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Environmental Noise Assessment

Redevelopment of Samuel Gilbert Public School
Ridgecrop Drive, Castle Hill, NSW

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1.0 CONSULTING BRIEF

Day Design Pty Ltd was engaged by Fulton Trotter Architects to carry out an acoustic assessment of the proposed redevelopment of the Samuel Gilbert Public School at Ridgescrop Drive, Castle Hill, NSW. This commission involves the following:

Scope of Work:

- Inspect the site and environs
- Measure the background noise levels at critical locations and times
- Establish acceptable noise level criteria
- Quantify noise emissions from the School taking into consideration the proposed redevelopment
- Calculate the level of noise emission, taking into account building envelope transmission, screen walls and distance attenuation
- Prepare a site plan identifying the development and nearby noise sensitive locations
- Provide recommendations for acoustical treatment (if necessary)
- Prepare an Environmental Noise Assessment Report.



2.0 PROJECT DESCRIPTION & SUMMARY OF FINDINGS

The Department of Education propose to redevelop the existing Samuel Gilbert Public School at Ridgescrop Drive, Castle Hill, NSW.

The existing site is situated on land zoned R2 – Low Density Residential under The Hills Local Environmental Plan (LEP) 2012.

The existing School comprises of an administration building, library, hall and permanent and demountable learning spaces.

The proposal seeks approval for the removal of the demountables on the site to accommodate the redevelopment of the School and also the construction of 25 new permanent teaching spaces (home bases). The site plan is shown in the attached Appendix C. The proposal will allow for an additional enrolment of approximately 220 students, taking the total number of students enrolled at the School to $(780 + 220 =)$ 1000 students.

Mechanical plant, including but not limited to air conditioning condenser units and exhaust fans, will be required to serve the proposed home bases, administration building, library and hall.

Samuel Gilbert Public School is bounded by Castle Glen Reserve to the north, commercial premises to the east, Gilbert Road to the south-east, Ridgescrop Drive to the south-west and residential premises to the west. Residential premises are also located on the opposite side of Gilbert Road to the south-east and Ridgescrop Drive to the south-west, as shown on Figure 1.

The nearest noise sensitive receptors to the School, in various directions, are shown on Figure 1 and as follows in Table 1.

Table 1 Noise Sensitive Receptors

Receptor and Type	Address	Direction from site
R1 – Child Care Centre (commercial) - indoors	22 Gilbert Road	East
R1a – Child Care Centre (commercial) - outdoors	22 Gilbert Road	East
R2 – Residential	75 Gilbert Road	South-East
R3 – Residential	2 Galahad Crescent	South-West
R4 – Residential	9 Squire Place	West

The existing and ongoing operating hours for the School are:

Standard Hours:

- Monday – Friday: 8.00 am – 4.00 pm



Outside of standard school hours (community use), the existing and ongoing operating hours for the refurbished Hall are:

Outside of Standard Hours:

- Monday: 3.15 pm – 9.30 pm;
- Tuesday: 4.00 pm – 7.00 pm;
- Wednesday: 3.15 pm – 4.45 pm;
- Thursday: 3.05 pm – 3.45 pm; and
- Saturday: 9.00 am– 11.00 am.

The proposal is a State Significant Development (SSD) and has been issued by the NSW Department of Planning and Environment with the Secretary's Environmental Assessment Requirements (SEARs). The SEARs require an assessment against the NSW Environment Protection Authority's (EPA) *Noise Policy for Industry 2017* and the NSW Department of Planning's (DoP) *Development Near Rail Corridors and Busy Roads – Interim Guideline*.

An acoustic assessment of the noise from the outdoor play areas, home bases, public address system and school bell and mechanical plant and the use of the hall both during and outside of standard school hours has been carried out to ensure the noise impact of the School, subsequent to the proposed redevelopment, will not adversely affect the acoustic amenity of the nearby residences or Child Care Centre.

Calculations show that, provided the recommendations in Section 5 of this report are implemented and adhered to, the level of noise emission, subsequent to the proposed redevelopment, from the School will meet the acoustic requirements in the NSW Department of Planning and Environment's *SEPP (Educational Establishments and Child Care Facilities) 2017*, NSW Environment Protection Authority's (EPA) *Noise Policy for Industry* and the Association of Australasian Acoustical Consultants (AAAC) *Technical Guideline for Child Care Centre Noise Assessment*.





Figure 1. Site Plan – Ridgecrop Drive, Castle Hill, NSW



3.0 ACOUSTIC CRITERIA

3.1 Measured Ambient Noise Levels

In order to assess the severity of a possible environmental noise problem in a residential area it is necessary to measure the ambient background noise level at the times and locations of worst possible annoyance. The lower the background noise level, the more perceptible the intrusive noise becomes and the more potentially annoying.

The ambient L_{90} background noise level is a statistical measure of the sound pressure level that is exceeded for 90% of the measuring period (typically 15 minutes).

The Rating Background Level (RBL) is defined by the Environment Protection Authority (NSW) as the median value of the (lower) tenth percentile of L_{90} ambient background noise levels for day, evening or night periods, measured over a number of days during the proposed days and times of operation.

The places of worst possible annoyance are the nearby residential dwellings. These locations are shown in the Site Plan on Figure 1 as 'R2' to 'R4'. The times of worst possible annoyance will be during the day when the School is operating.

Ambient noise levels were measured in two locations - the front yard of 73 Gilbert Road and the backyard of 9 Squire Place - shown as Logger Locations 'A' and 'B' on Figure 1, respectively, from Wednesday 13 December to Wednesday 20 December, 2017.

The day time ambient noise levels are presented in the attached Appendix B1 and B2 and also below in Table 2.

Table 2 Ambient Noise Levels

Noise Measurement Location	Time Period	L_{90} Rating Background Level	Existing L_{eq} Noise Level
Logger Location 'A' - Front yard – 73 Gilbert Road	Day (7 am to 6 pm)	49 dBA	62 dBA
		45 dBA	63 dBA
Logger Location 'B' - Backyard – 9 Squire Place	Day (7 am to 6 pm)	35 dBA	52 dBA
		32 dBA	53 dBA

Meteorological conditions during the testing typically consisted of clear skies and temperatures of 16 to 42°C. Atmospheric conditions were ideal for noise monitoring. Noise measurements were therefore considered reliable and typical for the receptor areas.

The measured ambient noise levels at Location 'A' were affected by road traffic noise from the Gilbert Road. Where the existing $L_{eq, traffic}$ noise level is 10 dB or more above the recommended amenity noise level, the area is considered to have high traffic noise (NPfI, Section 2.4.1).



3.2 NSW Department of Planning and Environment

3.2.1 SEPP (Educational Establishments and Child Care Facilities) 2017

The NSW Department of Planning and Environment (DoPE) published the State Environmental Planning Policy (SEPP) (Educational Establishments and Child Care Facilities) 2017 on 1 September 2017. 'Schedule 4 Schools – design quality principles' of the SEPP requires the following:

'Principle 5. Amenity

Schools should provide pleasant and engaging spaces that are accessible for a wide range of educational, informal and community activities, while also considering the amenity of adjacent development and the local neighbourhood.'

3.2.2 SEPP (Infrastructure) 2007

The NSW Department of Planning and Environment (DoPE) published the "Development Near Rail Corridors and Busy Roads – Interim Guidelines" in 2008. The Guidelines refer to Clauses 87 (Rail) and Clause 102 (Road) of the State Environment Planning Policy (Infrastructure) 2007 for the noise criteria for developments affected by railway or road traffic noise.

3.2.2.1 SEPP Clause 87 (Rail)

Clause 87 of the State Environmental Planning Policy (SEPP) (Infrastructure) 2007 details the following in with regards to rail noise and vibration:

- (1) *This clause applies to development for any of the following purposes that is on land in or adjacent to a rail corridor and that the consent authority considers is likely to be adversely affected by rail noise or vibration:*
 - (a) *a building for residential use,*
 - (b) *a place of public worship,*
 - (c) *a hospital,*
 - (d) *an educational establishment or child care centre.*
- (2) *Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Director-General for the purposes of this clause and published in the Gazette.*

The development site will not be 'adversely affected by rail noise or vibration' as per the above as there is no rail line in the general vicinity, therefore the SEPP is not applicable.



3.2.2.2 SEPP Clause 102 (Road)

Clause 102 of the State Environmental Planning Policy (SEPP) (Infrastructure) 2007 details the following in with regards to road noise and vibration:

This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 40,000 vehicles (based on the traffic volume data published on the website of the RTA) and that the consent authority considers is likely to be adversely affected by road noise or vibration:

- (a) a building for residential use,*
- (b) a place of public worship,*
- (c) a hospital,*
- (d) an educational establishment or child care centre.*

It is unlikely that the AADT will reach 40,000 on roads surrounding the development site, therefore the SEPP is not applicable.

3.3 NSW Environment Protection Authority – Noise Policy for Industry

The NSW Environment Protection Authority (EPA) published the *Noise Policy for Industry* (NPfI) in October 2017. The NPfI is specifically aimed at assessing noise from industrial noise sources listed in Schedule 1 of the Protection of the Environment Operations Act 1997 (POEO, 1997).

While the NPfI is not strictly applicable to this site, as the site is not scheduled, as the standards are consistent with the SEPP, the limits set out in the NPfI will be used as a guide in determining whether the level of noise is considered intrusive or not.

3.3.1 Intrusiveness Criteria

The EPA states in Section 2.3 of its NSW NPfI (October 2017) that the intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the rating background noise level by more than 5 dB when beyond a minimum threshold (EPA NPfI, 2017, Section 2.3).

The Rating Background Level at Logger Location 'A', 73 Gilbert Road, Castle Hill was 49 dBA during the day and 45 dBA in the evening (see Table 2).

Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ noise intrusiveness criteria in this area is:

- $(49 + 5 =) 54 \text{ dBA } L_{eq, 15 \text{ minute}}$ during the day and
- $(45 + 5 =) 50 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the evening.



The Rating Background Level at Logger Location 'B', 9 Squire Place, Castle Hill was 35 dBA during the day and 32 dBA in the evening (see Table 2).

Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ noise intrusiveness criteria in this area is:

- $(35 + 5 =) 40 \text{ dBA } L_{eq, 15 \text{ minute}}$ during the day; and
- $(32 + 5 =) 37 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the evening.

3.3.2 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 *NPfI* 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 3 are taken from Section 2.4, Table 2.2 of the *NPfI*.

Table 3 Amenity Criteria

Receiver	Noise Amenity Area	Time of Day	L_{eq} , dBA, Recommended Amenity Noise Level
Residential	Suburban	Day	55
		Evening	45
		Night	40
School classroom - internal	All	Noisiest 1-hour period when in use	35
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 *NPfI* assumes that the $L_{Aeq, 15 \text{ min}}$ will be taken to be equal to the $L_{Aeq, \text{period}} + 3 \text{ decibels (dB)}$ (Section 2.2, *NPfI*).

Compliance with the amenity criteria will limit ambient noise creep. Wherever the existing L_{eq} noise level from industrial noise sources approaches or exceeds the amenity criteria at a critical receptor location, the intrusive L_{eq} noise from the noise source in question must be reduced to



a level that may be as much as 10 dB below the existing L_{eq} industrial noise level. **Section 2.4** of the *NPfI* states that where the project amenity noise level is 10 dB or more lower than the existing industrial noise level, the project amenity noise levels can be set at 10 dB below the existing industrial noise levels, provided the existing industrial noise levels are unlikely to reduce over time.

In addition, the level of transport noise, road traffic noise in particular, may be high enough to make noise from an industrial source effectively inaudible, even though the L_{Aeq} noise level from that industrial noise source may exceed the project amenity noise level. In such cases the project amenity noise level may be derived from the $L_{Aeq, period (traffic)}$ minus 15 dBA.

The existing L_{eq} noise level at Logger Location 'A', 73 Gilbert Road, Castle Hill was 62 dBA during the day and 63 dBA in the evening (see Table 2). Therefore, the acceptable amenity criteria for the residential receptors in this area are:

- $(55 - 5 + 3 =) 53$ dBA $L_{eq, 15 \text{ minute}}$ during the day; and
- $(63 - 15 + 3 =) 51$ dBA $L_{eq, 15 \text{ minute}}$ in the evening.

The existing L_{eq} noise level at Logger Location 'B', 9 Squire Place, Castle Hill was 52 dBA during the day and 53 dBA in the evening. Therefore, the acceptable amenity criteria for the residential receptors in this area are:

- $(55 - 5 + 3 =) 53$ dBA $L_{eq, 15 \text{ minute}}$ during the day; and
- $(53 - 10 + 3 =) 46$ dBA $L_{eq, 15 \text{ minute}}$ in the evening.

Also, the acceptable amenity criteria for the classrooms and active recreation areas (child care centre playground) of the nearby child care centre are:

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



3.4 AAAC Noise Criteria for Outdoor Play Areas

In May 2008, the Association of Australasian Acoustical Consultants (AAAC) first published the *Technical Guideline for Child Care Centre Noise Assessment*. The guideline was updated in 2010 to assist both AAAC members and local councils to assess the noise impact from proposed child care centres both accurately and fairly, (see www.aaac.org.au).

Although the proposed development comprises alterations and additions to an existing school, and therefore may produce different levels of noise than a childcare centre, there are similarities in noise emission from uses of outdoor play areas for schools and childcare centres. As students do not play outdoors continuously for long periods of time, and as the duration of time for students playing outside is reduced, the overall noise annoyance reduces. Therefore, it is reasonable to allow a higher level of noise impact for a shorter duration.

The AAAC document states that a total time limit of 2 hours of outdoor play per day (e.g. 1 hour in the morning and 1 hour in the afternoon) should allow an additional 5 dB noise impact.

We recommend that the noise criteria detailed in *Technical Guideline for Child Care Centre Noise Assessment* be applied to outdoor areas of the School.

The relevant criteria is $L_{eq, 15min}$ noise level emitted from the outdoor play area shall not exceed the background noise level by more than 10 dB at the residential assessment location.

Up to 2 hours (total) per day – The $L_{eq, 15minute}$ noise level emitted from the outdoor areas shall not exceed the background noise level by more than 10 dB at the assessment location.

More than 2 hours per day – The $L_{eq, 15minute}$ noise level emitted from the outdoor areas shall not exceed the background noise level by more than 5 dB at the assessment location.



3.5 Project Specific Noise Criteria

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

3.5.1 Residential Receivers

Residential Receivers – ‘R2’ to ‘R3’ – based on Logger Location ‘A’

- **59 dBA** $L_{eq, 15 \text{ minute}}$ during the day **for outdoor activities** for up to 2 hours (total) per day;
- **54 dBA** $L_{eq, 15 \text{ minute}}$ during the day for all other noise.
- **50 dBA** $L_{eq, 15 \text{ minute}}$ in the evening for all other noise.

Residential Receiver – ‘R4’ – based on Logger Location ‘B’

- **45 dBA** $L_{eq, 15 \text{ minute}}$ during the day **for outdoor activities** for up to 2 hours (total) per day;
- **40 dBA** $L_{eq, 15 \text{ minute}}$ during the day for all other noise.
- **37 dBA** $L_{eq, 15 \text{ minute}}$ in the evening for all other noise.

These criteria apply at the most-affected point on or within the residential property boundary. For upper floors, the noise is assessed outside the nearest window.

3.5.2 Child Care Centre Receivers

Child Care Centre Receptor ‘R1’ & ‘R1a’

The following criterion will be applied for the classrooms and active recreation areas (playground) of the nearby Child Care Centre.

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



4.0 SCHOOL NOISE EMISSION

The main sources of noise from the School, will be as follows:

- Students playing in the outdoor play area;
- Students inside the home bases;
- Public address system and school bell;
- Mechanical plant; and
- Use of the Hall.

The noise assessment was based on the drawings by Fulton Trotter Architects for Project No. 7068SG01, attached as Appendix C.

4.1 Outdoor Play Areas

Children will be outside for a range of times, including before school, recess, lunch, PE classes and after school, however the outdoor areas are only likely to be at capacity during recess and lunch.

In order to model the worst case scenario of noise emission from students outdoors at play, we have assumed that 2/3 of the 1000 students (666) will engage in active play at the one time, with half (333) of those students making noise at any given time.

Sound power levels of children at play were previously measured for other similar projects and are presented below in Table 4. We believe these levels represent the typical $L_{eq, 15 \text{ minute}}$ maximum noise levels of children at play and will be used in this noise assessment.

Table 4 $L_{eq, 15 \text{ minute}}$ Sound Power Levels - Children Playing in Outdoor Play Areas

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
1 Child at play – Primary School	79	50	54	58	71	77	72	66	64
666 Children at play (333 children making noise)	104	75	79	83	96	102	97	91	89



4.2 General Learning Areas

We have assumed that the maximum home base class size within the proposed new rooms will be 23 students (1000 students / 43 home bases).

During normal classroom activities, the main source of noise will be from the teachers and students talking. We have assumed that there may be a maximum of 1/3 (8) of the students talking normally. We have also assumed that the teacher in each classroom may be talking loudly.

Calculations assume students are distributed evenly throughout the inside of the home bases and windows and doors are partially open (10 % of floor area).

Day Design Pty Ltd has previously measured and quantified the Octave Band Centre Frequency sound power level of teachers and students talking at different noise levels. The $L_{eq, 15 \text{ minute}}$ sound power levels of teachers and students are shown below in Table 5.

Table 5 $L_{eq, 15 \text{ minute}}$ Sound Power Levels – Teacher & Students – GLAs

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
Teacher talking loudly	79	60	70	75	80	73	70	62	55
School student talking normally	63	53	53	60	63	58	53	52	47
1 teacher and 23 students	80	64	71	76	81	74	71	65	59



4.3 Public Address System & School Bell

The School will be provided with a public address system and a bell to signal the start and end of classes. The location of the speakers has not yet been determined however assuming up to 6 speaker locations are provided, the maximum sound pressure level should be no greater than **75 dBA** at 3 metres from each speaker in order to meet the residential noise criteria.

4.4 Mechanical Plant

We have assumed that the air conditioning condenser units will be located in ground floor plant areas on the outer façades of the new buildings throughout the development site.

The type of mechanical plant have not yet been selected. The proposed mechanical plant will typically only operate during day time hours, Monday to Friday.

The $L_{eq, 15 \text{ minute}}$ sound power levels for typical equipment used at school sites are presented below in Table 6.

Table 6 $L_{eq, 15 \text{ minute}}$ Sound Power Levels - Mechanical Plant

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
Toilet Exhaust Fan	59	48	48	56	57	54	53	45	38
Split system Air Conditioner (Classrooms)	72	76	73	72	69	68	63	55	52
VRF Air Conditioner (Large Spaces)	89	82	82	85	74	87	80	77	69

Once mechanical plant selection has been finalised, a final assessment should be made, prior to the issue of a Construction Certificate.



4.5 Hall Usage

We have assumed the proposed Hall will have capacity for up to 200 people. From our observations of other sites, we have modelled the noise emission from the Hall as follows:

- People talking loudly (10%), guests talking with a raised voice (20 %), guests talking normally (20 %) and the rest are not talking or listening (50 %)
- Amplified music will be played during performances and will consist predominantly of either pre-recorded amplified music or live performances.
- We have assumed as a worst case scenario the Hall may operate at full capacity during a performance.
- We have assumed that the doors will be closed during performances.
- We have assumed any windows will be open (10 % of the floor area) during performances.

Based on information in Harris¹ and in our noise level database gathered over many years, we calculate the sound power levels shown below in Tables 7.

Table 7 **L_{eq}, 15 minute Sound Power Levels - Proposed Hall**

Description	L _{eq} Sound Power Level dBA
One Man Talking Loudly	80
One Man Talking with Raised Voice	69
One Man Talking Normally	63
Amplified Live Band	102
200 People	94
200 People with Amplified Live Band	103

¹ Handbook of Acoustical Measurements and Noise Control, Third Edition, Cyril M. Harris, McGraw-Hill Inc, New York, (Page 16.2)



4.6 Predicted Noise Level at Receptor Locations

Knowing the sound power level of a noise source (See Tables 4 - 7), 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, building envelope transmission, etc. The predicted noise level at the residential and educational receptors from the various noise producing facets of the development are shown below.

Where applicable, calculations include acoustic shielding provided by the proposed School buildings to the residential receptors. Calculations to the residential receptor at R4 also include a reduction for a minimum boundary fence height of 1.5 metres.

4.6.1 Outdoor Play Areas

Based on a maximum of 666 children (2 / 3 of 1000) playing in the outdoor play areas at any one time, the predicted $L_{eq\ 15\ minute}$ noise level is calculated to be as shown below in Table 8. The noise prediction was determined by placing all 666 children into two groups of children throughout the outdoor play areas as follows:

- Large northern play area = 444 children (2/3); and
- Small play area in middle of school buildings = 222 children (1/3).

Table 8 Predicted $L_{eq\ 15\ minute}$ Noise Levels – Outdoor Play

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 22 Gilbert Road (classroom)	54	43	No (+ 11 dB)
R1a – 22 Gilbert Road (playground)	55	53	Yes*
R2 – 75 Gilbert Road	42	59	Yes
R3 – 2 Galahad Crescent	42	59	Yes
R4 – 9 Squire Place	42	45	Yes

**An exceedance of up to 2 dB is not considered significant and is generally not audible to the human ear.*

The predicted cumulative level of noise from the children playing outdoors at the receptor locations 'R1a', 'R2', 'R3' and 'R4', complies with the criteria in Section 3.5 of this report, and is therefore acceptable.

However, the predicted cumulative level of noise from the children playing outdoors at the receptor location 'R1', exceeds the criteria in Section 3.5.2 of this report, therefore noise controls as outlined in Section 5 would be necessary.



4.6.2 Cumulative Noise Level – Home Bases & Mechanical Plant

The cumulative noise impacts from the home bases and mechanical plant within the School are summarised and shown in Table 9.

Table 9 Predicted Cumulative L_{eq} , 15 minute Noise Levels – Home Bases & Mechanical Plant

Receptor Location	Predicted L_{eq} Noise Level (dBA)	Acceptable L_{eq} Noise Level (dBA)	Compliance
R1 – 22 Gilbert Road (classrooms)			
- Home Bases	41		
- Mechanical Plant	34		
Cumulative Noise Level	41	43	Yes
R1a – 22 Gilbert Road (playground)			
- Home Bases	41		
- Mechanical Plant	37		
Cumulative Noise Level	42	53	Yes
R2 – 75 Gilbert Road			
- Home Bases	43		
- Mechanical Plant	46		
Cumulative Noise Level	47	54	Yes
R3 – 2 Galahad Crescent			
- Home Bases	44		
- Mechanical Plant	51		
Cumulative Noise Level	52	54	Yes
R4 – 9 Squire Place			
- Home Bases	29		
- Mechanical Plant	37		
Cumulative Noise Level	38	40	Yes

The predicted cumulative level of noise from the Home Bases and mechanical plant at the receptor locations 'R1', 'R1a', 'R2', 'R3' and 'R4', complies with the criteria in Section 3.5 of this report, and is therefore acceptable.



4.6.3 School Hall

The noise impacts from the Hall are summarised and shown in Table 10.

Table 10 Predicted L_{eq} , 15 minute Noise Levels – Hall

Receptor Location	Predicted L_{eq} Noise Level (dBA)	Acceptable L_{eq} Noise Level (dBA)	Compliance
Day – 7.00 am to 6.00 pm			
R1 – 22 Gilbert Road (classroom)			
- Live Performance	35	43	Yes
R1a – 22 Gilbert Road (playground)			
- Live Performance	35	53	Yes
R2 – 75 Gilbert Road			
- Live Performance	54	54	Yes
R3 – 2 Galahad Crescent			
- Live Performance	58	54	No (+ 4 dB)
R4 – 9 Squire Place			
- Live Performance	41	40	Yes*
Evening – 6.00 pm to 10.00 pm			
R2 – 75 Gilbert Road			
- Live Performance	54	50	No (+ 4 dB)
R3 – 2 Galahad Crescent			
- Live Performance	58	50	No (+ 8 dB)
R4 – 9 Squire Place			
- Live Performance	41	37	No (+ 4 dB)

**An exceedance of up to 2 dB is not considered significant and is generally not audible to the human ear.*

The predicted level of noise from the Hall at the receptor locations 'R1', 'R1a', 'R2' and 'R4', complies with the day criteria in Section 3.5 of this report, and is therefore acceptable.

However, the predicted cumulative level of noise from the Hall at the receptor location 'R3' exceeds the day criteria in Section 3.5 of this report. The predicted cumulative level of noise from the Hall also exceed the evening criteria in Section 3.5 of this report at receptor locations 'R2', 'R3' and 'R4', therefore noise controls as outlined in Section 5 are necessary.



5.0 NOISE CONTROL RECOMMENDATIONS

5.1 Outdoor Play

The predicted level of noise from children playing in the outdoor play areas during recess and lunch has the potential to exceed the noise levels specified in Section 3.5.2 at the adjacent Child Care Centre.

However, the addition of 220 students will only increase the noise level from the existing children at play in the outdoor play areas of the School by 1.1 dB. An increase of 1.1 dB is not considered significant as it is not audible to the human ear (see Tables 4.1 and 4.2 of the *NPI*).

Therefore, given the existing use of the School and the limited duration of outdoor play (recess and lunch) we are of the opinion any increase in noise emission from additional children playing in the outdoor play areas at the adjacent Child Care Centre will be considered acceptable.

5.2 Construction Certificate / Detailed Design

5.2.1 Mechanical Plant

The specifications for the mechanical plant have not yet been finalised for this development. For typical mechanical plant equipment with sound power levels not exceeding those listed in Table 6 and located in the areas shown in the architectural drawings (Appendix C), it is reasonable and feasible to acoustically treat the equipment so that noise will not impact the neighbouring properties.

Once mechanical plant has been finalised, a detailed acoustic assessment should be made, prior to the issue of a Construction Certificate / during the detailed design stage. We recommend that the mechanical services engineers select mechanical plant equipment with the lowest sound power levels to reduce the amount of acoustic treatment necessary to achieve the noise criteria at nearby residential receivers.

We offer to provide detailed noise controls when specifications of the mechanical plant equipment have been finalised.

5.2.2 Use of School Hall

There is the potential for noise emissions to exceed the noise criteria at several nearby residential receivers during the proposed use of the Hall.

Noise controls including, but not limited to, the following may be required:

- Closing external windows during noisy events;
- Limiting the noise level of any amplification system inside the Hall; and
- Limiting the noise level of any live instruments to be used in the Hall.



6.0 NOISE IMPACT STATEMENT

Day Design Pty Ltd was engaged by Fulton Trotter Architects to carry out an acoustic assessment of the proposed redevelopment of the Samuel Gilbert Public School at Ridgescrop Drive, Castle Hill, NSW.

Calculations show that provided the recommendation in Section 5 of this report are implemented and adhered to, the level of noise emitted from the Samuel Gilbert Public School at Ridgescrop Drive, Castle Hill, NSW, will meet the noise level requirements of the NSW Department of Planning and Environment's *SEPP (Educational Establishments and Child Care Facilities) 2017*, NSW Environment Protection Authority's (EPA) *Noise Policy for Industry* and the Association of Australasian Acoustical Consultants (AAAC) *Technical Guideline for Child Care Centre Noise Assessment*, as detailed in Section 3 of this report, and be considered acceptable.

In addition, the amenity of adjacent developments and the local neighbourhood will be respected and upheld.

Also, although not applicable to this site, the proposal will also comply with the requirements of the State Environment Planning Policy (SEPP) (Infrastructure) 2007 and the Department of Planning's (DoP) *Development Near Rail Corridors and Busy Roads – Interim Guideline*.



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 – Noise Survey Instrumentation
- Appendix B1 & B2 – Ambient Noise Surveys
- Appendix C – Proposed Site Layout



APPENDIX A – NOISE SURVEY INSTRUMENTATION

Noise level measurements and analysis were made with instrumentation as follows in Table A:

Table A Noise Instrumentation

Description	Model No.	Serial No.
Infobyte Noise Logger	iM4	107
Condenser Microphone 0.5" diameter	MK 250	107
Infobyte Noise Logger	iM4	118
Condenser Microphone 0.5" diameter	MK 250	118

An environmental noise logger is used to continuously monitor ambient noise levels and provide information on the statistical distribution of noise during an extended period of time. The Infobyte Noise Monitor iM4s #107 and #118 are Type 2 precision environmental noise monitor meeting all the applicable requirements of AS1259 for an integrating-averaging sound level meter.

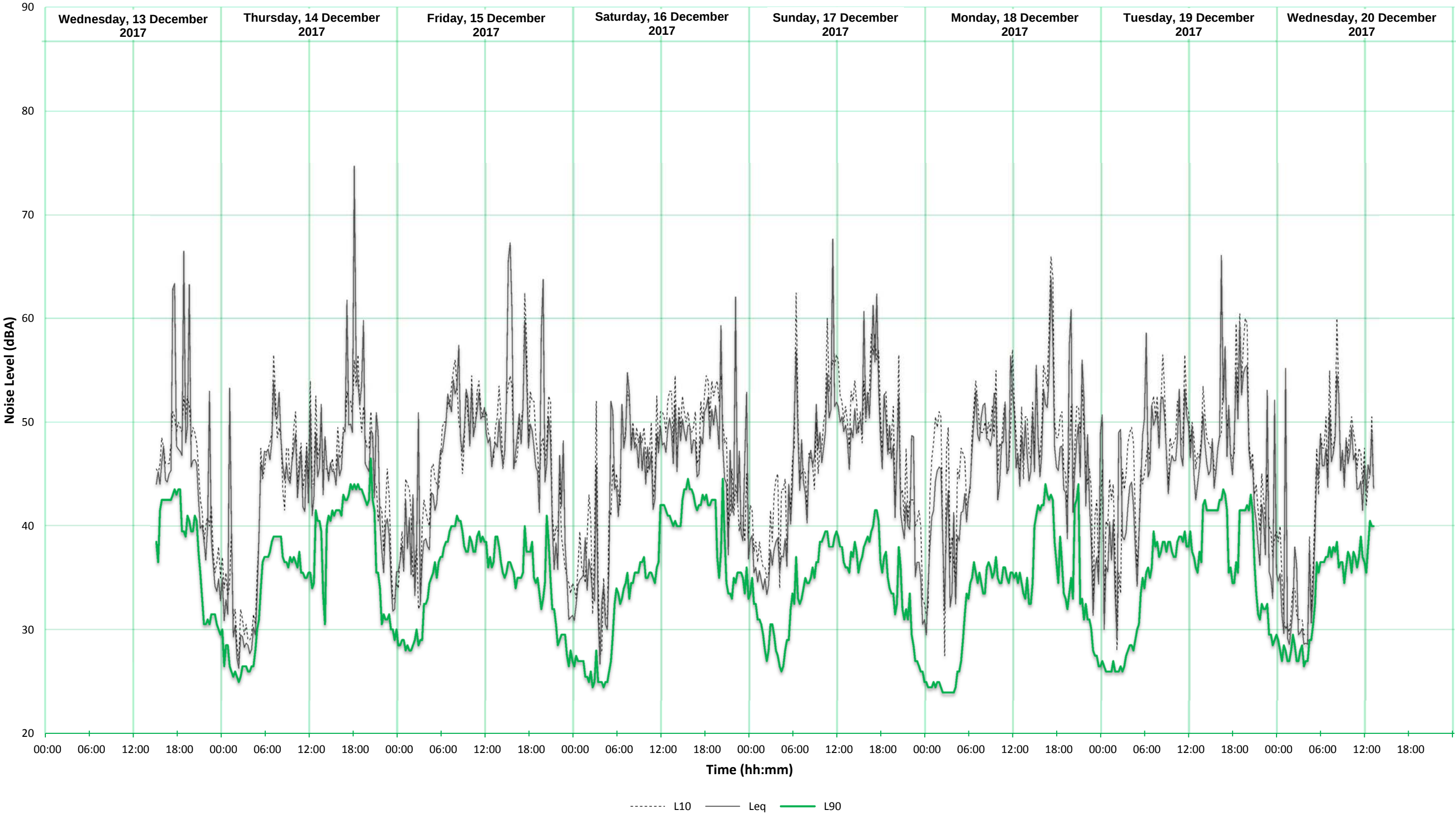
All instrument systems had been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The measurement system was also field calibrated prior to and after noise surveys. Calibration drift was found to be within 1 dB for long-term measurements. No adjustments for instrument drift during the measurement period were warranted.



AMBIENT NOISE SURVEY

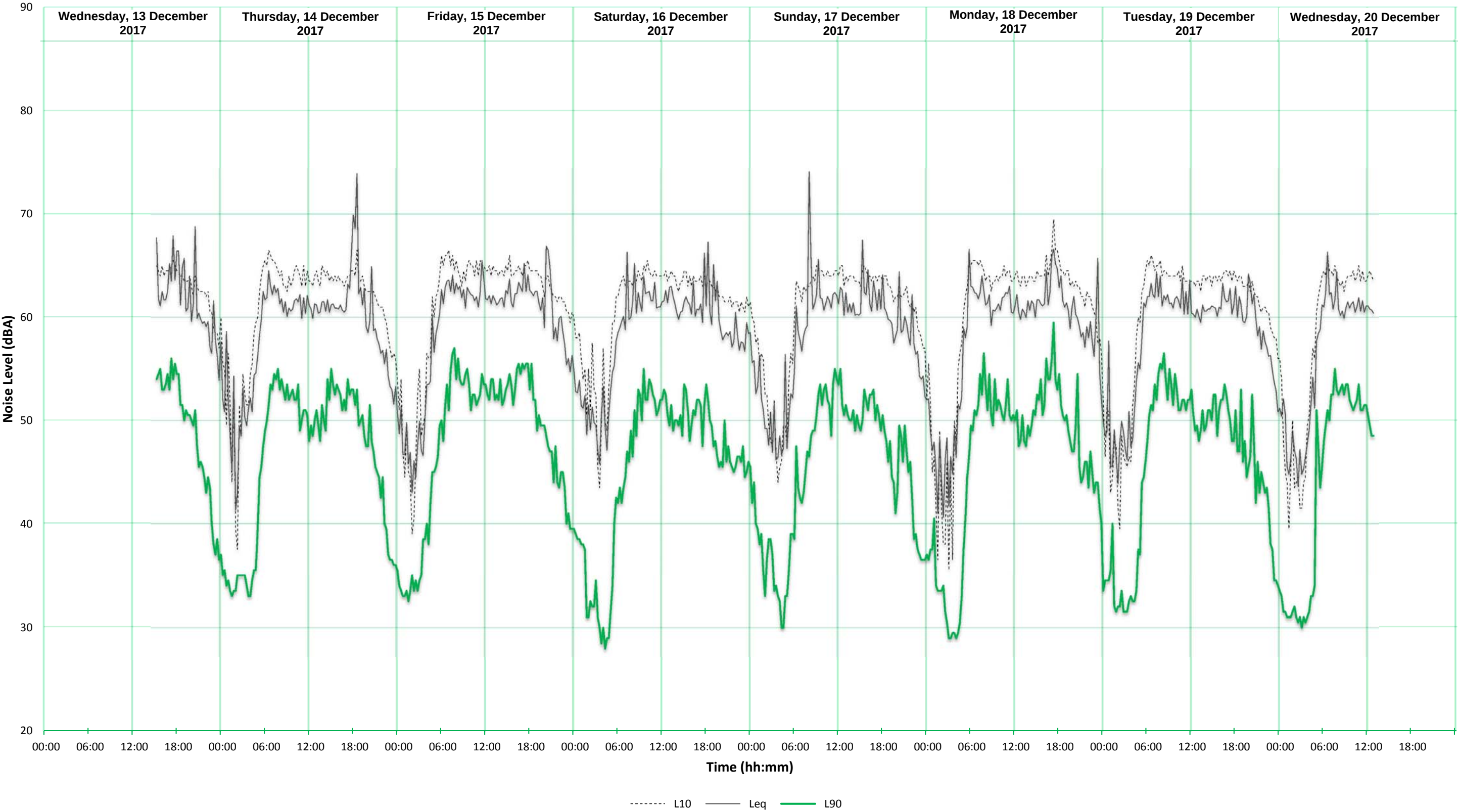
6395-1
Appendix B1

Located at 9 Squire Place, Castle Hill, NSW



AMBIENT NOISE SURVEY

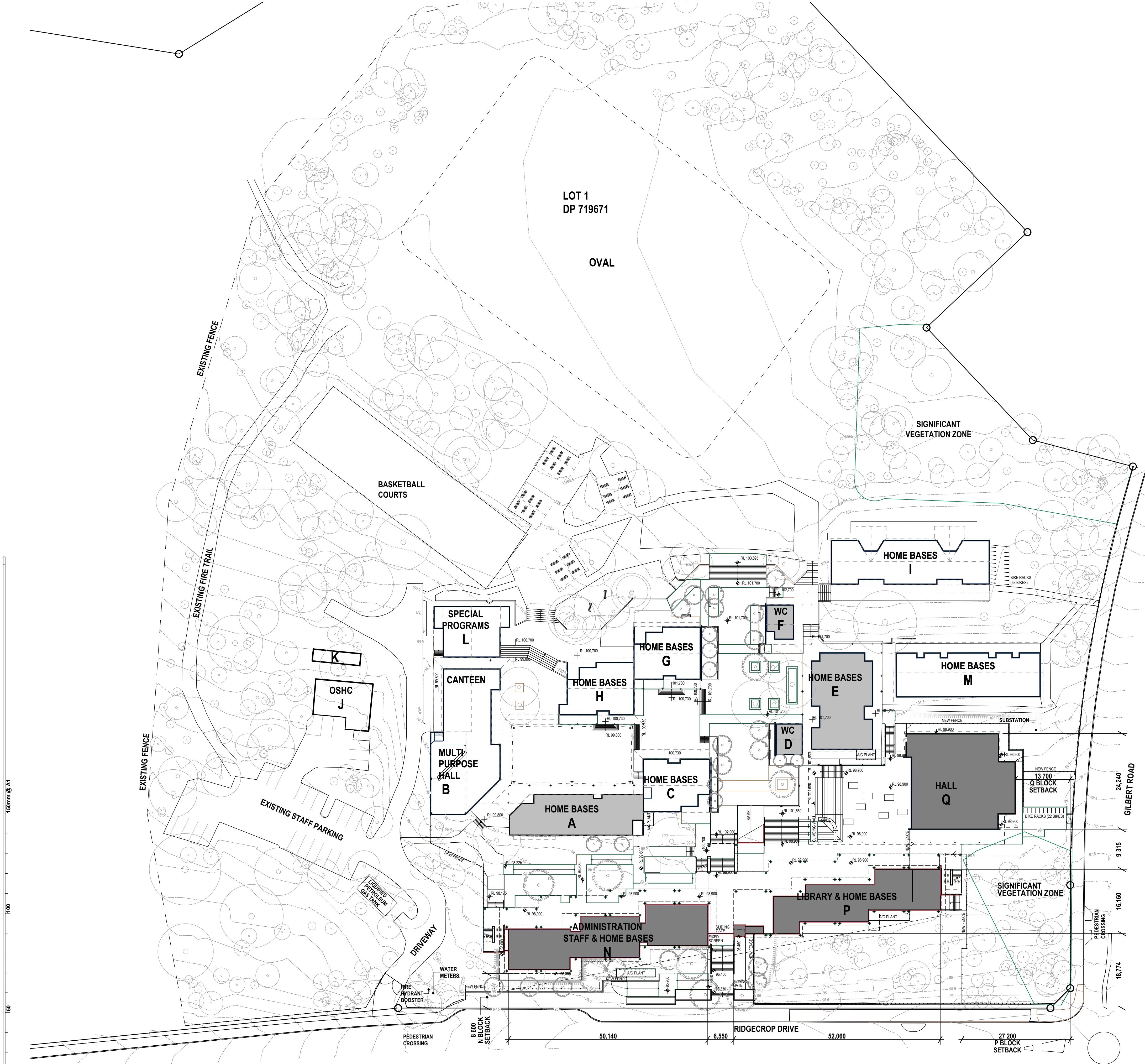
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PROPOSED SITE PLAN LEGEND

- EXISTING BUILDINGS
TO BE RETAINED
- EXISTING BUILDINGS
TO BE REFURBISHED
- PROPOSED
BUILDINGS
- EXISTING TREES
- PROPOSED TREES
- ROOF OVER
- CONTOURS
- FENCE



1 PLAN
PROPOSED SITE PLAN
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P9	Consultant Issue Draft SD	18/09/03	WG
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P15	SSDA Draft Issue	05/11/18	AB
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P17	SSDA Final Coordination Issue REV A	08.11.18	AB
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PHASE
SCHEMATIC DESIGN

CLIENT
NSW Department of Education

PROJECT
Samuel Gilbert Public School

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Ridgescrop Drive
Castle Hill, NSW

DRAWING
PROPOSED SITE PLAN

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P3	SSDA Consultant Report Issue	05/10/18	AB
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P6	SSDA Final Coordination Issue	07.11.18	AB
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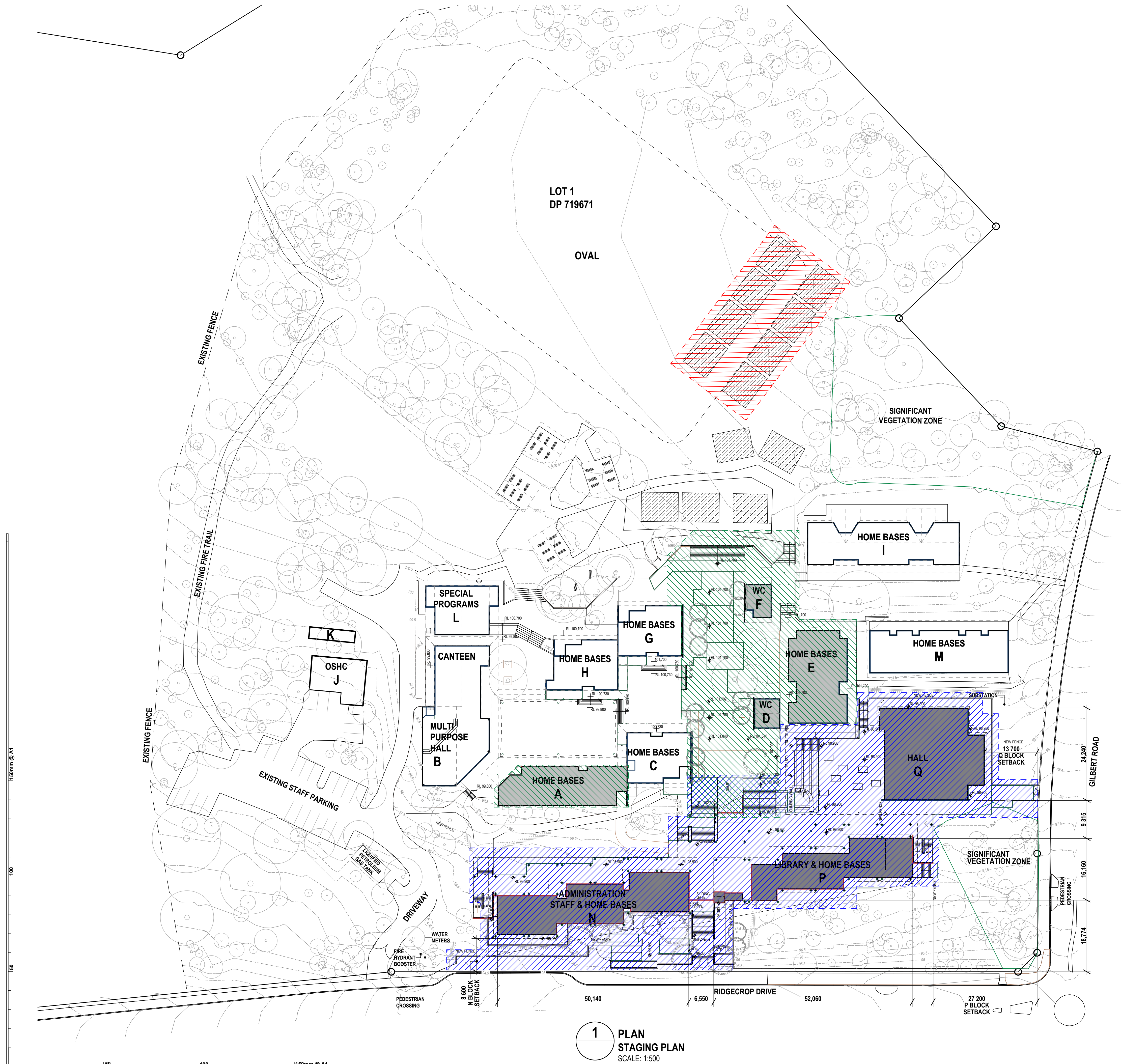
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SCHEMATIC DESIGN

Ridgecrop Drive
Castle Hill, NSW

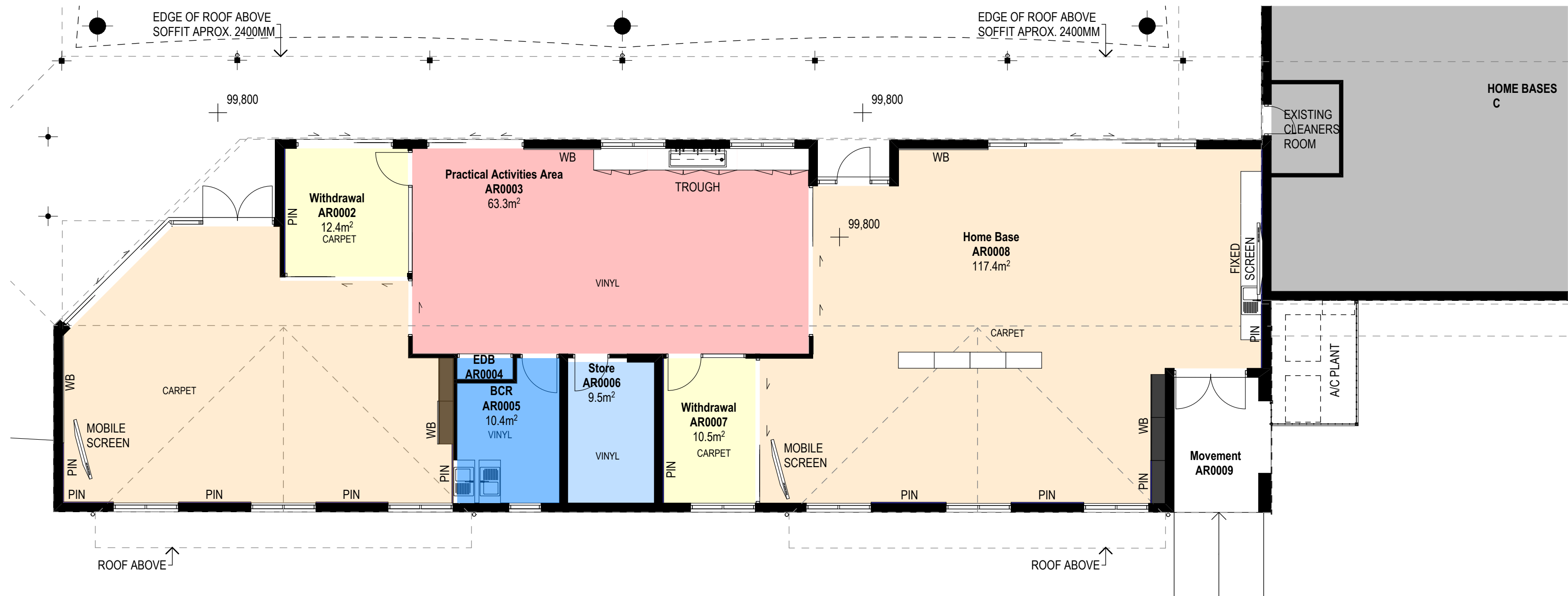
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GROUND FLOOR PLAN
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NSW Department of Education

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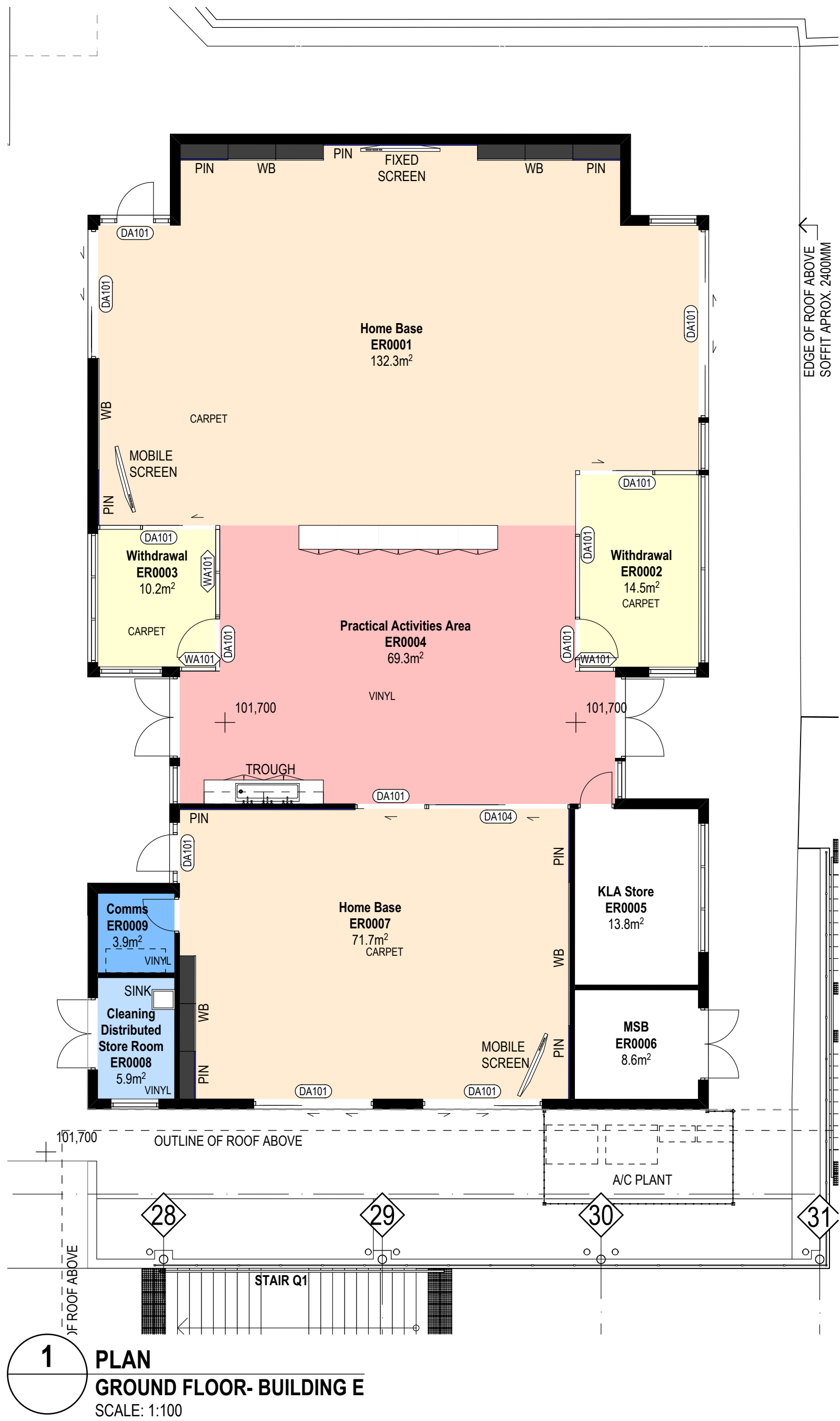
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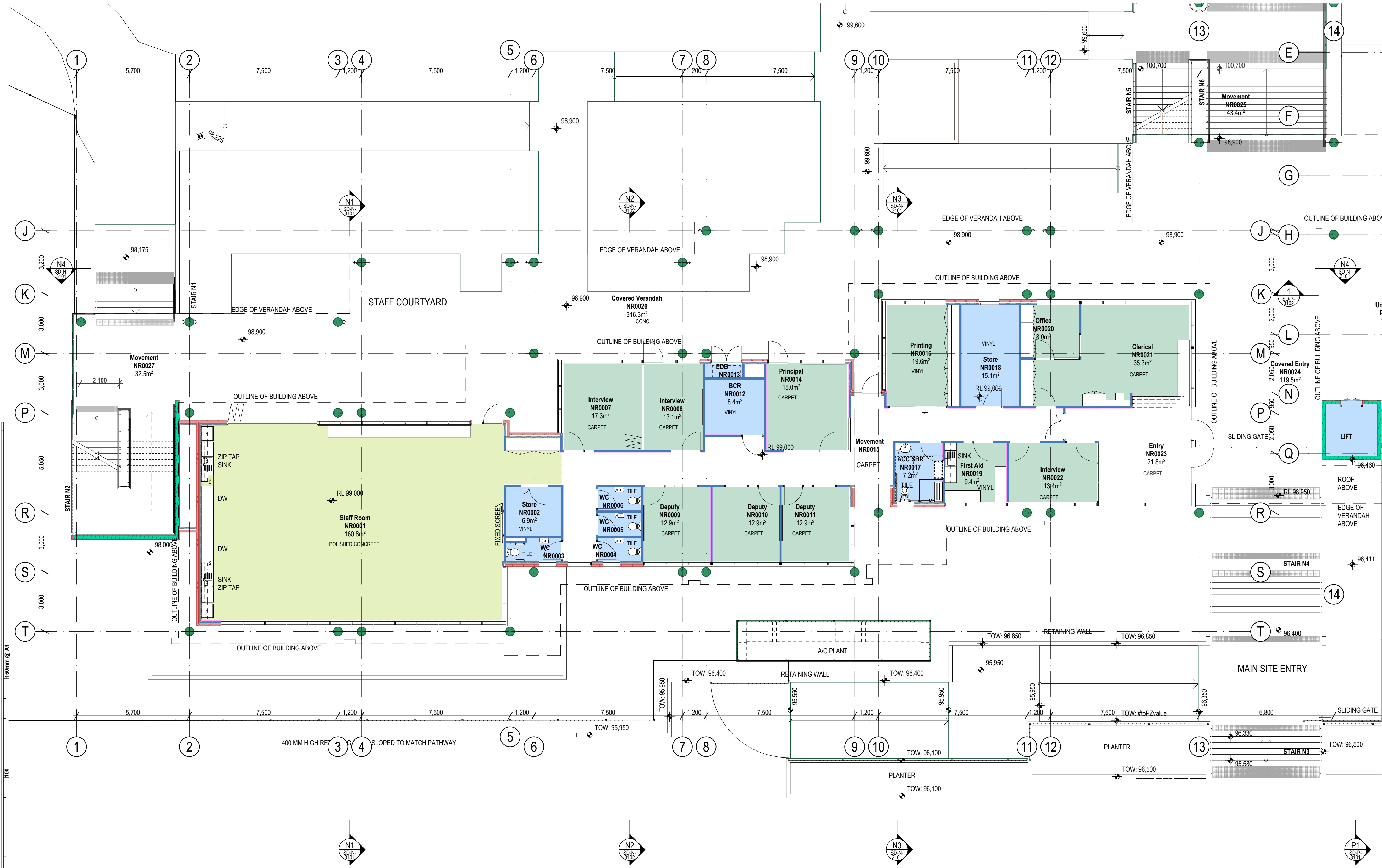
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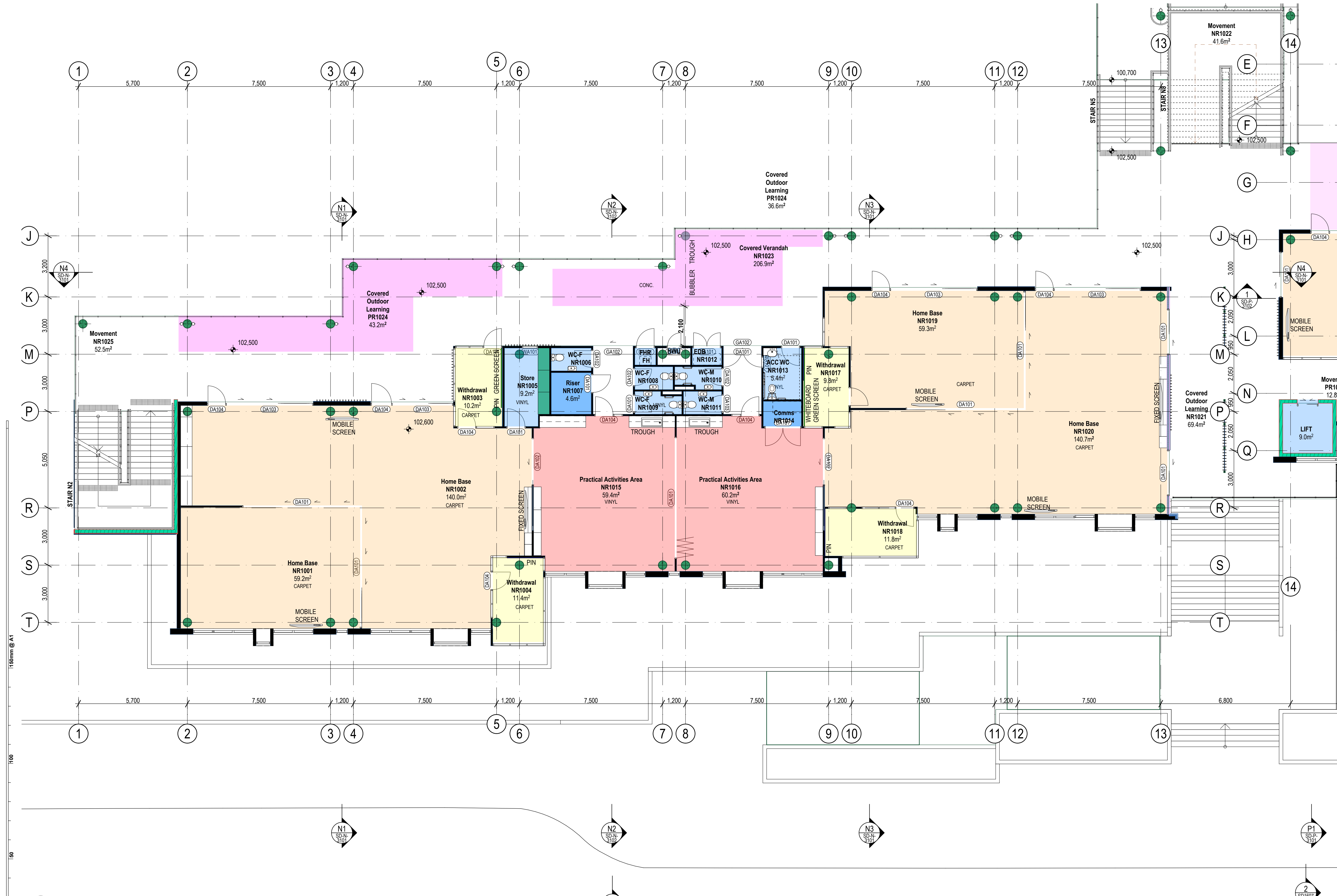
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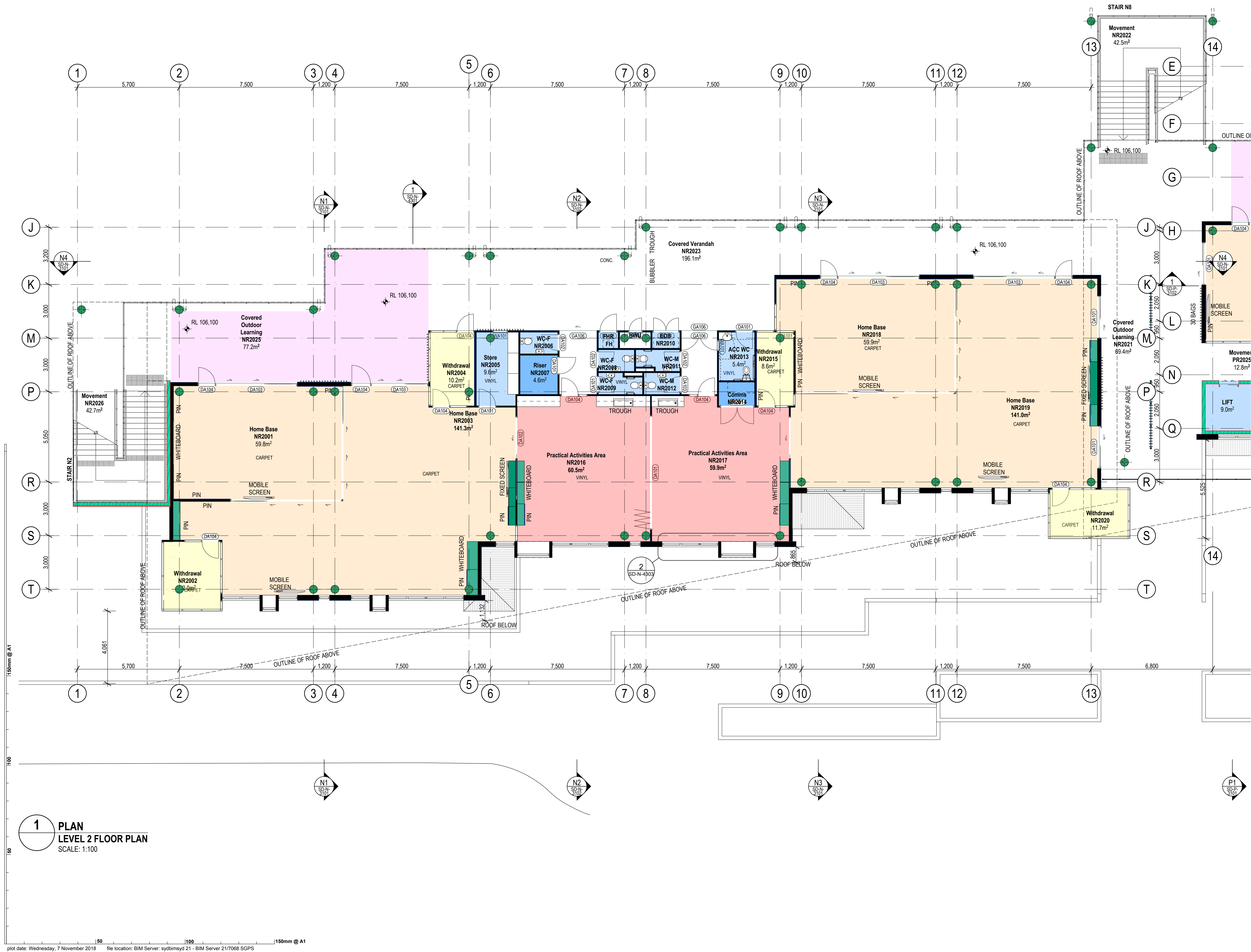
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LEVEL 1 FLOOR PLAN

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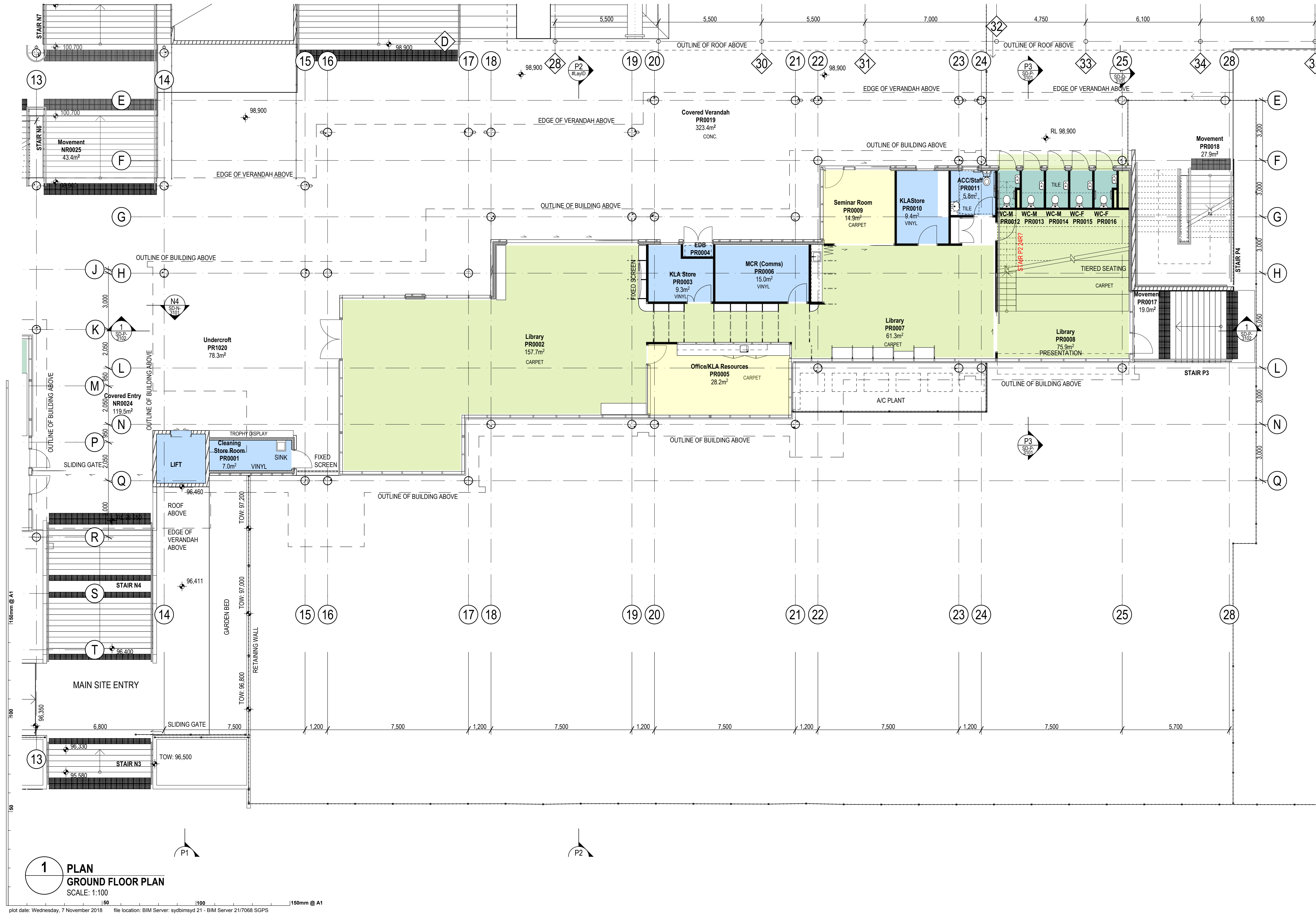
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CLIENT
NSW Department of Education

PROJECT
Samuel Gilbert Public School

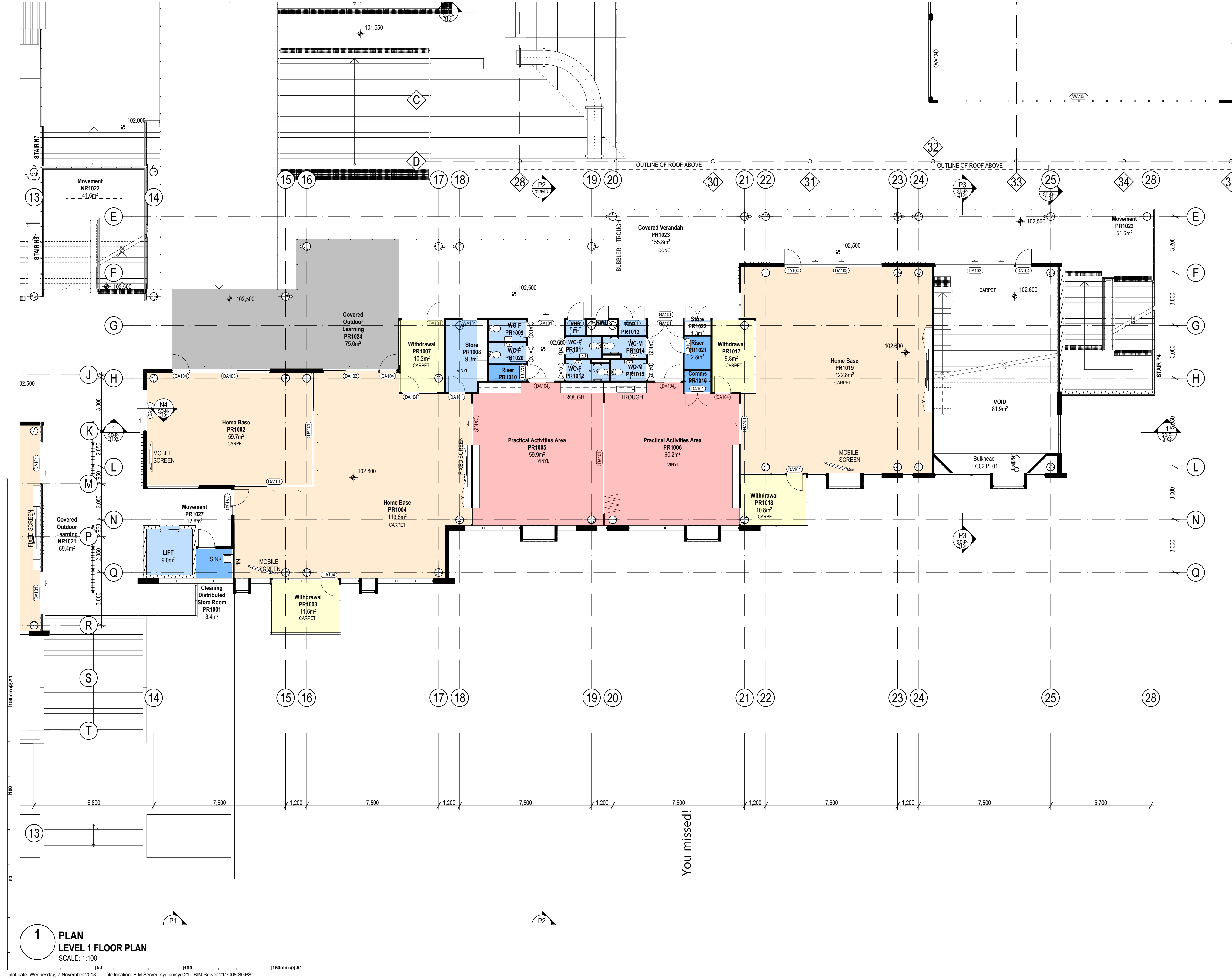
ADDRESS
**Ridgescop Drive
Castle Hill, NSW**

DRAWING
GROUND FLOOR PLAN

Figured dimensions take precedence over
scale dimensions. Contractors must verify
all dimensions on site before commencing
any work or making shop drawings.

PROJECT NUMBER 7068SG01	DIRECTOR JW	CHECKED AS
DRAWING NUMBER SD-P-2002	REVISION P15	

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P6	EFSG ISSUE	01/08/18	WG
P7	Consultant Issue	17/08/18	WG
P8	Consultant Issue Draft SD	18/09/03	WG
P9	Issued for TSG Review	20/09/18	AB
P10	TSG final SD review	26/09/18	WG
P11	SSDA Consultant Report Issue	05/10/18	AB
P12	SD / SSDA Client Review Issue	10/10/18	AB
P13	SSDA Draft Issue	05/11/18	AB
P14	SSDA Final Coordination Issue	07.11.18	AB
REV.	DESCRIPTION	DATE	INIT.

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PROJECT / CLIENT
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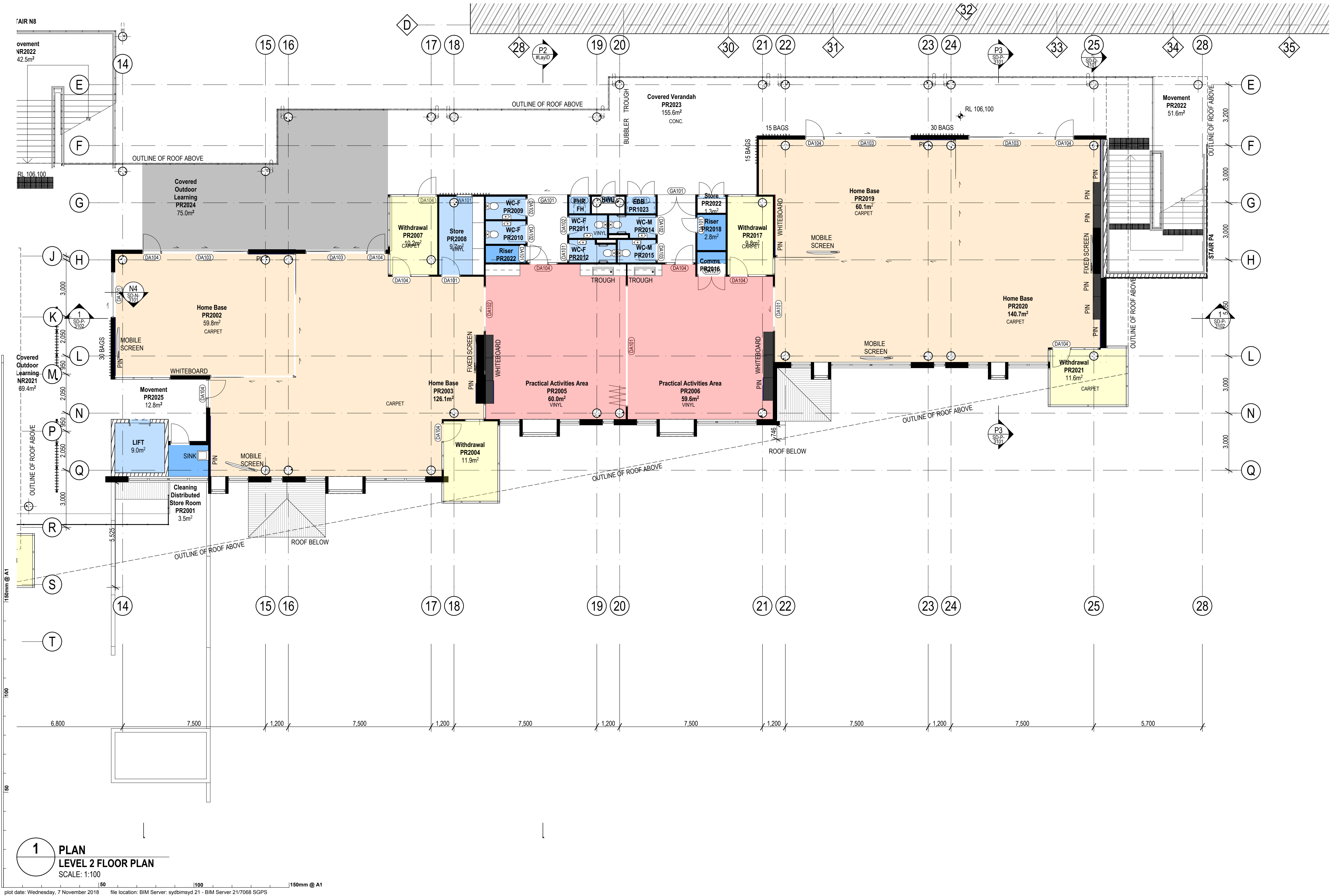
ADDRESS
Ridgescrop Drive
Castle Hill, NSW

DRAWING
LEVEL 1 FLOOR PLAN

[Figured dimensions take precedence over
scale dimensions. Contractors must verify
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any work or making shop drawings.]

PROJECT NUMBER 7068SG01	DIRECTOR JW	CHECKED AS
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P12	SD / SSDA Client Review Issue	10/10/18	AB
P13	SSDA Draft Issue	05/11/18	AB
P14	SSDA Final Coordination Issue	07.11.18	AB
REV.	DESCRIPTION	DATE	INIT.

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SCHEMATIC DESIGN

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PROJECT
Samuel Gilbert Public School

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DRAWING
LEVEL 2 FLOOR PLAN

PROJECT NUMBER
7068SG01

DIRECTOR
JW

CHECKED
AS

DRAWING NUMBER
SD-P-2004

REVISION
P14

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scale dimensions. Contractors must verify
all dimensions on site before commencing
any work or making shop drawings.

1

PLAN
LEVEL 2 FLOOR PLAN
SCALE: 1:100

50

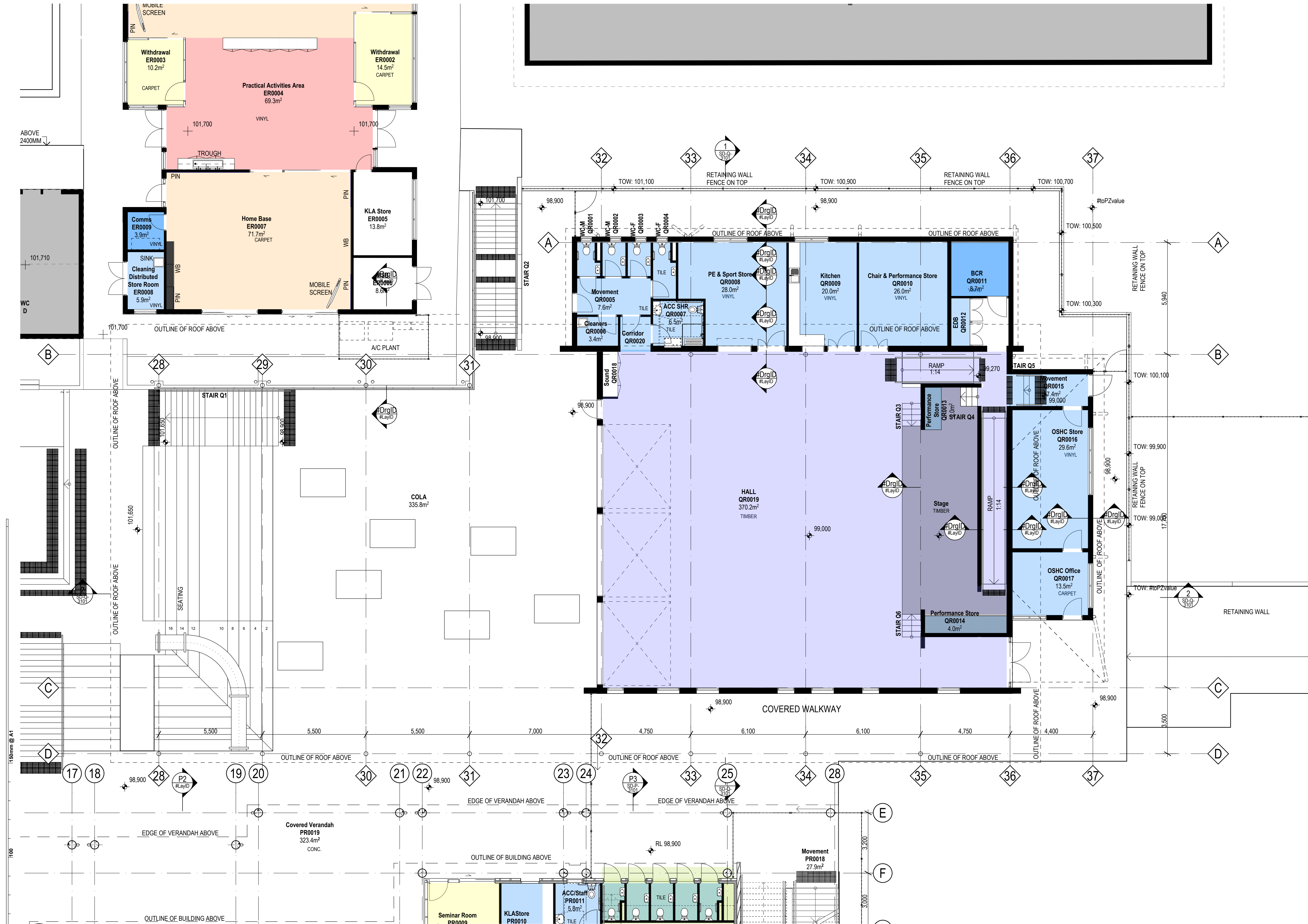
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150mm @ A1

plot date: Wednesday, 7 November 2018

file location: BIM Server: sydbim\syd 21 - BIM Server 21\7068 SGPS

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P8	Consultant Issue Draft SD	18/09/03	WG
P9	Issued for TSG Review	20/09/18	AB
P10	TSG final SD review	26/09/18	WG
P11	Issued for SDRP	03/10/18	AB
P12	SSDA Consultant Report Issue	05/10/18	AB
P13	SD / SSDA Client Review Issue	10/10/18	AB
P14	SSDA Draft Issue	05/11/18	AB
P15	SSDA Final Coordination Issue	07.11.18	AB
P16	SSDA Final Coordination Issue REV A	08.11.18	AB
REV.	DESCRIPTION	DATE	INIT.

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PROJECT NUMBER
7068SG01

DIRECTOR
JW

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DRAWING NUMBER
SD-Q-2001

REVISION
P16