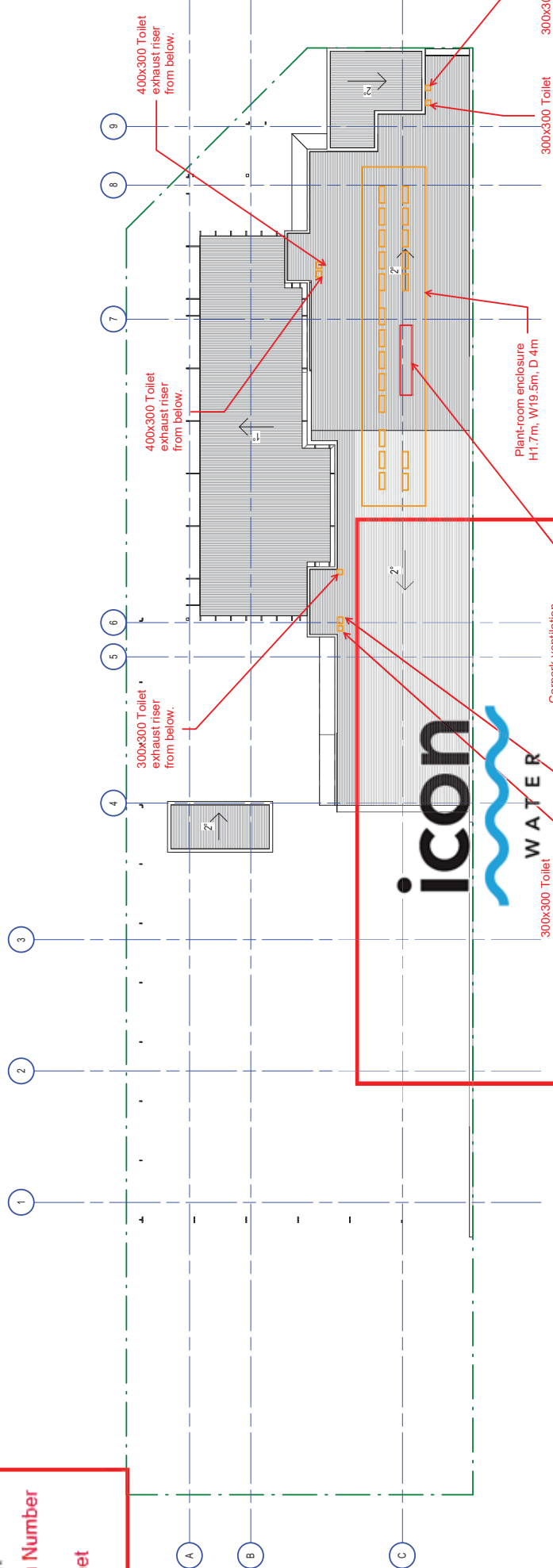




Application Number
167621
Sheet
90 of 208



icon
WATER

300x300 Toilet exhaust riser from below.
400x300 Toilet exhaust riser from below.
Carpark ventilation ductwork required

WATER AND SEWERAGE NETWORK

FAILS TO COMPLY

The design depicted in this document is not accepted because it fails to comply with conditions listed on the accompanying statement.

Please note: Construction of unapproved works may result in Icon Water's water and sewerage networks being denied and/or action being taken to require the property owner to remove non-compliant services or structures.

Signed Eddie Gonzalez Date 02 Mar 2018
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Rev	Amendment	Date	Init



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MITCHELL CHILDCARE CENTRE
BLOCK 18, SECTION 11 CORNER DARLING &
HEFFERNAN STREET, MITCHELL, ACT

ROOF PLAN			
Drawn	Date	Scale	Project Number
Author	1:250	A3	A17041
Review	Date	Project Leader	Designer
Checker	Date	Designer	Drawing Number
PRELIMINARY			SK 105
ACCT			

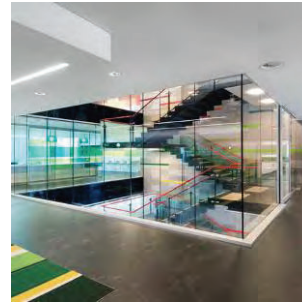


Rudds
Consulting Engineers
Comments 12/02/2018

Architectural Drawings
Issued 30-01-18



Application Number
167621
Sheet
91 of 208



Noise Management Plan

Block 18, Section 11 Mitchell ACT

Proposed Child Care Centre

For: Konstantinou Group

Report Number: R166641AC R1 17-11-30



AUSTRALIAN BUSINESS AWARDS
2013 ACT BUSINESS OF THE YEAR





Application Number
167621
Sheet
92 of 208



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Rev No	Reason for Issue	Written By		Approved By	
		Name	Date	Name	Date
00	For Information	[REDACTED]	15 November 2017	[REDACTED]	15 November 2017
01	For Information	[REDACTED]	30 November 2017	[REDACTED]	30 November 2017

This report has been prepared in accordance with the scope of services described in the contract or agreement between Rudds Consulting Engineers Pty Ltd ABN 16 054 221 162 or Rudds Acoustics Pty Ltd ABN 41 147 203 610 (Rudds) and the client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the client. Furthermore, the report has been prepared solely for use by the client and Rudds accepts no responsibility for its use by other parties.

Contents

	Page
SECTIONS	
Section 1 - Introduction	1
Section 2 - Noise Requirements	2
2.1 Industrial Zones Development Code	2
2.2 AS 3671 Acoustics - Road Traffic Noise Intrusion Building Siting and Construction	2
2.3 AS/NZS 2107:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors	3
2.4 Environmental Noise Limits	4
Section 3 - Assessment and Recommendations	7
3.1 Noise Measurement Period 1	7
3.2 Noise Measurement Period 2	8
3.3 Site Assessment	13
Section 4 - Conclusion	21
Section 5 - Appendices	22
TABLES	Page
Table 1 Industrial Zones Development Code Noise Requirements	2
Table 2 AS3671 1989 Construction Categories	3
Table 3 AS/NZS 2107:2016 Summary	3
Table 4 Noise Zones	4
Table 5 Site Specific Noise Standards	6
Table 6 Operator Attended Noise Measurement Results	10
FIGURES	Page
Figure 1 Territory Plan Site Location	5
Figure 2 Measurement Results – Wednesday 8 June 2016, 1:00 pm to 2:00 pm	7
Figure 3 Noise Monitoring Locations	8
Figure 4 Location A Noise Logging Results	9
Figure 5 Location B Noise Logging Results	10
Figure 6 Comparison of Location A and Location B Noise Monitoring Results	13
Figure 7 Proposed Building Floor Plans	14
Figure 8 Site Aerial Photograph	15
Figure 9 Sleep Disturbance Assessment	19
APPENDICES	Page
Appendix A Glossary of Acoustic Terms	22

Application Number

Section 1 - Introduction

167621

Sheet
94 of 208

The proposal is to design and construct a building to be used as a child care centre on Block 18 Section 11 Mitchell ACT, at the corner of Heffernan and Darling Streets. As the site is within an industrial area, a Noise Management Plan (NMP) and a detailed noise assessment is required for the Development Application to assess the level of road traffic and industry noise intrusion so that the appropriate measures to be undertaken to ensure the likelihood of sleep disturbance during nap times is minimised. It is also a requirement that current operations surrounding the site are not adversely impacted by the lease variation.

Rudds Acoustics (Rudds) is pleased to prepare a NMP for the site. This assessment will concentrate on noise emissions in accordance with the appropriate Australian Standards and ACT Codes, including:

1. The ACT Territory Plan
2. The ACT Environment Protection Regulation (2005)
3. The Industrial Zones Development Code
4. AS/NZS 3671 Acoustics - Road Traffic Noise Intrusion Building Siting and Construction.
5. AS/NZS 2107:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors.

Application Number

Section 2 - Noise Requirements

167621

2.1 Industrial Zones Development Code

95 of 208

Criteria 3 and 33 are applicable to the development and are shown in Table 1.

Table 1 Industrial Zones Development Code Noise Requirements

Rules	Criteria
1.1 Community Uses	
There is no applicable rule	C3 Community uses are to be considered only where it is demonstrated that the proposed use does not jeopardise the use of surrounding land for industrial purposes.
5.2 Noise	
	C33 Where the proposed use is adjacent to, or is, a noise producing activity, noise attenuation measures are utilised to protect the amenity of the area and promote compatibility of uses

Rule 34 is not applicable to this development because the development is not a club, drink establishment, hotel, industry, indoor entertainment facility or restaurant. Nevertheless, this report is a NMP, primarily written to address concerns relating to noise intrusion into the development from adjacent potentially noisy uses (light industry and commercial premises).

2.2 AS 3671 Acoustics - Road Traffic Noise Intrusion Building Siting and Construction

Ultimately, the goal of AS 3671 is to achieve AS/NZS 2107:2000 internal noise levels within the building. Since replacement of AS/NZS 2017:2000 with AS/NZS 2107:2016, Rudds undertakes the assessment based upon the new 2016 recommended noise levels.

To determine whether an assessment is required under AS3671, the distance of the site from the nearest major road and the number of vehicles per day that travel on the road are important. These two factors will be important in determining the likely noise level of the road. Other factors that will also influence road traffic noise levels are the road surface, intervening barriers, posted speed limit, actual vehicle speeds and traffic mix (percentage of heavy vehicles).

AS3671 addresses road traffic noise levels by determining a category of construction based upon the external road traffic noise level. Child care centres are not covered by the requirements of AS 3671.

Appendix A of AS 3671 provides the information pertaining to residential development and educational buildings. Both classifications have the same assessment levels and are suitable for use for a child care centre. The AS3671 road categories are presented in Table 2.

Table 2 AS3671 1989 Construction Categories

Application Number
167621
Sheet
96 of 208

Type of Building	Traffic noise level ($L_{Aeq, T}$) dB(A)			
	Category 1	Category 2	Category 3	Category 4
Residential buildings (private houses, hotels)	≤45	>45 ≤60	>60 ≤75	>75
Educational Buildings (classrooms, libraries)	≤45	>45 ≤60	>60 ≤75	>75

The AS 3671 construction categories are as follows (From Clause 3.2 of AS 3671):

- Category 1 – Standard Construction; openings, including open windows and doors may comprise up to 10% of the exposed facade. Traffic noise reduction of approximately 10 dB(A) is expected.
- Category 2 – Standard construction, except for lightweight elements such as fibrous cement or metal cladding or all glass facades. Windows, doors and other openings must be closed. Traffic noise reduction of approximately 25 dB(A) is expected.
- Category 3 – Special construction, chosen in accordance with Clause 3.4 of AS 3671. Windows, doors and other openings must be closed. Traffic noise reduction between 25 and 35 dB(A) is expected.
- Category 4 – Traffic noise reduction greater than 35 dB(A) is required; special acoustic advice should be sought

2.3 AS/NZS 2107:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors

Recommended noise levels are $L_{Aeq, T}$ values for the building unoccupied but ready for occupancy and the recommended reverberation times are for the occupied building. The recommended goals for a residential dwelling near a major road and a primary school classroom are summarised in Table 3.

Table 3 AS/NZS 2107:2016 Summary

Type of Occupancy	Recommended Design Sound Level Range L_{Aeq} , dB(A)	Recommended Reverberation Time (T), s
Sleeping areas in houses and apartments in suburban areas or near minor roads	30 to 35	N/A
Primary school classrooms	35 to 45	0.4 to 0.5
Staff common rooms in schools	40 to 45	<0.6
Offices – general office areas	40 to 45	0.4 to 0.6

As shown in Table 3, the reverberation time within the classroom space should be minimised through the incorporation of appropriate acoustic absorption. This is typically done in schools by using polyester insulation above perforated corrugated steel panels, or by using other similar acoustically absorptive ceiling and wall finishes. These tend to be cost-effective, are impact resistant, and provide excellent acoustic absorption.

Keeping the reverberation times low in the classrooms will also be essential for noise control with regard to road traffic noise intrusion. Therefore, Rudds recommends that the reverberation time be below 0.5 seconds in accordance with AS/NZS 2107:2016.

The issue of sleep disturbance is also something that needs to be considered. Many studies have been undertaken on adults to determine appropriate target levels for sleep disturbance, but a definitive target is yet to be established. There is little information available on younger children.

Typically, sleep disturbance occurs when a noise event that is significantly louder than the general background noise occurs. This is commonly determined as being a 15 dBA difference between ambient noise levels (L_{Aeq}) and the loud event ($A_n LA1_{(1 \text{ minute})}$ assessment level is usually used).

Application Number
167621

Sheet
97 of 208

World Health Organisation (WHO) guidelines suggest that the internal noise level should not exceed a maximum level of L_{max} 45 dBA to minimise the likelihood of sleep disturbance in sleeping areas.

2.4 Environmental Noise Limits

The Australian Capital Territory Environment Protection Regulation (2005) [hereafter referred to as the ACTEPR(2005)], Part 3 *Noise* sets environmental noise limits based upon noise zones. A detailed description of the Noise Zones and Noise Standards is located in Schedule 2 of the Regulation. The zones are based upon the Territory Plan in the ACT and associated LEP zones in NSW where the site borders NSW.

Table 4 defines the ACT Noise Zones and associated Noise Standards as defined in the ACT Environment Protection Regulation 2005, Schedule 2, Part 2.1 Tables 2.1 and 2.2, Pages 55-57.

Table 4 Noise Zones

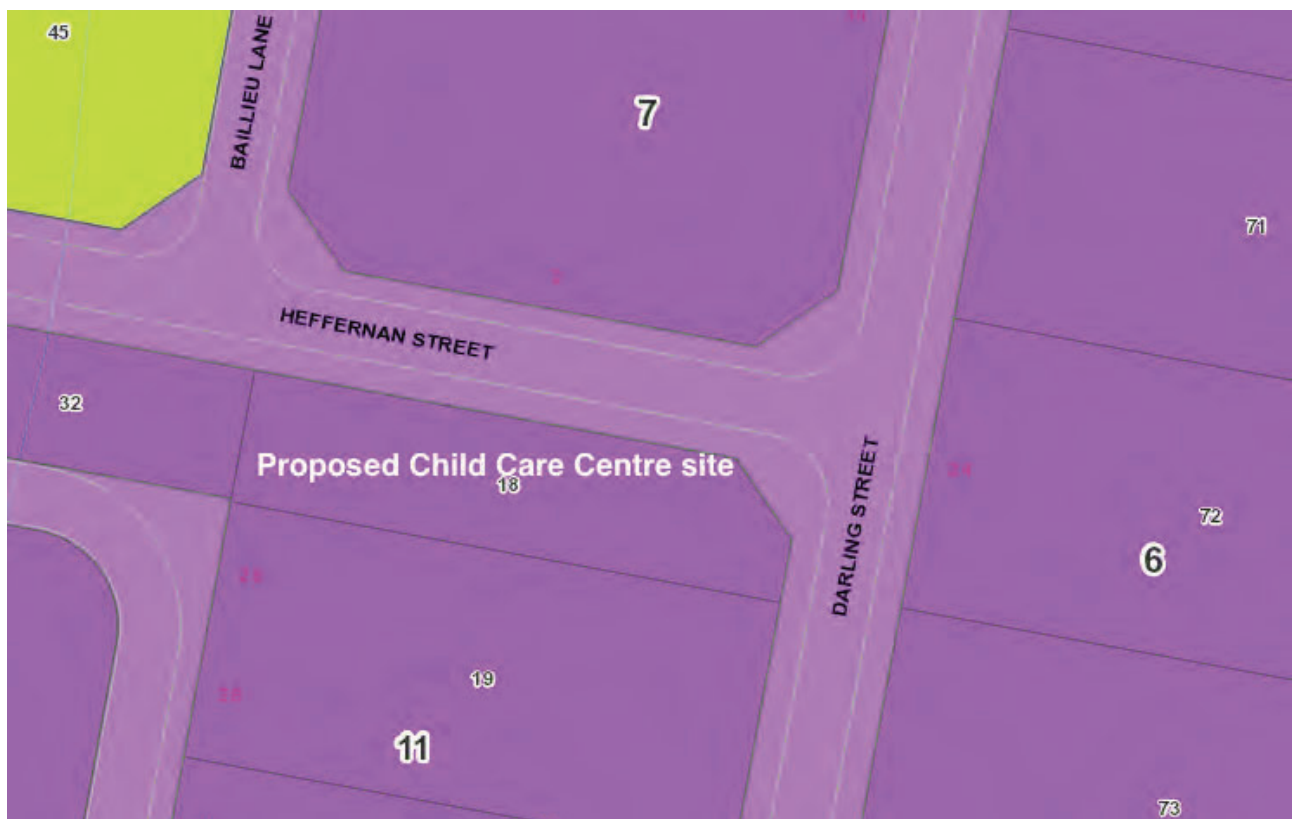
Item	Noise Zone	ACT Land	NSW Land	Noise Standard	
				Day	Night
1	Zone A	Land in an industrial zone	Land in the Queanbeyan city industrial zone	65	55
2	Zone B	Land in the city centre and town centres Land in the central national area (City Hill Precinct)	Land in the Queanbeyan city business zone	60	50
3	Zone C	Land in group centres, corridor sites and office sites Land in the Central National Area (The Parliamentary Zone and Other Areas)		55	45
4	Zone D	Land (other than land in the city centre, town centres and group centres) in a commercial CZ4 zone		50	35
5	Zone E	Land (other than land in the city centre, town centres and group centres) in – <ul style="list-style-type: none"> a restricted access recreation zone a broadacre zone 		50	40
6	Zone F	Land (other than land in the city centre, town centres and group centres) in – <ul style="list-style-type: none"> a commercial CZ5 zone a TSZ2 services zone a community facility zone a leisure and accommodation zone 	Land in the Queanbeyan city special uses zone	Same as the noise standard for the adjoining noise zone with the loudest noise standard for the time period	
7	Zone G	All other land, other than land in the Central National Area (Fairbairn)	Other NSW land	45	35

In each case, the following applies:

- Day is defined as Monday-Saturday 7am-10pm, Sunday and public holiday 8am-10pm
- Night is defined as Monday-Saturday 10pm-7am, Sunday and public holiday 10pm-8am
- The compliance point for leased land is any point as near as practicable to the boundary of the parcel of land.
- The compliance point for unleased land is any point as near as practicable to 5 metres from the source of the noise.
- The compliance limit for units within the same lease boundary is 5 dBA lower than the Zone Noise Standard for the appropriate time period.
- The compliance point for units within the same lease boundary is any point within any unit in the units plan, other than the unit generating the noise.
- The noise standard on the boundary between 2 or more noise zones is the average of the noise standards for the noise zones for the time when the noise is emitted, rounded up to the nearest dBA.
- The Noise Standard limit is to be used as an assessment limit for noise from all noise sources on the site, excluding the following:
 - A train;
 - A Commonwealth jurisdiction aircraft;
 - A person using his or her body (without any form of mechanical or electronic amplification);
 - An animal;
 - A motor vehicle being driven on a road unless it is being used in reliability tests or speed trials and has been exempted under the road transport legislation from the provisions of that legislation about attaching silencers to the exhaust pipes of motor vehicles, rules of the road and speed limits during the trials or tests
- Other exclusions apply for special cases. In this case, none of the exclusions are considered relevant to the proposed development.

The Territory Plan identifies the site as being in an IZ2 industrial mixed use zone, with IZ2 industrial mixed use zoned land all around. Figure 1 shows the location of the site.

Figure 1 Territory Plan Site Location



Source: www.actmapi.act.gov.au

Application Number
167621
Sheet
99 of 208

Based upon the location relative to the adjacent zones, the noise limits for noise zone A shown in Table 5 will apply.

Table 5 Site Specific Noise Standards

Location	Noise Zone	Noise Standard (L10 dBA)	
		Daytime	Night-time
All boundaries	Noise Zone A	65	55

As the site and surrounding sites are primarily to be used of a daytime, the daytime noise limit will be considered applicable when assessing noise intrusion into the site from external industrial noise sources.

Application Number Section 3 - Assessment and Recommendations

167621

In response to both Criteria C3 and Criteria C33 of the Industrial Zones Development Code, observations of adjoining industry and noise measurements were undertaken at the site. From these observations and measurements, an assessment of noise intrusion into the site was undertaken.

3.1 Noise Measurement Period 1

Noise measurements were undertaken at the site on Wednesday 8 June 2016 during the lunchtime period, from 1:00 pm to 2:00 pm at the north-eastern corner of the block, at the corner of Heffernan and Darling Streets. This time period is relevant to the child care centre because it is at or around the same time as the lunch time break, where doors to the centre will typically be open and children will be playing outside. Noise measurements include the following noise sources:

1. Local road traffic, including light and heavy vehicles
2. Construction noise from Block 70 Section 6 (An excavator jackhammering near the southern boundary of the site.)
3. Industrial noise (Grinder) from Block 19, Section 11. This was only occasional and occurred for less than 30 seconds in the 1 hour period.

The primary noise that occurred for most of the time was from road traffic and construction (which is likely to be temporary). As the streets are narrow, with cars parked down both sides, and a 50 km/hr speed limit, most traffic was travelling reasonably slowly, hence a relatively low road traffic noise level. There were occasional louder vehicles and noise from trucks unloading fill onto Block 70 Section 6.

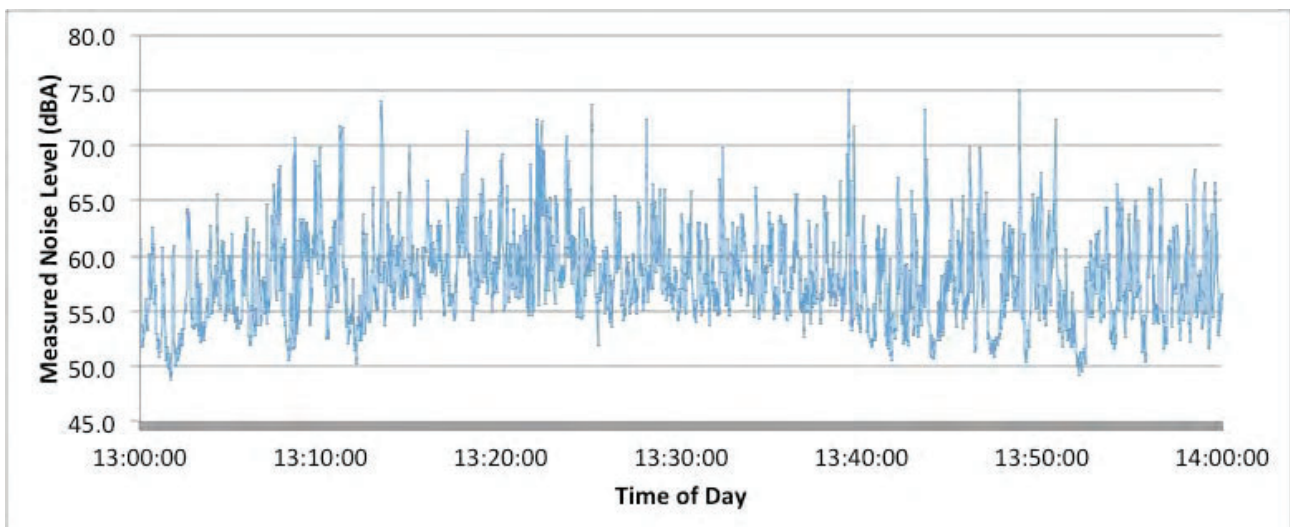
Observations made at the time of measurement indicate that there are no large pieces of mechanical plant, such as chillers, cooling towers or the like, close to the site. The primary industrial noise source is expected to be from the industrial building behind the proposed child care centre, on Block 19, Section 11.

Figure 2 shows the measured free-field noise levels in 1 second intervals over the measurement period. A summary of the measured noise levels is as follows:

1. LA1 70 dBA
2. LA10 63 dBA
3. LAeq 60 dBA
4. LA90 53 dBA

For a better understanding of the descriptors used, please refer to the Summary of Acoustic Terminology at the end of this report.

Figure 2 Measurement Results – Wednesday 8 June 2016, 1:00 pm to 2:00 pm



Therefore, the noise level expected to occur at the site boundary is Leq 63 dBA when a 2.5 dBA façade reflection is added to the measured noise level. This is expected to be a relatively consistent noise level for the site, which is on minor roads with a 50 km/hr speed limit with no major roads in the immediate vicinity to elevate noise levels during peak periods. In accordance with AS 3671, the building needs to be constructed to Category 3 requirements, meaning special construction, chosen in accordance with Clause 204 of AS 3671. Windows, doors and other openings must be closed. Traffic noise reduction between 25 and 35 dB(A) is to be expected.

3.2 Noise Measurement Period 2

Rudds conducted an additional full day of measurements that consisted of noise logging and operator attended noise measurements. Noise monitoring locations are shown in Figure 3.

Location A – Noise Logger Location for continuous noise monitoring. This location was chosen to determine whether there was significant noise emanating from the mechanical workshop building.

Location B – This was the closest location to the road for the proposed relocation of the outdoor play area. Semi-continuous logging and operator attended measurements were conducted at this location.

The original intent was to only monitor at one location (Location A) and to supplement with operator attended noise measurements. However, once on-site Rudds considered monitoring at two locations to be more appropriate, so a second logger was deployed at Location B, which represents the closest area of the revised play area to the road and adjoining businesses to the north. As there was nowhere to lock this logger to, it was removed and replaced when Rudds left the site for short breaks.

Figure 3 Noise Monitoring Locations



Source: app.actmapi.act.gov.au

Noise logging was undertaken with all data being recorded in 10 minute intervals across the day, from 7 am to 7 pm at Location A, and for the majority of the day at Location B. The logger at Location A was chained to the fence, so could be left when the site was unattended for short periods. The logger at Location B was in the open, with no opportunity to have it secured, so was removed when the site was unattended and replaced when the site was attended.

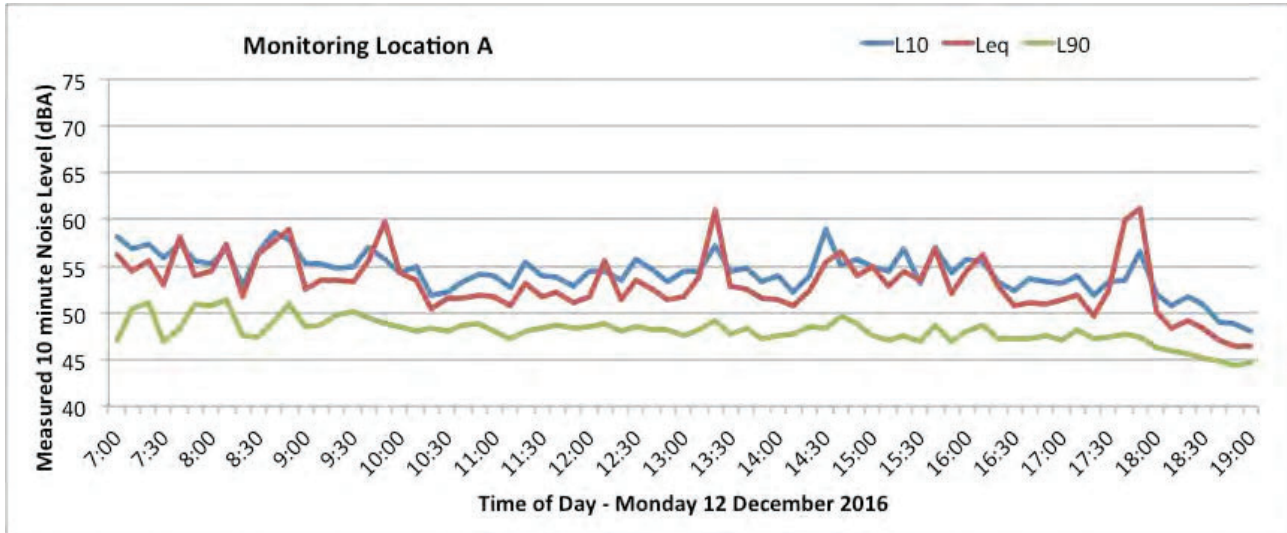
3.2.1 Location A

Application Number
167621
Sheet
102 of 208

The results of noise logging at Location A are presented in Figure 4. The results indicate LA10 (10 minute) noise levels up to 61 dBA, but more typically between 50 dBA and 60 dBA. These are all compliant with the daytime LA10 noise limit of 65 dBA.

The high LAeq noise level at 5:50 pm was due to a loud short-term noise near the logger. This was a car on the road with a loud engine and screeching tyres turning from Baillieu Lane west into Heffernan Street. The background noise level was set by cicadas, which produced relatively constant noise throughout the day.

Figure 4 Location A Noise Logging Results



3.2.2 Location B

Rudds observed the following across the day:

1. During the early morning there were many bird calls. As the temperature increased, bird calls were still present, but reduced in frequency and cicadas dominated the ambient noise environment. Cicadas were typically 50 dBA to 54 dBA, but occasionally up to 57 dBA when combined with birds. Most of the LA90 measurements will be dominated by the cicadas.
2. The primary industrial noise sources were the turf supplies business and the landscaping supplies business. The turf supplies business, while closer, produced less noise across the day than the landscaping supplies business.
3. The primary noise source from the landscaping supplies business was the front end loader and associated reversing alarm. The noisiest part of the front end loader was bucket rattle when emptying the bucket when loading a truck, which occasionally reached a noise level up to L_{Amax} 65 dBA at the proposed child care centre site. At this point, the bucket was elevated and visible above the fence and clearly audible. There were also occasional loud noises from trucks, primarily the tailgate banging as a tipper truck was being lowered after a delivery.
4. There was noise from air conditioning units on adjoining buildings. The levels were relatively low, typically being very close to the background noise level, therefore being very difficult to measure accurately. Rudds estimates the air conditioning noise levels to be approximately 50 dBA at the southern boundary of the site.
5. Two air conditioners bolted to the wall of the adjoining south-western commercial premises displayed signs showing sound power levels of 69 dBA and 64 dBA. At 1 metre, this would equal a sound pressure level of 61 dBA and 56 dBA respectively. Therefore, both would be compliant with the daytime Zone Noise Standard of 65 dBA, assuming a compliance measurement 1 metre from each unit.

Application Number
167621
Sheet
103 of 208

3.2.2.1 Location B Noise Logging

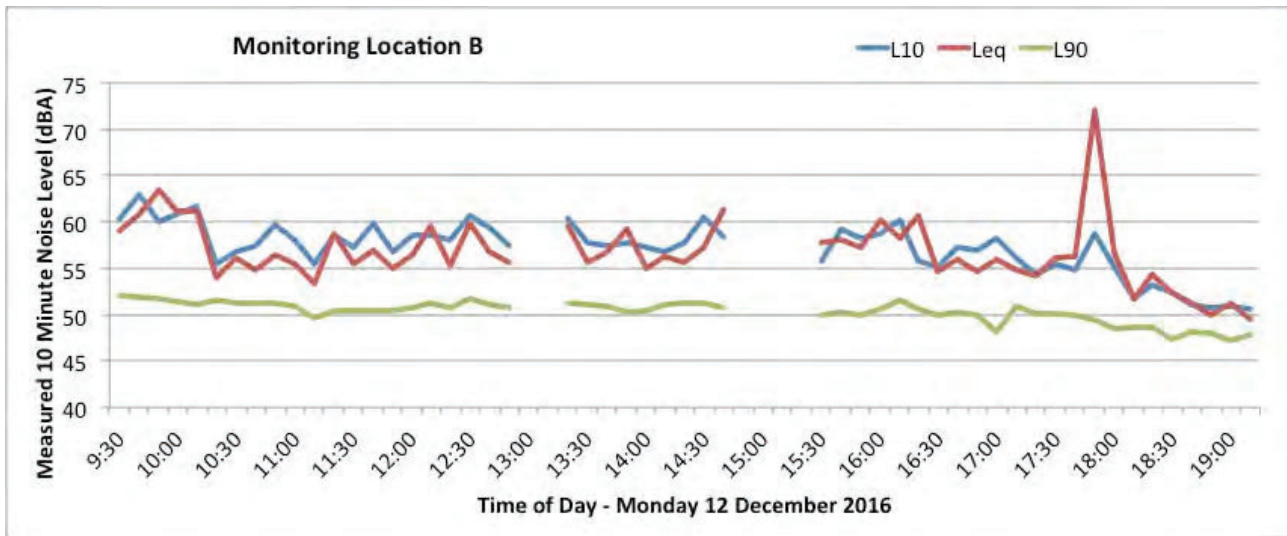
The results of noise logging at Location B are shown in Figure 5. This includes all noise measured throughout the day, including noise from industry and commerce and noise from road traffic (and occasional helicopters and aircraft).

The high LAeq noise level at 5:50 pm was due to a loud short-term noise near the logger. This was a car on the road with loud engine and screeching tyres turning from Baillieu Lane west into Heffernan Street. The background noise level was set by cicadas, which produced relatively constant noise throughout the day.

It is clear from this logging graph that the LA10(10 minute) noise levels were all well below the daytime industrial compliance limit of LA10 65 dBA. For most of the day, the LA10(10 minute) noise level was below 60 dBA.

It is very difficult to quantitatively separate the LA10 level of industrial noise from the LA10 level of road traffic noise. From observation, road traffic was the dominant noise source for most of the day, but industrial noise went through periods of peaks and troughs, so the contribution of each of these two noise sources varied constantly.

Figure 5 Location B Noise Logging Results



3.2.2.2 Location B Operator Attended Noise Monitoring

The results of operator attended noise monitoring are presented in Table 6. All measurements were approximately 10 minutes in duration. Measurement start times are stated to nearest minute on the sound level meter clock.

In all cases, where describing noise levels in the “Comments / Noise Sources” section of Table 6, levels refer to LAmax (maximum) levels unless stated otherwise.

Weather data observations were taken from the Canberra Airport weather station for the ½ hour the measurement was taken in. When wind was calm, this was noted on-site.

Table 6 Operator Attended Noise Measurement Results

Time	Temperature Degrees Celsius	Wind Speed Metres per Second	Wind Direction	Humidity Percentage	Cloud Cover Oktas
7:03 am	16	Still	Still	81	8 – Cloudy
Results	LAmax	LA10	LAeq	LA90	Lamin
	73	58	56	50	47
Comments / Noise Sources Birds singing					

Application Number
167621
Sheet

104 of 208

Truck and small front-end loader (Dingo style) at turf supplies business. Engine noise generally 52 to 64 dBA, occasional bangs when loading truck into the low to mid 60 dBA range.
Cars on road to 68 dBA

Time	Temperature Degrees Celsius	Wind Speed Metres per Second	Wind Direction	Humidity Percentage	Cloud Cover Oktas
7:15 am	16	<2.5	NW	81	8 – Cloudy
Results	LAmx	LA10	LAeq	LA90	LAmn
	71	58	56	47	43

Comments / Noise Sources

Turf Supplies – truck running constantly at 52 dBA, front-end loader running – noise variable, typically in the 50 dBA to 55 dBA range, occasional louder bangs to 71 dBA.
Cars on road to 68 dBA, trucks on road to 69 dBA.
Reversing alarm at landscape supplies business to 52 dBA, 1.6 kHz tone.
Garbage collection truck occasionally audible.
Regular bird calls.

Time	Temperature Degrees Celsius	Wind Speed Metres per Second	Wind Direction	Humidity Percentage	Cloud Cover Oktas
7:27 am	16	<2.5	NW	81	8 – Cloudy
Results	LAmx	LA10	LAeq	LA90	LAmn
	80	60	58	45	43

Comments / Noise Sources

Turf supplies business quiet.
Landscaping supplies business audible. Can see front-end loader bucket above wall with bucket rattle to 60 dBA. Reversing alarm on front-end loader typically around 53 dBA, varying between 49 dBA and 55 dBA.
Vehicles on road to 69 dBA
Garbage truck on road to 80 dBA.
Distant power tools and hammering occasionally audible.
Regular bird calls.

Application Number
167621
Time
7.39
Sheet
105 of 208

	Temperature Degrees Celsius	Wind Speed Metres per Second	Wind Direction	Humidity Percentage	Cloud Cover Oktas
	17	<2.5	NW	79	8 – Cloudy
Results	LAmx	LA10	LAeq	LA90	LAmn
	79	58	58	46	43

Comments / Noise Sources

Loud car on road (loud exhaust and tyres screeching) to 79 dBA.
Reversing alarm at landscape supplies to 56 dBA (usually around 50 dBA to 52 dBA) with 1.6 kHz tone.
Regular bird calls.

Time	Temperature Degrees Celsius	Wind Speed Metres per Second	Wind Direction	Humidity Percentage	Cloud Cover Oktas
8:48 am	20	still	still	66	1 - Fine
Results	LAmx	LA10	LAeq	LA90	LAmn
	87	62	61	53	52

Comments / Noise Sources

Cicadas constant 53 dBA, dominated the background noise environment.
Cars variable, typically 60 dBA to 65 dBA range. One very loud car to 87 dBA.
Distant power tools occasionally audible.
Bird calls around 62 dBA

Time	Temperature Degrees Celsius	Wind Speed Metres per Second	Wind Direction	Humidity Percentage	Cloud Cover Oktas
3:42 pm	30	<5	W	27	1 - Fine
Results	LAmx	LA10	LAeq	LA90	LAmn
	77	59	58	51	49

Comments / Noise Sources

Truck on road to 74 dBA, 4wd vehicles on road to 77 dBA
Cicadas constant 50 dBA
Air conditioning on building to south west audible.
Landscape supplies noise – front end loader bucket rattling to 56 dBA, reversing alarm to 61 dBA.

3.2.3 Comparison of Location A and Location B Noise Monitoring Results

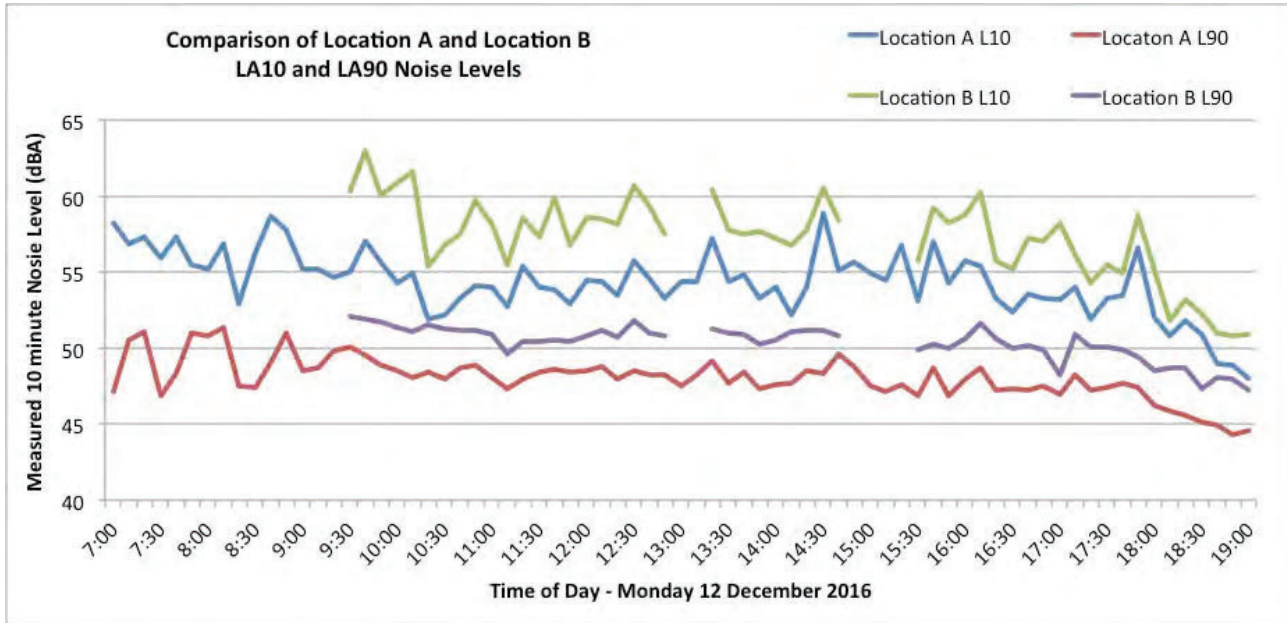
Application Number

167621

Figure 6 shows a comparison between the logging results at Location A and Location B. The graph indicates that LA90 noise levels are higher at Location B, which is a direct result of Location B being closer to the road with the cicadas. LA10 results are also higher at Location B than Location A, indicating most noise is coming from a position closer to Location B than Location A. This was evident during monitoring, with road traffic and noise from the landscaping supplies business being dominant.

Sheet
106 of 208

Figure 6 Comparison of Location A and Location B Noise Monitoring Results



3.3 Site Assessment

The introduction of a noise sensitive receiver into an active industrial area will need to be carefully considered in the context of Criteria C3 of the Industrial Zones Development Code. It is important to understand that local businesses will undertake noisy activities when necessary as part of their daily operations.

The building envelope can certainly be designed and constructed to ensure acceptable noise levels within the building. This means quiet activities and sleep times can occur as would be the case for such facilities in other areas. Acoustic shielding to outdoor areas is also recommended to minimise the likelihood of disturbance when outdoor areas are used. Rudds is aware of other such facilities in Canberra built near major roads, or within commercial areas (near shopping centres and the like) that are currently operating, or have been planned to operate.

The nature of children playing outside should also be considered. Children playing generate a significant amount of noise themselves and most children are not overly concerned about background noise unless they want quiet time, in which case they can retreat indoors. It is very common for recreational buildings for children (and adults) to be situated in industrial zones because such recreation generates noise that is more likely to be acceptable in an industrial zone than a residential zone. Such examples are common in Mitchell and Hume, and there are also many children’s play areas within busy shopping centres.

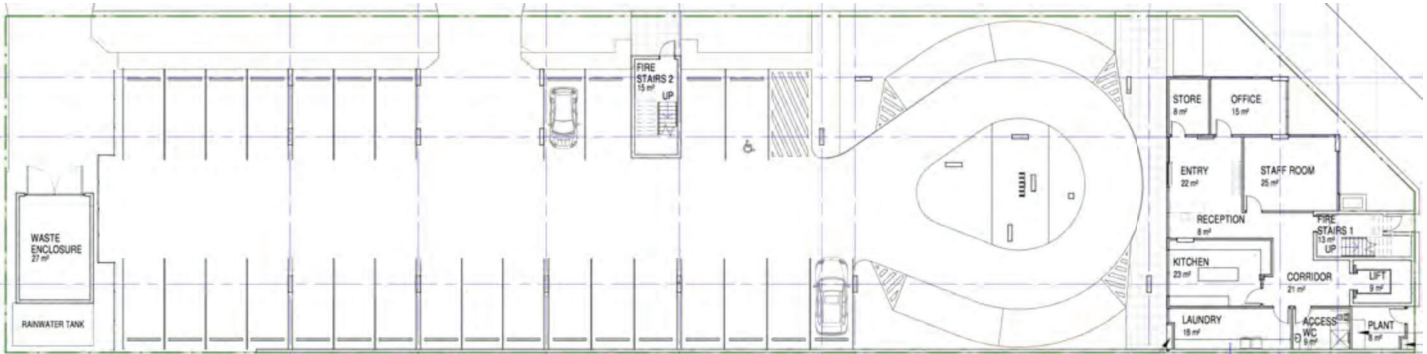
It is impossible for Rudds to provide a qualitative assessment as to whether adjoining businesses will be affected by the establishment of a child care centre, but if the building is constructed to minimise noise intrusion from these adjoining businesses, and the management understand the situation and location in which they are operating, then it should be possible for industrial uses and a child care centre to co-exist beside each other.

3.3.1 Building Plans

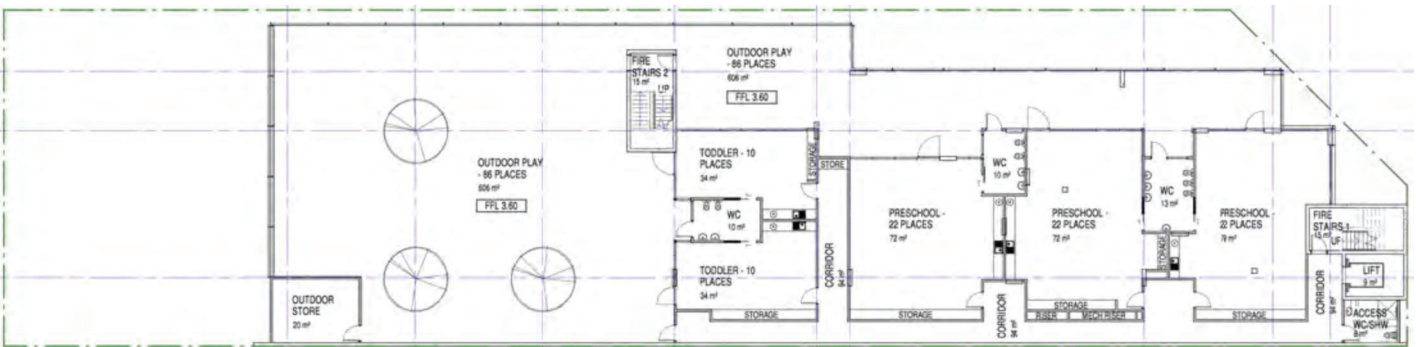
Application Number
167621
Sheet
107 of 218

Plans have been prepared for the site based upon a three storey building. The ground floor will contain a reception area and staff amenities. There will be stair and lift access to the other two floors. Level 1 will contain three pre-schoolers rooms, two toddler rooms and an outdoor play area facing north. Level 2 will contain two toddlers rooms and two babies rooms. Each of the babies rooms are linked to two cot rooms. The babies rooms are primarily designed as a play space, with cot rooms being used for sleeping.

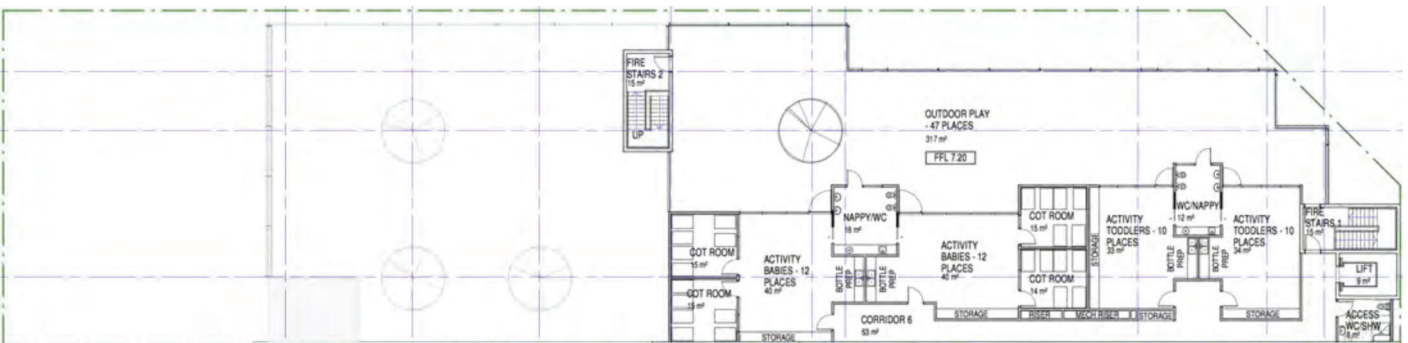
Figure 7 Proposed Building Floor Plans
Ground Floor



Level 1



Level 2



All of the outdoor play areas are to be surrounded by a 1.8 metre high solid barrier (i.e no perforation or holes that will let air (and noise) to pass through). At the western end of the Level 1 play area, the top of this wall will be approximately 2.4 to 2.5 metres above finished floor level where it is above a 500 mm garden bed,. Rudds expects these panels will be at least 10 mm thick glass, polycarbonate or Danpalon or a similar material (to be reviewed during detailed design). Any material with an acoustic rating of not less than Rw 20 will be suitable. They will also need to be continuous along their length, and be built to the slab (with no gap underneath). Rudds has also assumed a 100 mm overlap between the glass and the garden bed, so a top height of 2.4 metres above finished floor level has been modelled in areas where the gardens are to be located on the western end.

There will also be a wall built along the southern boundary of the site to the extent of the play area. Rudds understands that the primary reason for this wall is fire protection, but it will also act as an acoustic barrier. The exact material to be used has not yet been chosen, but Rudds expects it is likely to be something like

Application Number

167621

CSR Hebel or concrete. Both are commonly used as acoustic barriers beside roads and each will be suitable for use as an acoustic barrier on this site.

The building itself is expected to consist of concrete floor slabs and well insulated lightweight infill walls. Glazing is expected to be a minimum thickness of 6.38 mm, however thicker glazing or double glazing may be required in some areas.

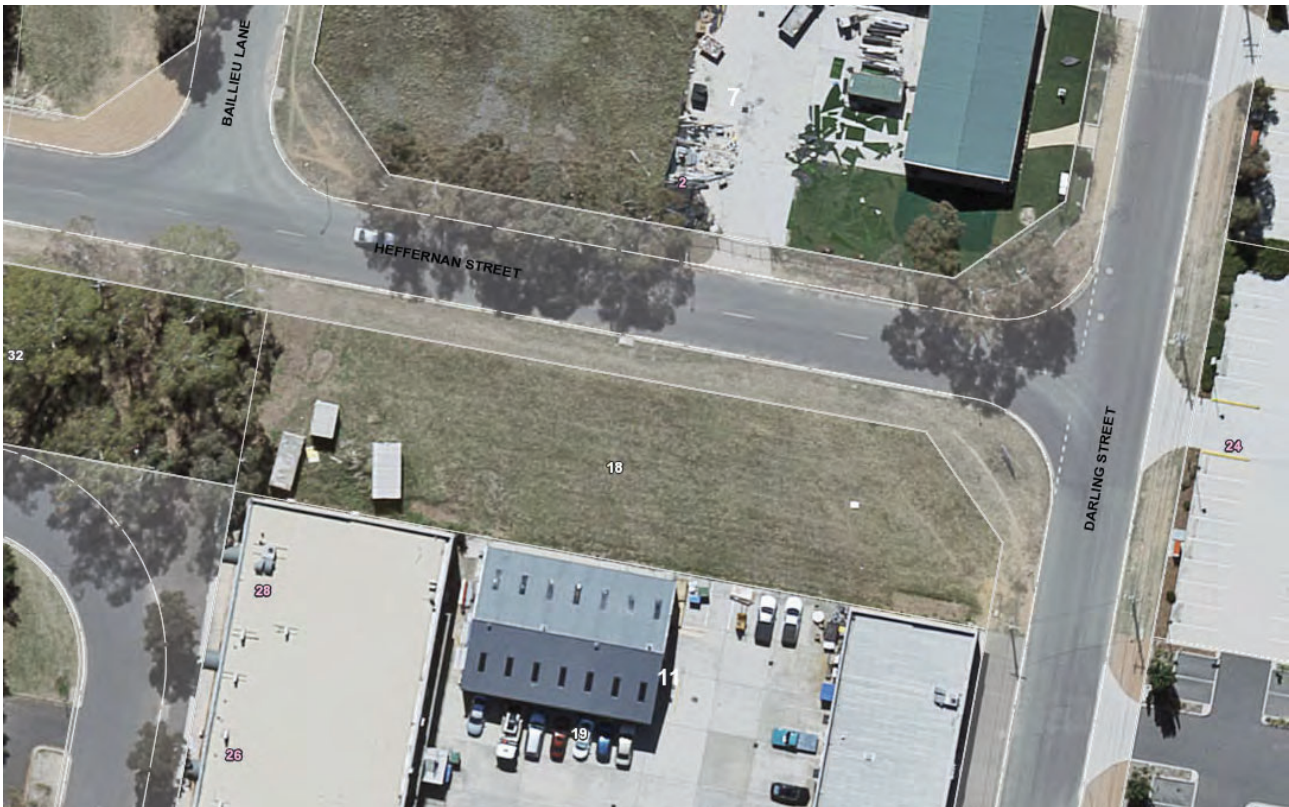
The orientation of cot rooms is well thought-out, with all cot rooms containing solid walls, with entry via the babies rooms. A very high degree of acoustic reduction from outside to inside is possible with this design.

The elevated play areas also result in good acoustic screening from ground level noise sources.

3.3.2 Site Location and Orientation

Figure 8 shows the site on the south-western corner of the Heffernan and Darling street intersection. The nearest industrial noise sources are directly to the south, with any other industrial noise sources being more than 20 metres from the northern and eastern site boundaries across the road. The block to the west is not currently developed, and it is understood that this block will not be developed as an industrial block in the future.

Figure 8 Site Aerial Photograph



Source :www.actmapi.act.gov.au

3.3.3 Outdoor Play Area Assessment

An assessment of the outdoor play are has been undertaken at a height of 1.5 metres above ground level. This is representative of the ear level of a typical adult, and is the common assessment height used in many jurisdictions. Small children are much shorter than adults, so the balustrades afford additional shielding that will mean at 1 metre to 1.2 metres above ground level, noise levels will be lower than predicted at the 1.5 mere level.

3.3.3.1 Existing Noise Sources

Application Number

167521

It will be important to minimise noise intrusion from adjacent industrial sites. This is to both protect the children and staff, and to allow adjacent industrial sites to be able to operate in a manner consistent with an industrial area.

The measured noise level on the nearest boundary to the road was up to Leq(1 hour) 63 dBA, including a 2.5 dBA facade reflection. The majority of the time, the noise level was actually lower than this, apart from occasional anomalous events, such as a car doing burnout on the street. Therefore, Rudds considers Leq(1 hour) 63 dBA to be the appropriate noise level to be used for the outdoor play area assessment.

This is 8 dBA higher than desirable for a play area, which should be designed to achieve Leq 55 dBA or lower (equivalent to the now repealed Draft Noise Management Guidelines requirement of L10 58 dBA for a private open space). Therefore, Rudds recommends that all play areas be protected from noise from both the road and adjacent sites by the incorporation of suitable noise barriers and by using the buildings themselves as acoustic shielding.

The proposed design incorporates the following:

1. Play areas on level 1 and the front of the building on Level 2 only.
2. A 1.8 metre high glass balustrade to protect the children. This will be at least 2.4 metres high because it is above a 500 mm deep garden bed on the western side of the Level 1 play area.
3. The wall behind the play areas is full height and full length on Level 1 and extends to a minimum of 3 metres above finished floor level.
4. The first floor play area has a concrete slab over part, which is the floor slab for the Level 2 play area.

Rudds recommends that the underside of the slab soffit that forms the ceiling of the Level 1 play area be fitted with acoustic absorption so that noise from the street cannot be reflected back down to the children within the play area. This treatment has been assumed in the noise modelling. Care will need to be taken on Level 2 to minimise reflections on the underside of the sunshade. The construction of this sunshade needs to be considered in the detailed design.

Based upon this scenario, Rudds has predicted that the noise levels in the play areas will be below LAeq 51 dBA toward the front (northern) edge of the play areas, reducing to 41 dBA at the rear (southern) edge of the Level 1 play area. This meets the required LAeq 55 dBA noise limit within these play areas.

3.3.3.2 Potential Future Noise Sources

The area has several existing industrial noise sources, which were included in the measurements undertaken at the site, and were therefore included in the initial existing situation assessment. In order to minimise the potential for issues in the future, and to comply with Criteria C3 of the Industrial Zones Development Code, Rudds has also undertaken an assessment of a potential scenario, whereby a noise source at an adjoining premises is operating at the noise limit of LA10 65 dBA at the property boundary.

Of course, not every situation can be determined and assessed, so Rudds has used a typical scenario whereby a new workshop or the like is constructed near to the site (most likely on the block to the North) and equipment (similar to a grinder) is operating within 3.5 metres of ground level. Rudds expects that it would be typical for most noisy equipment to be operating at a level lower than this. If it were a mechanical workshop or the like, the equipment height is likely to be less than two metres above ground level. It is also likely that such noise sources would be contained within the building rather than being external.

With a noise source at this 3.5 metre height on the site to the north of the building, achieving LA10 65 dBA at the childcare centre property boundary, Rudds finds that an LAeq level less than 55 dBA can still be achieved within the children's play areas. Depending on the source, and the duration of operation (i.e the difference between the LAeq and LA10 level) the predicted noise level is likely to be between 54 dBA and 51 dBA (assuming a 0 dB to 3 dB difference between LAeq and LA10 levels, which is typical). For a similar noise source to the south of the site, Rudds is predicting noise levels within the children's play areas less than 40 dBA due to the higher wall and additional building shielding.

If an adjacent site is constructed with an elevated noise source on a rooftop, such as a large chiller for a data centre or the like, then such a source would be difficult to shield from the outdoor play areas. This said, the likelihood of such equipment being provided on top of the existing buildings to the south is expected to be low, there is an additional buffer to the west because the building is on the eastern side of the block and such equipment would most likely be required to operate 24 hours per day, meaning it would need to comply with the night-time noise limit of LA10 55 dBA at the property boundary, in which case LAeq 55 dBA is still likely to be achieved within the children's outdoor play area when such equipment is operating.

3.3.4 Façade Assessment

Application Number

167621

Sheet

110 of 208

Again, the goal of the façade assessment is to reduce road traffic noise to within acceptable levels, but to also minimise disturbance due to potential future noise sources and to minimise the likelihood of sleep disturbance by designing to an appropriate LA1 sleep disturbance noise level.

Rudds has used the following external levels for the assessment:

1. Leq(1 hour) 63 dBA at the building façade where no shielding from the play areas is present.
2. Leq(1 hour) 49 dBA at the building façade where shielding from the play area balustrades is present.
3. The L_{Amax} (maximum) noise level measured over each 15 minute period for a sleep disturbance assessment, adjusted to the new façade position.

3.3.4.1 Ground Floor

The ground floor primarily contains office areas, a reception area and staff amenities, including a staff room. These will require AS 3671 Category 3 construction.

Allowable noise levels are up to LA_{eq} 45 dBA for this area. 6.38 mm thick laminated glass in a commercial glazing suite will be suitable for these areas. The entry doors into the building are located on the western side of the office area, fronting the new turn-around and carpark. In this location, they are well shielded from the road so no special treatment is required. Rudds does recommend acoustic seals on these doors.

3.3.4.2 Level 1 and Level 2

All activities rooms have been well designed, being well back from the road at the southern edge of the block. The level 1 toddler rooms also have doors facing to the west, not to the north toward the road, which are partially screened by the fire stairs.

They are also well screened from road and industry noise by the 1.8 metre high balustrades to the outdoor play areas, which are designed to minimise noise intrusion to less than LA_{eq} 55 dBA in the play areas. This means the highest noise levels experienced by these facades will be LA_{eq} 55 dBA. These will require AS 3671 Category 2 construction.

On the north-eastern corner of the block, noise levels may approach LA_{eq} 63 dBA at the façade, so these areas will be assessed separately. These will require AS 3671 Category 3 construction. This only occurs on one pre-school room on Level 1, for the glass on the north-eastern corner of the room.

The rooms are accessed through a long southern corridor. Where there is direct access to the outdoor play areas, large sliding doors have been avoided in lieu of a single hinged door. This design was chosen to minimise the extent of openable area, such as doors and openable windows, which tends to be the weakest acoustic element in the facades.

Adjoining toilets have an external door so that they can be accessed from both the indoor and outdoor play areas. They will act as a sound lock to the indoor play areas. Nevertheless, acoustic seals are recommend to these external doors.

The cot rooms are well designed, using the activity rooms as a buffer between the rooms and the outside environment.

The following design goals will be used:

1. Cot rooms to achieve a continuous noise level not more than LA_{eq} 30 dBA and LA₁ 45 dBA (See assessment of proposed wall system in Section 3.3.4.3 of this report).
2. All activities rooms/pre-schoolers rooms etc. to achieve a noise level not more than LA_{eq} 35 dBA.

To achieve these levels, the following is recommended:

1. 10.38 mm thick laminated glass to the façade of all preschool rooms, toddlers rooms and babies rooms where they are protected behind the play areas.
2. 12.38 mm thick laminated glass to the facade glazing on the north-eastern corner of the Level1 toddler Room, where the glazing is not protected by the play area glass. These sections will be fixed glass that is not openable.
3. All external doors to be fully acoustically sealed.
4. All rooms to achieve a mid-frequency reverberation time not exceeding 0.5 seconds. This can be achieved by providing a carpet/carpet tile floor and an acoustic grid ceiling or other acoustically absorptive ceiling. Acoustic pinboards should also be used on walls where possible.

Application Number

167621

Sheet

111 of 208

5. The internal doors to the cot rooms are to be either glass or solid core with acoustic perimeter and weather seals.
6. The external walls to the cot rooms to be constructed using a construction that achieves a minimum Rw 55 acoustic rating. The following is an example of a possible construction:
 - a. 2 layers of 16 mm thick fire rated plasterboard on the inside.
 - b. 150 mm thick cavity, which can be 92 mm 0.55 BMT steel studs with 60 mm top hat or 150 mm, 0.55 BMT steel studs with minimum 90 mm thick, R2.7 high density glasswool acoustic insulation in the cavity.
 - c. Two layers of 9 mm thick fibrous cement sheet on the outside of the walls.
 - d. All walls to be fully acoustically sealed on both sides.
7. The internal wall between the cot rooms to be constructed using construction that achieves a minimum Rw 55 acoustic rating. The following is an example of possible construction:
 - a. 2 layers of 16 mm thick fire rated plasterboard.
 - b. 92 mm thick, 0.55 BMT steel studs with 90 mm thick, R2.7 high density glasswool acoustic insulation in the cavity.
 - c. 2 layers of 16 mm thick fire rated plasterboard.
 - d. All walls to be fully acoustically sealed on both sides.
 - e. All walls to be constructed full height from the floor slab to the underside of the roof above.

The roof of the cot rooms is to also be treated to minimise rain noise intrusion and noise intrusion from external industrial sources. To this end, the following minimum roof construction is recommended:

1. Metal deck roof with Anticon insulation, or equivalent, under the roof sheeting.
2. Minimum 100 mm thick, 48 kg/m³ acoustic ceiling batts, being either fibreglass or polyester acoustic insulation.
3. A ceiling consisting of 2 layers of 16 mm thick fire rated plasterboard. This ceiling is to be fully acoustically sealed.
4. Any fresh air ductwork, relief air ductwork or the like will need to have an acoustic reduction equal to a Fantech Type CTZ2 cross-talk attenuator.

Rudds expects that there may be a need for a carer to hear a crying baby through the cot room door. For this reason, we are not recommending acoustic seals to these doors.

The rest of the façade and roof of the building should be designed so as to achieve a weighted sound reduction index of not less than Rw 45.

Rudds recommends that reverberation control treatment be provided to all rooms (play areas, toddler rooms and preschool rooms) to control reverberation so that the 0.5 second maximum reverberation time recommended in AS/NZS 2107:2000 be achieved. This can occur through a variety of ceiling and wall treatments, as deemed appropriate. Such treatment is also advantageous in reducing reverberant noise from the children themselves. This makes the overall classroom environment more comfortable for both the children and the carers.

Rudds also recommends that the glazing system and door framing system be designed to minimise sound leakage. All doors must provide a positive seal when closed so that the frame system does not degrade the performance of the glazing. If sliding doors are to be used, the doors must be able to provide a positive, airtight seal when closed. If this is not possible, the doors must be changed to sealed, hinged swing doors.

3.3.4.3 **Sleep Disturbance Assessment**

Application Number
167621
Sheet
112 of 208

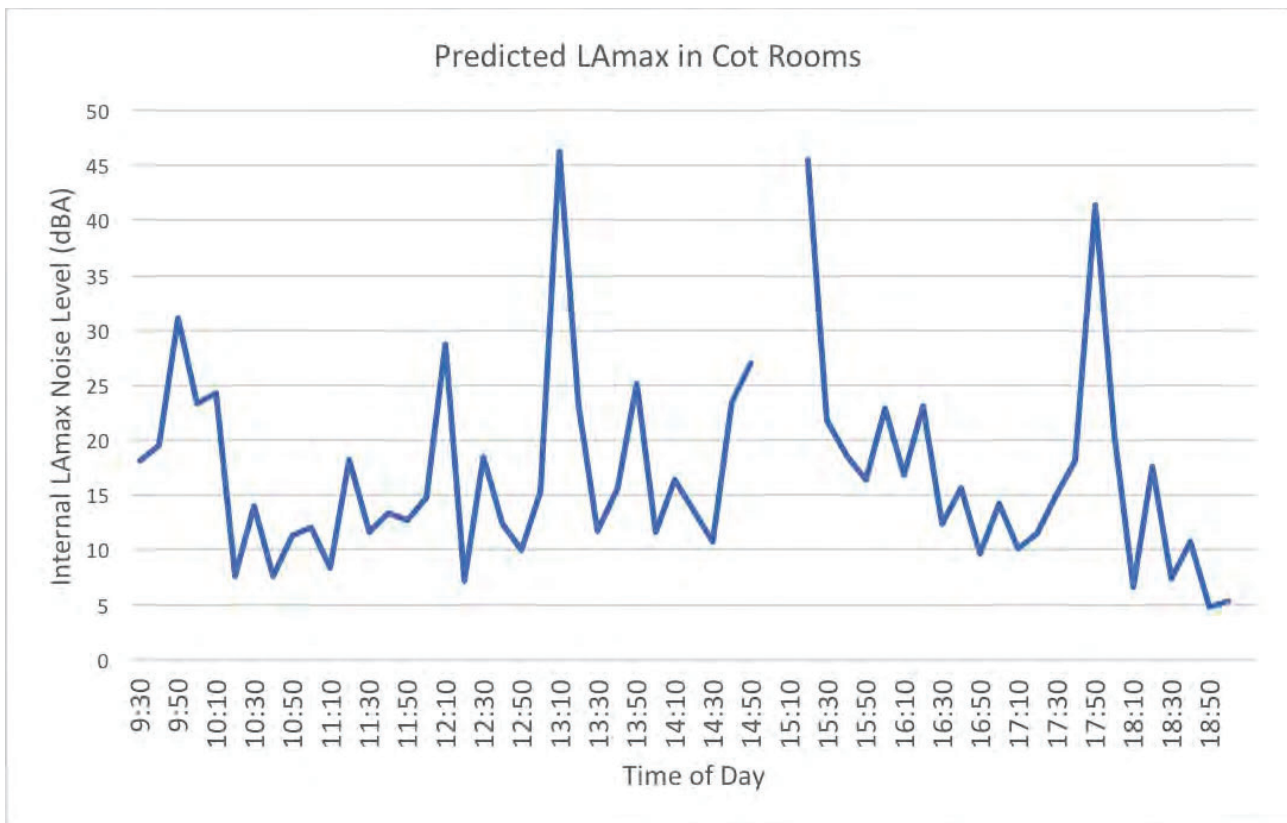
All of the highest maximum noise levels received at the site were due to road traffic, so this assessment assumes the noise source of maximum events to be from the roads surrounding the site.

Assessing sleep disturbance is a very difficult subject, primarily due to the large variability that occurs with maximum noise levels. A typical descriptor used to assess sleep disturbance is an LA1(1 minute) noise level, which is the noise level exceeded for 1% of the time within a minute. As the noise monitoring equipment used could not measure LA1(1 minute) noise levels, Rudds has used the L_{Amax}, or maximum, noise level for each 15 minute period for the noise assessment. This is considered to result in a conservatively high assessment level which would be louder than the actual LA1(1 minute) noise level likely to be experienced at these rooms. This will result in a significant over-design of the cot rooms to noise levels higher than are likely to be experienced at the site.

Based upon the proposed construction of the cot rooms, the resulting internal noise levels based upon the day of monitoring are shown in Figure 9. This assessment shows that for the period between 9:30 am and 6:50 pm, the 45 dBA recommended threshold is only exceeded for two of the 10 minute measurement periods by up to 2 dBA and 1 dBA respectively. The peak at 15: 20 was also likely to have been caused by the operator of the equipment when it was re-set after a lunch break, so the actual maximum is likely to be lower during this period.

Based on this assessment, the 45 dBA threshold is likely to be achieved for the majority of noise events, including all LA1(1 minute) noise events that are at or below 91 dBA at the cot room façade. This would equal a noise level at the front boundary of the site of approximately L_{Amax} 105 dBA. It can be seen from the monitoring data that noise levels approaching L_{Amax} 105 dBA are extremely rare at this site, with most maximum levels being between 70 dBA and 90 dBA.

Figure 9 Sleep Disturbance Assessment



It should be noted that the LA1(10 minute) noise levels recorded over the same period never exceeded 76 dBA at the monitoring location. Therefore, any exceedances of the LA1(1 minute) recommended noise level are expected to occur for less than 1% of the day.

Sleep disturbance was also a consideration of the babies activities rooms and toddlers rooms because these rooms are likely to also be used for nap times, although Rudds believes that these areas will not be as critical as the cot rooms. Maximum noise levels are expected to be below 45 dBA for the majority of the day in these rooms. An analysis of the L_{Amax} data recorded over the day, taking into account the expected

Application Number
167921
Sheet
113 of 208

glazing reduction to these rooms, Rudds determined that of the 56 ten-minute measurement periods when measurements were undertaken, from 9:20 am to 7:00 pm, that maximum levels occurred at a level that could exceed L_{Amax} 45 dBA in the classrooms for up to eight of these periods. This effectively means that L_{Amax} noise levels at 85 dBA at the boundary of the property are expected to achieve a noise level less than L_{Amax} 45 dBA inside these rooms. Again, L_{Amax} noise levels exceeding 85 dBA were not a common occurrence during the noise monitoring period. Any exceedances will be less than this in the toddlers room on the south-west of the building on Level 1 because this has no northern frontage to the road.

The pre-school rooms were also considered with regard to sleep disturbance. The two pre-school rooms between grids 5 and 7 on Level 1 will receive noise levels similar to the toddlers rooms and babies activities rooms, so the assessment for these rooms (undertaken above) holds true. The eastern end pre-school room will receive higher noise levels because it is on the corner of the block and receives direct road noise at the glass of up to $L_{Aeq}(1 \text{ hour})$ 63 dBA. With the proposed 12.38 mm thick laminated glass, which will provide approximately 28 dBA of sound reduction in this situation, this allows for external L_{Amax} noise levels up to 63 dBA to achieve not more than L_{Amax} 45 dBA in the classroom. If considered necessary, a second internal 6.38 mm thick laminated glass glazing suite could be constructed inside this glass, with an approximate 200 mm gap between to provide additional reduction. If this is done, the reduction would increase to approximately 40 dBA through this glass, allowing for external noise levels up to L_{Amax} 85 dBA to occur while receiving L_{Amax} 45 dBA or less inside this room.

Application Number

Section 4 - Conclusion

167621

Rudds has undertaken an assessment of road traffic and industry noise intrusion into the childcare centre proposed for Block 18 Section 11 Mitchell ACT, at the corner of Heffernan and Darling Streets, Mitchell ACT. As the site is within an industrial area, a noise assessment is required for the Development Application with ACTPLA to assess the level of road traffic and industry noise intrusion and the appropriate measures to be undertaken to ensure the likelihood of sleep disturbance during nap times is minimised.

Rudds has undertaken this assessment with reference to the appropriate Australian Standards and ACT Codes, including:

1. The ACT Territory Plan
2. The ACT Environment Protection Regulation (2005)
3. The Industrial Zones Development Code
4. AS/NZS 3671 Acoustics - Road Traffic Noise Intrusion Building Siting and Construction.
5. AS/NZS 2107:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors.

Rudds finds that with suitable building design to minimise noise intrusion from adjoining commercial uses and from road traffic noise, and the incorporation of shielding to play areas that achieves a minimum 8 dBA reduction, the proposal to construct a child care centre on Block 18 Section 11 Mitchell ACT, at the corner of Heffernan and Darling Streets is possible. The proposed design incorporates many measures to protect both the indoor areas and the outdoor play areas from both road noise and noise from industry.

We trust this information meets your current requirements. If you have any questions I can be contacted on 02 6240 2900 or 0438 017 087.

Sincerely,

Jeremy Lofts

BSc. Grad Cert (Env.) M.A.A.S.

dBA

Decibel. This is the unit measurement of sound.

A weighted decibel is the most commonly used descriptor. The A weighting is an adjustment to the raw sound level to approximate what the average human ear can hear, which is less sensitive at very low and very high frequencies.

Lw or SWL

Sound power level. This is the total radiated sound energy.

Lp or SPL

Sound pressure level. This is the measurable sound level at a given distance from a noise source.

L_{max}

The RMS maximum noise level of a measurement.

L₁₀

90th percentile sound level of a measurement. Often called the average maximum noise level.

L_{10(18hour)}

90th percentile sound level of an 18 hour time period from 7:00 am to midnight. This is commonly used for road traffic noise assessment.

L₉₀

10th percentile sound level of a measurement. Often called the average background noise level.

L_{min}

The minimum noise level of a measurement.

L_{eq}

The energy average noise level of a measurement.

L_{eq(8h)}

The 8 hour equivalent energy noise level. Primarily used for occupational noise assessments.

L_{eq(15minute)}

The 15 minute equivalent energy noise level. Primarily used for road traffic noise assessments which are typically undertaken in 15 minute blocks.

L_{eq(9h)}

The 9 hour equivalent energy noise level between the hours of 10:00 pm and 7:00 am. Often called the Leq Night-time noise level for road traffic noise assessments.

L_{eq(15h)}

The 15 hour equivalent energy noise level between the hours of 7:00 am and 10:00 pm. Often called the Leq Daytime noise level for road traffic noise assessments.

LC_{peak}

The C weighted peak noise level. Primarily used for occupational noise assessments.

Dw

The Weighted Level Difference as defined in AS/NZS ISO 717.1:2004. This is the single number rating describing the ability of a partition to reduce noise as measured in the field with no standardisation or normalisation.

Rw

The Weighted Sound Reduction Index. This is the single number rating describing the ability of a building element to reduce noise as measured in a laboratory.

PAVEMENT LEGEND

HEAVY DUTY DRIVEWAY
HD2 TYPE DRIVEWAY
HD2 TYPE DRIVEWAY
150mm HD2 CONCRETE - BROOM FINISH
100mm HD2 CONCRETE - BROOM FINISH
100mm HD2 CONCRETE - BROOM FINISH
100mm HD2 CONCRETE - BROOM FINISH
SUBGRADE COMPACTED TO 95% MDD

FOOTPATH
FINISH TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
CONSTRUCTED IN ACCORDANCE WITH TCCS STANDARD DRAWING DS-131

GRASSED AREA
TO LANDSCAPE ARCHITECT'S SPECIFICATIONS

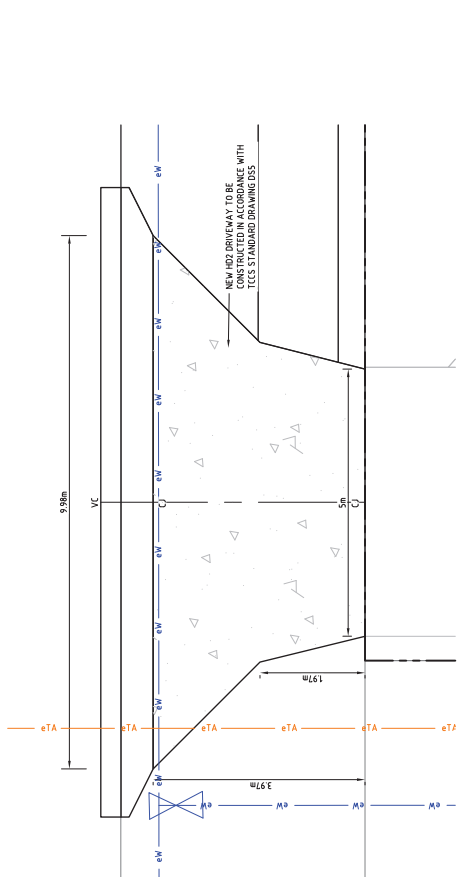
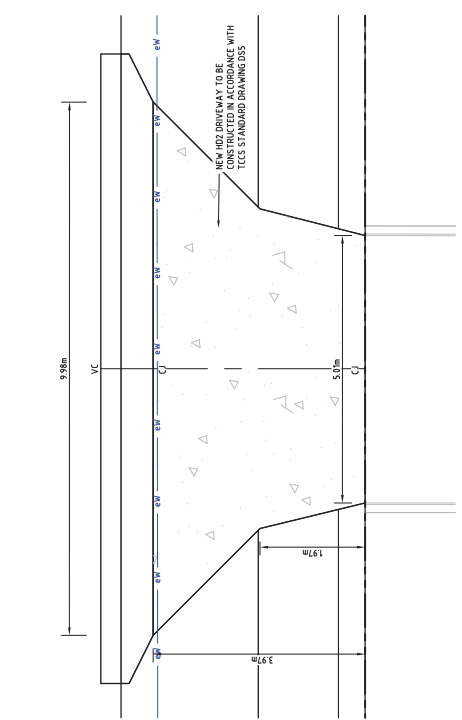
LEGEND

PROPOSED PAVEMENT STRUCTURES
VC - REINFORCED VEHICLE CROSSING CONSTRUCTED TO DETAIL ON TCCS STANDARD DRAWING DS3-02
CJ - CONSTRUCTION JOINT AS PER DETAIL ON TCCS STANDARD DRAWING DS5-01

EXISTING SERVICES

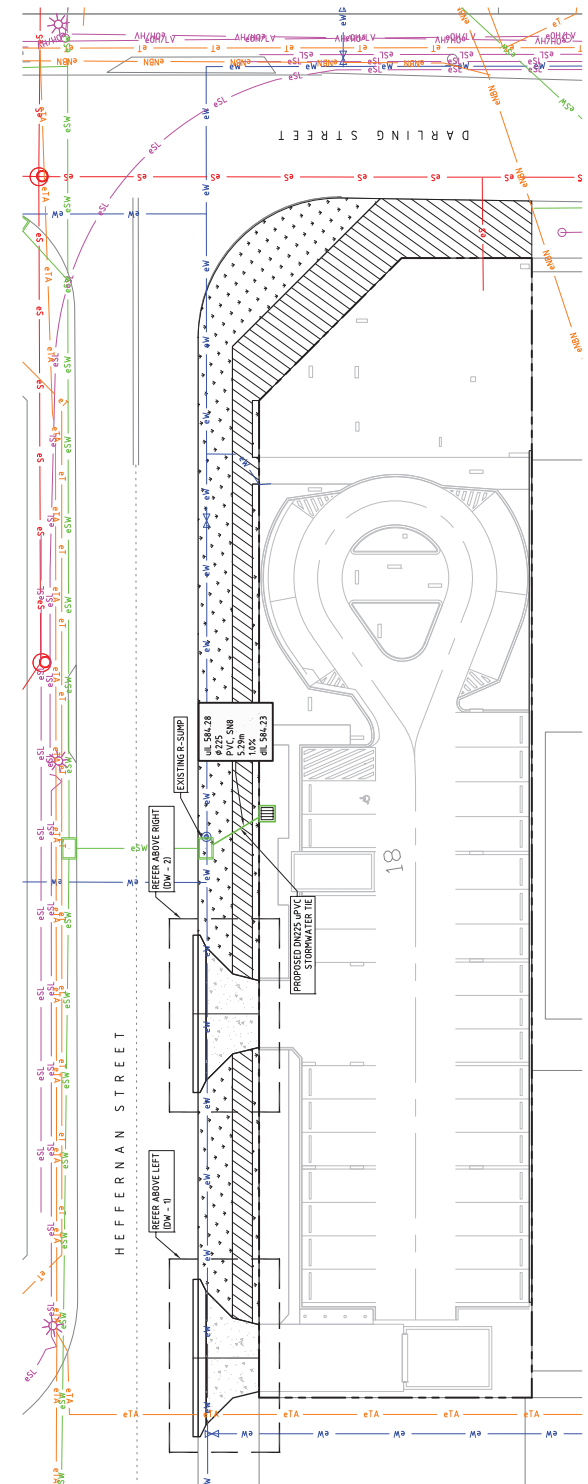
- STORMWATER MAIN
- SEWER MAIN
- WATER MAIN
- TEL STRA
- GAS
- ELECTRICITY
- HIGH VOLTAGE ELECTRICITY
- ABANDONED SERVICE
- SEWER MANHOLE
- STORMWATER MANHOLE
- STORMWATER SUMP
- FIRE HYDRANT
- STOP VALVE
- TEL STRA PIT
- LIGHT POLE
- EXISTING TREE

WARNING
SERVICES SHOWN ARE BASED ON INFORMATION PROVIDED BY SERVICE AUTHORITIES AND ARE ESTIMATES ONLY. UNDER NO CIRCUMSTANCES SHOULD THE LOCATION OF SERVICES SHOWN ON THIS PLAN BE RELIED UPON FOR ON SITE WORK. ALL INFORMATION MUST BE CONFIRMED IN THE FIELD.



WASTE TRUCK DRIVEWAY - (DW - 1) - HD2 - TYPE
SCALE 1:50

MAIN USERS DRIVEWAY - (DW - 2) - HD2 TYPE
SCALE 1:50



JOB NUMBER	CR171360
DRAWING NUMBER	REVISION
C121	2
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION

DRAWING TITLE
CIVIL WORKS
EXTERNAL SITE WORKS PLAN

PROJECT
CHILDREAN CENTRE
BLOCK 18 SECTION 11 MITCHELL

NORTHROP
Camberra
UHP 2, 248 Shea Street, Phillip ACT 2608
Ph (02) 6283 1622 Fax (02) 6283 1933
E-mail: enquiries@northrop.com.au www.northrop.com.au

THE DESIGN OF THE SERVICES IS THE RESPONSIBILITY OF THE ARCHITECT AND THE CLIENT. NORTHROP ARCHITECTURE PROJECT CONSULTING INTERIOR DESIGN ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF THE SERVICES SHOWN ON THIS PLAN. THE SERVICES SHOWN ON THIS PLAN ARE FOR INFORMATION ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION UNLESS VERIFICATION HAS BEEN MADE.

SCALE 1:500 @ A1

ISSUED	VERD	APP'D	DATE	CLIENT
1	AH	JW	22.11.17	
2	AH	JW	30.11.17	

ARCHITECT
ARPM
ARCHITECTURE PROJECT
CONSULTING INTERIOR DESIGN

REVISION	DESCRIPTION	ISSUED	VERD	APP'D	DATE	CLIENT
1	DRAFT D.A.	AH	JW	JW	22.11.17	
2	D.A.	AH	JW	JW	30.11.17	

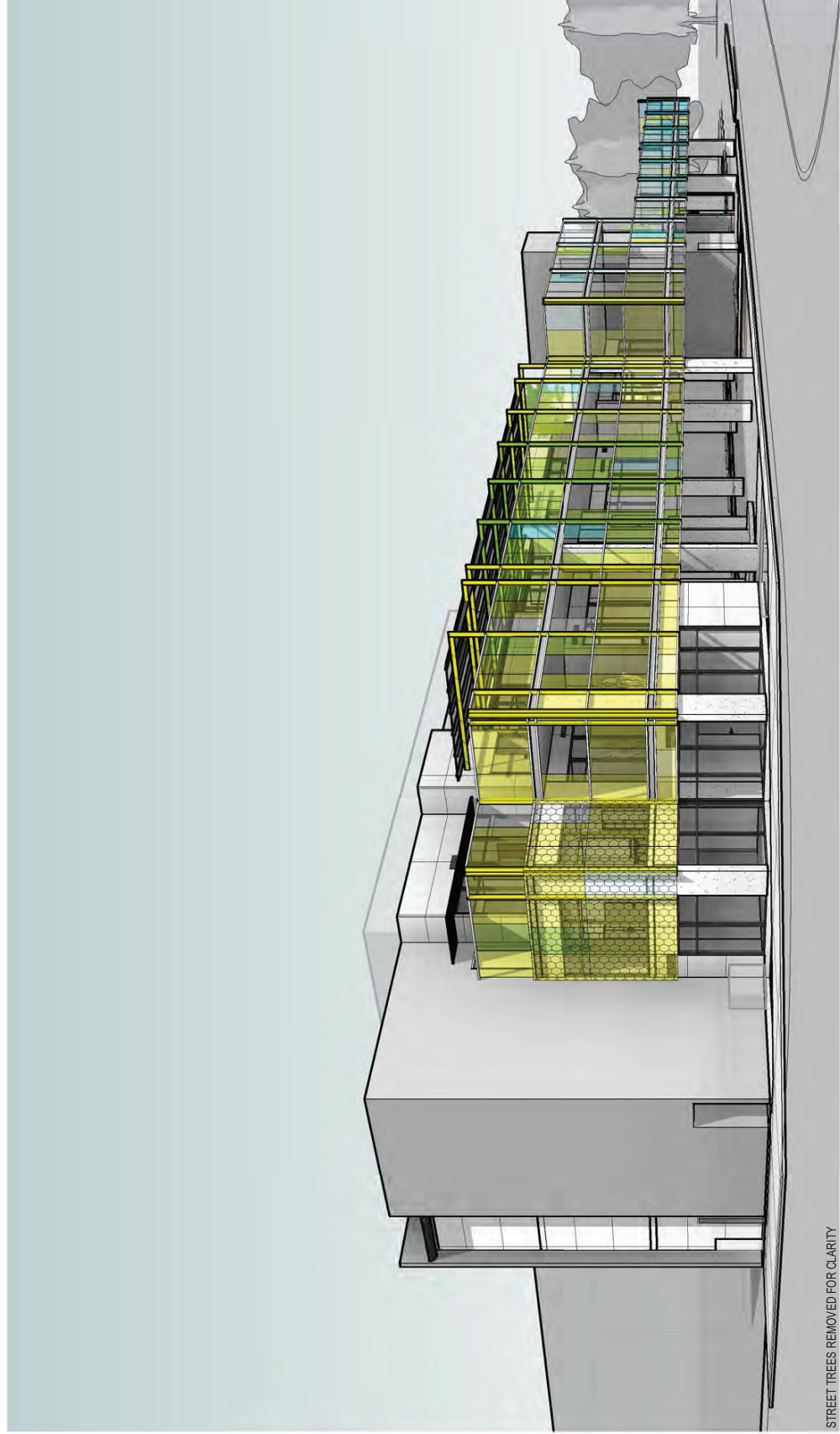


Application Number

167569

Sheet

45 of 53



STREET TREES REMOVED FOR CLARITY

Rev	Amendment	Date	Init
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Address: 1000 Spring | Carbons | Drawn | Project | Resources | Revit
 Level 15, 15 Horn Street Carbons ACT 2601
 P: 02 9199 6997 | E: info@arpm.net.au

MITCHELL CHILDCARE CENTRE
 BLOCK 18, SECTION 11 CORNER DARLING &
 HEFFERNAN STREET, MITCHELL, ACT

PERSPECTIVES

Drawn	Date	Scale	Project Number
Author		A3	A17041
Review	Date	Project Leader	Date
Checker		Designer	
PRELIMINARY			Drawing Number
			ACT
			SK 800

Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or erecting any



Rev	Amendment	Date	Init



Atlanta | Boca Raton | Cary | Denver | Fort Worth | Houston | Irvine
 Level 15, 15 Moore Street Canberra ACT 2601 P: (02) 6169 4097 E: info@arpm.net.au

MITCHELL CHILDCARE CENTRE
 BLOCK 18, SECTION 11 CORNER DARLING &
 HEFFERNAN STREET, MITCHELL, ACT

PERSPECTIVES

Drawn	Date	Scale	Project Number
Author		A3	A17041
Review	Date	Project Leader	Drawn
Checker		Designer	Drawn Number
			ACT1
PRELIMINARY			
			SK 801

Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or erecting any

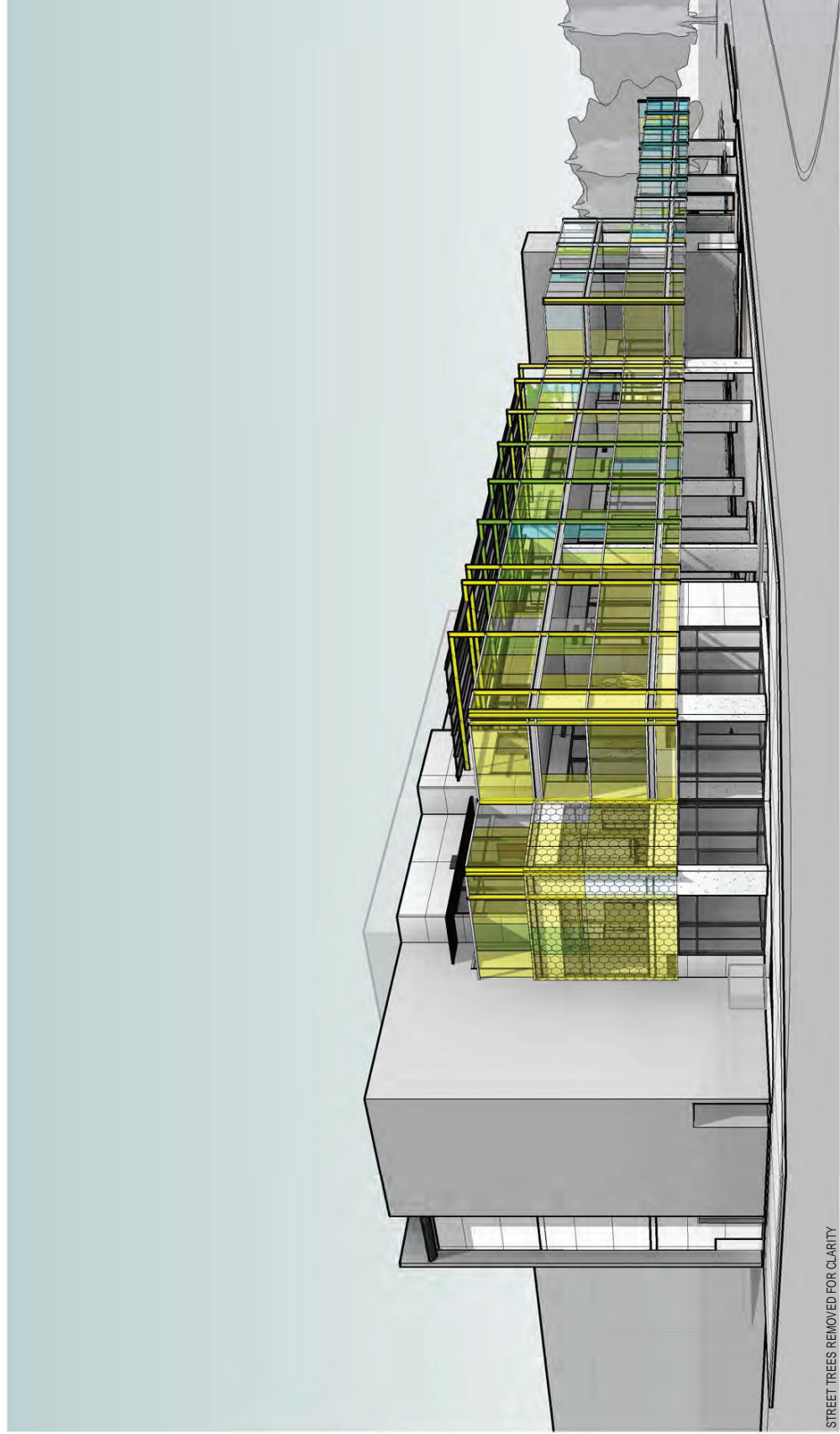


Application Number

167621

Sheet

117 of 208



STREET TREES REMOVED FOR CLARITY

Rev	Amendment	Date	Init
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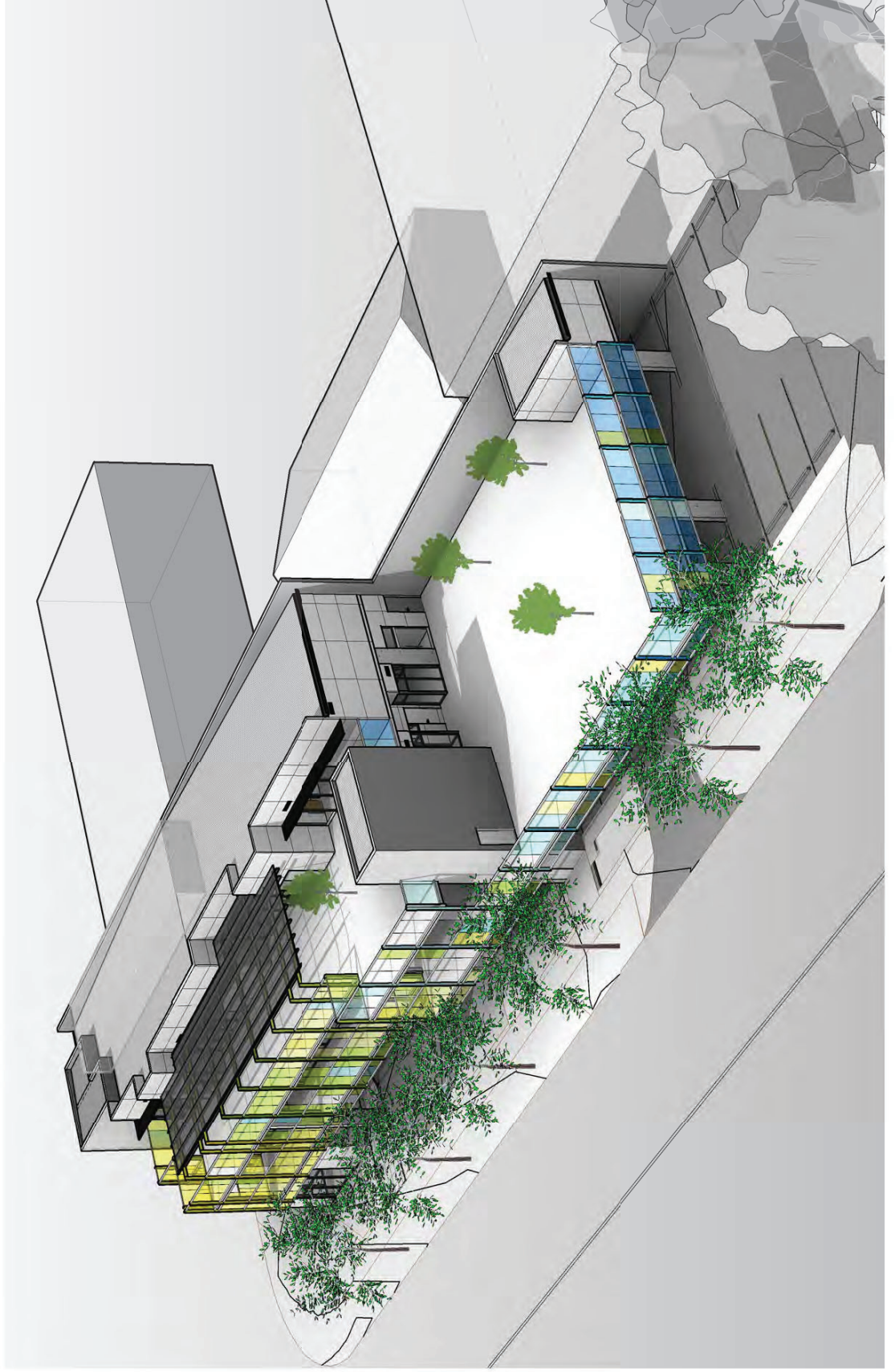
Address: 1000 Spring | Canberra | Drawn: Robert | Reviewed: [blank]
 Level 15, 15 Moore Street Canberra ACT 2601 P: 02 6169 4097 E: info@arpm.net.au

MITCHELL CHILDCARE CENTRE
 BLOCK 18, SECTION 11 CORNER DARLING &
 HEFFERNAN STREET, MITCHELL, ACT

PERPECTIVES

Drawn	Date	Scale	Project Number
Author		A3	A17041
Review	Date	Project Leader	Drawn
Checker		Designer	Drawing Number
PRELIMINARY			SK 800
			ACT1

Coordinate and check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or final drawings.



Rev	Amendment	Date	Init
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Address | Plus Springs | Canberra | Design | Project | Melbourne | Perth
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MITCHELL CHILDCARE CENTRE
BLOCK 18, SECTION 11 CORNER DARLING &
HEFFERNAN STREET, MITCHELL, ACT

PERSPECTIVES			
Drawn	Date	Scale	Project Number
Author		A3	A17041
Review	Date	Project Leader	Drawn
Checker		Designer	Drawing Number
PRELIMINARY			SK 801
ACT			

Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or erecting any

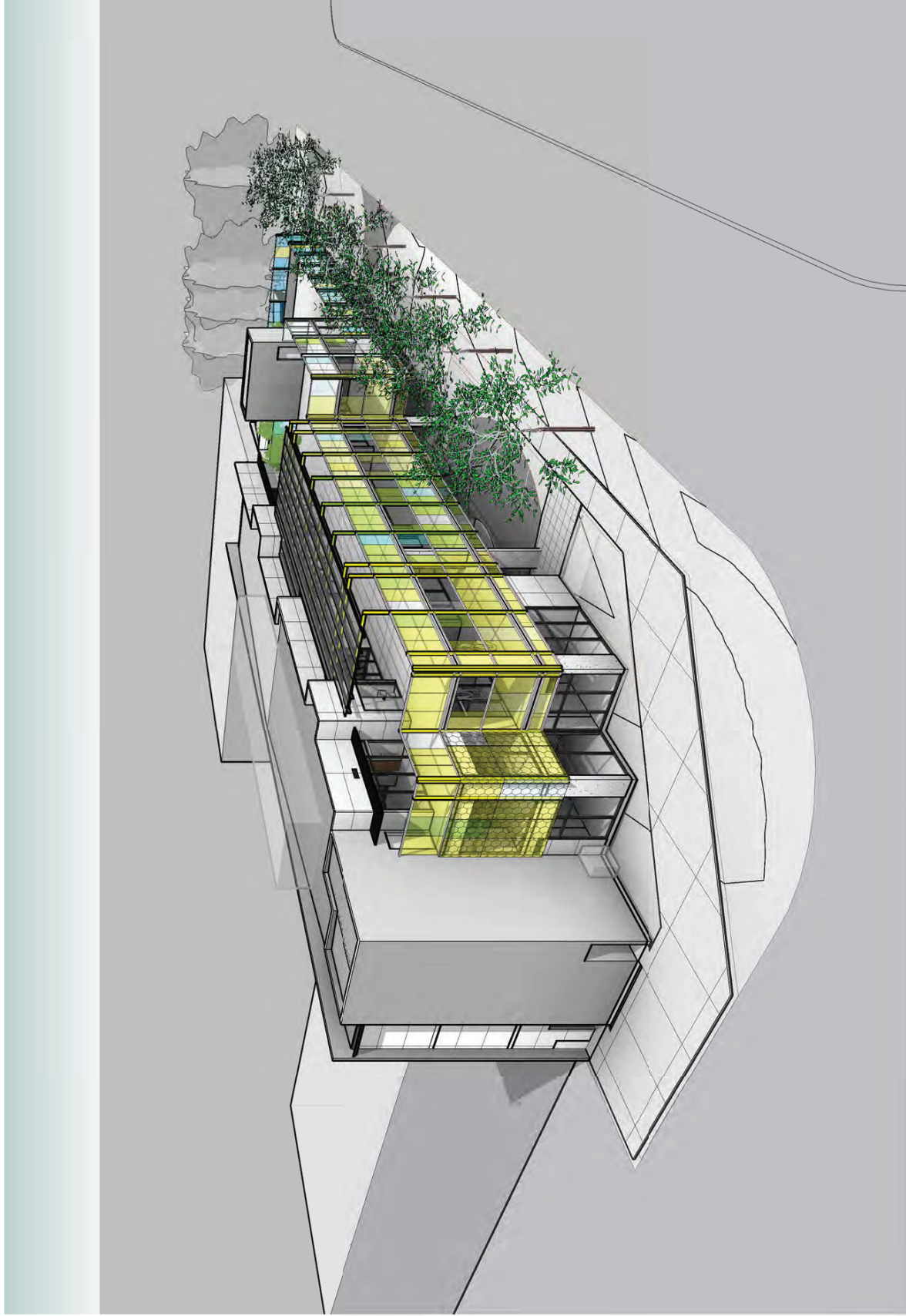


Application Number

167621

Sheet

119 of 208



Rev	Amendment	Date	Init
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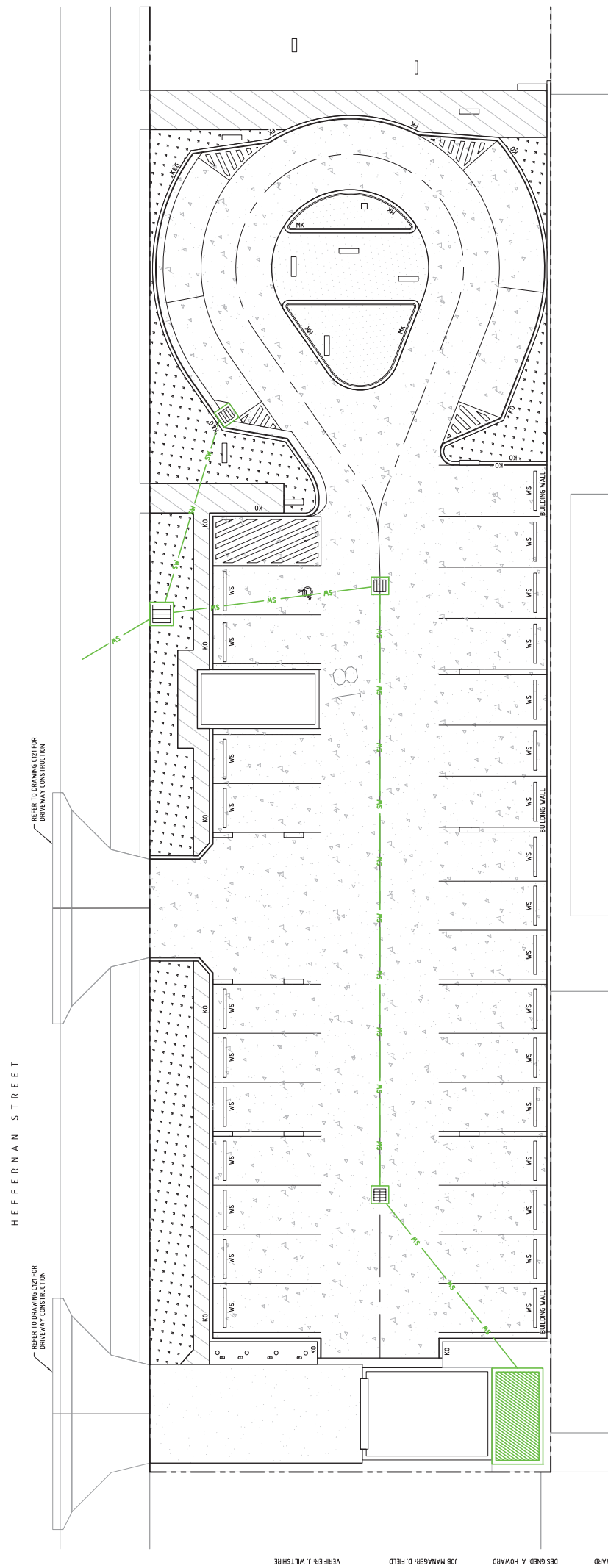
MITCHELL CHILDCARE CENTRE
 BLOCK 18, SECTION 11 CORNER DARLING &
 HEFFERNAN STREET, MITCHELL, ACT

PERSPECTIVES			
Drawn	Date	Scale	Project Number
Author		A3	A17041
Review	Date	Project Leader	Drawn
Checker		Designer	
PRELIMINARY			Drawing Number
			SK 802
			Arch

Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or final drawings.

- LEGEND**
- PROPOSED PAVEMENT STRUCTURES**
- KAG - KERB & GUTTER
 - KO - KERB ONLY
 - WS - WHEEL STOP
 - MK - MOUNTABLE KERB
 - FK - FLUSH KERB
- ALL KERBING TO BE CONSTRUCTED TO TCCS STANDARD DRAWING DS3-01
- B - BOLLARD
- PROPOSED SERVICES**
- SW - STORMWATER MAIN
 - SM - STORMWATER MANHOLE
 - SS - STORMWATER SUMP
 - RT - 24 L. RETENTION TANK

- PAVEMENT LEGEND**
- CONCRETE CIRCULATION ROAD
100mm N32 CONCRETE - BROOM FINISH
5.7% REINFORCEMENT - CENTRALLY PLACED
100mm DAB22 COMPACTED TO 95% MHDD
SUBGRADE COMPACTED TO 95% MHDD
 - HEAVY DUTY PAVEMENT FOR WASTE COLLECTION
100mm N32 CONCRETE - BROOM FINISH
5.7% REINFORCEMENT - TOP COVER
100mm DAB22 COMPACTED TO 95% MHDD
SUBGRADE COMPACTED TO 95% MHDD
 - INFILL CONCRETE PAVEMENT
100mm N35 CONCRETE - FINISH TO ARCHITECT'S SPECIFICATIONS
5.7% REINFORCEMENT - 50mm TOP COVER
100mm DAB22 COMPACTED TO 95% MHDD
SUBGRADE COMPACTED TO 95% MHDD
 - FOOTPATH
TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
CONSTRUCTED IN ACCORDANCE WITH TCCS STANDARD DRAWING DS-131
 - GRASSED AREA
TO LANDSCAPE ARCHITECT'S SPECIFICATIONS



NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VERD	APP'D	DATE	CLIENT
1	DRAFT D.A.	AH		JW	22.11.17	
2	D.A.	AH		JW	30.11.17	

DRAWMAN: A. HOWARD
 DESIGNED: A. HOWARD
 JOB MANAGER: D. FIELD
 CHECKER: J. WILTSHIRE

PROJECT
 CHILDCARE CENTRE
 BLOCK 18 SECTION 11 MITCHELL


DRAWING TITLE
 CIVIL WORKS AND
 SITE WORKS AND
 PAVEMENT PLAN

JOB NUMBER
 CR171360

DRAWING NUMBER
 REVISION
C120 2

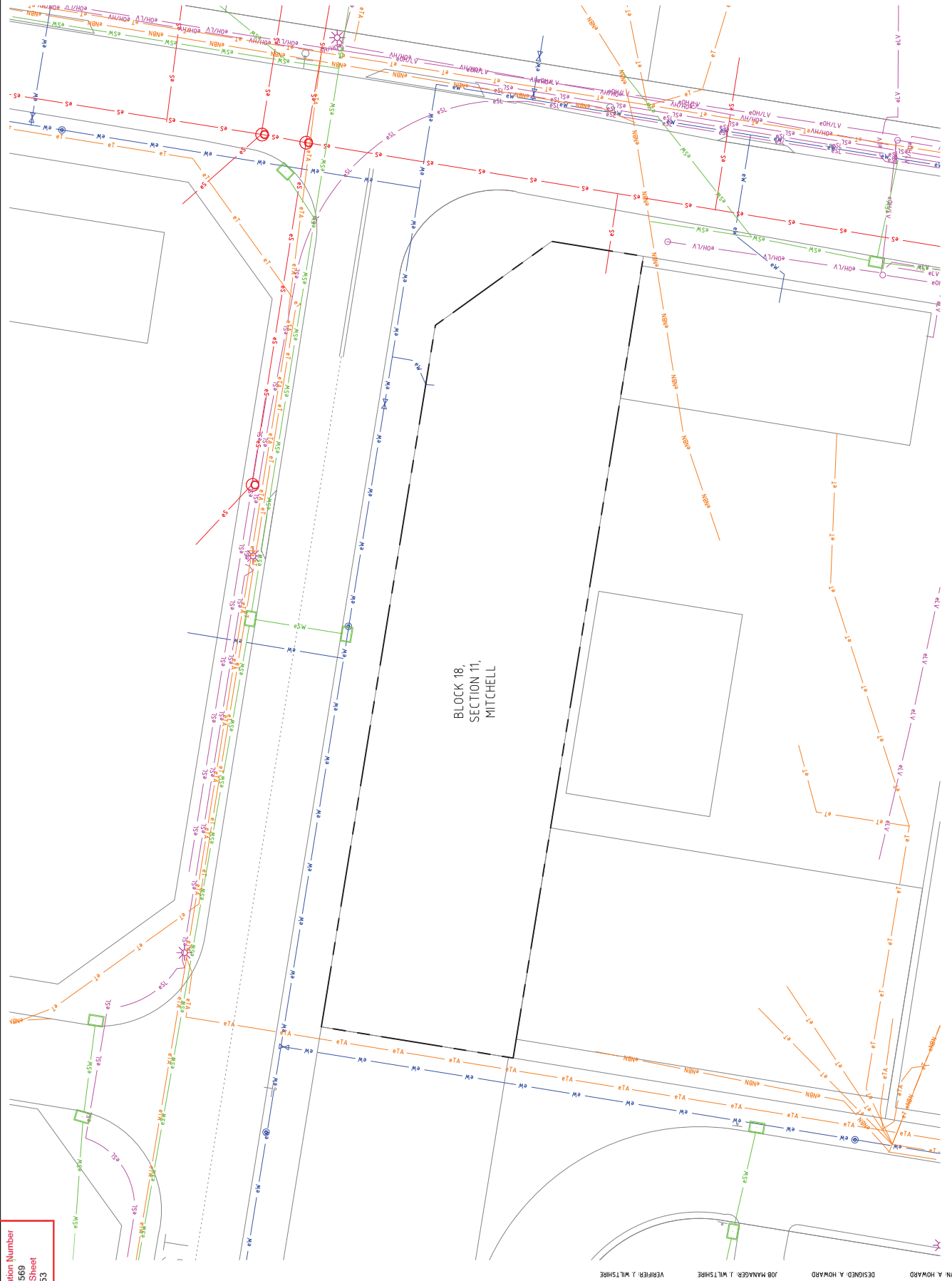
SCALE
 SCALE: 1:100 @ A1

ARCHITECT
 ARPM
 ARCHITECTURE PROJECT
 CONSULTING INTERIOR DESIGN
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BLOCK 18,
SECTION 11,
MITCHELL

EXISTING SERVICES LEGEND

	STORMWATER PIPE / MAINTENANCE HOLE / SIDE ENTRY PIT
	SEWER PIPE / MAINTENANCE HOLE / GENERAL BYPASS
	SEWER RISING MAIN / MAINTENANCE HOLE
	EXISTING WATER PIPE
	HYDRANT - STANDARD / HIGH CAPACITY
	EXISTING FIRE SERVICE / SLUICE VALVE / HYDRANT
	EFFLUENT PIPE / SLUICE VALVE
	ELECTRICAL SERVICE / POWER POLE / PIT
	STREETLIGHT SERVICE / LIGHT POLE
	GAS SERVICE / VALVE / MARKER
	TELSTRA SERVICE / PIT / MINI PILLAR
	OPTUS SERVICE / PIT
	ICOM SERVICE / PIT / MARKER
	TRANSACT SERVICE / PIT
	OPTIC FIBRE

GENERAL NOTES

- REFER SERVICE LIST ATTACHED DRAWING FOR EXISTING SERVICES GENERAL REQUIREMENTS.
- ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH LOCAL AUTHORITY REQUIREMENTS.
- ALL EXISTING SERVICES INDICATED ON THESE DRAWINGS ORIGINATE FROM SUPPLIED DATA OR DATA BEFORE YOU DIG SEARCHES. GUARANTEED BY THE SUPPLIER OF THE DATA. THE CONTRACTOR TO DETERMINE AND CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES TO THE CONTRACTOR'S SATISFACTION. THE CONTRACTOR TO OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE PROVIDERS TO ALLOW FOR THE WORK TO BE CARRIED OUT. THE CONTRACTOR TO ALLOW TO ADJUST AND LAISE WITH RELEVANT SERVICE PROVIDERS IN RELATION TO EXISTING SERVICE ADJUSTMENT REQUIREMENTS.
- ANY EXISTING COVER DEPTHS SHOWN ARE ASSUMPTIONS BASED ON INFORMATION PROVIDED AND SHOULD BE VERIFIED BY THE CONTRACTOR. CHECKING DEPTHS IS REQUIRED PRIOR TO CONSTRUCTION AT THE CONTRACTOR'S EXPENSE.
- CONTRACTOR TO REPORT ANY DISCREPANCIES TO THE SUPERINTENDENT PRIOR TO CONSTRUCTION.
- CONTRACTOR TO REPORT ANY DISCREPANCIES TO THE SUPERINTENDENT PRIOR TO CONSTRUCTION.



NOT FOR CONSTRUCTION

JOB NUMBER	CR171360
DRAWING NUMBER	REVISION
C070	2
DRAWING SHEET SIZE = A1	

CIVIL WORKS
EXISTING SERVICES PLAN

PROJECT
CHILDREAN CENTRE
BLOCK 18 SECTION 11 MITCHELL

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SCALE 1:200 @ A1

ARCHITECT
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ARCHITECTURE PROJECT
CONSULTING INTERIOR DESIGN

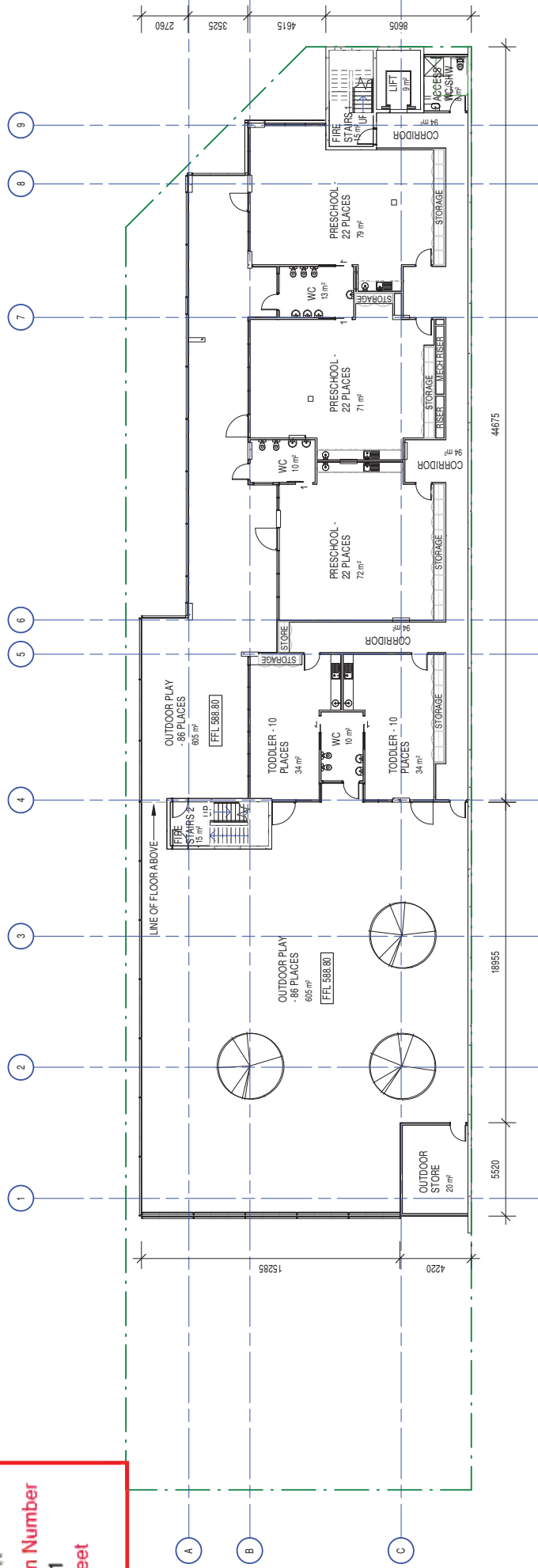
CLIENT
VERIFIED APP'D DATE
 AH JW 22.11.17
 AH JW 30.11.17

REVISION

1	DRAFT D.A.				
2	D.A.				

ISSUED	VERD	APP'D	DATE	CLIENT
	AH	JW	22.11.17	
	AH	JW	30.11.17	

DRAWN: A HOWARD
DESIGNED: A HOWARD
JOB MANAGER: J WILTSHIRE
VERIFIER: J WILTSHIRE



Rev	Amendment	Date	Init

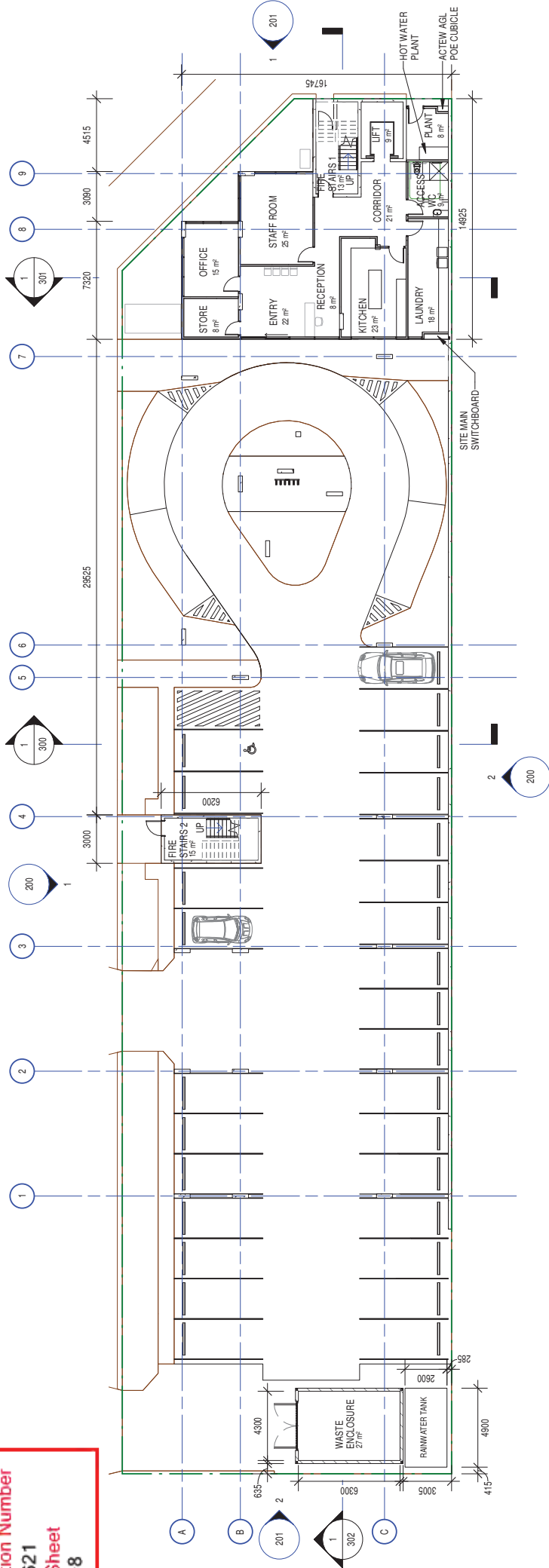


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MITCHELL CHILDCARE CENTRE
BLOCK 18, SECTION 11 CORNER DARLING &
HEFFERNAN STREET, MITCHELL, ACT

FIRST FLOOR PLAN			
Drawn	Date	Scale	Project Number
Author		1 : 250	A3
Review	Date	Project Leader	Design
Checker	Date	Designer	Drawing Number
PRELIMINARY			SK 103
ACT11			

Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or stage change.



Rev	Amendment	Date	Init



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MITCHELL CHILDCARE CENTRE
 BLOCK 18, SECTION 11 CORNER DARLING &
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GROUND FLOOR PLAN			
Drawn	Date	Scale	Project Number
Author		1 : 250	A3
Reviewed	Date	Project Leader	Checker
Designer			
Project Number	SK 102	Drawing Number	ACT11
PRELIMINARY			

Consultant shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or stage drawings.

CIVIL NOTES

- UNLESS NOTED OTHERWISE, CARRY OUT ALL WORK IN ACCORDANCE WITH THE CURRENT EDITION OF "TRANSPORT CAMBERRA AND CITY SERVICES STANDARD SPECIFICATION FOR URBAN INFRASTRUCTURE".
- CONTRACTOR TO OBTAIN SERVICES CLEARANCES FROM ALL RELEVANT AUTHORITIES TO PROTECT & MAINTAIN EXISTING SERVICES DURING CONSTRUCTION. RESTORE ALL SERVICES AT THE COMPLETION OF THE WORKS.
- CONTRACTOR IS TO DESIGN, OBTAIN APPROVALS AND CARRY OUT REQUIRED TEMPORARY TRAFFIC CONTROL PROCEDURES.
- CONTRACTOR IS TO CHECK WITH RELEVANT AUTHORITIES TO ENSURE WORKS ARE DAMAGED BY THE WORK TO THEIR ORIGINAL CONDITION ON COMPLETION OF WORKS.
- CONTRACTOR TO OBTAIN APPROVALS TO ENSURE WORKS ARE DAMAGED BY THE WORK TO THEIR ORIGINAL CONDITION ON COMPLETION OF WORKS.
- CONTRACTOR TO OBTAIN APPROVALS TO ENSURE WORKS ARE DAMAGED BY THE WORK TO THEIR ORIGINAL CONDITION ON COMPLETION OF WORKS.

EARTHWORKS

- ALLOW FOR EXCAVATION IN ALL MATERIALS AS FOUND UNDO.
- RECALL EXPOSED POLLUTION CONTROL MEASURES IN ACCORDANCE WITH THE ENVIRONMENTAL PROTECTION AGENCY REQUIREMENTS.
- REMOVE ALL EXISTING ORBANKS, BUILDINGS, REINFORCEMENT, CONCRETE & BROWN PLANKING AND SPILL OFF SITE TO AN APPROVED LOCATION, STRIP, TOPSOIL AND STOCKPILE FOR REUSE.
- REMOVE ALL TREES AND ROOTS EXCEPTING THOSE INTENDED FOR RETENTION. GRUB OUT ROOTS AND STUMPS OVER 75mm DIAMETER TO A MINIMUM OF 100mm BELOW GROUND LEVEL AND COMPACT IN 200mm COMPACTED LAYERS TO THE LEVELS SHOWN ON THE DRAWINGS.
- WHERE THERE IS INSUFFICIENT EXISTING MATERIAL SUITABLE FOR FILLING OR REUSE, IMPORT FILL SHALL COMPLY WITH THE FOLLOWING: MAXIMUM SIZE 50mm, PASSING 75% THROUGH 75mm SIEVE, PLASTICITY INDEX-LESS THAN 5% AND CBH < 8.
- FOR ROLL THE EXPOSED SURFACE WITH AT LEAST A 20 TONNE ROLLER IN THE DIRECTION OF TRAFFIC. REFORM THE SURFACE TO THE REQUIRED FINISH AND SURFACE CARRY OUT REPAIRS AS NECESSARY TO ACHIEVE THE REQUIRED FINISH.
- EXCAVATE AND REFACE UNSUITABLE LAYERS IN SELECT MATERIAL FROM EXCAVATION, PLACED IN 200mm LAYERS, WITH EACH LAYER COMPACTED TO 95% MOHD. UNSUITABLE MATERIAL TO BE SPOILED FROM SITE.
- UNDETAKE CUT/FILL OPERATIONS TO ESTABLISH THE BUILDING PLATFORM LEVELS NOMINATED.
- COMPACT THE EXPOSED SURFACE TO THE FOLLOWING CONDITIONS: UNDER FUTURE BUILDINGS COMPACT TO 95% MOHD MAXIMUM DRY DENSITY 1.90; UNDER FUTURE DRIVEWAYS COMPACT TO 95% MOHD MAXIMUM DRY DENSITY 1.80; UNDER ALL OTHER AREAS COMPACT TO 90% MOHD. UNDETAKE CUT/FILL OPERATIONS TO ESTABLISH THE BUILDING PLATFORM LEVELS NOMINATED.
- UNDETAKE CUT/FILL OPERATIONS TO ESTABLISH THE BUILDING PLATFORM LEVELS NOMINATED.
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- UNDETAKE CUT/FILL OPERATIONS TO ESTABLISH THE BUILDING PLATFORM LEVELS NOMINATED.

EARTH WORKS (CONT)

- #### TESTING
- COMPLY WITH THE FOLLOWING TESTS BY A NATA REGISTERED LABORATORY:
 - ODD LAYER: 100mm x 100mm x 100mm TEST PER 100m² OR SUCCESSIVE LAYERS TO OBTAIN REPRESENTATIVE RESULTS.
 - EVEN LAYER: 100mm x 100mm x 100mm TEST PER 100m² OR SUCCESSIVE LAYERS TO OBTAIN REPRESENTATIVE RESULTS.
 - FILL TO BE CERTIFIED BY AN APPROPRIATELY QUALIFIED ENGINEER TO LEVEL 1 STANDARD AS DEFINED IN AS 3798.
 - STABILISE TOPSOIL TO BE SPREAD AND LANDSCAPE BATTERS TO FINISH LEVEL ALL EXPOSED TOPSOIL & FILL TO ORIGINAL LEVEL SPREAD OVER SITE IN A LEGAL NUMBER OF STABILISATION ENGINERS SPANNING.
 - CONTROL ALL RAINWATER AND GROUNDWATER SEEPAGE BY PAVING, COMPLY WITH ENVIRONMENTAL PROTECTION AGENCY REQUIREMENTS RELATING TO DISPOSAL OF SITE WATER.
 - TOLERANCE LEVELS: +25mm, -10mm

TREE PROTECTION

- #### GENERAL
- INSTALL ALL PROTECTIVE MEASURES PRIOR TO COMMENCING CONSTRUCTION WORKS. ADVISE TRANSPORT CAMBERRA AND CITY SERVICES (AA) IN WRITING THAT THE PROTECTIVE MEASURES HAVE BEEN INSTALLED IN ACCORDANCE WITH THE APPROVED UPP.
 - ALL VERGE VEGETATION INCLUDING GRASS SHALL BE PROTECTED AND RETAINED THROUGHOUT THE CONSTRUCTION PERIOD. TO OBTAIN VEGETATION IN GOOD CONDITION.
 - WHERE ANY UNLAWFUL DAMAGE OR OBSTRUCTION TO ANY TREE OR SHRUB SHALL BE ENGAGED BY THE CONTRACTOR TO REMEDIATE ALL MAJOR WORK IN THE VERGE.
 - CONSTRUCTION MATERIAL SHALL NOT BE STORED ON VERGES OR PUBLIC OPEN SPACES.
 - CAR PARKING OR EQUIPMENT PARKING SHALL NOT BE PERMITTED ON VERGES OR ADJACENT PARKLAND.
 - SIZE GRASS, STRAW, BRUSH, WASTE OR OTHER DEBRIS SHALL NOT BE DEPOSITED ON VERGES OR PUBLIC OPEN SPACES WITHOUT THE PRIOR WRITTEN APPROVAL OF THE MANAGER, TCSS, OR THE USE OF VERGES, PUBLIC OPEN SPACES OR UNRELEASED TERRITORY LAND.
- #### PROTECTIVE FENCING
- ALL TEMPORARY PROTECTIVE FENCES SHALL BE IN ACCORDANCE WITH THE APPROVED UPP.
 - FENCE OFF TREES, PLANTINGS AND GRASS MARKED FOR RETENTION TO ENDS OF THE STREET VERGE, PUBLIC OPEN SPACE OR UNRELEASED TERRITORY LAND AREA.
 - THE STANDARD LOCATION FOR FENCING SHALL BE:
 - FOR EACH TREE ALONG THE DRAIN LINE 1.2m OFFSET TO THE BACK OF THE KERB FOR THE FULL FRONTAGE OF THE LEASE, ALONG THE PROPERTY BOUNDARY AND ALONG THE DRIVEWAY ACCESS TO ENSURE THAT THE VERGE IS COMPLETELY ENCLOSED.
 - FENCING SHALL BE ERECTED BEFORE THE COMMENCEMENT OF ANY SITE WORKS AND SHALL BE REMAIN IN PLACE THROUGHOUT THE WORKS AND REMOVED PRIOR TO RESTORATION OF THE VERGE.
 - USE TEMPORARY 600mm CONTINUOUS MESH FENCE SUPPORTED BY STEEL POSTS WITH CONCRETE BASES UNLESS OTHERWISE APPROVED IN WRITING BY TCSS.
 - MAINTAIN ALL EXISTING FOOTPATHS AND PROVIDE SAFE PEDESTRIAN MOVEMENT AT ALL TIMES.
 - WHERE A CONSTRUCTED FOOTPATH/CYCLEWAY EXISTS IN THE VERGE, OFFSET FENCING 600mm EACH SIDE.
 - WHERE A CONSTRUCTED FOOTPATH/CYCLEWAY PROVIDE A FENCED CLEARWAY 900mm WIDE FOR PEDESTRIAN ACCESS. ALONG THE ENTIRE FRONTAGE OF THE VERGE.
 - FENCING SHALL NOT BE REMOVED FOR THE SERVICE INSTALLATION UNLESS OTHERWISE APPROVED IN WRITING FROM TCSS. ENSURE ALL TREES ARE PROTECTED THROUGHOUT THE CONSTRUCTION PERIOD. FENCING ON COMPLETION RETURN THE FENCE TO ORIGINAL ALIGNMENT.
 - FILL MATERIALS TO BE PLACED IN MAXIMUM 200mm LAYERS, EACH LAYER COMPACTED TO THE NOMINATED DENSITY AND 90% DRY WEIGHT.
 - IMPOSED FILL TO MAKE UP ANY SHORTFALL IMPORTED FILL TO COMPLY WITH FOLLOWING CONDITIONS:
 - PASSING 75% THROUGH 75mm SIEVE - NOT GREATER THAN 25% PASSING 150mm SIEVE.
 - CBH - NO LESS THAN 8.
 - FREE OF ORGANIC MATTER AND LUMPS OF CLAY.

TREE PROTECTION (CONT)

- #### SERVICES AND UTILITIES
- SERVICES AND UTILITIES SHALL BE Laid ONLY IN THE LOCATIONS SHOWN ON THE DRAWINGS. WHERE SERVICES ARE NOT SHOWN, THEY SHALL BE IDENTIFIED AND WHERE SHOWN ON THE DRAWINGS, THEY SHALL BE IDENTIFIED AND WHERE SHOWN ON THE DRAWINGS, THEY SHALL BE IDENTIFIED AND WHERE SHOWN ON THE DRAWINGS, THEY SHALL BE IDENTIFIED.
 - UNLESS OTHERWISE SHOWN ON THE DRAWINGS NO TRENCHING SHALL BE CARRIED OUT WITHIN THE DRAIN LINE OF ANY TREE.
 - THE NUMBER OF VERGE CROSSINGS SHALL BE MINIMISED, WHERE PRACTICAL AND PERMITTED SHARED TRENCHING SHALL BE ADOPTED.
 - TRENCHES SHALL BE LOCATED MIDWAY BETWEEN TREES.
- #### SITE ACCESS
- SITE ACCESS SHALL ONLY BE VIA THE ACCESS POINTS SHOWN ON THE DRAWINGS.
 - PRIOR WRITER APPROVAL FOR ALTERNATIVE OR ADDITIONAL ACCESS POINTS SHALL BE OBTAINED THROUGH TCSS.
 - NEW ACCESS POINTS SHALL BE LOCATED MIDWAY BETWEEN EXISTING TREES UNLESS IT IS ABSOLUTELY DO NOT LOCATE ANY ACCESS WITHIN THE DRAIN LINE OF ANY TREE.
- #### WORKING NEAR TREES
- ALL TREES LOCATED IN THE ROAD RESERVE, PUBLIC OPEN SPACE AND UNRELEASED TERRITORY LAND SHALL BE PROTECTED FROM DISTURBANCE, DAMAGE OR ANY DISTURBANCE, DAMAGE OR DESTRUCTION OF ANY TREE OR LANDSCAPE ASSET.
 - EXISTING CANOPY CLEARANCES SHALL NOT BE ALTERED. CROWN AND APEX OF CANOPIES SHALL NOT BE ALTERED OR REDUCED.
 - REMOVE BRUSH, WEEDS AND GRASS FROM THE VERGE AND APEX OF TREE CANOPY WITHOUT DAMAGE TO CROWN. ENSURE CONSTRUCTION EQUIPMENT CAN PASS BENEATH LOWEST LIMB.
 - DO NOT EXCAVATE OR OTHERWISE DISTURB THE SURFACE LAYER WITHIN THE DRAIN LINE OF ANY TREE WITHOUT THE PRIOR WRITTEN APPROVAL OF TCSS.
 - DO NOT SEVER ROOTS >30mm DIAMETER CLOSER THAN HALF WAY FROM THE DRAIN LINE TO THE TRUNK.
 - HAND EXCAVATE TO A DEPTH OF 300mm TO LOCATE ROOTS BEFORE COMMENCING MACHINE EXCAVATION.
 - CUT ROOTS CLEANLY WITH EQUIPMENT SPECIFICALLY DESIGNED FOR PRUNING ROOTS.
 - PROTECT ANY EXPOSED ROOTS FROM DESICCATION. KEEP LIGHTLY WATERED OR COVER WITH MOST HEAVY HESSIAN AFTER REPLACEMENT OF TOPSOIL. REGULARLY WATER TREES UNTIL REESTABLISHED.
- #### CONDITION AND RESTORATION
- PRIOR TO COMMENCEMENT NOTIFY TCSS OF COMMENCEMENT OF WORK AND UNDETAKE A JOINT CONDITION SURVEY.
 - AT THE COMPLETION OF WORKS ENSURE THAT THE CONDITION OF ALL VEGETATION IS CONSISTENT WITH THE INITIAL CONDITION SURVEY.
 - UNDETAKE A JOINT CONDITION SURVEY AT COMPLETION OF WORKS AND IMPLEMENT ANY DIRECTIVE FROM TCSS.
 - IF THE GRASS COVER REQUIRES IMPROVEMENT, LIGHTLY CULTIVATE THE SOIL TO 50mm, ADD 50mm OF TYPE 9B TOPSOIL AND GRADE EVENLY. ADD 80kg FERTILISER AT 140g/ha/m² LAY TURF, WATER AND MAINTAIN UNTIL ESTABLISHED.
 - DAMAGED TREES SHALL BE ASSESSED BY TCSS AND REPAIRED OR REPLACED BY THE CONTRACTOR AS DIRECTED.

POLLUTION, EROSION & SEDIMENT CONTROL

- #### GENERAL
- THE CONTRACTOR MUST ENTER INTO AN ENVIRONMENT PROTECTION AGREEMENT WITH THE EPA.
 - ENSURE THAT ALL ENVIRONMENTAL PROTECTION WORKS ARE IN PLACE BEFORE COMMENCING CONSTRUCTION ON THE SITE.
 - USE AS NECESSARY WITH THE EPA AND OBTAIN AGREEMENT TO THE ADOPTED ENVIRONMENTAL PROTECTION WORKS.
 - KEEP A COPY OF THE EPA APPROVED EROSION AND SEDIMENT CONTROL PLAN ON SITE AT ALL TIMES THROUGHOUT CONSTRUCTION.
 - USE ALL POLLUTION CONTROL WORKS WHOLLY WITHIN THE SITE UNLESS OTHERWISE PRE-APPROVED.
 - CONDUCT AN ENVIRONMENTAL PROTECTION SURVEY IN ACCORDANCE WITH THE ENVIRONMENTAL PROTECTION AGENCY REQUIREMENTS AND DEVELOP A PLAN OF WORK IN ACCORDANCE WITH THE ENVIRONMENTAL PROTECTION AGENCY REQUIREMENTS AND DEVELOPMENT IN THE ACT (12/01) AND THE NSW BLUE BOOK AS APPROPRIATE.
 - ASSIGN A DESIGNATED PARKING AREA. ALL VEHICLES VEHICLES ARE TO BE PARKED IN LEGAL PARKING ZONES, WHERE POSSIBLE, TO BE PARKED WITHIN THE BLOCK.
 - MINIMISE DISTURBANCE OF THE EXISTING SURFACE AND VEGETATION.
- #### SPOIL MANAGEMENT
- DESIGNATE AN AREA ON SITE FOR CONCRETE TRUCK WASH-DOWNS.
 - BRICK CUTTING TO OCCUR ON SITE WITHIN THE MATERIALS AND WASTE STORAGE AREA.
 - SPOIL TO BE DEPOSED OF APPROPRIATELY TO AN APPROVED LOCATION OFF SITE.
- #### NOISE
- ENSURE ALL CONSTRUCTION WORK THAT GENERATES NOISE TAKES PLACE ONLY WITHIN THE PRE-APPROVED OPERATING HOURS FOR THE PROJECT: MONDAY TO SATURDAY, BETWEEN 7AM AND 6PM.
- #### SEDIMENT CONTROLS AND STORMWATER
- MAINTAIN STAKE SITE ACCESS CONTROL WITH A STABILISED ACCESS POINT THAT ALL VEHICLES MUST USE.
 - AT THE END OF EACH DAY OR WHEN STOP, OBTAIN ORS TO ANY BANK EROSION, REMOVE ANY SEDIMENT FROM PUBLIC ROADS ADJACENT TO THE WORK AREA, DO NOT WASH INTO THE STORMWATER SYSTEM.
 - MAINTAIN AS MUCH VEGETATIVE COVER AS PRACTICAL PARTICULARLY BESIDE MAIN DRAINAGE LINES. FENCE OFF BUFFER AREAS TO PREVENT DISTURBANCE.
 - PROTECT ALL CUT AND FILL BATTERS FROM RUN-OFF AND STABILISE IMMEDIATELY AFTER CONSTRUCTION.
 - USE CONTOUR PLOUGHING AND/OR SURFACE ROUGHENING OF FINISHED LANDFORM TO SLOW WATER FLOW DURING RAIN EVENTS.
 - INSTALL SILT FENCES ON THE LOW SIDE OF ANY STOCKPILE.
 - INSTALL PERMANENT DRAINAGE FACILITIES AT AN EARLY STAGE.
 - FILTER SOCKS TO BE INSTALLED AT ALL OPEN INTAKES AND KERB SIDE SUMPS PROGRESSIVELY AS CONSTRUCTION PROCEEDS.
 - PROVIDE PROTECTION TO NEW DRAINAGE INLETS IMMEDIATELY ON CONNECTION TO THE DRAINAGE SYSTEM.
 - ESTABLISH ALTERNATIVE STABLE DRAINAGE SYSTEMS THROUGH THE SITE WHILE PERMANENT FACILITIES ARE BEING INSTALLED.
 - USE DIVERSION STRUCTURES TO CONVERT RUN-OFF TO A STABLE DISPOSAL AREA.
 - STABILISE AND GRASS ALL DIVERSION SWALES AND DRAINS, WHERE MAJOR TEMPORARY DRAINAGE PATHS ARE CREATED. CONSTRUCT THAT DRAIN WEIRS WRAPPED IN MATRIAL ACROSS THE ENTIRE FLOW PATH AND AT 75m INTERVALS.
 - STABILISE AND GRASS ALL DIVERSION SWALES AND DRAINS.
 - INSTALL SEDIMENT TRAPS AT DRAINAGE INLETS AND OTHER POINTS OF DISCHARGE FROM AREAS OF DISTURBANCE.
 - UNDETAKE VEGETATIVE STABILISATION MEASURES IMMEDIATELY AFTER COMPLETION OF FINAL LAND FORMING.
 - PLACE HAY BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE HAY TO FILL ANY GAPS BETWEEN BALES - ENSURE THAT THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE.
 - EMBED EACH BALE IN THE GROUND 50mm-100mm AND ANCHOR WITH TWO 12m STAR PICKETS PER BALE. ENSURE THAT THE BALE IS FULLY SEATED IN THE GROUND. STAR PICKETS, LAY BALE DRIVE 600mm INTO THE GROUND AND WHERE STAR PICKETS PROTRUDE ABOVE BALES, ENSURE THEY ARE FITTED WITH SAFETY CAPS.

POLLUTION, EROSION & SEDIMENT CONTROL

- #### INSPECTIONS AND MAINTENANCE SCHEDULE
- RECORD MAINTENANCE ACTIVITIES AND DETAILS TO PROVIDE TO EPA)
 - CHUTES, BARRELS, WHEELBARROWS AND OTHER EQUIPMENT TO BE RINSED IN THE SITE WASH-DOWN AREA.
 - WASH-DOWN AREA TO BE RINSED WITH CLEAN WATER TO THE PUBLIC DRAINAGE SYSTEM ADJACENT TO THE WORK AREA. DO NOT WASH INTO THE STORMWATER SYSTEM.
 - ADDRESS DUST BY REGULAR SPRAYING OF WATER AND COVERING AND SUPPRESS VEHICLES LOADING TO TRANSPORTING SITE.
 - WEEDS AND INSECT PESTS TO BE CONTROLLED THROUGHOUT CONSTRUCTION AND UNTIL FULL STABILISATION. REPAIR AND REINSTATE WORKS AS NEEDED.
 - MONTHLY:
 - MAINTAIN AND INSPECT STABILISED SITE ACCESS POINTS.
 - MAINTAIN AND INSPECT HAY BALES, REPLACE AS REQUIRED IF DEGRADED OR DAMAGED.
- #### AIR QUALITY
- SURFACE DUST BY THE FOLLOWING METHODS WHERE APPLICABLE:
 - WATER SPRAYING OF CUT AND FILL SURFACES.
 - REGULAR SPRAYING OF WATER.
 - COVER ALL EXPOSED SOIL WITH A GEOTEXTILE OR A 100mm SOIL TOGETHER WITH STABILISING UNLINED SOIL.
 - RESTRICT SPEED OF VEHICLES ON DUSTY TERRAINS.
 - COVER VEHICLES TO PREVENT DUST FROM THE WIND.
 - IMPLEMENT MEASURES TO LIMIT AIR POLLUTION BY VEHICLES AND PLANT WORKING ON OR PASSING THROUGH THE SITE.
 - MAINTAIN POLLUTION CONTROL MEASURES DURING CONSTRUCTION AND UNTIL FULL STABILISATION. ROUTINELY INSPECT EACH WEEK AND AFTER SIGNIFICANT RAIN-FALL EVENTS REPAIR AND REINSTATE WORKS AS NEEDED TO MAINTAIN PROTECTION. RECORD ALL INSPECTIONS AND DETAILS AND PROVIDE TO EPA ON REQUEST WHEN REQUESTED.
- #### FIRE
- BURNING OF WASTE MATERIALS MUST NOT BE UNDERTAKEN.
 - FIRE MAY BE PERMITTED FOR GENERAL WEEDING PURPOSES IF IN A BRAZIER OR CONSTRUCTED FIREPLACE, USING SEASONED, UNTREATED TIMBER.

SAFETY IN DESIGN

CIVIL SAFETY REPORT

IN ACCORDANCE WITH THE REQUIREMENTS OF THE WORK HEALTH AND SAFETY REGULATIONS 2011, SO FAR AS WE ARE REASONABLY AWARE AND BASED ON THE DESIGNS FOR WHICH WE HAVE BEEN COMMISSIONED, THERE ARE NO HAZARDS RELATING TO THE DESIGN OF THE CONSTRUCTION WORKS THAT WOULD NORMALLY BE EXPECTED IN THE COURSE OF CONSTRUCTION BEYOND THOSE THAT WOULD NORMALLY BE EXPECTED IN THE COURSE OF THE SAME TYPE.

THE METHOD OF CONSTRUCTION AND THE MAINTENANCE OF SAFETY DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE BUILDER.

IF ANY CIVIL ENGINEER (OR OTHER REGISTERED PROFESSIONAL ENGINEER) IS REQUESTED TO SAFETY, THE MATTER SHALL BE REFERRED TO REGISTERED CONSULTING ENGINEERS THROUGH THE APPROPRIATE CHANNELS FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.

THIS REPORT IS PREPARED SOLELY FOR THE PURPOSES OF THE PERSON CONDUCTING THE BUSINESS OR UNDERTAKING WORK WHICH IS COVERED BY THE DESIGN UNDER REGULATION 29(1)(b) OF THE WORK HEALTH AND SAFETY REGULATIONS 2011. IT IS NOT TO BE USED FOR ANY OTHER PURPOSE.

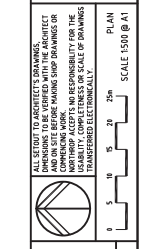
SIGNED: _____

DRAWING TITLE		JOB NUMBER	
CIVIL WORKS STANDARD NOTES		CR171360	
PROJECT		DRAWING NUMBER	
CHILDREAN CENTRE BLOCK 18 SECTION 11 MITCHELL		C001	
DRAWING SHEET		2	

PROJECT		JOB NUMBER	
CHILDREAN CENTRE BLOCK 18 SECTION 11 MITCHELL		CR171360	
DRAWING SHEET		DRAWING NUMBER	
2		C001	

NORTHROP
Camberra

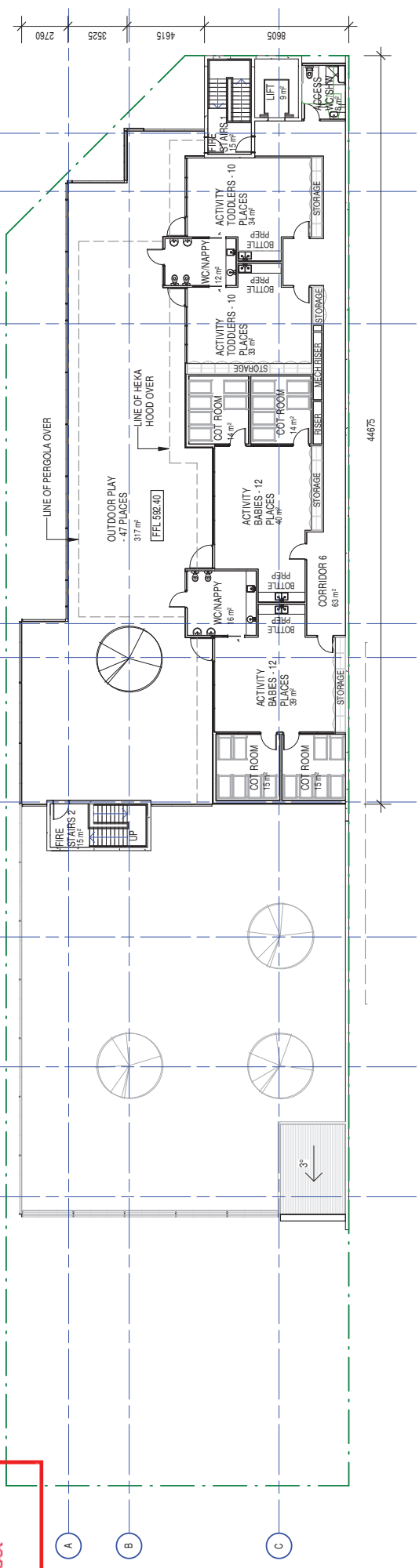
Unit 2, 24 Shea Street, Phillip ACT 2608
Ph (02) 6283 1622 Fax (02) 6283 1963
Email: camberra@northrop.com.au



THESE DRAWINGS ARE THE PROPERTY OF NORTHROP CONSULTING ENGINEERS PTY LTD. AND ARE NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF NORTHROP CONSULTING ENGINEERS PTY LTD.

REVISION	ISSUED	VERED	APP'D	DATE	CLIENT
1	DRAFT D.A.	AH	JW	22/11/17	
2	D.A.	AH	JW	30/11/17	

REVISION	DESCRIPTION	ISSUED	VERED	APP'D	DATE	CLIENT
1		AH	JW		22/11/17	
2		AH	JW		30/11/17	

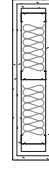


WALL TYPE LEGEND:

INTERNAL WALLS:



- P01**
- STUD FRAMED WALL - STANDARD
 - 32mm INTERNAL STEEL STUD FRAMING @ 400mm MAX CENTRES
 - 13mm PLASTERBOARD LINING TO BOTH SIDES, FLUSHED AND PAINTED
 - 11 kg/m³ POLYESTER OR GLASS WOOL 75mm INSULATION

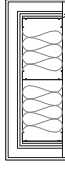


- P02**
- STUD FRAMED WALL - COT ROOMS
 - 32mm INTERNAL STEEL STUD FRAMING @ 400mm MAX CENTRES
 - 2 LAYERS 16mm FIRE RATED PLASTERBOARD LINING TO BOTH SIDES, FLUSHED AND PAINTED
 - R2.7 HIGH DENSITY GLASSWOL ACUSTIC INSULATION TO STUDS

EXTERNAL WALLS:



- E01**
- EXTERNAL STUD FRAMED WALL - STANDARD
 - 32mm STEEL STUD FRAMING @ 400mm MAX CENTRES AND NOGGINGS @ 800mm MAX CENTRES
 - 13mm PLASTERBOARD LINING INTERNALLY, FLUSHED AND PAINTED
 - R2.5 INSULATION TO STUDS
 - 9mm CEMINTEL BARESTONE EXTERNAL CLADDING (1200 X 2400mm PANELS) ON 35mm TOPHATS @ 800mm CENTRES



- E02**
- STUD FRAMED WALL - COT ROOMS
 - 150mm STEEL STUD FRAMING @ 400mm MAX CENTRES AND NOGGINGS @ 800mm MAX CENTRES
 - 2 LAYERS 16mm FIRE RATED PLASTERBOARD LINING INTERNALLY, FLUSHED AND PAINTED
 - 90mm THICK R2.7 HIGH DENSITY GLASSWOL ACUSTIC INSULATION TO STUDS
 - 2 LAYERS 9mm CFC SHEET FIXED DIRECTLY TO OUTSIDE OF STEEL STUDS, 9mm CEMINTEL BARESTONE EXTERNAL CLADDING (1200 X 2400mm PANELS) ON 35mm TOPHATS @ 800mm CENTRES OVER THE TOP OF THE 2 LAYERS OF CFC SHEET



- E03**
- PRECAST CONCRETE WALL
 - 200mm THICK PRECAST CONCRETE PANELS



Rev	Amendment	Date	Init
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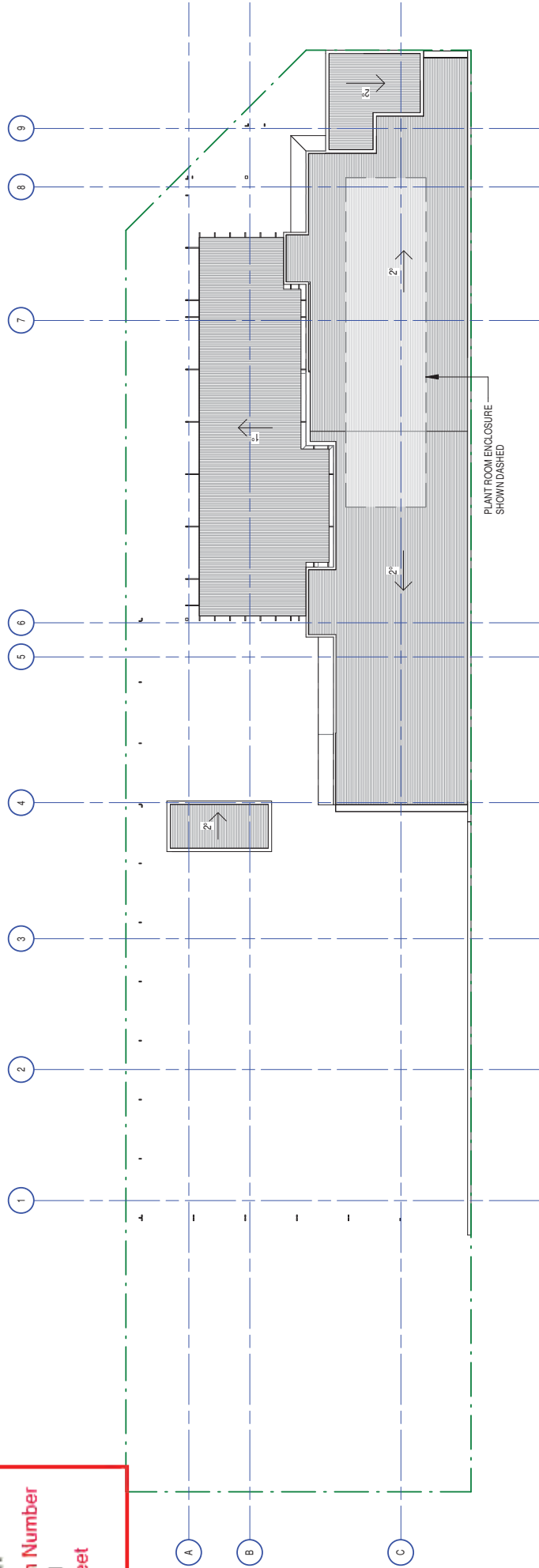
Atlanta | Brisbane | Canberra | Darwin | Hobart | Melbourne | Perth
P: 08 8238 2000 | E: info@arpm.net.au
189 Woodfield Street, Adelaide SA 5000

MITCHELL CHILD CARE CENTRE
BLOCK 18, SECTION 11 CORNER DARLING &
HEFFERNAN STREET, MITCHELL, ACT

SECOND FLOOR PLAN

Drawn	Date	Scale	Project Number
Author	As indicated	A3	A17041
Review	Date	Project Leader	Date
Checker	Date	Designer	Date
PRELIMINARY			Drawing Number
			SK 104
			Arch

Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent below, understanding any work or shop drawings



Rev	Amendment	Date	Init
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Address: 1 Alice Springs | Canberra | Drawn: Project | Brisbane | Revit
Level 15, 15 Bower Street Canberra ACT 2601 P: 02 6199 4097 | E: info@arpm.net.au

MITCHELL CHILD CARE CENTRE
BLOCK 18, SECTION 11 CORNER DARLING &
HEFFERNAN STREET, MITCHELL, ACT

ROOF PLAN			
Drawn	Scale	Project Number	
Author	1 : 250	A3	A17041
Review	Project Leader	Date	
Checker	Designer	Drawing Number	ACT11
PRELIMINARY			SK 105

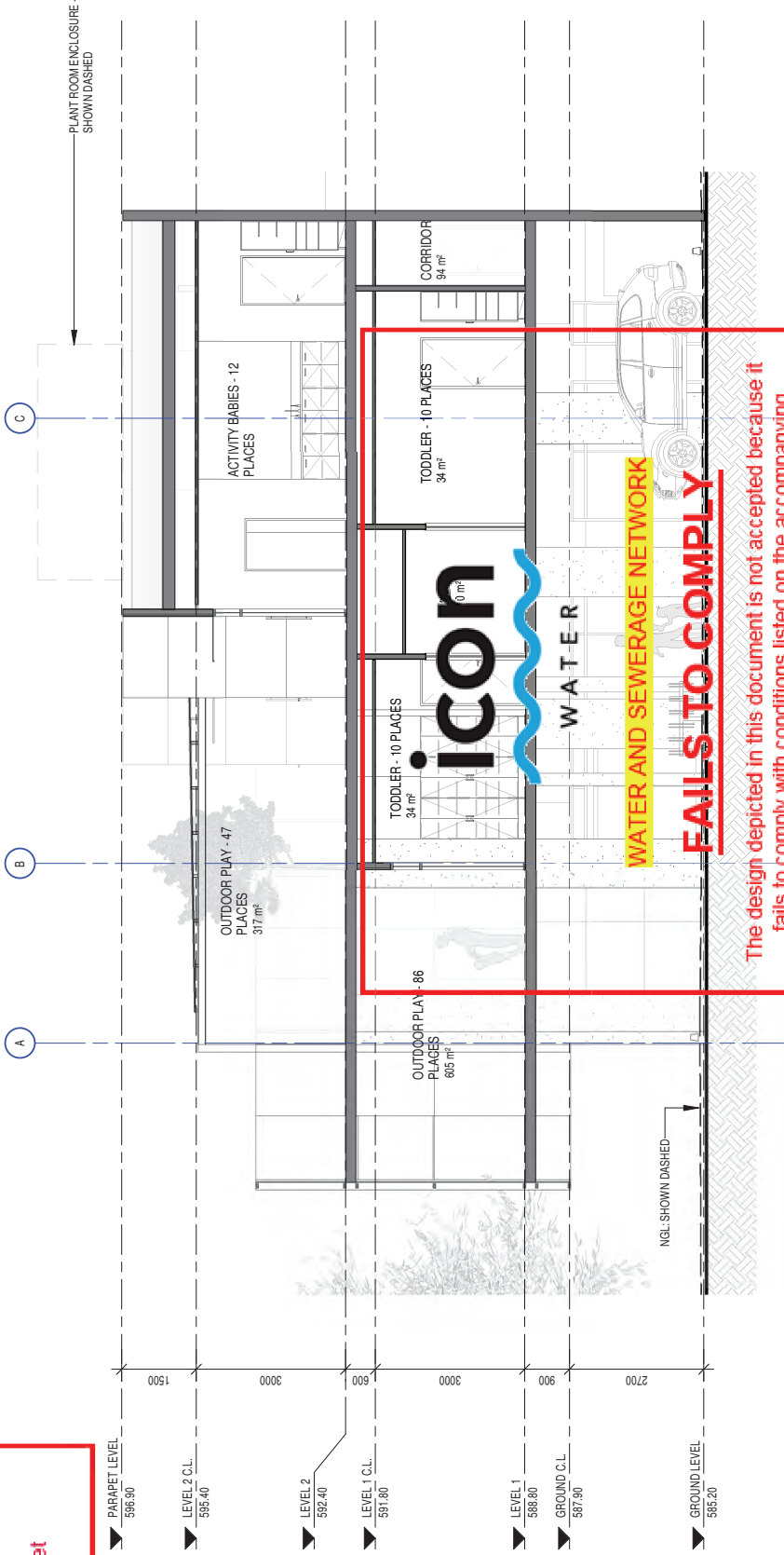


Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or stage change.





Application Number
167621
Sheet
185 of 208



1 SECTION A
102 1:100

The design depicted in this document is not accepted because it fails to comply with conditions listed on the accompanying statement.

Please note: Construction of unapproved works may result in connection to Icon Water's water and sewerage networks being denied and/or action being taken to require the property owner to remove non-compliant services or structures.

Signed Eddie Gonzalez Date 02 Mar 2018
Contact phone: 6248 3111

Rev	Amendment	Date	Init
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Atlanta | Brisbane | Canberra | Darwin | Hobart | Melbourne | Perth
Level 15, 15 Bloor Street Canberra ACT 2601 P: (02) 6169 4397 E: info@arpm.net.au

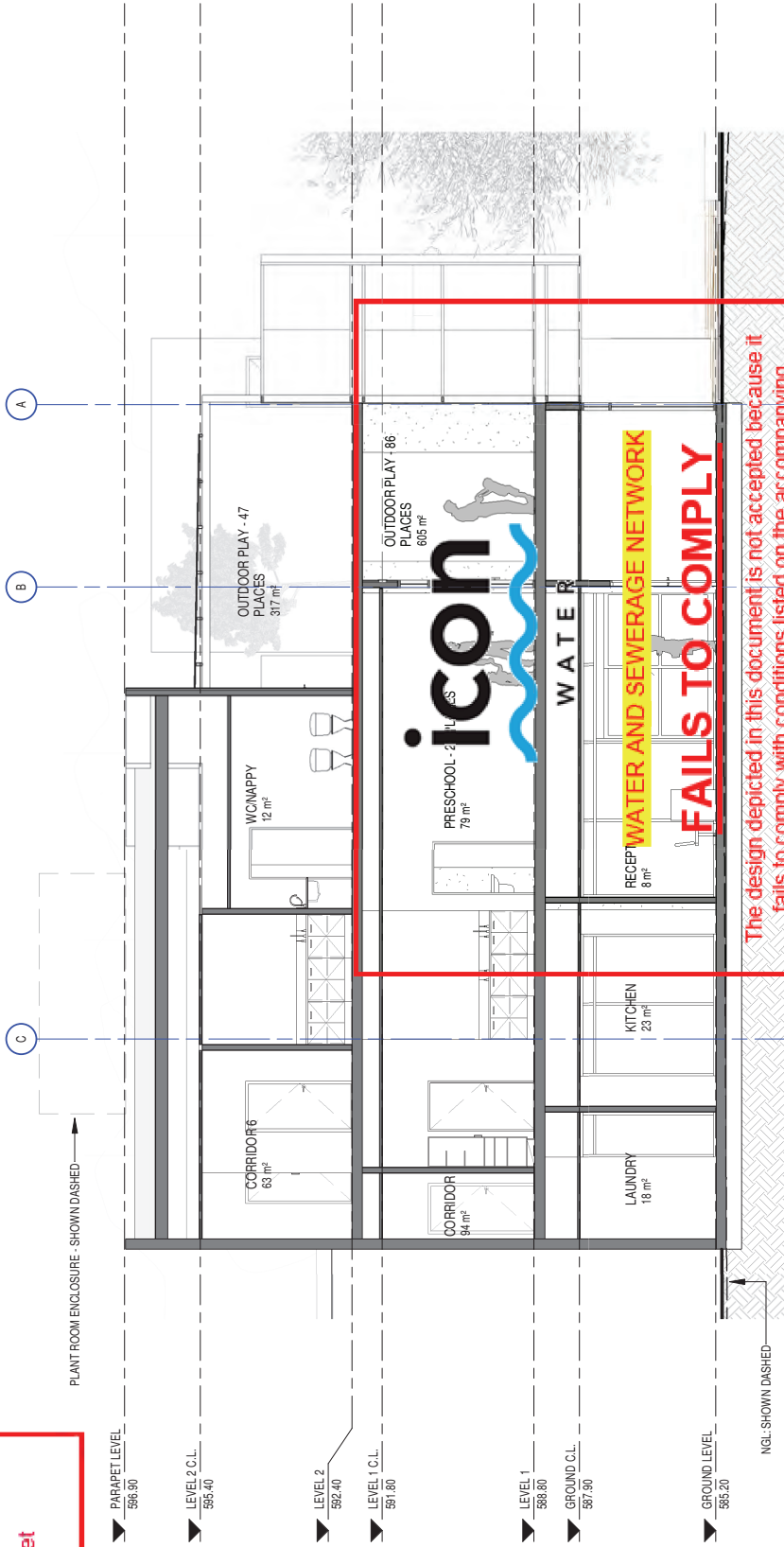
MITCHELL CHILD CARE CENTRE
BLOCK 18, SECTION 11 CORNER DARLING & HEFFERNAN STREET, MITCHELL, ACT

SECTIONS			
Drawn	Date	Scale	Project Number
Author		1:100	A3 A17041
Review	Date	Project Leads	Drawn
Checker		Designer	Drawing Number
PRELIMINARY			ACT#
			SK 300

Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or stage change.



Application Number
167621
Sheet
186 of 208



The design depicted in this document is not accepted because it fails to comply with conditions listed on the accompanying statement.

Please note: Construction of unapproved works may result in Icon Water's water and sewerage networks being denied and/or action being taken to require the property owner to remove non-compliant services or structures.

Signed **Eddie Gonzalez** Date **02 Mar 2018**

Contact phone: 6248 3111

Rev	Amendment	Date	Init
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Atlasdale | Alice Springs | Canberra | Darwin | Hobart | Melbourne | Perth
Level 15, 15 Moore Street Canberra ACT 2601 P: (02) 6169 4397 | E: info@arpm.net.au

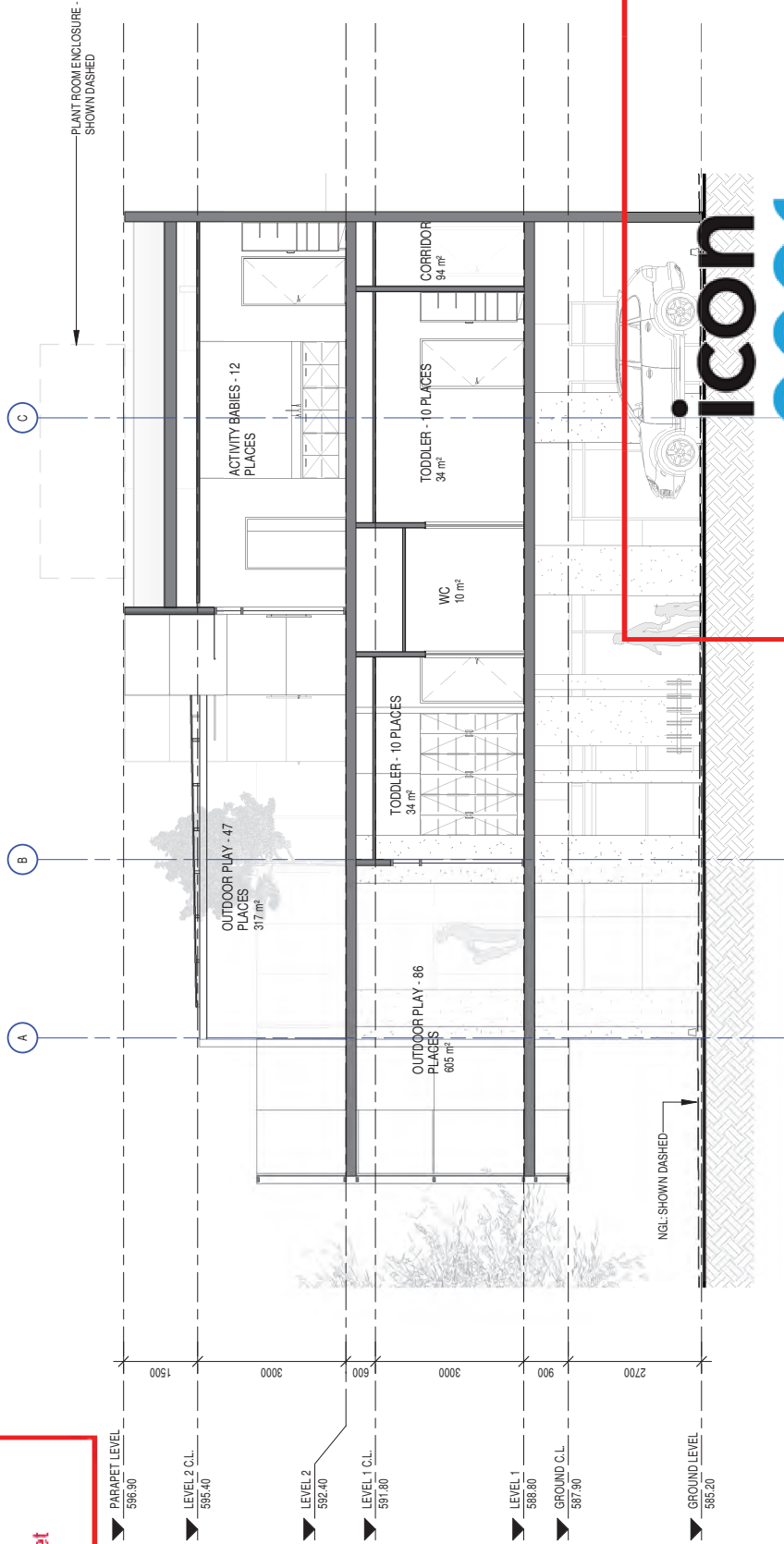
MITCHELL CHILDCARE CENTRE
BLOCK 18, SECTION 11 CORNER DARLING &
HEFFERNAN STREET, MITCHELL, ACT

SECTIONS			
Drawn	Date	Scale	Project Number
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Review	Date	Project Leader	Design
Checker		Designer	
PRELIMINARY			Drawing Number
			AK11
			SK 301

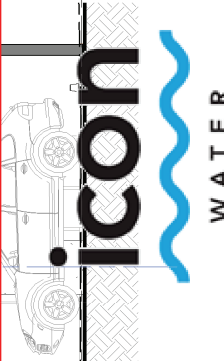
Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent below, undertaking any work or check as required.



Application Number
167569
Sheet
49 of 53



1 SECTION A
102 1:100



WATER AND SEWERAGE NETWORK

FAILS TO COMPLY

The design depicted in this document is not accepted because it fails to comply with conditions listed on the accompanying statement.

Please note: Construction of unapproved works may result in connection to Icon Water's water and sewerage networks being denied and/or action being taken to require the property owner to remove non-compliant services or structures.

Signed **Eddie Gonzalez** Date **22 Feb 2018**
Contact phone: **6248 3111**

Rev	Amendment	Date	Init
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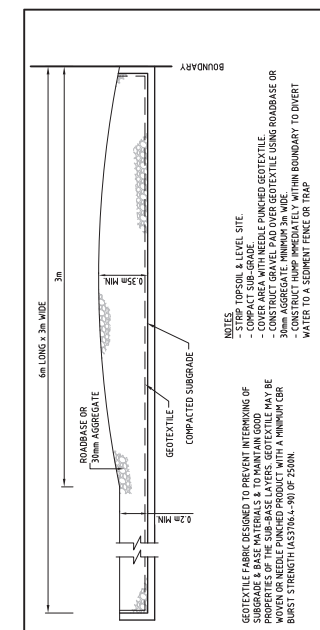


Address | Jobs | Projects | Clients | Drawings | Products | Resources | Events
Level 15, 15 Moore Street Canberra ACT 2601 P: 02 6199 4997 E: info@arpm.net.au

MITCHELL CHILD CARE CENTRE
BLOCK 18, SECTION 11 CORNER DARLING &
HEFFERNAN STREET, MITCHELL, ACT

SECTIONS			
Drawn	Scale	Project Number	
Author	1:100	A3	A17041
Review	Project Leads	Date	
Checker	Designer	Design Number	
PRELIMINARY			SK 300
			ACT11

Contractor shall check and verify all levels and dimensions on site and report any discrepancies to the Superintendent before undertaking any work or stage change.



- NOTES**
- TOPSOIL & LEVEL SITE
 - COMPACT SUB-GRADE
 - COVER AREA WITH NEEDLE PUNCHED GEOTEXTILE
 - COVER AREA WITH NEEDLE PUNCHED GEOTEXTILE USING ROADBASE OR WOVEN OR NEEDLE PUNCHED PRODUCT WITH A MINIMUM CBR BURST STRENGTH (ASTM F 1287) OF 2500N
 - CONSTRUCT HUMP IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT FENCE OR TRAP

STABILISED SITE ACCESS DETAIL

- NOTES**
- CONSTRUCTION MUST PRESENT AN ENVIRONMENT PROTECTION ACCESSION WITH THE EPA
 - ENSURE THAT ALL ENVIRONMENT PROTECTION WORKS ARE IN PLACE BEFORE COMMENCING CONSTRUCTION ON THE SITE
 - LIASE AS NECESSARY WITH THE EPA AND OBTAIN AGREEMENT TO THE ADEQUACY OF THE PROTECTION WORKS
 - KEEP A COPY OF THE EPA SIGNED EROSION AND SEDIMENT CONTROL PLAN ON SITE AT ALL TIMES. DISPLAY IN A PROMINENT LOCATION
 - CONSTRUCT AND MAINTAIN PROTECTION WORKS IN ACCORDANCE WITH THE ENVIRONMENT PROTECTION GUIDELINES FOR CONSTRUCTION AND LAND DEVELOPMENT IN THE ACT 100TH AND THE NEW BLUE BOOK AS APPROPRIATE
 - CONSTRUCT AND MAINTAIN PROTECTION WORKS IN ACCORDANCE WITH THE ENVIRONMENT PROTECTION GUIDELINES FOR CONSTRUCTION AND LAND DEVELOPMENT IN THE ACT 100TH AND THE NEW BLUE BOOK AS APPROPRIATE
 - BE PARKED WITHIN THE BLOCK
 - MINIMISE DISTURBANCE OF THE EXISTING SURFACE AND VEGETATION

- SPOIL MANAGEMENT**
- DESIGNATE AN AREA ON SITE FOR CONCRETE TRUCK WASH-DOWNS
 - BRICK CUTTING TO OCCUR ON SITE WITHIN THE MATERIALS AND WASTE STORAGE AREA
 - SPOIL TO BE DISPOSED OF APPROPRIATELY TO AN APPROVED LOCATION OFF SITE

- NOISE**
- ENSURE ALL CONSTRUCTION WORK THAT GENERATES NOISE TAKES PLACE ONLY WITHIN THE PRE-APPROVED OPERATING HOURS FOR THE PROJECT: MONDAY TO SATURDAY, BETWEEN 7AM AND 6PM

- SEDIMENT CONTROLS AND STORMWATER**
- MAINTAIN STRICT SITE ACCESS CONTROL WITH A STABILISED ACCESS POINT THAT ALL VEHICLES MUST USE
 - AT THE END OF EACH DAY OR WHEN DIRT OCCURS OR PRIOR TO ANY RAIN EVENT, REMOVE ANY SEDIMENT FROM PUBLIC ROADS ADJACENT TO THE WORK AREA. DO NOT WASH INTO THE STORMWATER SYSTEM
 - HIGH VELOCITY WATER COVER AS PRACTICAL, PARTICULARLY BESIDE MAIN DRAINAGE LINES. FENCE OFF BUFFER AREAS TO PREVENT DISTURBANCE
 - PROTECT ALL CUT AND FILL BATTERS FROM RUN-OFF AND STABILISE IMMEDIATELY AFTER CONSTRUCTION
 - PROTECT ALL EXPOSED SOIL SURFACES FROM EROSION
 - INSTALL SILT FENCES ON THE DOWN SIDE OF ANY STOCKPILE
 - INSTALL PERMANENT DRAINAGE FACILITIES AT AN EARLY STAGE
 - PROTECT ALL EXPOSED SOIL SURFACES FROM EROSION
 - PROTECT ALL EXPOSED SOIL SURFACES FROM EROSION
 - ESTABLISH ALTERNATIVE STABLE DRAINAGE SYSTEMS THROUGH THE SITE WHILE PERMANENT FACILITIES ARE BEING INSTALLED
 - USE DIVERSION STRUCTURES TO CONVEY RUN-OFF TO A STABLE DISPOSAL AREA
 - BALE WHERES (WRAPPED IN BROOM) ACROSS THE ENTIRE FLOW PATH AND AT 25M INTERVALS
 - STABILISE AND GRASS ALL DIVERSION SWALES AND DRAINS
 - MAINTAIN VEGETATION AS DISCHARGE FROM AREA AS DISTURBANCE
 - UNDER TAKE VEGETATIVE STABILISATION MEASURES IMMEDIATELY AFTER COMPLETION OF FINAL LAND FORMING
 - PLACE HAY BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE HAY TO FILL ANY GAPS BETWEEN BALES. - ENSURE THAT THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE
 - EACH BALE TOWARDS PREVIOUSLY LAND BALE. DRIVE 600mm INTO THE GROUND AND WHERE STAR PICKETS PROTRUDE ABOVE BALES, ENSURE THEY ARE FITTED WITH SAFETY CAPS
 - PLACE A LEVEL INDICATOR WITHIN THE POND SHOWING 10% CAPACITY
 - CLEAN OUT SEDIMENT WHEN ABOVE 10% CAPACITY
 - DISCHARGE FROM SEDIMENT CONTROL POND SHALL BE ALLOWED WHEN WATER WITH 45-45% CLAMBER TO BELOW 40% SOLIDS (50 NTU) AND WITH THE PRIOR APPROVAL OF THE EPA
 - MAINTAIN TEMPORARY SEDIMENT CONTROL PONDS UNTIL AT LEAST 85% OF THE PROJECT WORKS ARE COMPLETE OR WHEN ALL DISTURBED AREAS ARE STABILISED

- INSPECTIONS AND MAINTENANCE SCHEDULE**
- RECORD MAINTENANCE ACTIVITIES AND DETAILS TO PROVIDE TO EPA)
 - CHUTES, BARRELS, WHEELBARROWS AND OTHER EQUIPMENT TO BE RINSED IN THE SITE WASH-DOWN AREA
 - REMOVE ANY SEDIMENT FROM PUBLIC ROADS ADJACENT TO THE WORK AREA. DO NOT WASH INTO THE STORMWATER SYSTEM
 - SUPPRESS DUST BY REGULAR SPRAYING OF WATER AND COVERING AND SECURING VEHICLE LOADS ENTERING/EXITING SITE
 - MAINTAIN AND INSPECT POLLUTION CONTROL MEASURES DURING CONSTRUCTION AND UNTIL FULL STABILISATION, REPAIR AND REINSTATE WORKS AS NEEDED
 - MAINTAIN AND INSPECT HAY BALES. REPLACE AS REQUIRED IF DEGRADED OR DAMAGED

- AIR QUALITY**
- STAGE WORKS TO LIMIT THE EXTENT OF EXPOSED AND UNPROTECTED AREAS
 - COVER AND SECURE VEHICLE LOADS ENTERING/EXITING SITE
 - USE AN ENVIRONMENTALLY FRIENDLY CHEMICAL SPRAY TO BIND SOIL TOGETHER. THIS STABILISING UNISED SOIL
 - RESTRICT SPEED OF VEHICLES ON THE ROAD
 - RESTRICT SPEED OF VEHICLES ON THE ROAD
 - IMPLEMENT MEASURES TO LIMIT AIR POLLUTION BY VEHICLES AND PLANT WORKING ON OR PASSING THROUGH THE SITE
 - MAINTAIN POLLUTION CONTROL MEASURES DURING CONSTRUCTION AND UNTIL FULL STABILISATION. ROUTINELY INSPECT EACH WEEK AND AFTER EACH RAIN EVENT. RECORD AND REPORT TO EPA AS REQUIRED
 - DETAILS AND PROVIDE TO EPA FOR INSPECTION WHEN REQUESTED

- FIRE**
- BURNING OF WASTE MATERIALS MUST NOT BE UNDERTAKEN
 - FIRE MAY BE PERMITTED FOR GENERAL HEATING PURPOSES IF IN A BRAZIER OR CONSTRUCTED FIREPLACE, USING SEASONED, UNTREATED TIMBER

- NOT FOR CONSTRUCTION**

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DRAWING NUMBER	REVISION
C010	2
DRAWING SHEET SIZE = A1	

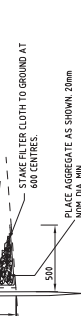
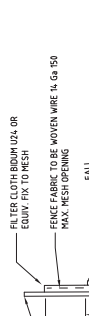
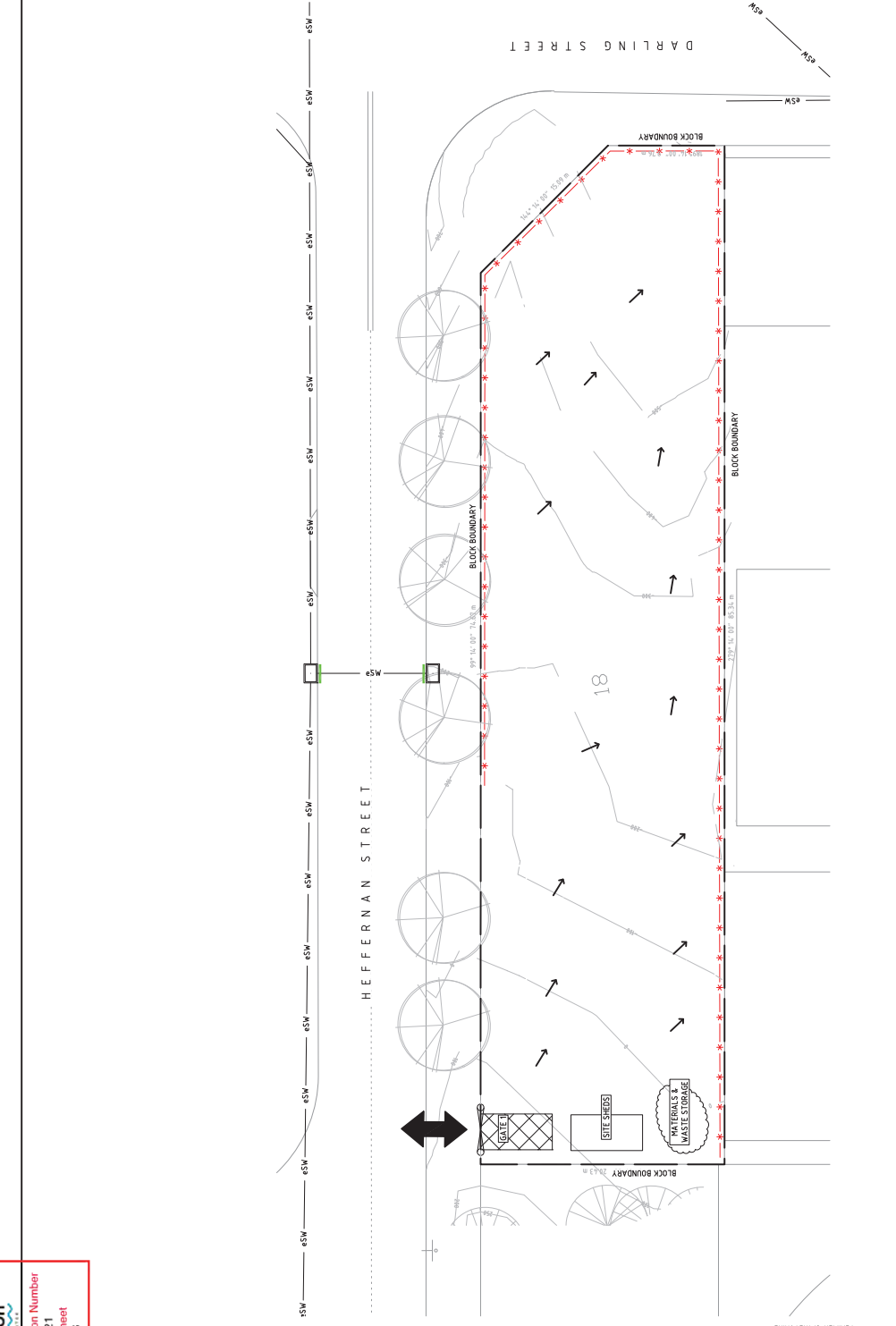
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PROJECT	CHILDREAN CENTRE
PROJECT	BLOCK 18 SECTION 11 MITCHELL

PROJECT	CHILDREAN CENTRE
PROJECT	BLOCK 18 SECTION 11 MITCHELL
PROJECT	CHILDREAN CENTRE
PROJECT	BLOCK 18 SECTION 11 MITCHELL

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PROJECT	BLOCK 18 SECTION 11 MITCHELL

PROJECT	CHILDREAN CENTRE
PROJECT	BLOCK 18 SECTION 11 MITCHELL
PROJECT	CHILDREAN CENTRE
PROJECT	BLOCK 18 SECTION 11 MITCHELL



LEGEND	RELATIVE CONTOUR
LEGEND	1.8m HIGH STEEL MESH TEMPORARY SITE FENCE
LEGEND	TEMPORARY SEDIMENT CONTROL FENCE
LEGEND	OVERLAND FLOW DIRECTION
LEGEND	STABILISED ACCESS
LEGEND	SITE ACCESS
LEGEND	PROPOSED LOCATION OF FILTER SOCKS
LEGEND	EXISTING STORMWATER MAIN

LEGEND	RELATIVE CONTOUR
LEGEND	1.8m HIGH STEEL MESH TEMPORARY SITE FENCE
LEGEND	TEMPORARY SEDIMENT CONTROL FENCE
LEGEND	OVERLAND FLOW DIRECTION
LEGEND	STABILISED ACCESS
LEGEND	SITE ACCESS
LEGEND	PROPOSED LOCATION OF FILTER SOCKS
LEGEND	EXISTING STORMWATER MAIN

LEGEND	RELATIVE CONTOUR
LEGEND	1.8m HIGH STEEL MESH TEMPORARY SITE FENCE
LEGEND	TEMPORARY SEDIMENT CONTROL FENCE
LEGEND	OVERLAND FLOW DIRECTION
LEGEND	STABILISED ACCESS
LEGEND	SITE ACCESS
LEGEND	PROPOSED LOCATION OF FILTER SOCKS
LEGEND	EXISTING STORMWATER MAIN

ISSUED	VERD	APPD	DATE
1	AH	JW	22.11.17
2	AH	JW	30.11.17

ISSUED	VERD	APPD	DATE
1	AH	JW	22.11.17
2	AH	JW	30.11.17

ISSUED	VERD	APPD	DATE
1	AH	JW	22.11.17
2	AH	JW	30.11.17

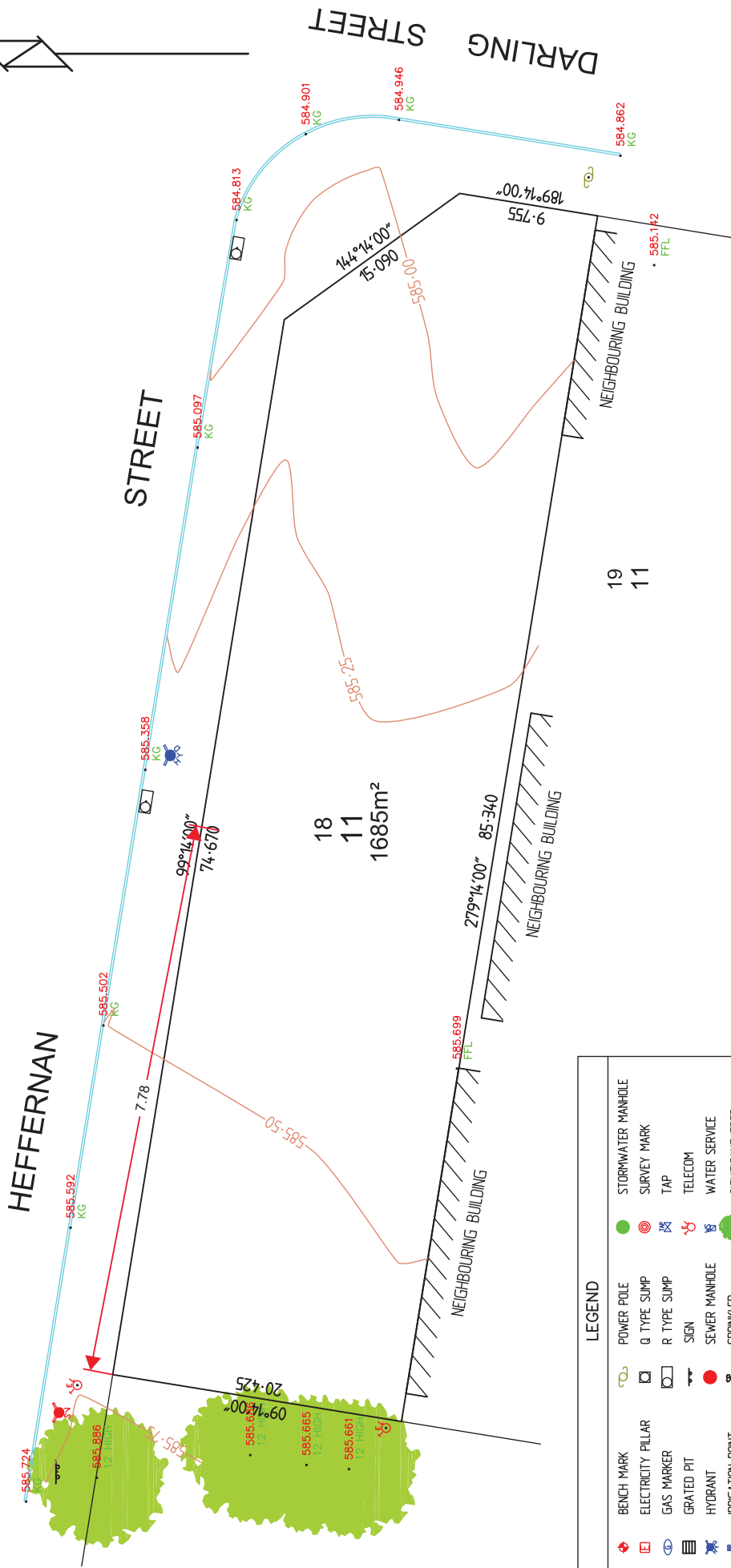
DESIGNED: A. HOWARD
JOB MANAGER: D. FIELD
VERIFIER: J. WILTSHE

DESIGNED: A. HOWARD
JOB MANAGER: D. FIELD
VERIFIER: J. WILTSHE

DESIGNED: A. HOWARD
JOB MANAGER: D. FIELD
VERIFIER: J. WILTSHE

DESIGNED: A. HOWARD
JOB MANAGER: D. FIELD
VERIFIER: J. WILTSHE

DESIGNED: A. HOWARD
JOB MANAGER: D. FIELD
VERIFIER: J. WILTSHE



LEGEND	
	BENCH MARK
	ELECTRICITY PILLAR
	GAS MARKER
	GRADED PIT
	HYDRANT
	IRRIGATION POINT
	LIGHT POLE
	POST
	POWER POLE
	Q TYPE SUMP
	R TYPE SUMP
	SIGN
	SEWER MANHOLE
	SPRINKLER
	SUBSOIL POINT
	STOP VALVE
	STORMWATER MANHOLE
	SURVEY MARK
	TAP
	TELECOM
	WATER SERVICE
	SIGNIFICANT TREE
	TREE

30/10/2007 \\Venus\Land Projects\167569\07455D1.dwg

- NOTES:
- 1 NO INVESTIGATION HAS BEEN MADE FOR ANY SUBTERRANEAN ENCROACHMENTS OF SERVICES OR BUILDINGS BY OR UPON THE SITE
 - 2 THERE HAS BEEN NO INVESTIGATION OF TITLE: IT IS RECOMMENDED THAT THE CLIENT INVESTIGATE THE TITLE BEFORE PROCEEDING
 - 3 TREE POSITION & SHAPE IS INDICATIVE ONLY
 - 4 PLAN IS FOR DESIGN PURPOSES ONLY & NOT TO BE USED FOR FUTURE BUILDING SETOUT



SCOTT D MCNIVEN & ASSOCIATES
CONSULTING LAND & ENGINEERING SURVEYORS
8 SHOUT PLACE PEARCE ACT 2607
T (02) 62902369 F (02) 6286 8148 Email survey@sdma.com.au

CLIENT	KONSTANTINOU GROUP		
SCALE	@A3	JOB No	07455
DATE	30-10-07	DRAWN	MC/DT

PROJECT	18/11 MITCHELL
TITLE	DETAIL SURVEY
DRAWING No	07455D1



MITCHELL SECTION 11 BLOCK 18

**DEVELOPMENT APPLICATION FOR CHILD CARE CENTRE
TRAFFIC IMPACT AND PARKING ASSESSMENT**

1.0 PURPOSE AND BACKGROUND

The purpose of this report is to consider the traffic and parking issues relating to the proposed development of a child care centre for 130 child care places on Block 18 Section 11 Mitchell (the Site).

A variation to the Crown Lease to permit Community Use limited to Child Care Facility within the IZ2 Industrial Mixed Use Land Use Zone was the subject of a Development Application DA 201528763 which was lodged on 4 January 2016 by Capital Crown Leasing Pty Ltd.

The primary purpose of this report is to provide a Traffic Impact and Parking Assessment report in support of the DA for the proposed child care centre for 130 places. The designs for the proposed development on this vacant block of land are shown on architectural drawings prepared by arpm [Project Number A17041].

2.0 PROPOSED DEVELOPMENT

The proposed development is for a child care centre with 130 child care places and 32 car parking spaces on the site. The vehicular access to the on site carparking area will be from Heffernan Street which runs along the northern frontage to the site (with separate access for waste collection vehicles).

3.0 EXISTING ROAD NETWORK AND TRAFFIC CONDITIONS

The road network in the vicinity of the Site which lies in the minor industrial suburb of Mitchell and the Site lies in the southern section of Mitchell which is bounded by Flemington Road (Arterial Road and Intertown Public Transport Corridor) to the east, Lysaght Street (Major Collector Street) to the north, Hoskins Street (Major Collector Street) to the west and Sandford Street (Major Collector Street) to the south.



GRAEME SHOBRIDGE ADVISORY SERVICES

ABN 90 451 246 623

PO Box 441 Batemans Bay NSW 2536 Mobile [REDACTED]

Application Number

167621

Sheet

194 of 208

This section is further divided by local streets running north/south parallel to Hoskins Street (Grimwade Street) in the west and parallel to Flemington Road (Darling Street) to the east and running east/west between these streets and approximately mid-way between Lysaght Street and Sandford Street (Heffernan Street) with these streets forming the letter “H” through the middle of the section.

There is an additional local street running in a north/south direction through the middle of the section (Brookes Street) approximately midway between Grimwade Street and Darling Street. The intersection of Brookes Street and Heffernan Street is controlled by a single lane roundabout and there is a local shopping centre at the northwest corner of this intersection. Brookes Street has a direct connection to both Sandford Street to the south and Lysaght Street to the north.

Within the finer grain of the road system the local roads typically take the form of courts and lanes that provide parking areas and direct street access to the shop frontages and rear service areas.

The traffic volumes and classification of vehicles along the Major Collector Streets generally reflect the role of these streets in providing access to Mitchell for vehicles including heavy vehicles, however heavy industrial sites (such as concrete batching plants) are generally located along Hosking Street, rather than the local street network.

There is limited traffic volume data generally available throughout Mitchell, however observations of traffic patterns indicate that peak activity times during weekdays are between 7.00am and 8.30am and 3.00pm and 4.30pm. This activity pattern is consistent with the arrival and start-up at the beginning of the day for businesses and similarly during the afternoon associated with the end of the business day. The customer activity is generally spread throughout the day with a change from a majority of tradespersons early in the day and private retail customers after 9.00am and with a noticeable peak during the lunch time period.



Traffic conditions along Heffernan Street are generally good with vehicles mainly gaining access to adjoining shop frontages (rather than through traffic) as the street runs only between Darling Street and Grimwade Street. I have estimated that the traffic volumes along Heffernan Street between 7.00am and 9.00am are of the order of 50 to 60 vph and daily volumes are approximately 700 vpd (with very low flows after 4.00pm). Traffic volumes along Baillieu Court/Lane and Winchcombe Court/Lane are estimated to be not greater than 500 vpd and these are typical of the local streets which are operating well within their design and respective environmental capacities.

There are generally no parking restrictions along the local streets such as Heffernan Street, Baillieu Court and Winchcombe Court in the vicinity of the Site (except for some short stay parking controls along the shop frontages). The local street road widths (typically 9.2 metres wide) are generally insufficient to accommodate on street parking on both sides of the street whilst still allowing two way traffic to flow, although there is generally limited on street parking demand and obstruction to traffic flow has not ever been observed during my observations.

4.0 EXISTING PARKING SUPPLY AND OCCUPANCY

The existing parking supply in the vicinity of the site is a combination of on street parking (along Darling Street, Heffernan Street, Baillieu Court and Winchcombe Court) and off street parking within Baillieu Court (Section 5 Block 1) and Winchcombe Court (Section 12 Block 1). The majority of parking supply is unrestricted except for some short stay parking along the shop frontages.

I have conducted comprehensive parking occupancy surveys in the vicinity of Darling Street, Heffernan Street, Baillieu Court, Winchcombe Court and Darling Street. The surveys indicated that the number of occupied spaces increased from 10% at 8.00am, 35% to 40% between 10.30am and 12 noon, 80% to 85% between 12 noon and 2.00pm and decreased to 70% to 80% between 2.00pm and 3.30pm and further decreased significantly after 4.00pm.



Observations in the vicinity of the site typically indicate car parking occupancy in the unrestricted parking spaces on business days to be of the order of 4 cars parked on street along Heffernan Street (between Darling Street and Brookes Street), 55 cars parked on street on Winchcombe Court, 65 cars parked off street in Winchcombe Court, 27 cars parked on street along Baillieu Court and 36 cars parked off street (formal and informal) in Baillieu Court.

There is low occupancy of on-street parking along the western side of Darling Street north of Heffernan Street but high occupancy during business hours in the time restricted spaces south of Heffernan Street. Parking is not permitted along the eastern side of Darling Street, however Darling Street generally displays high occupancy of both on street (public) and off street (private) car parking during business hours.

There is an apparent overspill of parking onto Heffernan Street from businesses in Darling Street during busy periods, however there are currently no public entrances to any business from Heffernan Street between Darling Street and Brookes Street.

Heffernan Street has shown variable numbers of cars parked on street, ranging between 4 and 13 cars (estimated capacity 30 cars) during my observations and these cars were parked between Darling Street and Baillieu Lane.

Baillieu Court/Lane has shown very low numbers of cars parked on street at the southern end in the vicinity of the Site and Winchcombe court has shown variable numbers of cars parked on street and off street ranging from 40% after 9.30am up to 80% during the period 12 noon to 2.00pm.

3.9 PARKING REQUIREMENTS

The parking requirements for child care centres in industrial zones are set out in the Parking and Vehicular Access General Code (PVAGC) Clause 3.5.5 Schedule 5 as follows:

- 1 space / centre, plus
- 2 spaces per 15 child care places for employees, plus
- Visitor parking 2 spaces < 30, 3 spaces 30 to 59, 4 spaces 60 to 90 plus
- 1 pick up/set down per 10 child care places.

Table 1 below sets out the number of car spaces required by PVAGC for a child care centre with 130 child care places.

Table 1 Car Parking Requirements for 130 place Child Care Centre

N° Places	Centre	Employees	Visitors	PUSD	Total Required
130	1	18	6	13	19E, 6V, 13 PU

The employee parking is long stay (all day) parking which should be a combination of on site (management and senior staff) and off site within 200 metres (balance of staff). The visitor parking is short stay (2 hour limit is suggested) and the pick up / set down spaces are required to be available during morning and afternoon peak activity periods (7.30am to 9.00am and 4.00pm to 6.00pm Monday to Friday).

The suggested parking management strategy is for the proposed employee parking (19 spaces required) to be unrestricted and for the pick up and set down spaces (13 spaces required) to be marked as 15 Minute Parking 7.30 to 9.00am and 4.00 to 6.00pm Mon to Fri and 2 Hour Parking 9.00am to 4.00pm. The pick up and set down spaces will be available during peak activity times and during these times they will be available for use by visitors to the child care centre (6 spaces required).

The proposed on site car parking is for 28 perpendicular car spaces (including one accessible space) and 4 parallel parking spaces in the vicinity of the main entrance (which may be suitable for pick up and set down of young children). These spaces would be sufficient to accommodate all of the parking requirements (as set out in PVAGC) wholly within the site.

It is however noted that some parents may prefer to park along the Heffernan Street frontage to the site for pick up and drop off (5 spaces available along block frontage) and there is no apparent reason to believe that this would need to be restricted by signage except in the vicinity of the proposed access driveway to the site.

It is noted that the driveway to the car park is proposed to be located clear of the intersection between Heffernan Street and Baillieu Lane (in accordance with the requirements of AS2890.1).

6.0 TRAFFIC GENERATION AND IMPACT

It is estimated that the maximum traffic generation from a child care centre in Mitchell has been calculated as follows:

- Morning drop off period 7.00am to 9.00am
Number of child care places X 1.8 plus Number of Employees X 1
- Evening drop off period 4.00pm to 6.00pm
Number of child care places X 1.8 plus Number of Employees X 1
- Total Daily Trips
Number of child care places X 4 plus Number of Employees X 2
plus Number of Visitor spaces X 5

This provides for drop off (IN) and pick up (OUT) of children (deduction allowing multiple children in same family or out of peak hour delivery, absences, etc), employees arriving at work and departing after work and turnover of all visitor spaces five times during the middle of the day from 9.00am to 4.00pm. The total traffic generation estimated for the proposed development with 130 child care places is shown in Table 2 below.



GRAEME SHOBRIDGE ADVISORY SERVICES

ABN 90 451 246 623

PO Box 441 Batemans Bay NSW 2536 Mobile [REDACTED]

Application Number

167621

Sheet

199 of 208

Table 2 Estimated Traffic Generation for 130 Place Child Care Centre

Number of Places	AM 7.00 to 9.00		PM 4.00 to 6.00pm		TOTAL DAILY	
	IN	OUT	IN	OUT	IN	OUT
130	137vph	114 vph	114 vph	137 vph	290 vpd	290 vpd

The most conservative approach will be to assume that the peak AM traffic will be 2/3 of the 2 hour drop off traffic volume generated and that this coincides with the AM commuter peak traffic period and that all of these vehicle movements are along Heffernan Street and this would result in an increase in traffic along Heffernan Street as shown in Table 3 below.

Table 3 Additional Vehicle Movements - Heffernan Street AM Peak

Number of Places	7.00 to 9.00		8.00-9 00		2 Way 8-9	
	IN	OUT	IN	OUT	EAST	WEST
130	137vph	114 vph	90 vph	75 vph	110 vph	55 vph

This estimation will result in additional two way traffic volumes following the route of Flemington Road to Lysaght Street or Sandford Street to Darling Street to Heffernan Street (indicated as EAST) and the route from Brookes Street roundabout along Heffernan Street (indicated by WEST) in Table 3 above during the commuter peak hour 8.00 am to 9.00 am.

I have estimated that a greater proportion of the traffic will come from Flemington Road as the worst case (rather than from Hoskins Street direction) and this traffic could be further distributed to the north and south along Darling Street before Lysaght Street or Sandford Street respectively.



In the absence of detailed intersection turning counts or undertaking SIDRA Intersection Performance Analysis, I have made observations during the morning commuter traffic period and I believe that the intersections of Darling Street / Lysaght Street and Darling Street / Sandford Street will have the capacity to absorb the additional turning movements noting that during the busiest periods, drivers may choose to turn left rather than right to avoid conflicts with other vehicles while turning right.

It is suggested that the afternoon pick up between 4.00pm and 6.00pm (with peak during the period 5.00pm to 6.00pm) is not expected to coincide with the local peak traffic flows within Mitchell which decrease after 4.00pm due to closure of trades-based light industrial businesses. Traffic volumes and parking demand on the road network in the vicinity of the Site have been observed to be reduced significantly after 4.00pm when compared with those earlier in the day.

Similarly, during the morning drop off period (with peak during the period 8.00am to 9.00am) the local peak is expected to be higher between 7.30am and 8.30am during the trades-based light industry business start up and the peak drop off and commuter peak traffic conditions are slightly offset.

7.0 OTHER CONSIDERATIONS

Public Transport Options – ACTION Bus Services in the vicinity of the Site through Mitchell include Route Services 56 and 57 which run along Sandford Street, Brookes Street, Lysaght Street and Hoskins Street and there are two stops in close proximity to the intersection of Brooke Street (south of the roundabout) and Heffernan Street (West of the roundabout) approximately 200 metres from the site. Other bus services which run along Flemington Road include Route Service 58 (from Harrison) and the Red Rapid Services 200, 202, 251, 252, 255 & 259, however these services do not have frequent stops in the vicinity of Lysaght Street or Sandford Street so they may not provide a viable option for service to a child care centre on the Site.



It is not expected that many parents will select public transport (Bus or light rail services) to drop off or pick up children from the services along the Flemington Road corridor.

The assessment (in Section 6.0 above) has set out the estimated traffic generation and anticipated distribution of vehicle trips to and from the Site and based on the observations of current morning peak traffic conditions, it is considered that the additional traffic arising from a 130 place child care centre can be accommodated safely on the road network and intersections without adverse impacts on the operation of roads or intersections.

Pedestrian Safety issues are not considered to be critical to the development of a child care centre on the Site, particularly if “No Parking” signs are erected along the northern side of Heffernan Street opposite the site frontage in order to discourage parents from parking on the northern side. This will generally discourage parents from stopping along the northern side of Heffernan Street then walking across the street to the child care centre.

8.0 CONCLUSIONS AND RECOMMENDATIONS

I have prepared a table of parking requirements for the proposed child care centre and I am satisfied that the proposed provision of 34 parking spaces on the site will be in excess of the minimum requirements set out in PVAGC for a child care centre with 130 child care places and that the proposed development will not be dependent on any off site car parking spaces.

I have considered the maximum likely traffic generation from the proposed 130 place child care centre and without relying on optimistic distribution and dispersion assumptions (vehicles have been assumed to take the most direct route from the main road network) I am satisfied that the peak period and daily traffic volumes and vehicle movements expected to be created by a child care centre on the Site will not have adverse impacts on safety and operational Level of Service on the road network or at nearby intersections.



GRAEME SHOBRIDGE ADVISORY SERVICES

ABN 90 451 246 623

PO Box 441 Batemans Bay NSW 2536 Mobile [REDACTED]

Application Number

167621

Sheet

202 of 208

Off-site works should be limited to making appropriate changes to parking restrictions immediately adjacent to the site.

I recommend approval of the development application on parking and traffic grounds.

Graeme Shoobridge

29 November 2017

GRAEME SHOBRIDGE ADVISORY SERVICES

Annette Pogas

Project Architect

ArPM Pty Ltd

Level 5, 15 Moore Street

Canberra ACT 2601

Email: [redacted]@arpm.net.au

Dear Annette,

**Project: Mitchell Childcare
Block 18 Section 11 Mitchell
Statement on WSUD requirements Conditions**

Northrop has reviewed Water Sensitive Urban Design (WSUD) Requirements above mentioned blocks and has prepared this statement. This letter is prepared using the most recent architectural ground Floor Plan provided by ArPM on 10/11/2017.

Site Summary

Block 1 Section 11, (1,685m²) is located on the corner of Heffernan St & Darling St in Mitchell. In accordance with the Territory Plan this Block is designated as Land Use IZ2: INDUSTRIAL MIXED USE. The block is currently undeveloped as shown in the figure below.

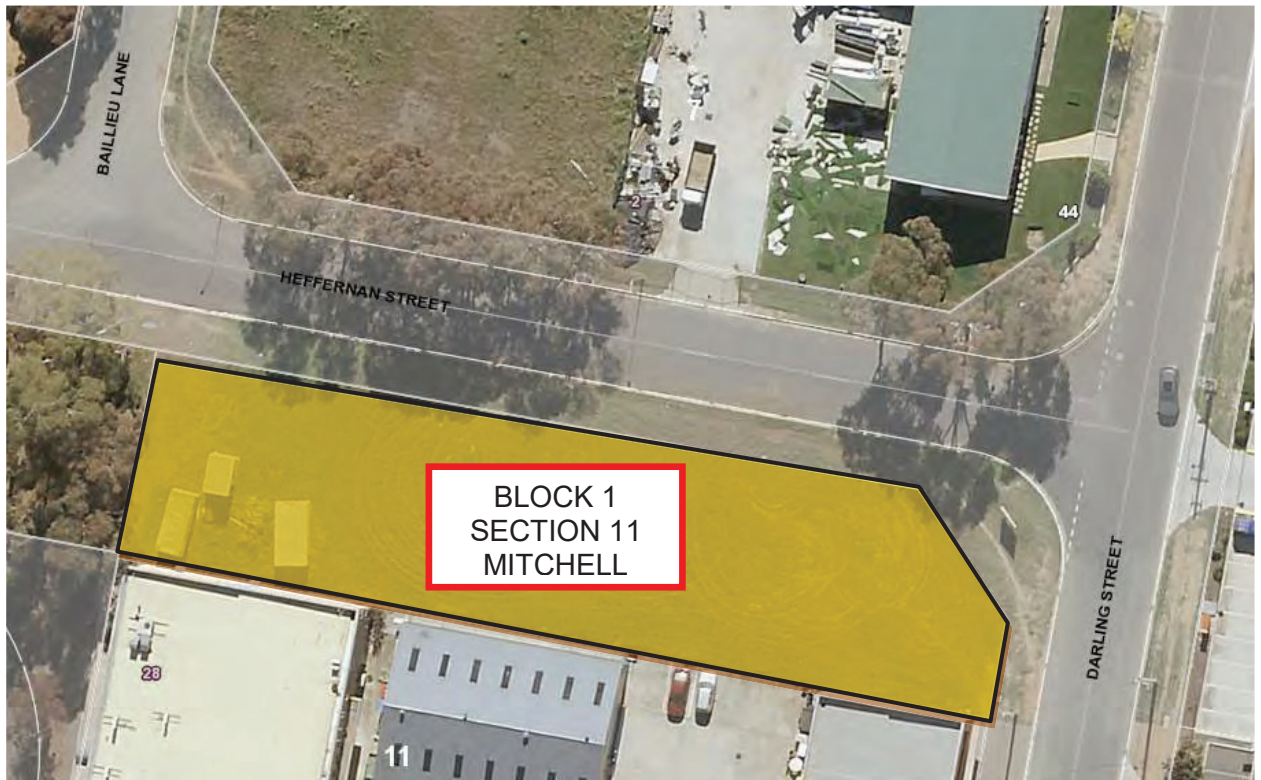


Figure 1 – Site location within Wanniasa

The proposed works on Block 18 include the construction of a 3 story (ground floor plus 2 stories above) childcare centre including 2 driveways, a ground floor at grade carpark & a loading/ waste collection area on the far west of the site. The carpark is completed covered by the floor above except for the lading/ waste area which is open.

A summary of the proposed sites conditions are follows:

- total Existing site area of is 1,685m² of which:
≈100% of the site is composed of pervious area (grassy area totalling 1,685m².)
- total proposed site area of is 1,685m² of which:
≈95% of the site is composed of impervious area (≈1,130m² Paved/ areas on the 1st floor,
≈470m² roof totalling 1,600m²)
≈5% of the site is composed of pervious area (85m² unirrigated and unwatered grass areas)

As the is zoned as Land Use IZ2: INDUSTRIAL MIXED USE in accordance with the territory plan; the WSUD requirements for the site are to comply with the Industrial Zones Development Code (December 2015)

From these site conditions the 4 WSUD rules for the proposed development were investigated and addressed as shown in the below sections

Rule 38: 40% Reduction in Main Water Consumption

In order to comply with this rule the following is to be provided for the site.

- A 24KL retention tank connected to at least 235m² of roof area;
- Retained water is to be reused for toilet flushing with at least 75% or all toilets and urinals connected to the reuse system;
- At least 3-star shower heads and dish washer fittings are to be installed; and
- At least 4-star sinks, toilets, urinals and bathroom basin fittings are to be installed.

Rule 39: Capture & slow release of Storm water

This rule does not apply this site area is only 1,685m² which is less than the required 5000m² at which this rule applies.

Rule 40: Water Quality

This rule does not apply this site area is only 1,685m² which is less than the required 5000m² at which this rule applies.

Rule 41: Water Detention (pre-Development Flows vs Post Development Flows)

This rule does not apply this site area is only 1,685m² which is less than the required 5000m² at which this rule applies.

This spreadsheet is an online calculator for individuals, designers and developers to gauge possible methods of reducing mains water consumption for commercial, industrial and institutional developments. Please enter ALL the relevant information for your development before using the reduction percentage. This calculator will not be able to cover all water use and water savings for every commercial, industrial and institutional developments. If your development has significant water use or savings that can not be shown in this calculator, then this needs to be disclosed in your Development Application.

Application Number
167621
Sheet

207 of 208

Percentage Reduction

=

40%

Indoor information

What is the Net Lettable Floor Area (m ²)?	2,249
What is the water rating of the shower head?	3 Star ▼
What is the water rating of the dishwashers?	3 Star ▼
What is the water rating of the sink in the kitchen?	4 Star ▼
What is the water rating of the toilets?	4 Star ▼
What is the water rating of the urinals?	4 Star ▼
What is the water rating of the basins in the bathroom?	4 Star ▼

Site information

Site area (m ²)?	1,685
Roof area (including house and garage or carport) (m ²)?	470
Irrigated garden area (m ²)?	0

Other water use

What is the approximate yearly water consumption of the Cooling System (L/yr)?	0
What is the approximate yearly water consumption of the Fire Testing System (L/yr)?	0

Application Number

167621

Sheet

208 of 208

Rain water tank information

Is there going to be a water tank installed?	Yes
What is the size of the tank (L)?	24,000
What is the approx. roof area flowing into the tank (m ²)?	235
What will be the use for the water in the tank?	Toilet and Urinal
What is the % of Toilets connected to Rain Water?	75%
What is the % of Urinals connected to Rain Water?	75%

Grey water information

What type of grey water system is installed?	None
What is the size of the grey water storage tank (L)?	0
Where will the grey water be collected from?	
What will be the use for the grey water?	
What is the % of Toilets connected to Grey Water?	0%
Does this treated Grey water supply Toilets that have Rain water supplied to them?	No
What is the % of Urinals connected to Grey Water?	0%
Does this treated Grey water supply Urinals that have Rain water supplied to them?	No

Pool, spa or water feature information

Is there going to be a pool, spa, or water feature?	No
Is there going to be a cover on the pool or water feature?	No
Average depth of the pool, spa or water feature (m)?	0
Average length of the pool, spa or water feature (m)?	0
Average width of the pool, spa or water feature (m)?	0
The volume of the pool, spa or water feature is (L)	0