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Acoustic Statement

Proposed Temporary Child Care Centre
189 Fox Valley Road, Wahroonga, NSW

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1.0 CONSULTING BRIEF

Day Design Pty Ltd was engaged by Cana Construction to carry out an acoustic assessment of a proposed temporary Child Care Centre at 189 Fox Valley Road, Wahroonga, NSW.

This commission involves the following:

Scope of Work:

- Inspect the site and environs
- Comment on the background noise levels at critical locations and times
- Comment on the acceptable noise level criteria
- Comment on noise emissions from the proposed Child Care Centre
- Estimate and provide comment on the level of noise emission, taking into account building envelope transmission loss, screen walls and distance attenuation
- Prepare a site plan identifying the development and nearby noise sensitive locations
- Provide comment on possible acoustical treatment, such as fencing (if necessary)
- Prepare an Acoustic Statement.



2.0 PROJECT DESCRIPTION AND SUMMARY OF FINDINGS

A temporary Child Care Centre is proposed to be located at the existing Wahroonga Adventist Primary School, 189 Fox Valley Road, Wahroonga, NSW for up to 212 children.

The existing site is located in the south-eastern corner of the Wahroonga Estate. The site consists of a one and two storey brick building in a U-shape, fronting a carpark to the north, car park and Fox Valley Road to the west and The Comenarra Parkway to the south. A large outdoor play area is located on the western side of the building, within the U-shape. The site was previously used as a 230 place primary school.

The temporary Child Care Centre will include the use of the existing building. Alterations and additions are proposed to the existing buildings to include seven indoor play rooms, two outdoor play areas and the associated staff rooms and amenities.

The existing car park for visitors and staff on the eastern side of the site will be maintained with entry from Fox Valley Road.

The proposed layout of the temporary Child Care Centre can be seen in the Zanazan Architecture Studio drawings for Project Number 1703, dated September 2017, attached as Appendix A.

The proposed development site is situated on land zoned *B1 – Neighbourhood Centre* under Ku-Ring-Gai Local Environmental Plan (LEP) 2015.

The site is bounded by a car park to the north and east, The Comenarra Parkway to the south and Avondale College of Higher Education to the west. Single storey residential dwellings exist on the opposite side of Fox Valley Road to the east and the opposite side of The Comenarra Parkway to the south. We have been advised that a development application for the construction of a 127 place child care centre over three residential blocks (172-176 The Comenarra Parkway) on the opposite side of The Comenarra Parkway has recently been submitted (*DA0270/17*). These locations are shown in Figure 1.

The nearest noise sensitive receivers to the property, in various directions, are shown on Figure 1 and in Table 1.

Table 1 Noise Sensitive Receivers

Receiver and Type	Address	Direction from site
R1 – Medical Practice	187 Fox Valley Road	North
R2 – Residence	172 Fox Valley Road	East
R3 – Residences	172-176 The Comenarra Parkway	South
R3a – Child Care Centre (subject to approval)	172-176 The Comenarra Parkway	South
R4 – Residence	178-180 The Comenarra Parkway	South - East
R5 – Higher Education	203 The Comenarra Parkway	West



We have assumed the operating hours for the proposed temporary Child Care Centre will be:

- Monday – Friday: 7 am to 6 pm.

The temporary Child Care Centre is proposed to have a capacity of 212 children as follows:

- 0 - 2 year old: 59 Children
- 2 - 3 year old: 73 Children
- 3 - 5 year old: 80 Children

Ku-Ring-Gai Council will likely require an acoustic assessment of the potential noise levels from the children playing indoors and outdoors, car park and the mechanical plant to ensure the noise impact from the proposed temporary Child Care Centre will not adversely affect the acoustic amenity of nearby noise sensitive receivers.

Ku-Ring-Gai Council will also require an acoustic assessment of the potential intrusive noise the proposal may be exposed to, such as road traffic on Fox Valley Road and The Comenarra Parkway.

Calculations and assumptions show that, noise controls such as those recommendations in Section 7.0 will likely be required for the temporary Child Care Centre. Once implemented, it is feasible that the level of noise emission from the Child Care Centre and also the level of intrusive noise at the Child Care Centre will be able to meet the requirements of Ku-Ring-Gai Council's *DCP*, the NSW Department of Planning and Environment's *Child Care Planning Guideline* and the NSW Environment Protection Authority's *Noise Guide for Local Government, Noise Policy for Industry and Road Noise Policy*.





Figure 1. Site Plan – 189 Fox Valley Road, Wahroonga, NSW





Figure 2. Site Location Plan – Wahroonga Estate, NSW



3.0 EXISTING NOISE LEVELS

3.1 Ambient Noise Levels

The places of worst possible annoyance are the residential premises located to the east and south-east, 'R2' and 'R4', of the proposed site. These locations are shown in the Site Plan on Figure 1. The times of worst possible annoyance will be during the day when the children are playing outside in the outdoor playing areas.

Following an examination of Council's online DA Tracking service it was found that ambient noise levels have been measured at the front and rear of 174 The Comenarra Parkway by Renzo Tonin and Associates for their Acoustic Assessment Report (RTAAR), Doc reference TJ240-02F01 (r2) Acoustic Assessment, dated 4 April 2017, for the proposed child care centre at 172-176 The Comenarra Parkway, Wahroonga, in support of DA0270/17.

The measured L_{A90} background noise levels ranged from 52 dBA (short term) in the front of the property to 42 dBA (long term) in the rear of the property.

Based on the above measurements, we estimate that the assessment L_{A90} background noise level at the front of the residential receivers, 'R2' and 'R4', will be 45 dBA (+/- 2 dB).

3.2 Road Traffic Noise Levels

The proposal is also exposed to traffic noise from vehicles on Fox Valley Road and The Comenarra Parkway.

As part of the RTAAR short term $L_{eq, 15 \text{ minute}}$ measurements were also conducted at the front of 172 (eastern side) and 174 The Comenarra Parkway. The measurements were affected by road traffic noise on Fox Valley Road and The Comenarra Parkway.

The measured noise levels $L_{eq, 15 \text{ minute}}$ ranged from 58 dBA (172 The Comenarra Parkway) to 60 dBA (172 The Comenarra Parkway).



4.0 ACOUSTIC CRITERIA

This Section presents the noise guidelines applicable to this proposal and establishes an estimated project specific noise criteria.

4.1 Ku-Ring-Gai Council Development Control Plan 2015

Ku-Ring-Gai Council in its Development Control Plan (DCP) 2015 – Section A, Part 10, Child Care Centres, Subsection 10C.2, 'Noise', states the following for Child Care Centre Development Applications:

'Objective

To minimise the impact of the child care centre on the acoustic privacy of neighbouring developments.

Controls

1. *Where a child care centre is to be located on a site adjoining a residential property, noise generated by the centre is not to be more than 5 dBA above the L_{90} (ambient background) noise level, as measured at any point on the adjoining residential property.'*

Also, Subsection 10C.6, 'Outdoor Play Spaces', states the following with regards to external play areas:

'Noise

18. *The outdoor play spaces of the child care centre is not to be exposed to an average noise level in excess of 55 dBA originating from external sources, during the centre's operating hours.'*



4.2 NSW Department of Planning & Environment – Child Care Planning Guideline

The NSW Department of Planning and Environment (DoPE) published the Child Care Planning Guideline (CCPG) in August 2017 as a supplement to the State Environmental Planning Policy (SEPP) (Educational Establishments and Child Care Facilities) 2017.

The SEPP states that “a consent authority must take into consideration this Guideline [CCPG] when assessing a development application (DA) for a centre-based child care facility.” The SEPP also determines the Guideline “will take precedence over a Development Control Plan (DCP), with some exceptions, where the two overlap in relation to a child care facility.”

Section 3, *Matters for Consideration*, Subsection 3.5 Acoustic Privacy, contains the following considerations:

‘Considerations

Objective: To minimize the impact of child care facilities on the acoustic privacy of neighboring residential developments.

C23

A new development, or development that includes alterations to more than 50 percent of the existing floor area, and is adjacent to residential accommodation should:

- *Provide an acoustic fence along any boundary where the adjoining property contains a residential use (An acoustic fence is one that is a solid, gap free fence)*
- *Ensure that mechanical plant or equipment is screened by solid, gap free material and constructed to reduce noise levels e.g. acoustic fence, building or enclosure*

C24

A suitably qualified acoustic professional should prepare an acoustic report which will cover the following matters:

- *Identify an appropriate noise level for a child care facility located in residential and other zones*
- *Determine an appropriate background noise level for outdoor play area during times they are proposed to be in use*
- *Determine the appropriate height of any acoustic fence to enable the noise criteria to be met*



Subsection 3.6 Noise and air Pollution, contains the following consideration:

‘Considerations

C26

An acoustic report should identify appropriate noise levels for sleeping areas and other non play areas and examine impacts and noise attenuation measures where a child care facility is proposed in any of the following locations:

- *On industrial zoned land*
- *Where the ANEF contour is between 20 and 25, consistent with AS2021:2000*
- *Along a railway or mass transit corridor, as defined by State Environmental Planning Policy (infrastructure) 2007*
- *On a major or busy road*
- *Other land that is impacted by a substantial external noise.’*

4.3 NSW Environment Protection Authority

4.3.1 Amenity Criteria

Depending on the type of area in which the noise is being made, there is a certain reasonable expectancy for noise amenity. The NSW *Noise Policy for Industry* provides a schedule of recommended L_{eq} industrial noise levels that under normal circumstances should not be exceeded. If successive developments occur near a residential area, each one allowing a criterion of background noise level plus 5 dB, the ambient noise level will gradually creep higher.

The recommended L_{eq} noise levels below in Table 2 are taken from Section 2.4, Table 2.2 of the NPI.

Table 2 Amenity Criteria

Receiver	Noise Amenity Area	Time of Day	L_{eq} , dBA, Recommended Amenity Noise Level
School classroom - internal	All	Noisiest 1-hour period when in use	35
Hospital ward – external	All	Noisiest 1-hour	50
Active recreation area (eg school playground, golf course)	All	When in use	55



The L_{Aeq} is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels, the *NPI* assumes that the $L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq, period} + 3$ **decibels (dB)** (Section 2.2, *NPI*).

The acceptable amenity criteria for the nearby school classrooms, future child care centre and the dental practice are:

- $(35 - 5 + 3)$ 33 dBA $L_{eq, 15 \text{ minute}}$ inside the school classrooms and the future child care centre during the noisiest 1 hour period when in use;
- $(55 - 5 + 3)$ 53 dBA $L_{eq, 15 \text{ minute}}$ in the active recreation areas (child care centre playground) when in use; and
- $(50 - 5 + 3)$ 48 dBA $L_{eq, 15 \text{ minute}}$ outside the dental practice during the noisiest 1 hour period.

4.3.2 *Sleep Disturbance Criterion*

The Environment Protection Authority's (EPA) *Noise Guide for Local Government* (NGLG) states in Section 2.2.4 that where sleep disturbance is being assessed, the $L_{A1, 1 \text{ minute}}$ or L_{Amax} noise level is most appropriate, and the measurement position should be outside the bedroom window. Sleep may be disturbed if the source noise level exceeds the background noise by more than 15 dB.

In this instance consideration should be given to the potential for sleep disturbance from the noise associated with staff vehicles entering the car park between 6.30 am and 7 am. The early morning L_{90} ambient noise levels at the front of 'R2', 'R3' and 'R4' will likely be higher than the day time L_{90} ambient noise levels due to increased traffic flow. However, to ensure a conservative approach, we have adopted the day time noise level.

The acceptable $L_{A1, 1 \text{ minute}}$ intrusiveness criterion for broadband noise at the nearby residences, using the estimated day time noise levels, is as follows:

- $(45 + 15=)$ **60 dBA** $L_{A1, 1 \text{ minute}}$ in the early morning.



4.3.3 Road Traffic Noise Criteria

The NSW Road Noise Policy (RNP), in Section 2.3.1, sets out road traffic noise assessment criteria for residential land uses in Table 3. The information in that table is extracted below in Table 3.

Table 3 Road Traffic Noise Assessment Criterion - Residential

Road Category	Type of project/land use	Assessment Criteria - dB(A) Day (7 am - 10 pm)
Local roads	<ol style="list-style-type: none"> 1. Existing residences affected by noise from new local road corridors 2. Existing residences affected by noise from redevelopment of existing local roads 3. Existing residences affected by additional traffic on existing local roads generated by land use developments 	$L_{Aeq, (1 \text{ hour})}$ 55 (external)

Section 2.3.2 of the Policy, sets out the road traffic noise assessment criteria for non-residential land uses in Table 4. The information in that table is extracted below in Table 4.

Table 4 Road Traffic Noise Assessment Criteria - Non - Residential

Existing Sensitive Land Use	Assessment Criteria - dB(A) Day (7 am - 10 pm)
Child care facilities	Sleeping rooms $L_{Aeq, (1 \text{ hour})}$ 35 (internal) Indoor play areas $L_{Aeq, (1 \text{ hour})}$ 40 (internal) Outdoor play areas $L_{Aeq, (1 \text{ hour})}$ 55 (external)



4.4 Estimated Project Specific Noise Criteria

Noise emissions from the cumulative noise impacts of the Child Care Centre are assessed against Ku-Ring-Gai Council's *DCP* and the EPA's *NPI*, as follows in Sections 4.4.1.1 to 4.4.1.3. Sleep disturbance that may arise from staff arriving in the mornings and on - road traffic have been assessed against the EPA's *NGLG* and *RNP*, as follows in Sections 4.4.1.4 and 4.4.1.5.

Noise intrusion from local sources (road traffic) are assessed against the Ku-Ring-Gai Council's *DCP* and the *RNP*, as follows in Sections 4.4.2.

4.4.1 Noise Emission Criteria

When all the above factors are considered, we find that the most stringent noise criteria are:

4.4.1.1 Residential Receivers

The following criteria will be applied for children playing in the outdoor play areas and the cumulative noise impact from all other noise sources including the indoor play areas, mechanical plant and car park during the day period (7 am to 6 pm).

Residential Receivers 'R2', 'R3' and 'R4'

- **50 dBA** $L_{Aeq, 15 \text{ minute}}$ during the day.

These criteria are to be assessed at the most affected point on or within the property boundary during the day. For upper residential floors, the noise is assessed outside the nearest window.

4.4.1.2 Educational Receivers

Educational Receiver 'R3a'

The following criterion will be applied for the classrooms and active recreation areas (outdoor play area) of the child care centre.

- 33 dBA $L_{eq, 15 \text{ minute}}$ inside (43 dBA external) the classrooms during the noisiest 1 hour period when in use; and
- 53 dBA $L_{eq, 15 \text{ minute}}$ in the child care centre playground when in use.

Educational Receiver 'R5'

We have assumed the windows on the eastern façade of the higher educational facility remain closed during operation due to the traffic noise on The Comenarra Parkway. Standard glazing will reduce noise levels by up to 20 dB.

Therefore, the following criterion will be applied for the school classrooms of the nearby higher educational building.

- 33 dBA $L_{eq, 15 \text{ minute}}$ inside (53 dBA external / noting existing L_{eq} traffic noise levels are 58 – 60 dBA, see Section 3.2) the school classrooms during the noisiest 1 hour period when in use;



4.4.1.3 Medical Receivers

Medical Receiver 'R1'

The following criterion will be applied for the consulting rooms of the nearby dental practice.

- **53 dBA** $L_{eq, 15 \text{ minute}}$ outside the dental practice during the noisiest 1 hour period.

4.4.1.4 Sleep Disturbance

The following criterion will be applied at 1 metre from the most affected façade of 'R2', 'R3' and 'R4', for sleep disturbance:

- **60 dBA** $L_{A1, 1 \text{ minute}}$ between 6.30 am and 7 am (staff arriving).

4.4.1.5 On – Road Traffic Noise Criteria

The following criterion will be applied at 1 metre from the most affected façade of 'R2', 'R3' and 'R4', for on – road traffic noise:

- **55 dBA** (external) $L_{eq, 1 \text{ hour}}$ between 7 am and 6 pm.

4.4.2 Noise Intrusion Criteria

Road Traffic Intrusion - in accordance with the NSW Road Noise Policy:

- Internal traffic noise levels within sleeping areas of the Child Care Centre should not exceed $L_{eq, 1 \text{ hour}}$ **35 dBA** during operating hours.
- Internal traffic noise levels within indoor play areas of the Child Care Centre should not exceed $L_{eq, 1 \text{ hour}}$ **40 dBA** during operating hours.
- External traffic noise levels in any outdoor play or activity area of the Child Care Centre should not exceed $L_{eq, 1 \text{ hour}}$ **55 dBA** during operating hours.



5.0 CHILD CARE CENTRE NOISE EMISSION

The main sources of noise from the proposed temporary Child Care Centre will be as follows:

- Children playing both outside and inside;
- Mechanical plant; and
- Cars entering and exiting the car park.

We have assumed all external windows facing Fox Valley Road and The Comenarra Parkway will be closed during operation to reduce the level of traffic noise within the indoor play rooms.

The noise assessment was based on the Zanazan Architecture Studio drawings for Project Number 1703, dated September 2017, attached as Appendix A.

5.1 Indoor and Outdoor Play Areas

Day Design Pty Ltd has had the opportunity to measure and quantify the $L_{eq, 15 \text{ minute}}$ sound power levels of children at a number of different Child Care Centres. We have measured the noise of children playing; from this data we have been able to determine the $L_{eq, 15 \text{ minute}}$ sound power level per child. The sound power level data is presented below in Table 5.

Table 5 $L_{eq, 15 \text{ minute}}$ Sound Power Levels - Children at Play

Number and Age of Children	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
10 children, 0 to 2 years	79	55	61	67	73	75	72	68	64
10 children, 2 to 3 years	85	61	67	73	79	81	78	74	70
10 children, 3 to 5 years	88	65	71	76	82	84	81	77	73



5.2 Car Park Noise Emission

Based on the RTA's 'Guide to Traffic Generating Developments' prediction of 0.8 peak (morning 7 am-9 am) vehicle trips per child for Child Care Centres (Long-day care), we have assumed, as a worst case scenario, a flow of cars equivalent to 170 cars in 1 hour arriving or leaving the Child Care Centre in the morning peak. This is equivalent to 43 vehicle trips in a 15 minute period.

For the assessment of sleep disturbance we have assumed two staff members will arrive at the Child Care Centre prior to 7 am and park on the western side of the car park, adjacent to the building.

The Sound Exposure Level (SEL) and $L_{A1, 1 \text{ minute}}$ sound power level and spectra of vehicle noise is shown below in Table 6 and is based on previous measurements by Day Design.

Table 6 SEL & $L_{A1, 1 \text{ minute}}$ Sound Power Levels - Car Park

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
SEL level of car door slam, ignition and drive away	91	104	96	89	87	86	83	81	75
SEL level of car drive by at approximately 10 km/h	82	90	87	80	78	77	72	70	64
$L_{A1, 1 \text{ minute}}$ level of car door closing	84	92	88	84	81	79	75	73	69

5.3 Mechanical Plant

The mechanical plant, including the existing air conditioning system, is not proposed to be modified as part of this development. Therefore, any noise emissions from the existing mechanical plant could be considered to form part of the existing ambient background noise level.

Notwithstanding the above, if in the future the mechanical plant is proposed to be upgraded, a detailed acoustic assessment should be undertaken by a suitably qualified acoustical consultant. Also, we are of the opinion that for typical mechanical plant and equipment it is reasonable and feasible to acoustically treat the associated plant area or equipment itself so that noise will not impact the neighbouring properties.



5.4 Predicted Noise Levels

Knowing the sound power level of a noise source (See Table 5 - 6), the sound pressure level (as measured with a sound level meter) can be calculated at a remote location using suitable formulae to account for distance losses, sound barriers, etc.

The shape of the existing buildings provides good acoustic shielding to receiver locations 'R1', 'R2', 'R3', 'R3a' and 'R4' from children playing in the outdoor play areas.

Therefore, noise emission calculations for the indoor and outdoor play areas include reductions provided by the following, where applicable:

- 'R1' - approximate 6.5 metre high existing building;
- 'R2' - approximate 6.5 metre high existing building;
- 'R3' and 'R3a' - approximate 8 metre high existing building; and
- 'R4' - approximate 3 metre high existing building

Table 7 to 10 show the predicted noise levels at the receiver locations from the activities discussed previously, during the early morning and day periods.

5.4.1 Outdoor Play Area Noise Levels

The following formula, which is well known to acoustic professionals, was used to calculate noise levels at the receiver locations:

$$L_p = L_w + 10\log(n/10) - 20\log(d) - 8 - B$$

Where: L_p = Sound Pressure Level at receiver
 L_w = Sound Power Level for group of 10 children
 n = number of children
 d = distance from children playing to receiver
 B = acoustic reduction due to barrier

Based on a maximum of 212 children playing in the two outdoor play areas at any one time, the predicted worst-case scenario external $L_{eq, 15 \text{ minute}}$ predicted noise level is shown in Table 10. The noise prediction was determined by evenly spacing the 212 children across the Child Care Centre outdoor play areas as follows:

- Outdoor Play Space 01 = 59 x 0 – 2 year olds (group 1);
- Outdoor Play Space 02 = 73 x 2 – 3 year olds and 80 x 3 – 5 year olds;
 - Group 2 – 36.5 x 2 – 3 year olds and 40 x 3 – 5 year olds; and
 - Group 3 - 36.5 x 2 – 3 year olds and 40 x 3 – 5 year olds.



The approximate locations of the noise sources (children) used for the assessment of each of the outdoor play areas above are shown in the attached Appendix B. All noise sources in each outdoor play area shown in Appendix B are assessed as being outside at the same time to achieve the overall worst case predicted noise levels at each of the receiver locations.

The intrusive external $L_{eq, 15\text{minute}}$ noise levels at all receiver locations are calculated to be as shown in Table 7.

Table 7 Predicted $L_{eq, 15\text{ minute}}$ Noise Levels - Outdoor Play

Receiver Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 187 Fox Valley Road	54*	53	Yes
R2 – 172 Fox Valley Road	32	50	Yes
R3 – 172-176 The Comenarra Pkwy	41	50	Yes
R3a – 172-176 The Comenarra Pkwy Classrooms	41	43	Yes
R3a – 172-176 The Comenarra Pkwy Playground	38	53	Yes
R4 – 178-180 The Comenarra Pkwy	53	50	No (+ 3 dB)
R5 – 203 The Comenarra Pkwy	50	53	Yes

**An exceedance of 1 dB is considered negligible, as per Tables 4.1 and 4.2 of the NPI.*

Based on assumptions made in previous Sections, the predicted L_{eq} levels of noise from children playing outdoors are summarised in Table 7 at the receivers. The predicted levels of noise at receiver locations 'R1', 'R2', 'R3', 'R3a' and 'R5', complies with the criteria in Section 4.4.1 of this report, and will therefore likely be acceptable. However, the predicted levels of noise at receiver location 'R4' has the potential to exceed the noise criteria in Section 4.4.1 of this report, and will therefore likely require noise controls as recommended in Section 7.



5.4.2 Cumulative Noise Level - Indoor Play Area and Car Park

The predicted worst case cumulative $L_{eq, 15\text{minute}}$ noise levels at all receiver locations are calculated to be as shown in Table 8.

Table 8 Predicted Cumulative $L_{eq, 15\text{minute}}$ Noise Levels – Indoor Play & Car Park

Description	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 187 Fox Valley Road			
- Indoor play area	26		
- Car park	37		
Cumulative Noise Level	37	53	Yes
R2 – 172 Fox Valley Road			
- Indoor play area	24		
- Car park	40		
Cumulative Noise Level	41	50	Yes
R3 – 172 – 176 The Comenarra Parkway			
- Indoor play area	33		
- Car park	35		
Cumulative Noise Level	37	50	Yes
R3a - 172 – 176 The Comenarra Parkway - Classrooms			
- Indoor play area	33		
- Car park	35		
Cumulative Noise Level	37	43	Yes
R3a - 172 – 176 The Comenarra Parkway - Playground			
- Indoor play area	27		
- Car park	32		
Cumulative Noise Level	33	53	Yes
R4 – 178 – 180 The Comenarra Parkway			
- Indoor play area	31		
- Car park	17		
Cumulative Noise Level	32	50	Yes
R5 – 203 The Comenarra Parkway			
- Indoor play area	51		
- Car park	15		
Cumulative Noise Level	51	53	Yes



Based on assumptions made in previous Sections, the predicted cumulative L_{eq} levels of noise from the temporary Child Care Centre are summarised in Table 8 at the receivers. The predicted levels of noise at the receiver locations 'R1', 'R2', 'R3', 'R3a', 'R4' and 'R5', comply with the criteria in Section 4.4.1 of this report, and will therefore likely be acceptable.

5.4.3 Sleep Disturbance

The external $L_{A1, 1 \text{ minute}}$ noise levels at the residential receiver locations, 'R2', 'R3' and 'R4', from noise associated with two staff vehicles entering the car park prior to 7 am are calculated to be as shown below in Table 9.

Table 9 Predicted $L_{A1, 1 \text{ minute}}$ Noise Levels – Sleep Disturbance

Receiver Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R2 – 172 Fox Valley Road	50	60	Yes
R3 – 172-176 The Comenarra Pkwy	44	60	Yes
R4 – 178-180 The Comenarra Pkwy	24	60	Yes

The predicted external levels of noise from staff vehicles entering the car park prior to 7 am are within the noise criteria in Section 4.4.1, and are therefore likely to be acceptable.

5.4.4 On – Road Traffic

The external $L_{eq, 1 \text{ hour}}$ noise levels at the most affected residential receiver locations, 'R2', 'R3' and 'R4', from noise associated with on – road traffic throughout the day are calculated to be as shown below in Table 10.

Table 10 Predicted $L_{eq, 1 \text{ hour}}$ Noise Levels – On – Road Traffic

Receiver Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R2 – 172 Fox Valley Road	34	55	Yes
R3 – 172-176 The Comenarra Pkwy	38	55	Yes
R4 – 178-180 The Comenarra Pkwy	34	55	Yes

The predicted external levels of noise from on – road traffic are within the noise criteria in Section 4.4.1, and are therefore likely to be acceptable.



6.0 NOISE INTRUSION

6.1 Road Traffic Noise

6.1.1 External Road Traffic Noise Levels – Outdoor Play Areas

The shape of the existing building provides good acoustic shielding from road traffic noise on Fox Valley Road and The Comenarra Parkway to the majority of the proposed outdoor play areas, with the exception of the south-western corner of the site. Noise levels associated with road traffic would likely be acceptable ($< = 55$ dBA) in the center of outdoor play space 02.

Assuming the maximum $L_{eq, 15 \text{ minute}}$ road traffic noise level of 60 dBA shown in Section 3.2 is typical for the area, a minimum 1.3 metre high sound barrier wall would be required to be constructed along a section of the southern boundary, west of the existing brick shed, to reduce the intrusive traffic noise levels to within Council's external noise limit for Child Care Centres of $L_{eq, 1 \text{ hour}}$ 55 dBA. The sound barrier wall should also be constructed along the length of the western boundary of the site.

6.1.2 Road Traffic Noise Intrusion Assessment – Indoor Play & Sleeping Areas

The assumed $L_{Aeq, 1 \text{ hour (traffic)}}$ external road traffic noise levels is 60 dBA at the façade of the existing building facing Fox Valley Road and The Comenarra Parkway. Standard building construction such as brick walls, ceramic tile roof with plasterboard ceiling and standard glazing can achieve a minimum 20 dB reduction with windows and doors closed, which will reduce the outdoor noise level to 40 dBA for traffic noise, inside the Child Care Centre. This level is below the *RNP* noise limit for Child Care Centres of $L_{Aeq, 1 \text{ hour}}$ 40 dBA for indoor play areas.

In addition the sleeping areas (Cot Rooms) are located in the north-western corner of the existing building, far removed from Fox Valley Road and The Comenarra Parkway. The internal noise levels from traffic noise are likely to be below the *RNP* noise limit for Child Care Centres of $L_{Aeq, 1 \text{ hour}}$ 35 dBA for designated sleeping areas.



7.0 RECOMMENDED ACOUSTICAL TREATMENT

7.1 Noise Management Plan

We recommend the temporary Child Care Centre's management implement a Noise Management Plan that should include, but not be limited to the following:

- Neighbours should be provided with the name and contact details of the Centre's Manager, and an invitation to contact that person at any time the Centre is operating.
- Ensuring a sufficient number of educators are provided to supervise children's outside play to discourage unnecessarily loud activities.
- Facilitating children's small group play when outside, and encouraging educators to engage in children's play and facilitate friendships between children.
- Crying children should be comforted as quickly as possible and moved indoors.

7.2 Sound Barrier Walls

The sound barriers specified below may be constructed from 3 rail 'solid capped and lapped' timber, 10 mm thick solid polycarbonate, 6.38 mm thick laminated glass or masonry. The construction shall be free of visible air gaps to provide an impervious sound barrier.

We recommend the following sound barrier walls be constructed:

7.2.1 *Southern Boundary*

We recommend that a 1.3 metre high fence be constructed along the southern boundary to the west of the existing brick shed in the south-western corner of the site, as shown on the attached Appendix A.

7.2.2 *Western Boundary*

We recommend that a 1.3 metre high fence be constructed along the entire length of the western boundary of the Outdoor Play Areas, as shown on the attached Appendix A.



8.0 PREDICTED NOISE LEVELS - AFTER NOISE CONTROLS

Once the noise control recommendations in Section 7 are incorporated into the design, the calculated sound pressure level at the nearby receiver 'R4', from the outdoor play area will be as shown in Table 11.

Table 11 Predicted $L_{eq, 15 \text{ minute}}$ Noise Levels - Outdoor Play - After Noise Controls

Receiver Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R4 - 178-180 The Comenarra Pkwy	49	50	Yes

The predicted L_{eq} levels of noise from the outdoor play areas are summarised in Table 11 at the receivers. Once noise controls are incorporated as recommended in Section 7, the predicted levels of noise at all receiver location comply with the criteria in Section 4.4.1 of this report, and will therefore likely be acceptable.



9.0 ACOUSTIC STATEMENT

Day Design Pty Ltd was engaged by Cana Construction to carry out an acoustic assessment of a proposed temporary Child Care Centre at 189 Fox Valley Road, Wahroonga, NSW.

Calculations show that, provided the recommendations in Section 7.0 of this report are implemented, it is feasible for the level of noise emission by the proposed temporary Child Care Centre to meet the noise level requirements of Willoughby City Council's *DCP*, the NSW Department of Planning and Environment's *Child Care Planning Guideline* and the NSW Environment Protection Authority's *Noise Guide for Local Government, Noise Policy for Industry and Road Noise Policy*, and be considered acceptable.

Also, calculations show that, provided the recommendations in Section 7.0 of this report are implemented, it is feasible for the intrusive road traffic noise levels to meet the noise level requirements of Willoughby City Council's *DCP*, NSW Environment Protection Authority's *Road Noise Policy* and the NSW Department of Planning and Environment's *Child Care Planning Guideline*, and be considered acceptable.



Adam Shearer, BCT (Audio), MDesSc (Audio and Acoustics), MAAS
Senior Acoustical Consultant
for and on behalf of Day Design Pty Ltd

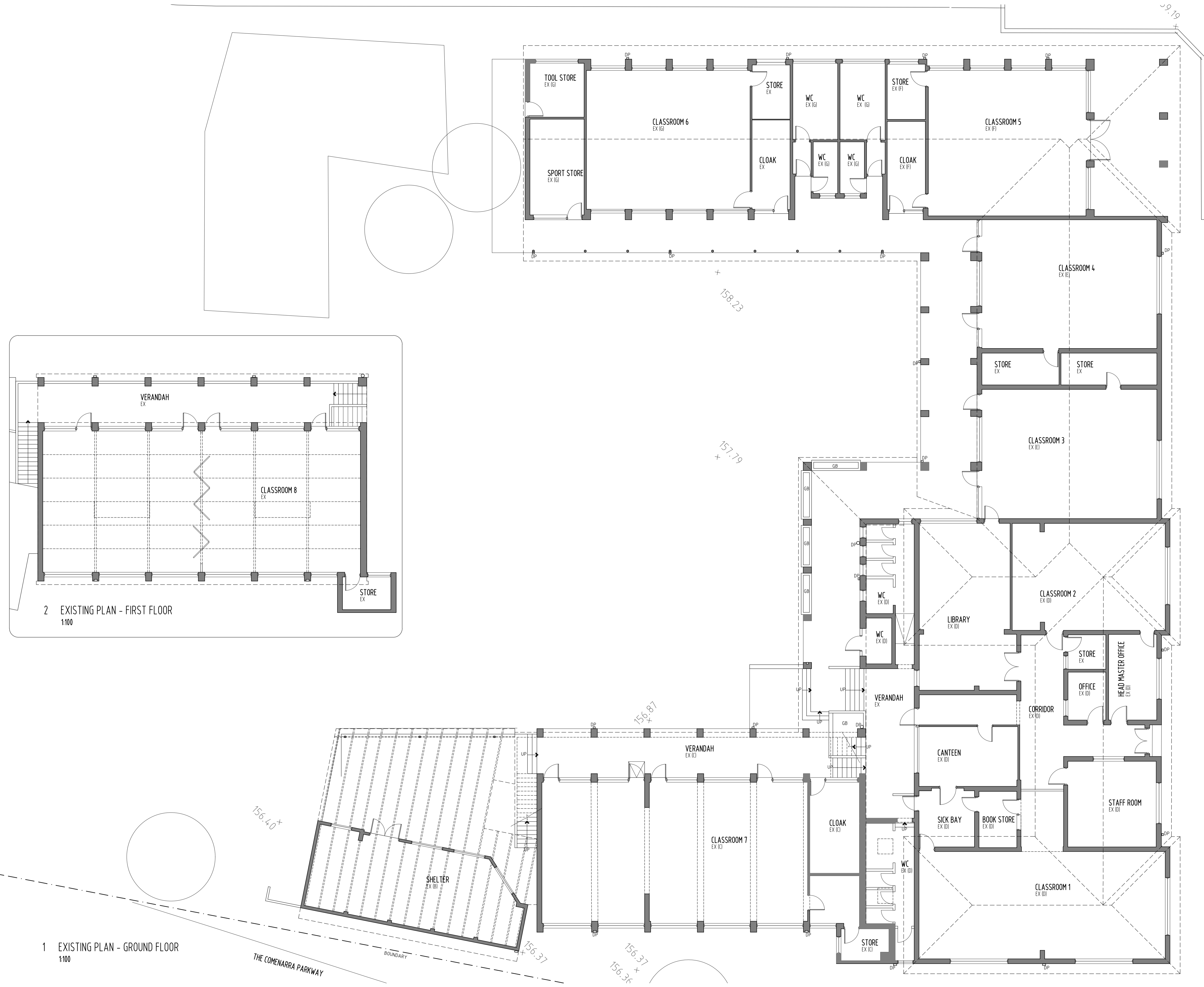
AAAC MEMBERSHIP

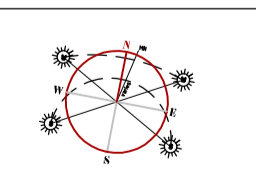
Day Design Pty Ltd is a member company of the Association of Australasian Acoustical Consultants, and the work herein reported has been performed in accordance with the terms of membership.

APPENDICES

- Appendix A – Architectural Drawings
- Appendix B – Approximate Noise Source Locations







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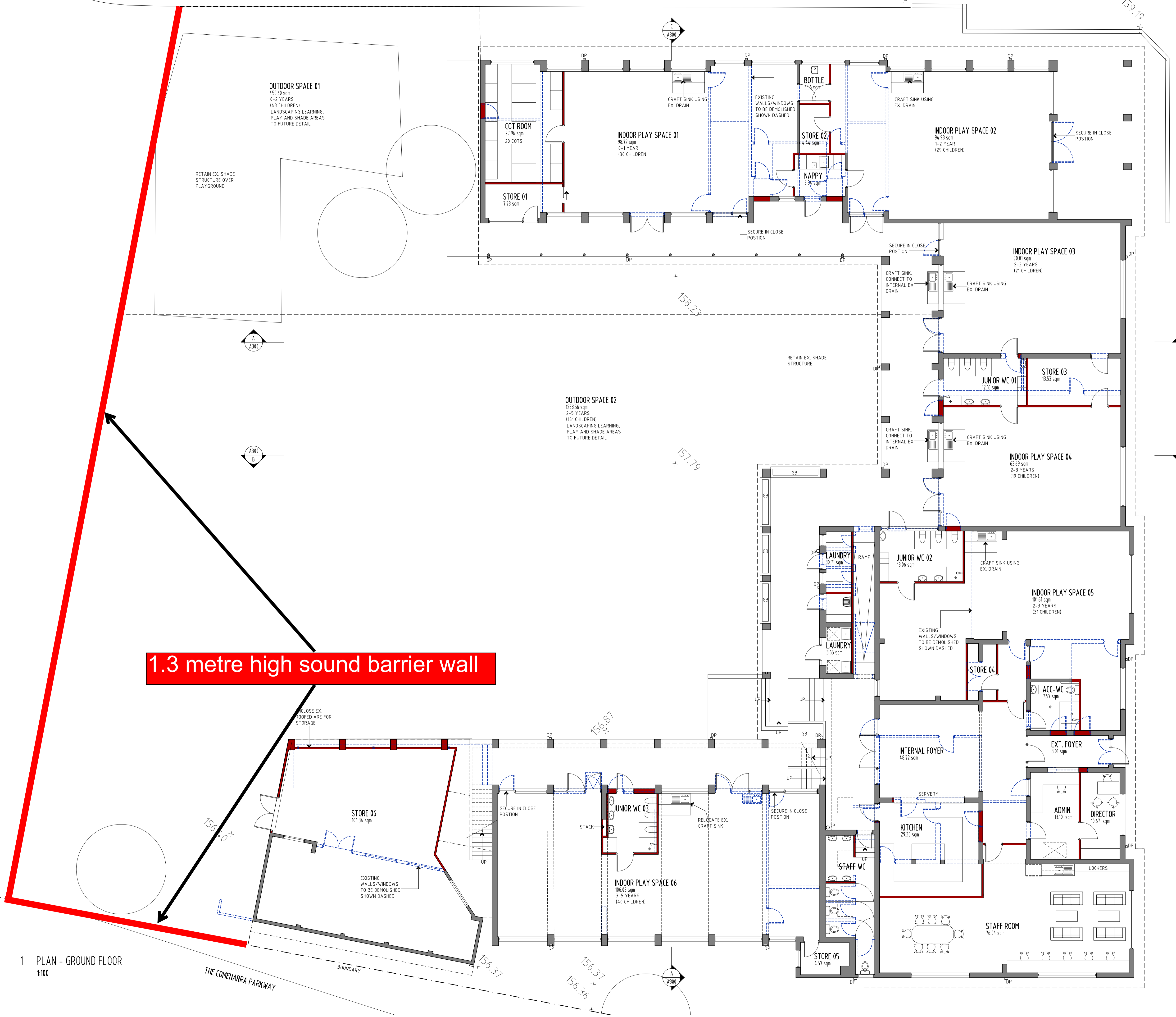
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<small> JOB NAME AND ADDRESS: CHILLAR 101 FOX VALLEY RD, WARRONGA </small>	<small> DRAWN: VLS DATE: SEP 11 SCALE: 1:100 </small>	<small> DWG NO.: A100 </small>
<small> DRAWING TITLE: EXISTING PLANS - GROUND & FIRST FLOOR </small>	<small> APPROVED: VLS DATE: SEP 11 </small>	<small> DATE: 11/09/11 </small>

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1.3 metre high sound barrier wall

1 PLAN - GROUND FLOOR
1:100

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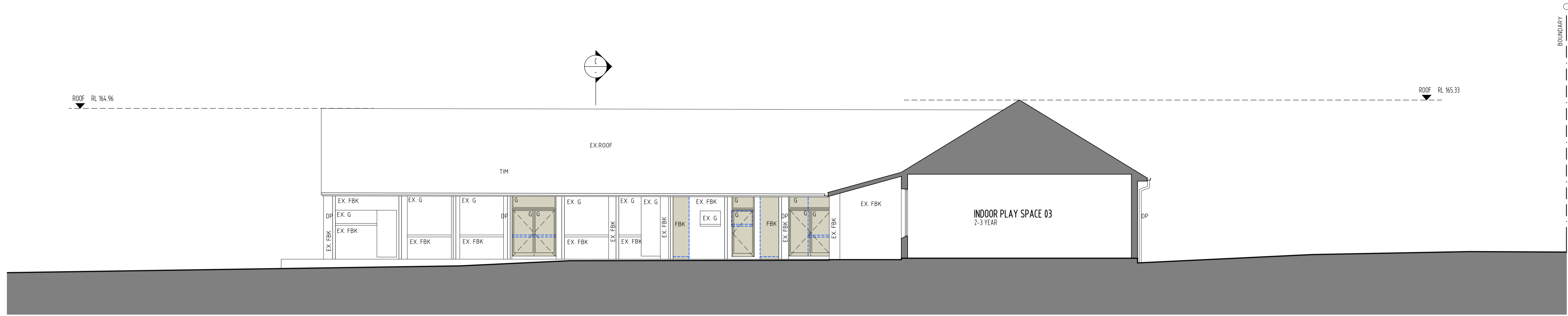
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 CHILDCARE
 157 FOX VALLEY RD,
 WARRONGLA
 DRAWING TITLE:
 GROUND FLOOR PLAN

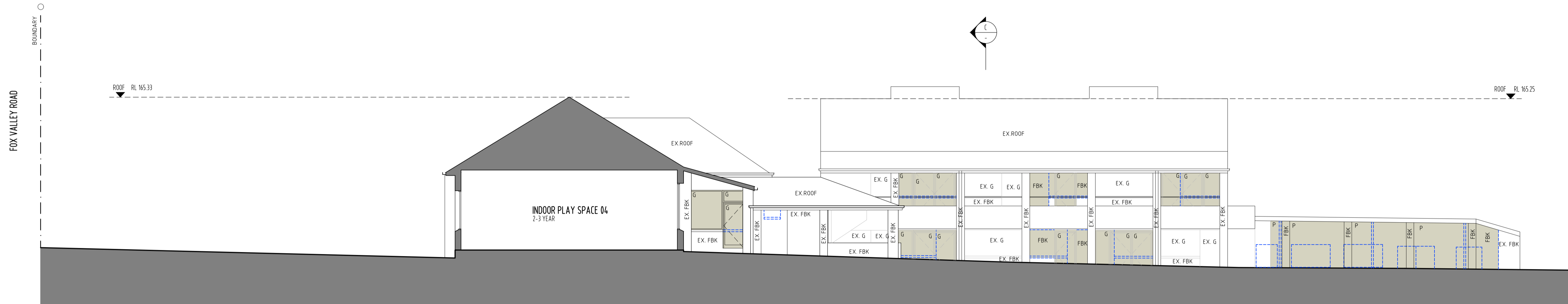
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 CHECKED DATE: 02/11/11

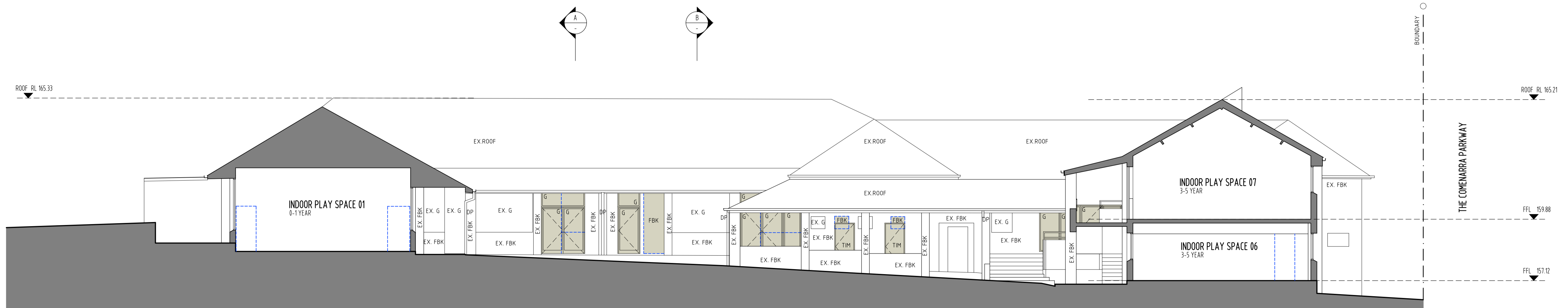
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1 SECTION - AA
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2 SECTION - BB
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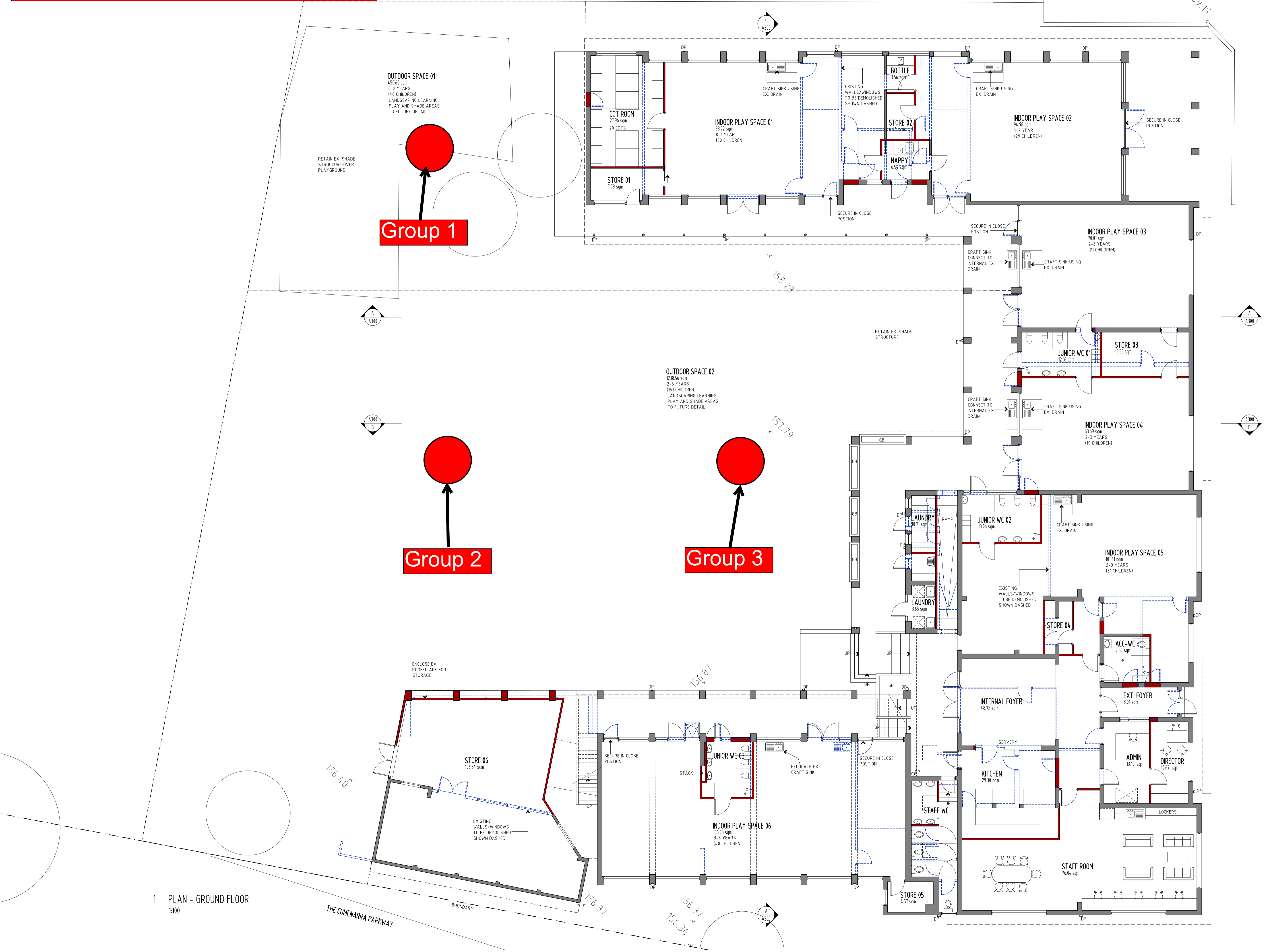
3 SECTION - CC
1:100 (WEST ELEVATION)

1:200 (Overall)
REVISION DATE

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JOB NAME AND ADDRESS	DESIGNER	DATE	SCALE	DATE
CONSCARE 189 FOX VALLEY RD	SH	2019	A500	
WARRIGALLA DRAWING TITLE	SH	2019	B	
SECTIONS - A, B & C				

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Group 1

Group 2

Group 3

1 PLAN - GROUND FLOOR
1:100

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 99 - REV. 99
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