movement per car or average sound power level of 78dB(A) L_{eq} per hour. Due to the separation of 9 metres (no barrier assumed, thus 27dB reduction), the impact is predicted to be 52dB(A) $L_{eq,1hr}$, which is compliant with daytime noise limits, but exceed slightly evening noise limits. The L_1 noise of a car door is 90dB(A) which would lead to exceedances as well with no acoustic barrier. Given the impacts, the following is recommended:

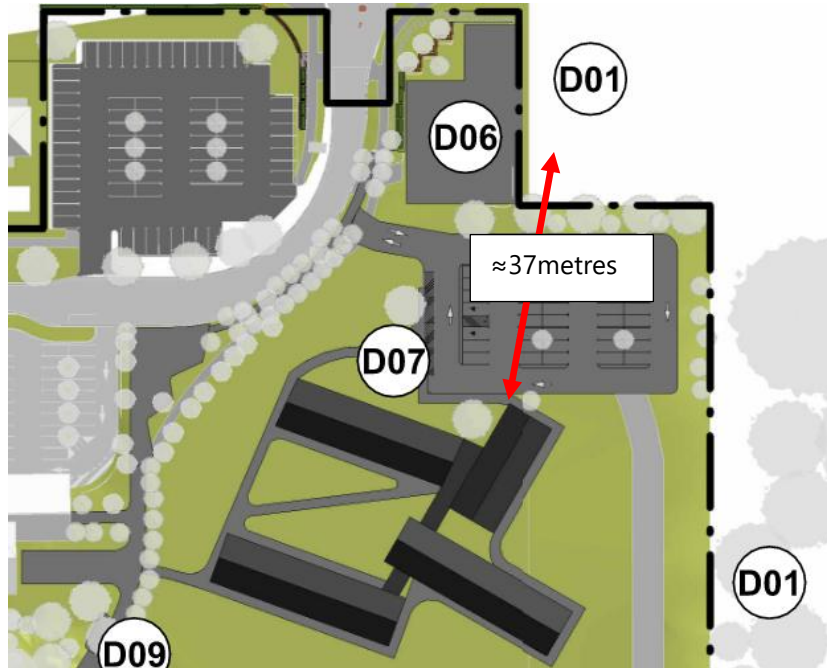
- Due to the increased car movements in the area and the proximity to the existing residential site to the West, we recommend upgrading the separating fencing to a double paling acoustic fence (minimum 10kg/m² overall surface weight), with no gaps or holes.



5.5 BOARDING FACILITY (D07)

New 2 storey boarding facility and drop off/parking (39 spots) are proposed to be located in an existing sports field with considerable noise emissions

Car parking noise emission compliance is predicted at all times based on half of car parking turnaround every hour and the 14 metre separation distance. Even if all parking lots have a turnaround every hour, compliance with day and evening noise emissions limits are still predicted.



Boarding facilities shall be fully enclosable buildings and the only noise emission is anticipated to be generated by new plant and equipment, and noise from children. The latter is currently present, given the boarding facility is proposed to be located at a play field.



Current sports field activities.

Noise emissions from the boarding facility will be managed by college (i.e. quiet times after 10pm). With 37 metre separation (-39dB), conversational noise emissions would have to exceed substantially 85dB(A)_{Leq} in order to lead to exceedances of day and evening noise emission limits. Given that conversational noise levels are between 65-70dB(A)_{Leq,T}, exceedances of noise limits during day and evening periods are not predicted.

Pumps and refrigeration equipment are not proposed; however, we anticipate air conditioning and other plant. To achieve noise emission limits at the noise sensitive receiver, we recommend the following limits for the plant at the source.

Target for New Plant and Equipment (combined for all)	Noise Levels dB(A) @ 3metres from Plant/Intake/Exhaust		
	Daytime operation	Evening operation	Night time operation
Air-conditioning equipment	71 ¹	66 ¹	57 ¹
Other Plant	66 ¹	61 ¹	54 ¹

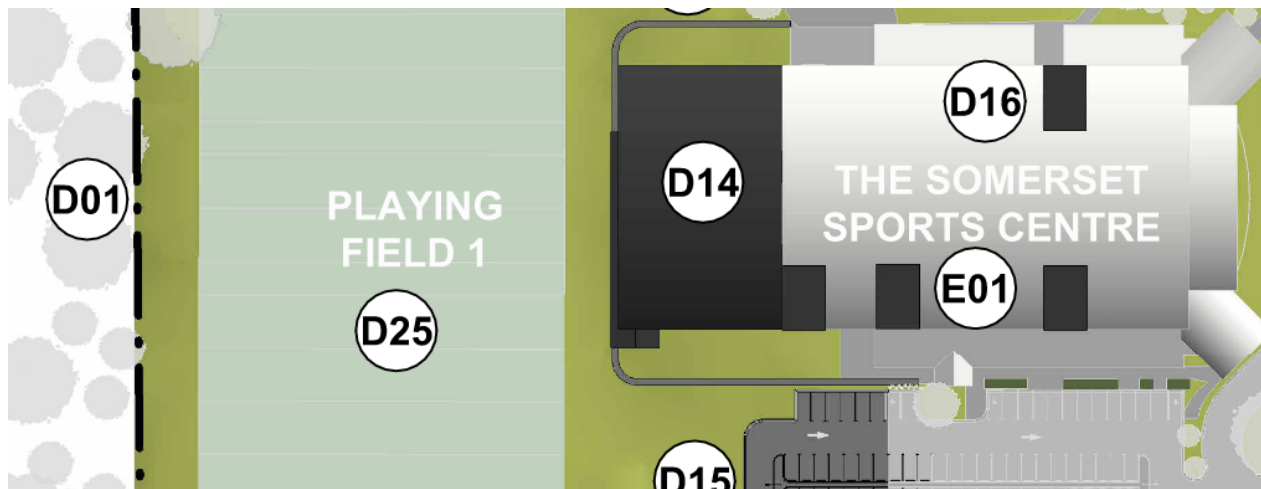
Note ¹: the noise limits are only indicated for the purposes of achieving noise emission limits at residential buildings outside of the College and not within the college. Reduced noise emissions/additional acoustic treatment is required to achieve compliance within outdoor areas of the College, as well as achieving indoor noise limits within the buildings. Detailed review of plant would be required once the selection has occurred, and we recommend to achieve acceptable noise levels within external areas of the College (nominally 48dB(A) at external recreation, pedestrian and external to other buildings within College, except at night external to sleeping areas where lower noise impacts must be targeted to achieve acceptable indoor noise levels at night) as well as within College indoor areas to satisfy DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

5.6 GRAND STAND (D14)

Cover over existing spectator viewing area is proposed adjacent to Playing Field 1. The use of the Playing field grand stand will be limited to 7am to 10pm, thus no night time noise emissions would occur.

The covered area is located approximately 110metres from closest residential receiver outside of the college (-49dB noise reduction). In order to exceed Redland Comparison of like parameters, the sound power level at the source must exceed 99dB(A)_{Leq,T} / 102dB(A)_{L10,T} / 107dB(A)_{L1,T}.

Based on loud crowds in venues, as per 'Prediction of Noise from Small to Medium Sized Crowds' by M.J. Hayne et al, 2011, the crowd has to exceed 230 people to achieve such sound power levels. The proposed Grand Stand is small and located at the existing spectator area and on that basis, we consider the proposal acoustically acceptable. When loudspeakers are used, we recommend to locate these at the Grand Stand and limit combined sound power level to 88dB(A)_{Leq}.

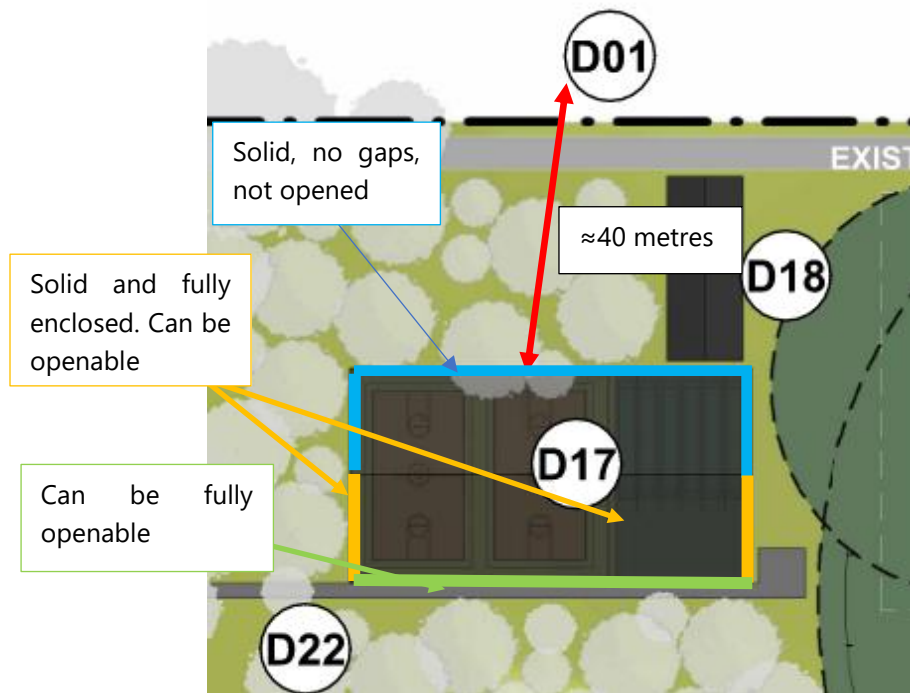


Given that no new noise sources are introduced for the sports centre area, these changes are acoustically acceptable and have not been further addressed.

5.7 NEW INDOOR MULTI-PURPOSE COURTS (D17)

The following is recommended (refer to Figure below), noting that:

1. Roof construction – colorbond with Anticon blanket over purlins (note: additional acoustic treatment (e.g. solid plasterboard ceiling) would be required to address rain noise and external noise impacts and sound absorption (e.g. sound absorptive panels) to satisfy DoE, DETE and Ormiston College own requirements).



1. Walls – colorbond (or equivalent) with thermal treatment (e.g. Anticon or similar) on walls (note: additional acoustic treatment may be required to address noise intrusion and sound absorption to satisfy DoE, DETE and Ormiston College own requirements. Northern (Blue) walls require additional internal plasterboard/fibre cement/colorbond lining internally to increase the sound transmission loss of the wall.
2. Where openable sections (orange) are indicated, these require acoustically rated louvered windows (nominally $Rw30$) and acoustic treatments of other penetrations. Doors can be standard construction with weather seals (nominally $Rw30$). These areas must be kept closed after 6pm and before 7am.
3. Where openable sections are indicated (green), these do not require acoustic seals, however, to address indoor noise requirements, similar treatments as Orange areas would likely be required. Where considerable noise generation occurs after 6pm, these must be closed.
4. Plant and equipment is selected and acoustically treated to achieve noise emission limits in Section 4.2, as well as achieving acceptable noise levels within external areas of the College (nominally 48dB(A) at external recreation, pedestrian and external to other buildings within College, except at night external to sleeping areas where lower noise impacts must be targeted to achieve acceptable indoor noise levels at night) as well as within College indoor areas to satisfy DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.
5. Due to close proximity to residential receivers, we do not recommend locating any plant or equipment along the Northern side of the Hall.

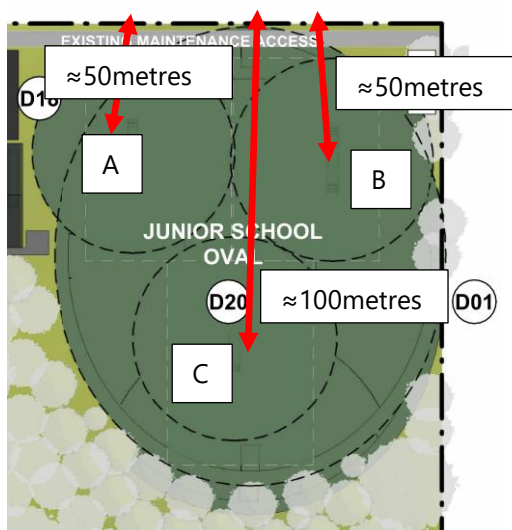
The above acoustic treatments allow indoor noise levels to exceed 85dB(A) L_{eq} , which can be experienced during games or training activities and with amplified music, and would allow the indoor areas to operate between 7am and 10pm.

5.8 NEW CRICKET PITCH AND NETS (D17)

New cricket pitch and nets (operational between 7am and 6pm) are separated from the residential buildings by Storage shed D18, thus allowing a separation of 50metres. Considering each pitch to have two participants, i.e. combined 12 participants and using the crowd noise formula (Hayne et al, 2011), the following noise generation is considered: 80dB(A) $L_{eq,T}$ / 83dB(A) $L_{10,T}$ / 89dB(A) $L_{1,T}$. Such noise emissions are predicted to lead to compliant noise emissions at closest sensitive residential receivers on the condition the Multi-Purpose Court treatments are implemented.

5.9 JUNIOR SCHOOL SPORTS FIELDS (D20)

Junior school sports ovals are proposed along the Eastern side of the College.



Considering children being scattered across all fields during classes, the assessment is based on 1 class, each with 30 children, located at each of the three areas indicated above, i.e. 90 children using the field at the same time, with 60 children located on average, 50 metres from the residential receivers and 30 children 100 metres from residential receivers.

Vocal efforts of group of children are based on the following:

- Effective Sound Power Level for 'n' children = Effective Sound Power Level for 10 children + $10 \log (n/10)$.

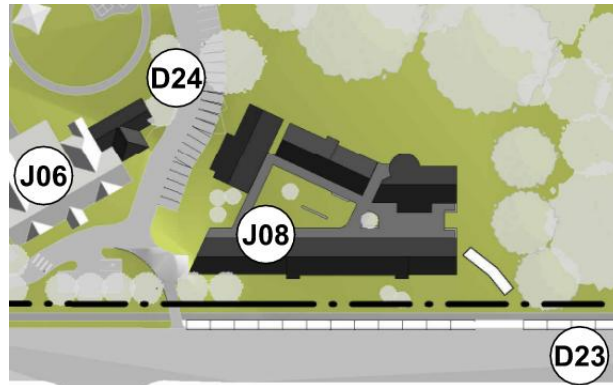
Effective sound power level ($L_{Aeq,15min}$) for groups of 10 children playing is 87dB(A) which leads to each group of 30 children emitting 91.8dB(A) $L_{eq,15min}$.

Area Noise Impact	Calculation Example		
	Sound Power, dB(A) $L_{eq,15min}$	Distance reduction, dB	Resultant Noise, dB(A) $L_{eq,15min}$
A	91.8	-42	49.8
B	91.8	-42	49.8
C	91.8	-48	44
Combined			53

The combined noise impact of 53dB(A)Leq,T is compliant with the Redland Comparison of Like Parameters applicable for daytime (7am to 6pm), however, exceed the noise limits for evening and night time. On that basis, unless participant number reduction from the above considerations are acceptable, we recommend limiting the hours of use – i.e. allowable usage between 7am and 6pm.

5.10 EARLY LEARNING CENTRE (J08)

New early learning centre is proposed along the Southern boundary of the College. The College has an Early Learning centre (79 approved places), operational between 7am and 6pm, however, given the new location at J08, our assessment has considered noise emissions from the new location between the same timeframes as current early learning centre but increasing the number of children to ≤ 150 .



The closest point of the new proposed location is approximately 72 metres from closest sensitive residential building outside of the development (-45.1dB, distance noise reduction). To achieve compliance with Redland comparison of like parameters and background creep limits, the total generated sound power level of children must not exceed 98dB(A)Leq,15min, without considering any natural barriers or shielding from building structures.

Noise emissions associated with the early learning centre are dominated by outdoor play area usages. Based on AAAC Guideline for Child Care Centre Acoustic Assessment, vocal efforts are generally determined in three age groups as follows:

- Group A, 0 to 2 years - 78dB(A) Leq,15min (group of 10);
- Group B, 2 to 3 years - 85dB(A) Leq,15min (group of 10);
- Group C, 3 to 5 years - 87dB(A) Leq,15min (group of 10);

Combined vocal efforts of group of children are based on the following:

- Effective Sound Power Level for 'n' children = Effective Sound Power Level for 10 children + $10 \log (n/10)$.

The above leads to the following sound power levels:

Group	Calculation Example	
	Number of Children	Resultant Sound Power Level, dB(A) $L_{eq,15min}$
A	50	90
B	50	92
C	50	94
Combined		97

The above conservative calculations indicate that the noise impacts of the children are at least 1dB(A) below the limit and on that basis, compliance with noise emission limits can be achieved.

Noise impacts from children to other sites within the College shall be addressed at a later stage, to ensure that the impacts are acceptable. It is common to apply solid barriers to outdoor areas to limit noise emissions to outside, and acoustically rate building facades to limit noise emissions from internal areas.

Rain induced noise impacts and external noise impacts onto internal areas of the Early Learning centre shall be assessed during detailed design phase, to ensure acceptable indoor noise limits are achieved. Typically, R_w 32 rated glazing systems, R_w 40-45 rated façade systems, colorbond roof with Anticon over purlins and solid plasterboard are adequately addressing external noise sources.

Additional sound absorptive ceiling/wall treatments are recommended to indoor play and study areas and the like to achieve adequate reverberation time targets and reduce noise build-up. In addition, privacy between various areas of the centre shall be assessed to ensure adequate sound insulation is achieved.

Plant and equipment is selected and acoustically treated to achieve noise emission limits in Section 4.2, as well as achieving acceptable noise levels within external areas of the College and the Early Learning Centre (nominally 48dB(A) at external recreation/play areas, pedestrian and external to other buildings within College, except at night external to sleeping areas where lower noise impacts must be targeted to achieve acceptable indoor noise levels at night) as well as within College indoor areas to satisfy DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

6 CONCLUSION

Acoustic Logic has carried out an acoustic review of the MID of Ormiston College to ensure noise emissions from the proposed amendments and additions would be adequately controlled.

The scope of this document excludes the review of the noise impacts from the amendments/additions/existing uses to existing/new/changed usages within the College itself. We recommend further acoustic studies during schematic and detailed design phase which shall address building envelopes, plant, additional structures, and internal areas, as well as management controls etc required to achieve DoE, DETE and Ormiston College own requirements, whichever is relevant and applicable.

Based on our review, we note the following:

1. Building acoustic treatments are recommended in Section 5 to control noise emissions from the new proposed buildings
2. Where operational time restrictions are recommended, these are listed in Section 2 and Section 5. We note the following specifically:
 - a. Early learning centre is operational between 7am and 6pm;
 - b. Junior School Sports Fields (D20) are not recommended to operate after 6pm and prior to 7am, due to the proximity to the nearby residential receivers;
 - c. Indoor enclosed Multi Purpose courts with enclosed cricket pitch and nets (D17) can be operational up to 10pm, on the proviso that external façade is closed as per recommendations in Section 5.
3. Once the plant and equipment selection has been carried out, detailed assessment is required to ensure that noise emission limits are achieved and impacts to indoor and outdoor areas of the College are acceptable. The noise emissions to residential receivers outside of College are to be conditioned by Council and we recommend certification from a qualified acoustic consultant prior to certification of use/certification of occupancy.
4. Other acoustic controls and reviews are presented in Section 2 and Section 5 of this report.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,



Acoustic Logic Pty Ltd
Benjamin Cox
MAAS

APPENDIX A – PROPOSED MASTER PLAN



163m2
797m2
395m2
SITE TOTAL 25,657m2
1,206m2
19,842m2
164m3
DUNDAS ST W

2 KOALA ZONES- EXISTING WITH JWA AREAS
A1 = 1 : 5000

[illegible]

ORMISTON COLLEGE

MASTERPLAN DEVELOPMENT

QC2120

MASTER PLAN KOALA ZONE

DATE: 11/11/11	TIME: 11:11	BY: 1111
A-01-0005		
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