LEGEND

- Subject Area (2.1824ha)
- Existing Structure to be Retained
- Proposed Structure
- Proposed Carpark
- Indicative Garden Location
- Footpath
- Indicative Land Application Area
- Native Trees with Evidence of Black Cockatoo Foraging
- AE — Overhead Electricity (BYDA)
- T — Telecommunications (BYDA)

LABELS

- (A) Admin/Care Taker
- (C) Classroom
- (K) Kitchen/Home Goods
- (S) Shed
- (W) Water Tank
- (P) Outdoor Play Space
- (M) Workshop/Maintenance Shed
- (T) Ablutions
- (CC) Chicken Coop
- (F) Falai/Samoan Hut
- (CP) Compost Area
- (BP) Bicycle Parking
- (BS) Bin Store
- (PC) Two Caretaker Parking Bays

DEVELOPMENT APPLICATION

SITE PLAN

Lot 9 on Diagram 90508 Watkins Road,
MUNDIJONG

Plan No.	23560-02	
Date	17/08/23	
Drawn	NP	
Checked	JS	
Revision	C	
Scale	1:1000@A3	0 10m 20m 30m

PERTH & FORRESTDALE:
Lvl 1, 252 Fitzgerald St
PERTH WA 6000
15/2 Hensbrook Loop,
FORRESTDALE WA 6112
T: 08 9495 1947
E: metro@harleydykstra.com.au
ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra
PLANNING & SURVEY SOLUTIONS

DEVELOPMENT APPLICATION

SITE PLAN

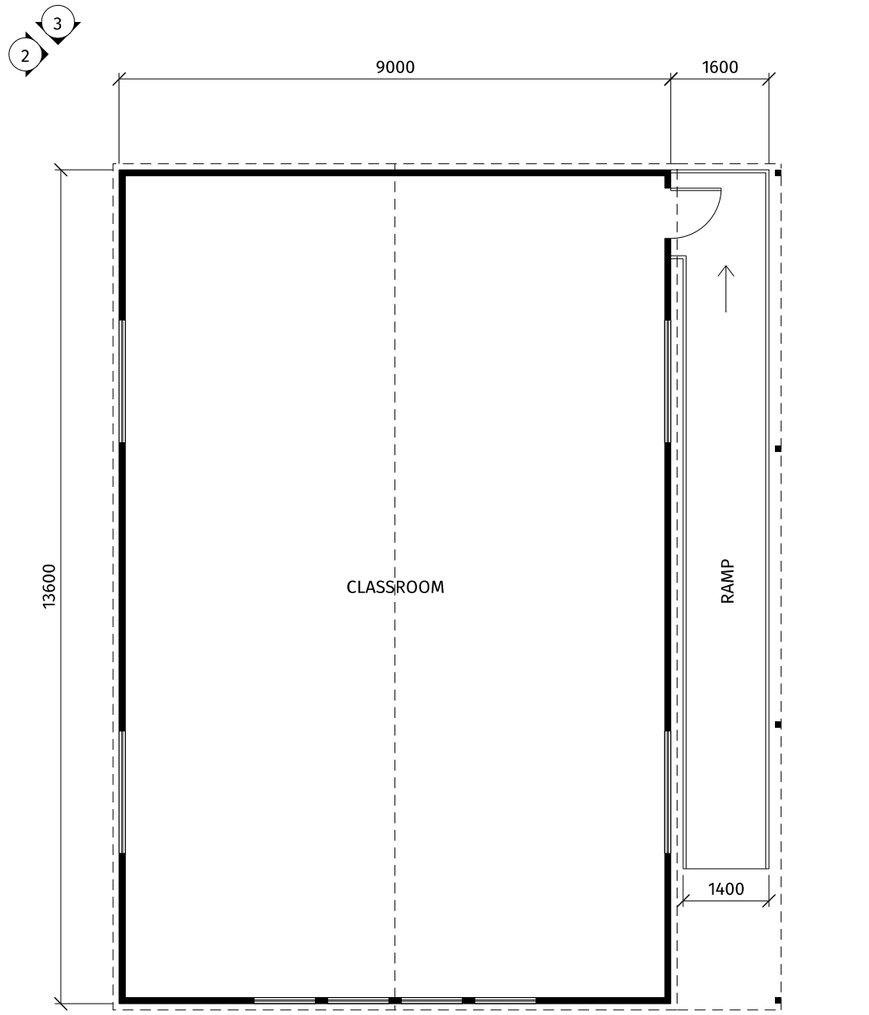
Lot 9 on Diagram 90508 Watkins Road, MUNDIJONG

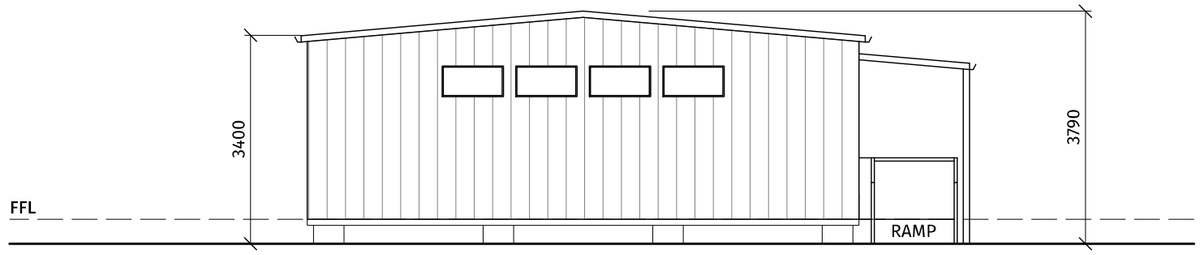
Plan No.	23560-02	
Date	17/08/23	
Drawn	NP	
Checked	JS	
Revision	C	
Scale	1:1000@A3	0 10m 20m 30m

PERTH & FORRESTDALE:
Lvl 1, 252 Fitzgerald St
PERTH WA 6000
15/2 Hensbrook Loop,
FORRESTDALE WA 6112
T: 08 9495 1947
E: metro@harleydykstra.com.au
ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

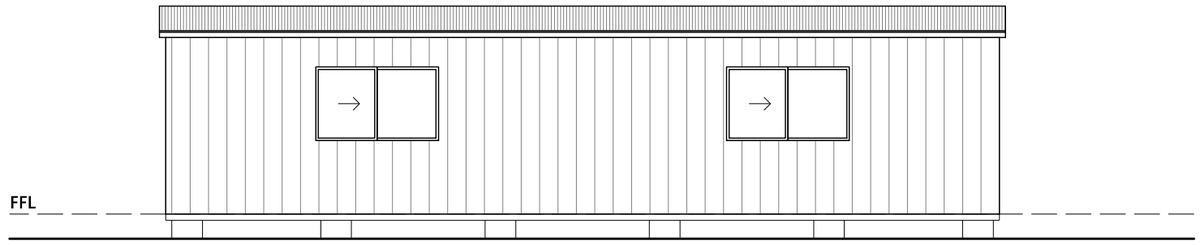
NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra®
PLANNING & SURVEY SOLUTIONS

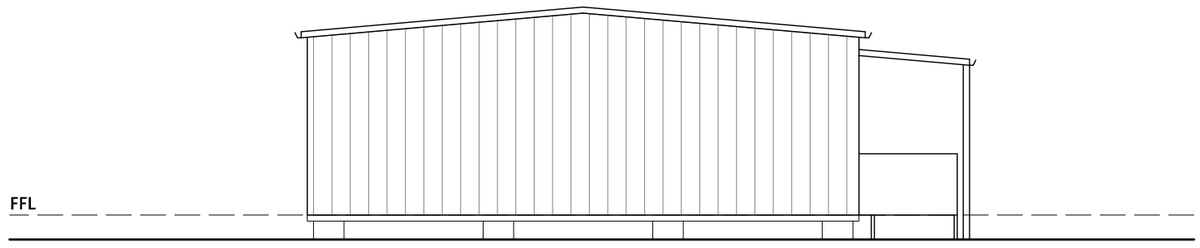




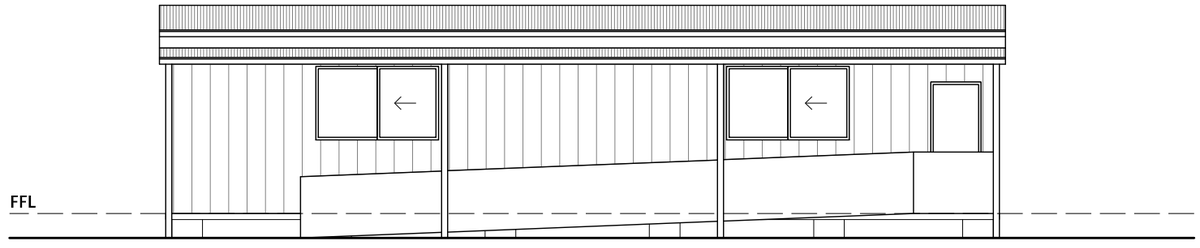
ELEVATION - 1



ELEVATION - 2



ELEVATION - 3



ELEVATION - 4

DEVELOPMENT APPLICATION
CLASSROOM FLOOR PLAN & ELEVATIONS

Lot 9 on Diagram 90508 Watkins Road, MUNDIJONG

Plan No. | 23560-03
Date | 10/05/23
Drawn | NP
Checked | JS
Revision | A

Scale | 1:100@A3

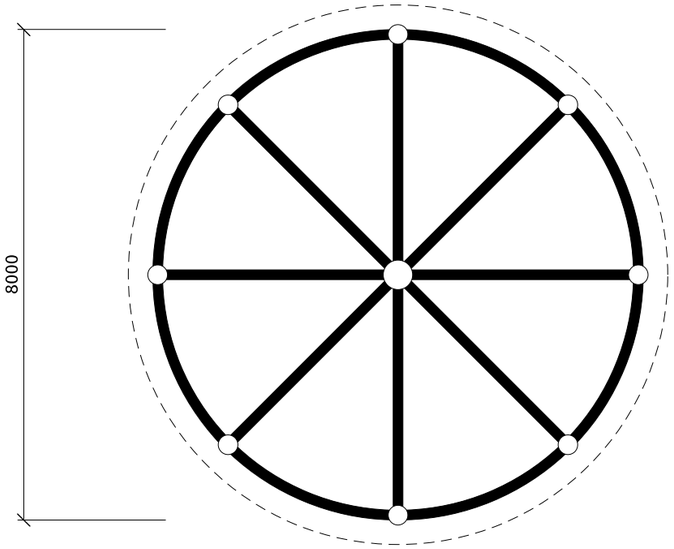
0 1m 2m 3m

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

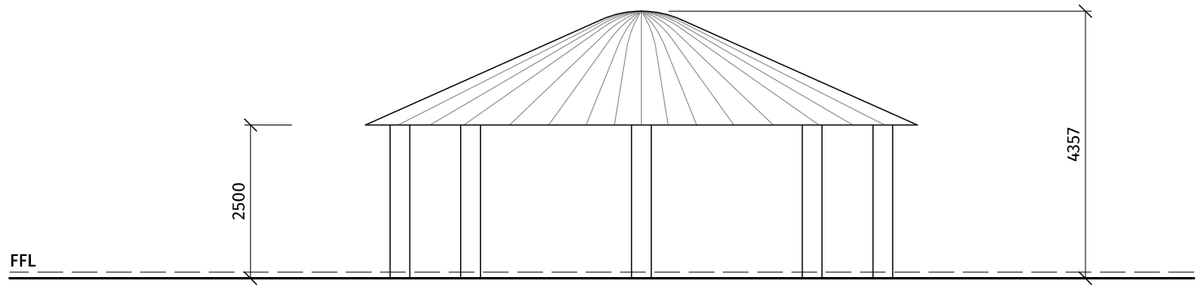
PERTH & FORRESTDALE:
Lvl 1, 252 Fitzgerald St
PERTH WA 6000
15/2 Hensbrook Loop,
FORRESTDALE WA 6112
T: 08 9495 1947
E: metro@harleydykstra.com.au

ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

Harley Dykstra®
PLANNING & SURVEY SOLUTIONS



SOMOAN HUT



ELEVATION - 1

1

DEVELOPMENT APPLICATION
SAMOAN HUT FLOOR PLAN & ELEVATIONS

Lot 9 on Diagram 90508 Watkins Road, MUNDIJONG

Plan No.	23560-03	
Date	10/05/23	
Drawn	NP	
Checked	JS	
Revision	A	
Scale	1:100@A3	

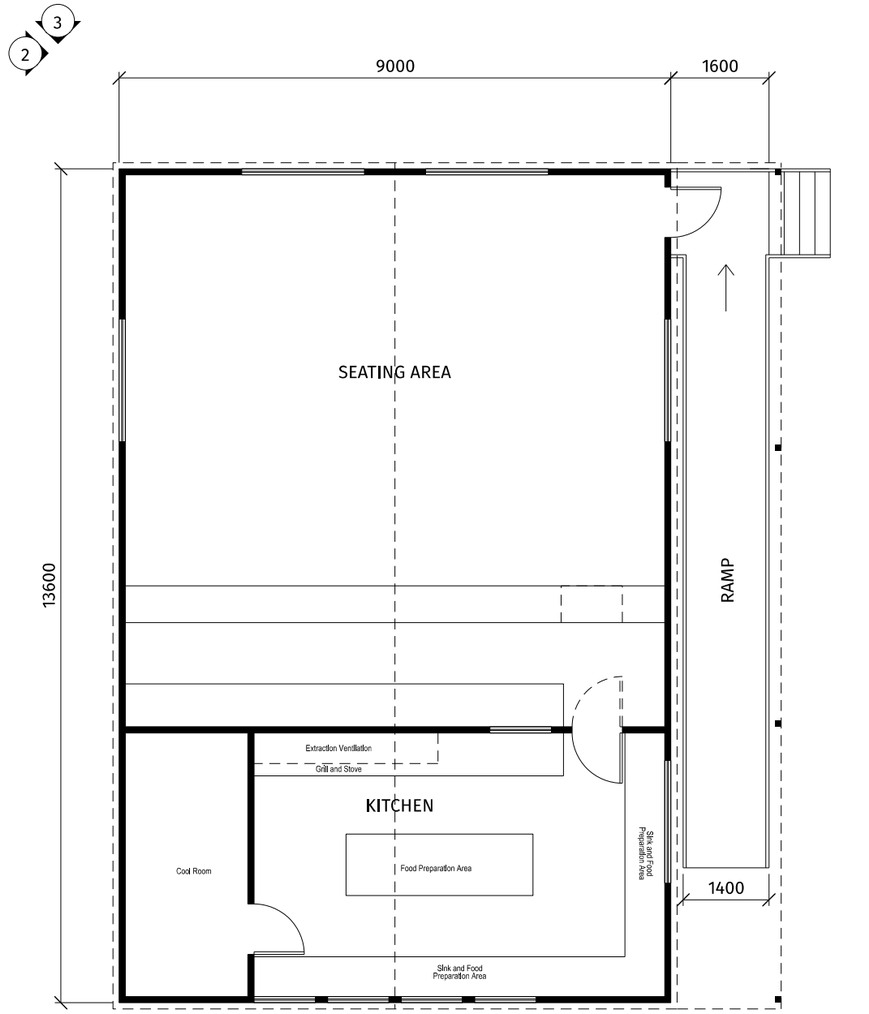
PERTH & FORRESTDALE:
Lvl 1, 252 Fitzgerald St
PERTH WA 6000
15/2 Hensbrook Loop,
FORRESTDALE WA 6112
T: 08 9495 1947
E: metro@harleydykstra.com.au

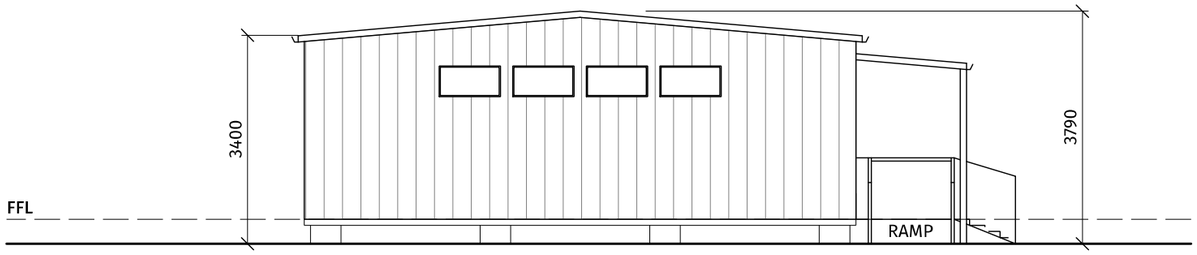
ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

0 1m 2m 3m

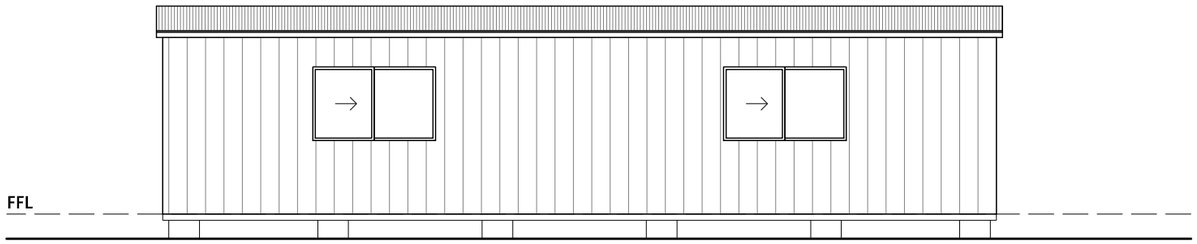
NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra®
PLANNING & SURVEY SOLUTIONS

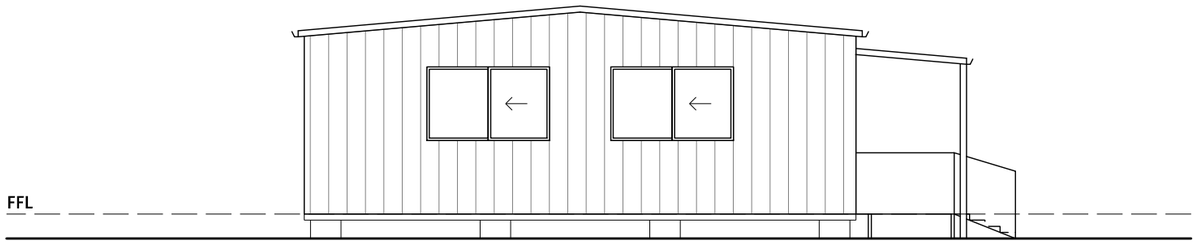




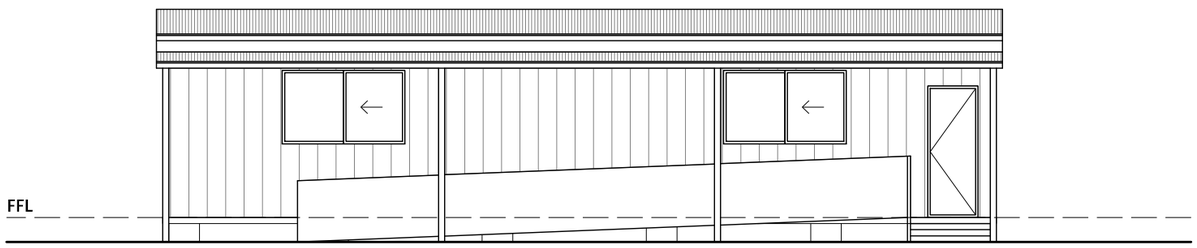
ELEVATION - 1



ELEVATION - 2



ELEVATION - 3



ELEVATION - 4

DEVELOPMENT APPLICATION
KITCHEN FLOOR PLAN & ELEVATIONS

Lot 9 on Diagram 90508 Watkins Road, MUNDIJONG

Plan No. | 23560-03
Date | 04/05/23
Drawn | NP
Checked | JS
Revision | A

Scale | 1:100@A3

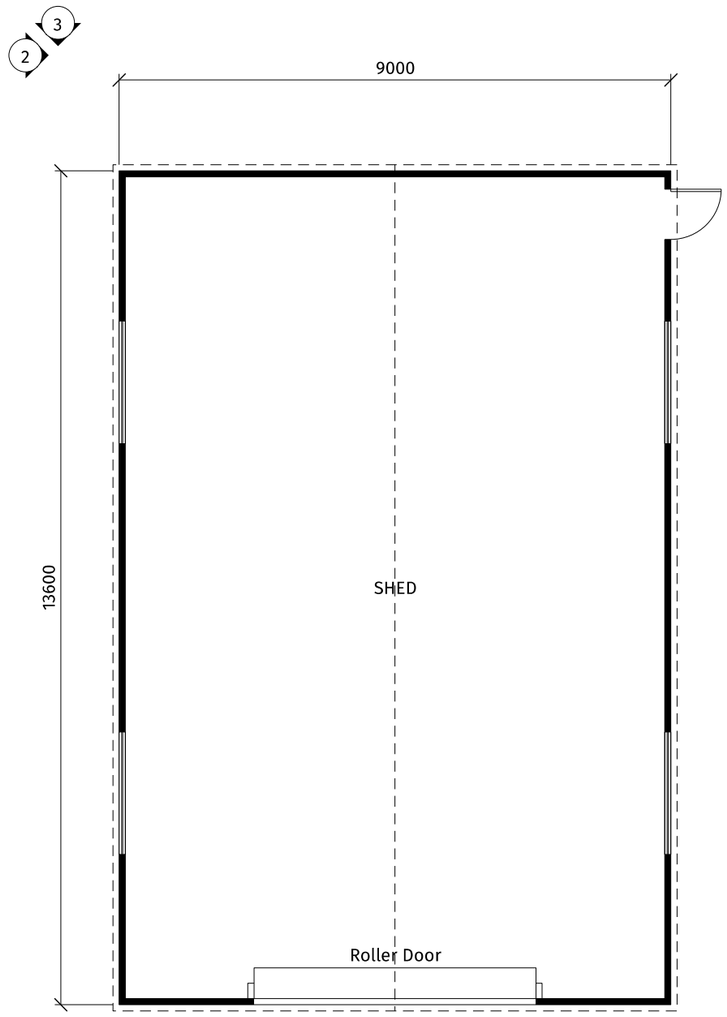
0 1m 2m 3m

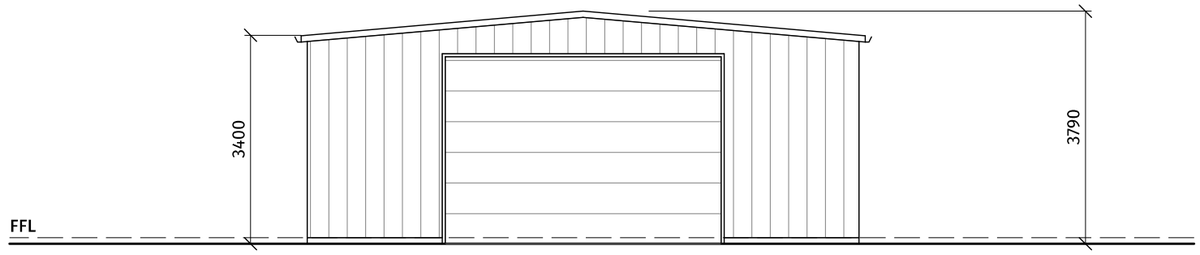
PERTH & FORRESTDALE:
Lvl 1, 252 Fitzgerald St
PERTH WA 6000
15/2 Hensbrook Loop,
FORRESTDALE WA 6112
T: 08 9495 1947
E: metro@harleydykstra.com.au

ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

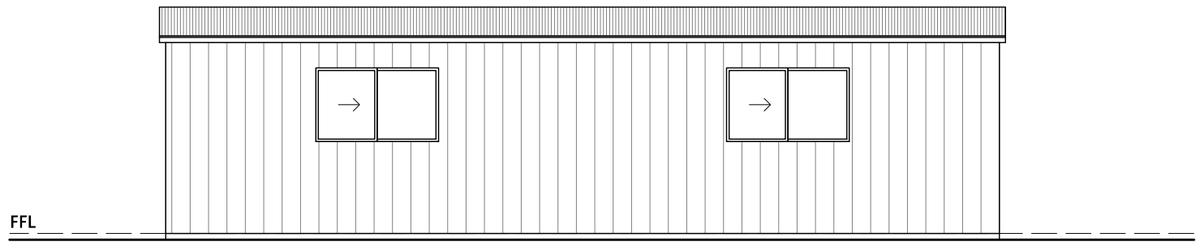
NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra®
PLANNING & SURVEY SOLUTIONS

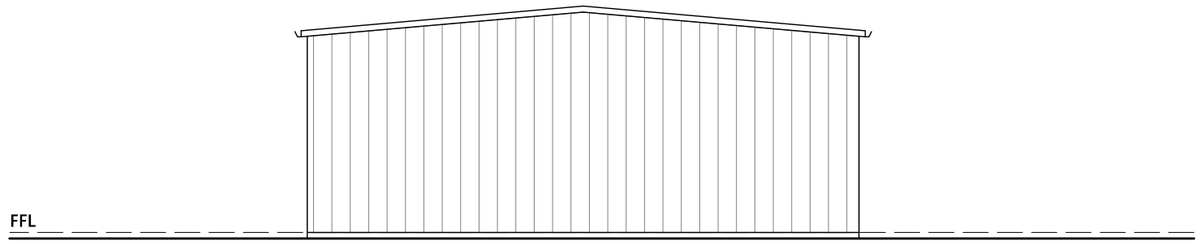




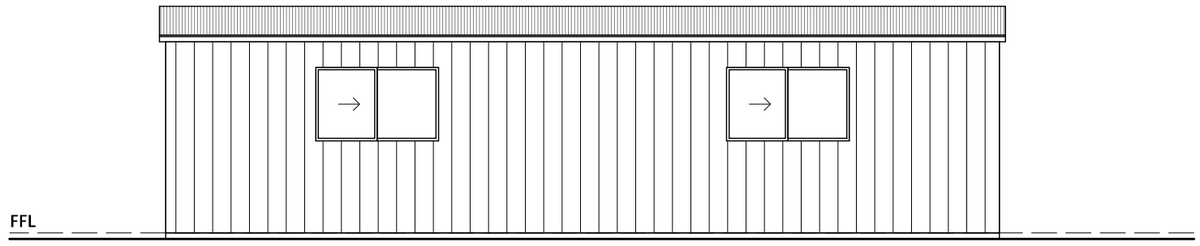
ELEVATION - 1



ELEVATION - 2



ELEVATION - 3



ELEVATION - 4

DEVELOPMENT APPLICATION
SHED FLOOR PLAN & ELEVATIONS

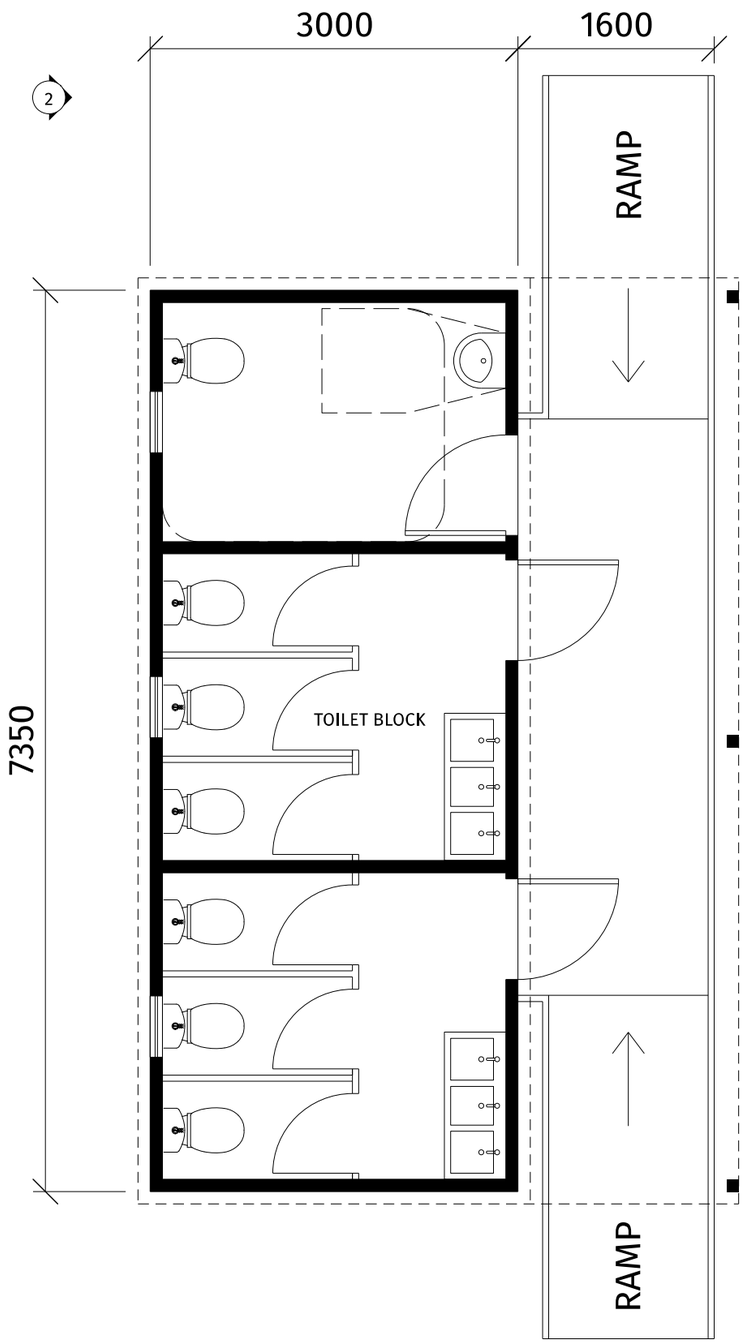
Lot 9 on Diagram 90508 Watkins Road, MUNDIJONG

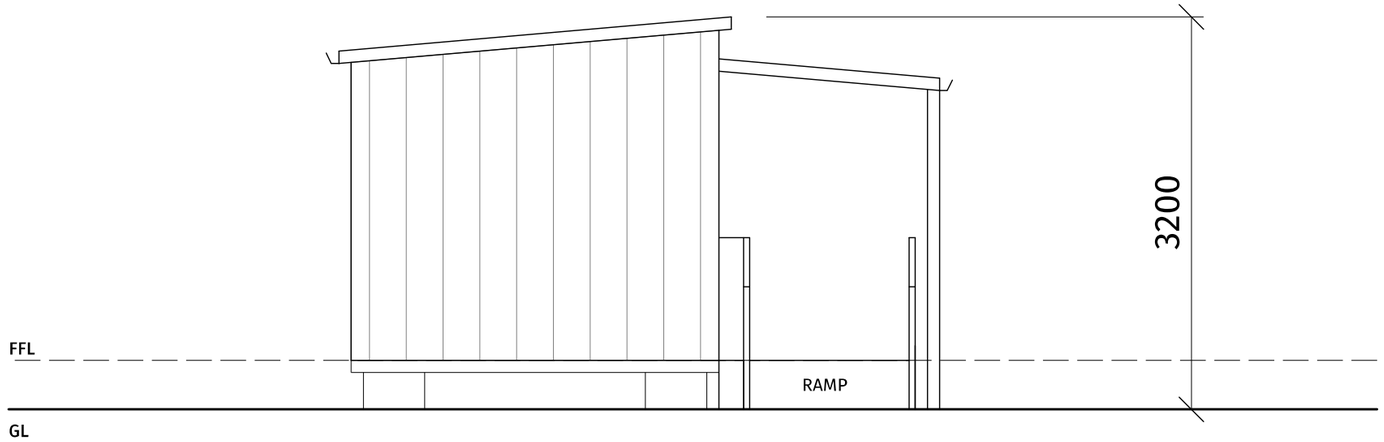
Plan No.	23560-03	
Date	10/05/23	
Drawn	NP	
Checked	JS	
Revision	A	
Scale	1:100@A3	0 1m 2m 3m

PERTH & FORRESTDALE:
Lvl 1, 252 Fitzgerald St
PERTH WA 6000
15/2 Hensbrook Loop,
FORRESTDALE WA 6112
T: 08 9495 1947
E: metro@harleydykstra.com.au
ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

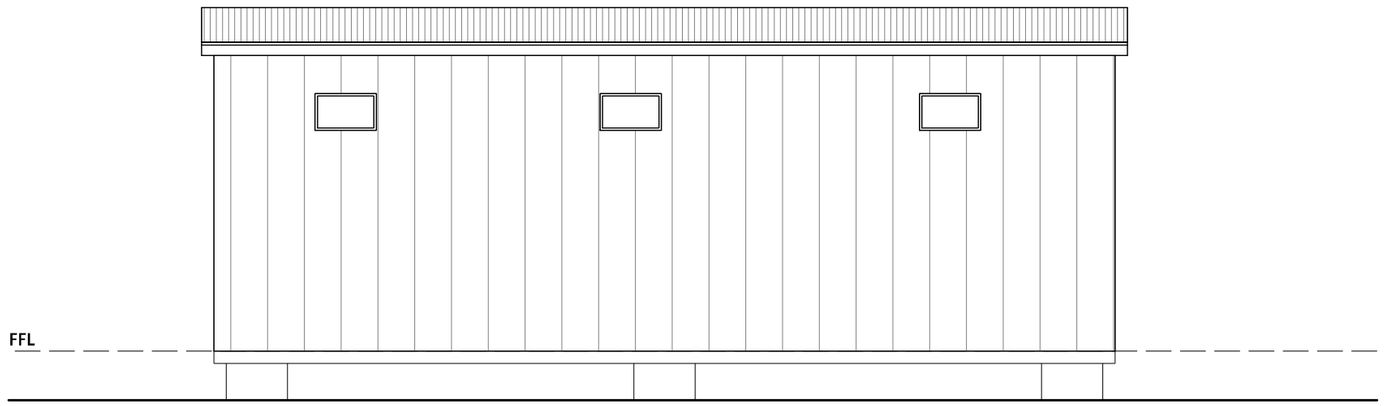
NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra®
PLANNING & SURVEY SOLUTIONS

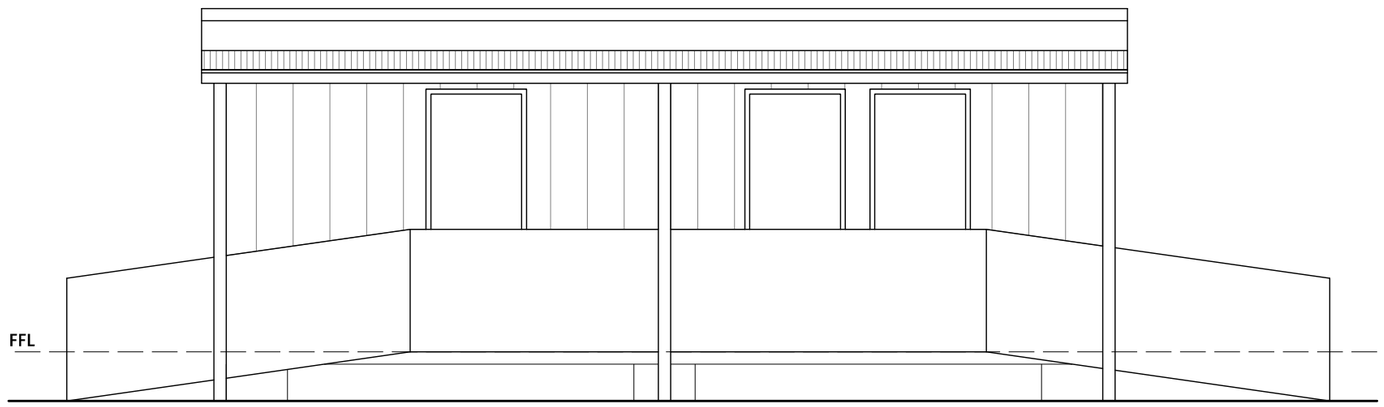




ELEVATION - 1



ELEVATION - 2



ELEVATION - 3

DEVELOPMENT APPLICATION
TOILET BLOCK PLAN & ELEVATIONS

Lot 9 on Diagram 90508 Watkins Road, MUNDIJONG

Plan No.	23560-03	
Date	04/05/23	
Drawn	NP	
Checked	JS	
Revision	A	
Scale	1:50@A3	

PERTH & FORRESTDALE:
Lvl 1, 252 Fitzgerald St
PERTH WA 6000
15/2 Hensbrook Loop,
FORRESTDALE WA 6112
T: 08 9495 1947
E: metro@harleydykstra.com.au

ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

0 0.5m 1m 1.5m

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra®
PLANNING & SURVEY SOLUTIONS

Administration

Housekeeping

Existing Wall

New Wall

Wall to be Removed

NOTE:
Drawing is best fit based based on scan data collected. All dimensions to be confirmed on site.

DEVELOPMENT APPLICATION
EXISTING HOUSE FLOOR PLAN

Lot 9 on Diagram 90508 Watkins Road, MUNDIJONG

Plan No. | 23560-04
Date | 18/05/23
Drawn | NP
Checked | JS
Revision | A

Scale | 1:50@A3

0 0.5m 1m 1.5m

PERTH & FORRESTDALE:
Lvl 1, 252 Fitzgerald St
PERTH WA 6000
15/2 Hensbrook Loop,
FORRESTDALE WA 6112
T: 08 9495 1947
E: metro@harleydykstra.com.au

ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra
PLANNING & SURVEY SOLUTIONS

Transport Impact Statement

Proposed Educational Establishment –
Lot 9 Watkins Road, Mundijong

CW1200696_300304624

15 May 2023

Prepared for:

Harley Dykstra Pty Ltd

Prepared by:

Stantec Australia Pty Ltd

Proposed Educational Establishment – Lot 9 Watkins Road, Mundijong

Revision	Description	Author	Quality Check	Independent Review
A	For Issue	Dana Romic	Brian Sii	Scott Lambie

This document entitled Transport Impact Assessment was prepared by Stantec Australia Pty Ltd. ("Stantec") for the account of Harley Dykstra Pty Ltd (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule, and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify the information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____

Dana Romic

Reviewed by _____

Brian Sii

Approved by _____

Scott Lambie

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 BACKGROUND

Stantec has been commissioned by Harley Dykstra Pty Ltd ("the Client") to prepare a Transport Impact Assessment (TIA) for a proposed Educational Establishment at Lot 9 Watkins Road, Mundijong (the "Site").

This report aims to assess the impact of the development on the adjacent road network. The report will also discuss access, public transport, pedestrian and cycle networks, circulation, and car parking requirements.

This TIA has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines Volume 4 – Individual Developments (2016)* and the relevant WAPC Checklist included at **Appendix A**.

2.0 EXISTING SITUATION

2.1 EXISTING SITE CONTEXT

The Site is located at Lot 9 Watkins Road, Mundijong. **Figure 2-1** shows an aerial image of the Site. The Site currently consists of a single residential dwelling on large-scale land.

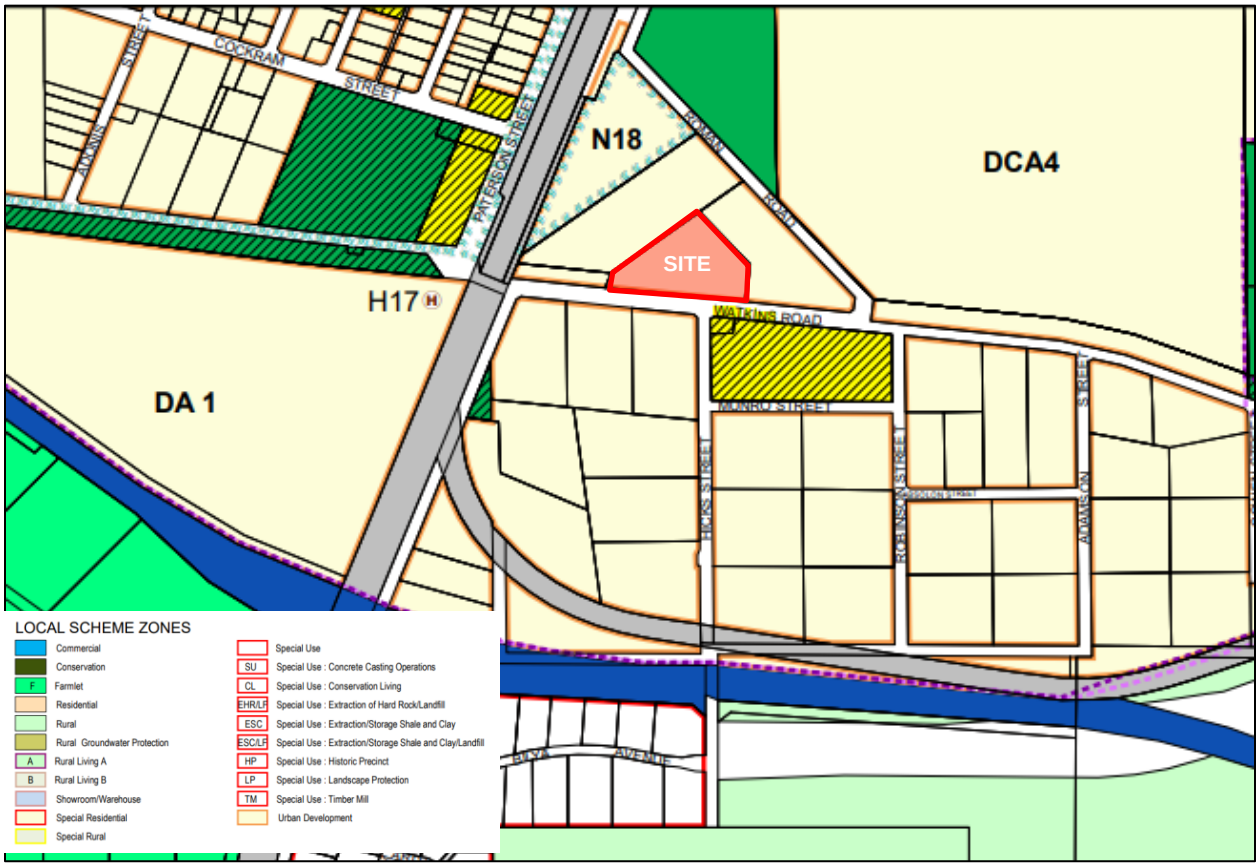
Figure 2-1 Aerial Image of Site

Source: MetroMap (2023)

2.2 EXISTING LAND USES

According to the provision of the *Shire of Serpentine-Jarrahdale Local Planning Scheme No. 2* (LPS2), the Site is zoned *'Urban Development'* as shown in **Figure 2-2**. The Site is surrounded by other Urban Development land uses to the north, east, and west, with Public and Community purpose land uses to the south.

Figure 2-2 Site Zoning



Source: Shire of Serpentine-Jarrahdale Local Planning Scheme No. 2

2.3 EXISTING ROAD NETWORK

Road Classifications are defined in the Main Roads Functional Hierarchy as follows:

- **Primary Distributors (light blue):** Form the regional and inter-regional grid of MRWA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes, and all are National or State roads. They are managed by Main Roads.
- **Regional Distributors (red):** Roads that are not Primary Distributors, but link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by Local Government.
- **District Distributor A (green):** These carry traffic between industrial, commercial, and residential areas and connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by Local Government.
- **District Distributor B (dark blue):** Perform a similar function to District Distributor A but with reduced capacity due to flow restrictions from access to and roadside parking alongside the adjoining

property. These are often older roads with traffic demand more than what was originally intended. District Distributor A and B roads run between land-use cells and not through them, forming a grid that would ideally be around 1.5 kilometres apart. They are managed by Local Government.

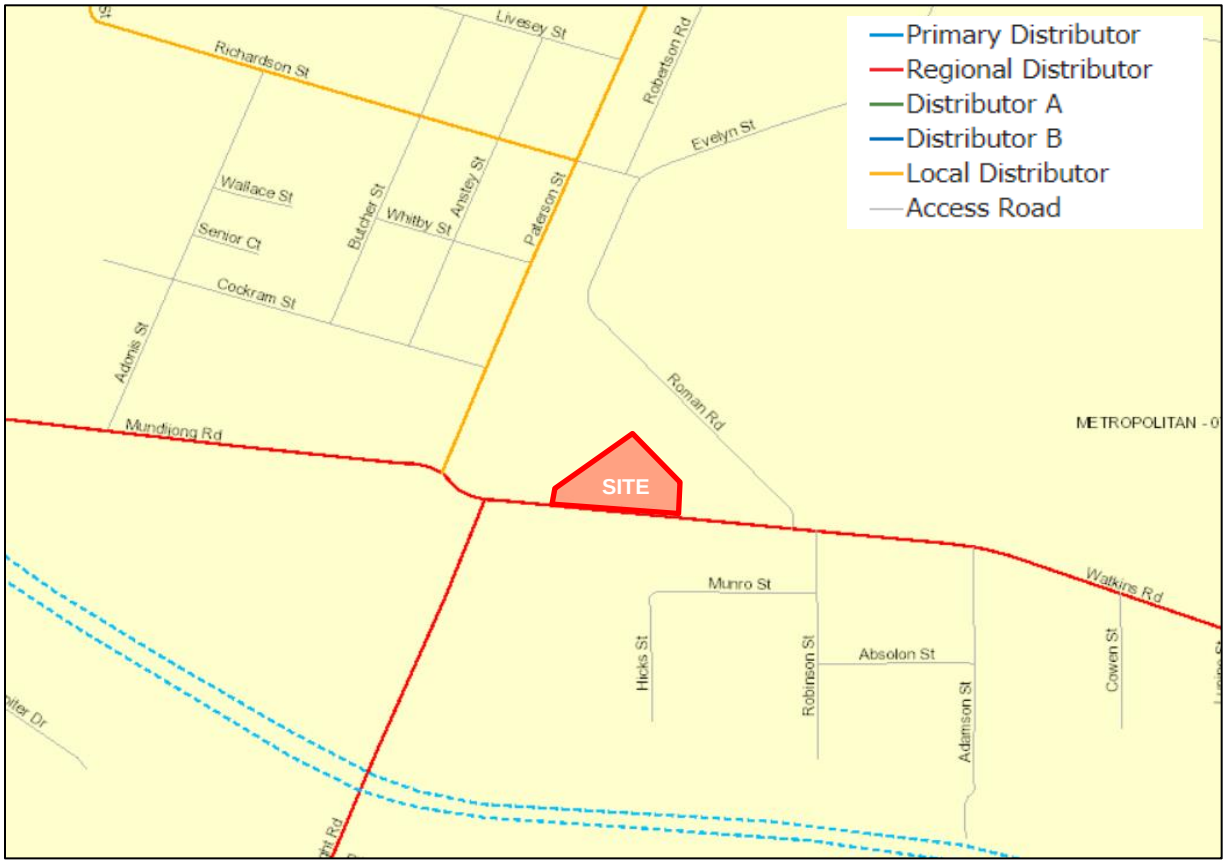
- **Local Distributors (orange):** Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by the Local government.
- Access Roads (grey): Provide access to abutting properties with amenity, safety, and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian-friendly. They are managed by the Local government.

The Site is bounded by Watkins Road to the north and Absolon Street to the south. The surrounding road network is further described in **Table 2-1** and shows the hierarchy as per the Main Roads WA Road Information Mapping System, whilst **Figure 2-3** shows the road hierarchy.

Table 2-1 Road Network Classification

Road Name	Road Hierarchy	Jurisdiction	No of Lanes	No of Footpaths	Approximate Width (m)	Speed Limit (km/h)
Watkins Road	Regional Distributor	Local Government	2	1	8m	60 km/h
Roman Road	Access Road	Local Government	1	0	4m	50km/h
Paterson Street	Local Distributor	Local Government	2	1	15m (1x 3.5m median)	60km/h

Figure 2-3 Road Hierarchy



Source: Main Roads Information Mapping (2023)

2.4 EXISTING TRAFFIC VOLUMES

A traffic count survey along Watkins Road (approximately 1km east of Paterson Street) was conducted in 2019. Recent traffic volumes along Watkins Road from MRWA's Traffic Map database were not available. Instead, traffic data on other nearby roads and of the 2019 survey are shown below in **Table 2-2**.

Table 2-2 Traffic Volumes

Road	Date	Traffic Volumes			
		Weekday AM Peak Hour	Weekday PM Peak Hour	Avg. Daily (Weekday) Volume	Heavy Vehicles (%)
Watkins Road (1km east of Paterson St)	2019	176 *(8:00 AM)*	228 *(4:00 PM)*	2,640	13.0%
South Western Highway (South of Watkins Road)	2021/22	483	551	6,540	15.7%

South Western Highway (North of Jarrahdale Road)	2017/18	460	480	6,028	15.9%

Sources: Main Roads Traffic Map and AusTraffic Pty Ltd

2.5 EXISTING PUBLIC TRANSPORT FACILITIES

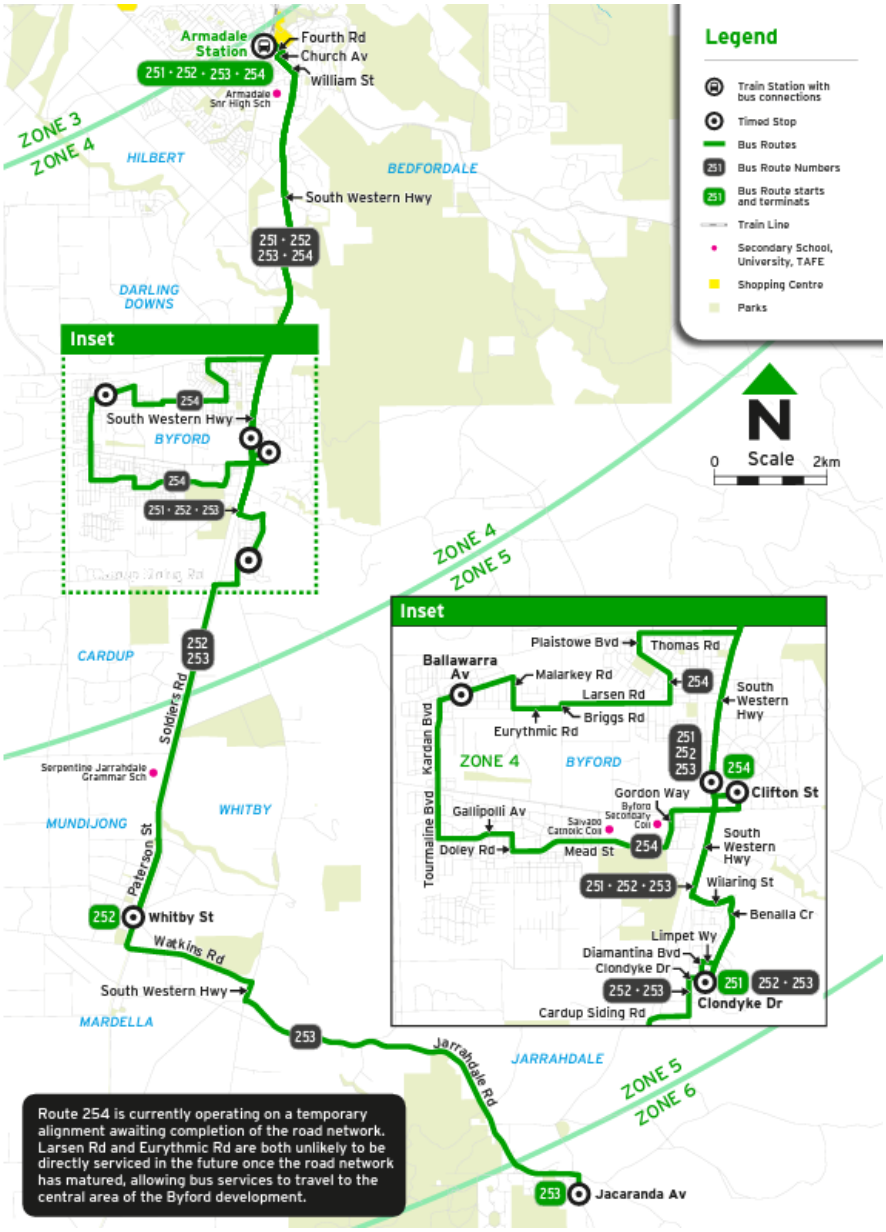
The nearest bus stops to the Site are located adjacent to and directly opposite the Site along Watkins Road, as shown in **Figure 2-4**. Bus route 253 operates services to Jarrahdale from these stops as illustrated in **Figure 2-5**. Overall, public transport within the surrounding area is poor given the low frequency and the limited amount of operational bus routes near the Site.

Figure 2-4 Nearest Bus Stops

Source: Metromap 2023

Proposed Educational Establishment – Lot 9 Watkins Road, Mundijong
2.0 Existing Situation

Figure 2-5 Bus Route 253

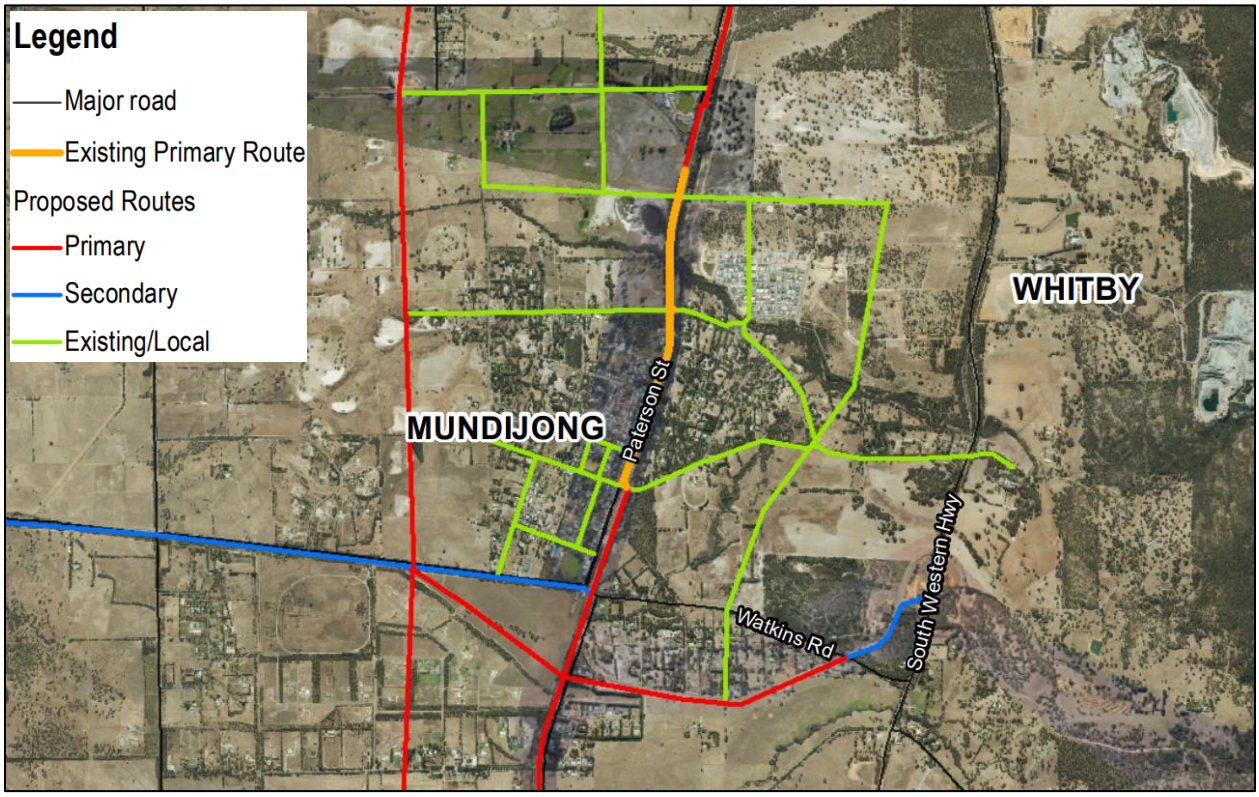


Source: Public Transport Authority

2.6 EXISTING PEDESTRIAN/CYCLE NETWORK FACILITIES

A single footpath is provided along the northern edge of Watkins Road, mainly to accommodate passengers of the bus route available along this road. Currently, Watkins Road does not follow any road-sharing scheme nor is it classified as a primary or secondary cycling route. According to the Shire's cycling and walking plan from 2020, there are no plans to develop Watkins Road to be part of the long-term cycling network.

Figure 2-6 Cycling Network Plan



Source: Public Transport Authority

2.7 CRASH ASSESSMENT

A search of the Main Roads WA Reporting Centre for crash data was undertaken for all recorded traffic accidents between 1 January 2017 and 31 December 2021 within the surrounding area of the Site. **Figure 2-7** shows the locations of the recorded crashes and **Table 2-3** and **Table 2-4** provides a summary of the crash type and severity.

A summary of the crash data is as follows:

- A total of 2 crashes were recorded along Watkins Road;
- No fatalities were recorded or crashes that required medical attention;
- Both crashes recorded resulted in hospitalization because of objects being hit; and
- Both crashes are listed as occurring on the same date / time and may have been related.

The low number of crashes suggest that the proposed development would unlikely result in any material changes to the overall road safety in the area.

Proposed Educational Establishment – Lot 9 Watkins Road, Mundijong
2.0 Existing Situation

Figure 2-7 Crash Map Location

Table 2-3 Total Crashes

Type of Crash (RUM Code)	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Hit Object	-	2	-	-	-	2
Total	-	2	-	-	-	2

Table 2-4 Midblock Crashes

Road Name	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Watkins Rd	-	2	-	-	-	2
Total	-	2	-	-	-	2

3.0 PROPOSED DEVELOPMENT

3.1 PROPOSED DEVELOPMENT

The proposal at the Site is for an establishment of an educational centre (alternative curriculum program) for youths, aged between 12 to 20 years old. The Site currently consists of an existing residential dwelling which will be retained for use as an administration building for the proposed school. The following site-specific design components are proposed at the Site:

- A maximum of 50 students;
- 5 staff members (2 administration staff and 3 teaching staff);
- 14 car parking bays;
- 1 bus bay (for a 60-seater bus); and
- a small hobby farm

The layout of the proposed educational establishment at the Site is shown below in **Figure 3-1**. The Site plan is also provided in **Appendix B**.

Figure 3-1 Site Plan

Source: Harley Dykstra

As shown in the figure above, several structures are proposed to be built on the Site. While some existing structures, like the residential dwelling, will be retained and converted into an administration office. **Table 3-1** below provides a tabular summary of the proposed and existing structures that will be part of the proposed development.

Table 3-1 List of Existing and Proposed Structures

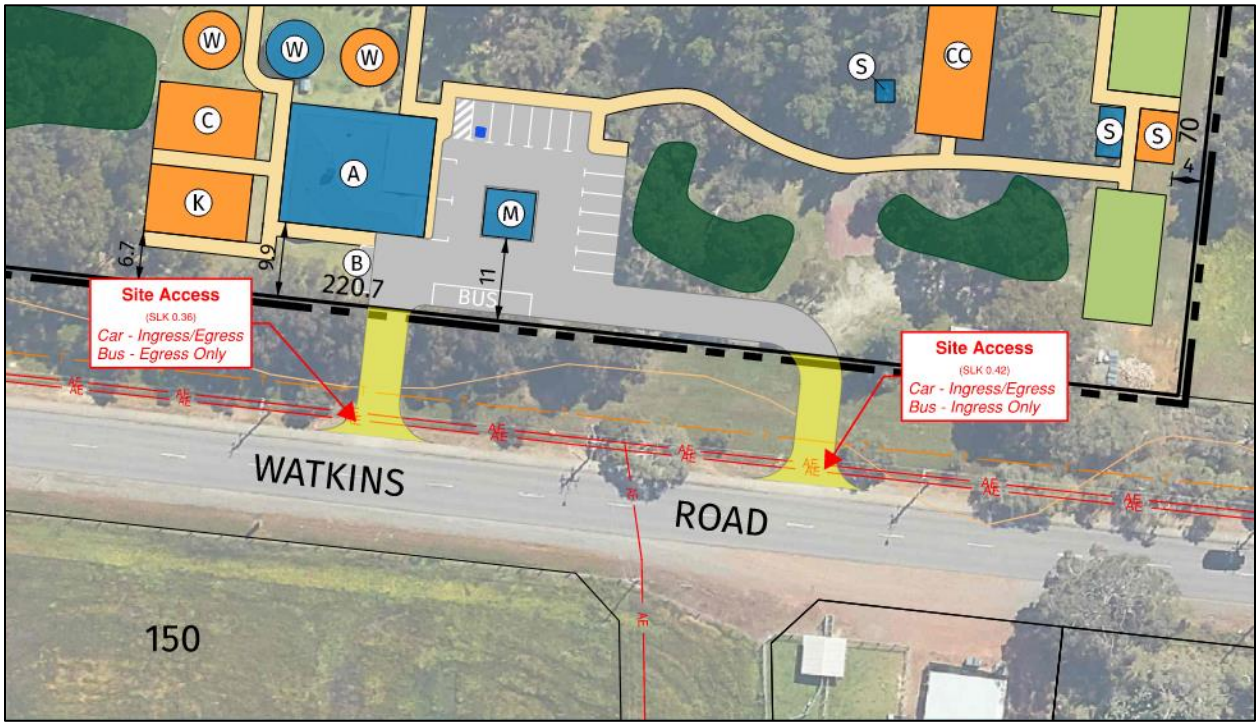
Structure Type	Number of Structure/s		Total
	Existing	*Proposed*	
Admin/Care Taker	1	--	1
Classroom	--	3	3
Kitchen/Home Goods	--	1	1
Shed	4	3	7
Water Tank	1	5	6
Outdoor Play Space	--	1	1
Workshop/Maintenance	1	--	1
Ablutions	--	1	1
Chicken Coop	--	1	1
Falai/Samoan Hut	--	1	1
Compost Area	--	1	1
Bicycle Parking	--	1	1
Total	*7*	*18*	*25*

Source: Harley Dykstra

3.2 ACCESS ARRANGEMENTS

The Site is accessible via the two proposed driveways on the northern side of Watkins Road. One driveway is on the western side of the Site (near the existing house), approximately at SLK 0.36. The other proposed driveway is on the eastern side of the Site, approximately at SLK 0.42. The two access points are proposed to be built on top of existing driveways and can be utilised by cars for ingress and egress. However, it is proposed that buses will access the Site via the driveway on the east (at SLK 0.42) and use the driveway on the west (at SLK 36) for egress. **Figure 3-2** illustrates the access arrangements for the proposed development.

Figure 3-2 Access Arrangement



Both of the Site's proposed access points are nearby the Hicks Street road reserve on the southern side of Watkins Road. Desktop investigations suggest that the western driveway is approximately 45m from the centre of the unconstructed road reserve of Hicks Street. This value ensures enough distance to avoid any future movement overlaps once the extension of Hicks Street towards Watkins Road is constructed. The eastern access on the other hand was measured to be at least 12m from Hicks street road reserve; this distance could be considered to be within the prohibited access driveway locations as specified in *AS 2890.1*. However, given that the intersection of Hicks Street with Watkins Road is still unconstructed, the access location is existing and the Site's land use will change from residential to educational establishment rather than commercial, this driveway location should have a negligible effect on any movement overlaps in the future.

3.3 PARKING REQUIREMENTS AND PROVISION

3.3.1 Car Parking Requirements and Provision

The Statutory parking requirements, following the *Shire of Serpentine Jarrahdale Local Planning Scheme No. 2,* have been considered in the context of the proposed development and are summarised below in **Table 3-2.**

Table 3-2 Car Parking Requirement and Provision

Land Use	Yield	Parking Requirements		Provision	Excess/ Shortfall
Educational Establishment > *Primary* > *Secondary*	3 classrooms	1.25 spaces per classroom 2 spaces per classroom	4 6	14	4
Total			**10**	**14**	**4**

The proposed development is not a typical educational establishment as its main objective is to re-engage youths (ages between 12 – 20) in an alternative learning environment. As such, both types of educational establishments were used to compute the statutory car parking requirements for the Site, as stipulated in the *Shire of Serpentine Jarrahdale's Town Planning Scheme No. 2*.

As shown in the table above, an excess of 4 parking spaces is computed. Given that the Site is also proposing to have a maximum of five (5) staff members, this excess in car parking space can be allocated for employees. However, this would generate 1 parking space deficiency for the staff. This deficiency can be alleviated by allocating another parking space to staff thereby reducing the available parking space for the Site to just 9. Take note that the parking requirements computed above were based on descriptors that does not exactly fit with the nature of the proposed development. Hence, the requirement of 10 car parking spaces can be considered as an overestimation. In addition, the Site also proposes a parking space for buses, to pick-up or drop-off students thereby further reducing parking space minimums. Hence, the one (1) shortfall in parking space can be considered negligible.

3.3.2 Bicycle Parking Requirements and Provision

Statutory parking requirements for bicycles are provided within the *Shire of Serpentine Jarrahdale's Local Planning Policy 4.15: Bicycle Facilities Policy of 2018,* which must be read in conjunction with the provisions of the *Town Planning Scheme No.2* relating to development applications. **Table 3-3** provides the result of the bicycle parking assessment.

Table 3-3 Minimum Bicycle Parking Requirements

Land Use	Proposed Parameter	Long Term Parking *(Employee/Resident Spaces)*			Short Term Parking *(Visitor/Shopper Spaces)*		
		Requirement	*Yield*	*Class*	*Requirement*	*Yield*	*Class*
Educational Establishment *Primary School and High Schools*	Max. of 50 students	1 space per 5 students over Year 4	10	2	1 space per 50 full-time students	1	3
Total			***10***			***1***	

As shown in the table above, a minimum of 11 bicycle parking spaces (1 short-term and 10 long-term) must be provided for the proposed development. The exact number of parking spaces provided in the Site is yet to be finalised; it should however, meet the minimum requirement computed above. A bicycle parking area is included in the Site plan as shown in **Figure 3-1** and as listed in **Table 3-1**.

Note that the minimum conditions were used to compute bicycle parking spaces. The *Local Planning Policy 4.15: Bicycle Facilities Policy of 2018* stipulates both a minimum and preferred parameter in computing bicycle parking spaces, it is available in Schedule 1 of the mentioned policy. In addition, the class of bicycle parking refers to the type of parking facility and corresponding security class that must be provided. Type 3 parking facility is low security wherein bike racks or rails with or without open shelter can be provided. Type 2 on the other hand has medium security wherein enclosure or shelter for parked bicycles is provided. Type 1 has the highest security wherein individual bicycle lockers are provided, best for use in areas that require long-term usage of parking facilities.

3.4 PARKING GEOMETRY ASSESSMENTS

The Site's proposed parking layout and dimensions were compared against the prescribed geometry requirements of the Australian/New Zealand Standards for various off-street parking facilities. Results of the geometrical assessment are presented in **Table 3-4** to **Table 3-6**.

Table 3-4 Geometry Assessment – for Perpendicular Car Parking Bays

Parameter	Parking Layout	*User Class 1A[1]*		*User Class 3A[1]*		*User Class 4[2]*	
		Minimum Dimension	*Remarks*	*Minimum Dimension*	*Remarks*	*Minimum Dimension*	*Remarks*
Bay Width, m	2.6	2.4	***Compliant***	2.6	***Compliant***	2.4	***Compliant***
Bay Length, m	5.4	5.4	***Compliant***	5.4	***Compliant***	5.4	***Compliant***
Aisle Width, m	5.8	5.8	***Compliant***	6.2	***Non-compliant***		
Circulation Roadway Width, m	5.8	5.5 *(two-way)*	***Compliant***	5.5 *(two-way)*	***Compliant***		
Access Width, m *(Category 1)*	5.5	3.0 – 5.5	***Compliant***	3.0 – 5.5	***Compliant***		

[1] from AS2890.1:2004 – Parking Facilities Part 1: Off-street Car Parking
[2] from AS2890.6:2009 – Parking Facilities Part 1: Off-street Car Parking for People with Disabilities

The table above shows the assessment conducted for the proposed parking layout against statutory parking geometry requirements. The aisle width for User Class 3A was found to be non-compliant as the minimum dimension must be 6.2m, whereas the minimum proposed aisle width is only 5.8m wide. However, for a single manoeuvre entry and exit on parking bays, this aisle width is sufficient and compliant for User Class 3. The access width minimum value was found to be between 3.0m – 5.5m on the basis that there are less than 25 parking spaces on-site and that Watkins Road is a local road, hence the Category 1 classification.

Table 3-5 Geometry Assessment – for Parallel Car Parking Bays

Parameter	Parking Layout	Parallel Parking Requirements[1]	
		Minimum Dimension	*Remarks*
Bay Width, m	2.1	2.1	***Compliant***
Bay Length, m *(unobstructed end)*	5.4	5.4	***Compliant***
Aisle Width, m	4.2	3.6[2]	***Compliant***

[1] from AS2890.1:2004 – Parking Facilities Part 1: Off-street Car Parking
[2] aisle width measured from RHS kerb of a one-way road or centre line of a two-way road

Two parallel car parking bays are proposed on the Site and were found to be compliant with the required bay width size. The available aisle width adjacent to the parallel parking bays was measured to be 4.2m wide. The measured aisle width is compliant with the minimum dimension prescribed in the standards.

Table 3-6 Geometry Assessment - for Bus/Service Vehicle Parking Bay

Parameter	Parking Layout	Design Vehicle Dimensions[1]					
		SRV		***MRV***		***HRV***	
		Minimum Dimension	*Remarks*	*Minimum Dimension*	*Remarks*	*Minimum Dimension*	*Remarks*
Overall Length, m	13.0	6.40	**Suitable**	8.80	**Suitable**	12.50	**Suitable**
Design Width, m	3.0	2.30	**Suitable**	2.50	**Suitable**	2.50	**Suitable**
Wheelbase, m		3.80	*Refer to Swept Paths*	5.00	*Refer to Swept Paths*	6.85	*Refer to Swept Paths*
Design Turning Radius, m		7.1		10.0		12.5	
Swept Circles		15.3		21.6		27.8	
Clearance Height, m		3.5		4.5		4.5	

[1] from AS2890.2:2018 – Parking Facilities Part 2: Off-street Commercial Vehicle Facilities

A single bus bay or service vehicle parking bay was assessed against the requirements of *AS2890.2:2018 for off-street commercial vehicle parking*. It was found that SRVs (small rigid vehicles), MRVs (medium rigid vehicles), and HRVs (heavy rigid vehicles) are all suited to utilise the parking space. The aisle width adjacent to the bus bay was measured to be 6.9m. From *AS2890.1:2004*, this measured aisle width is sufficient for a vehicle to safely pass the parking bay adjacent to it.

3.5 OPERATING HOURS

The educational establishment at the Site is proposed to operate between 8:00 AM to 4:00 PM, during weekdays (Monday to Friday). Operations during weekends are yet to be confirmed by the Client.

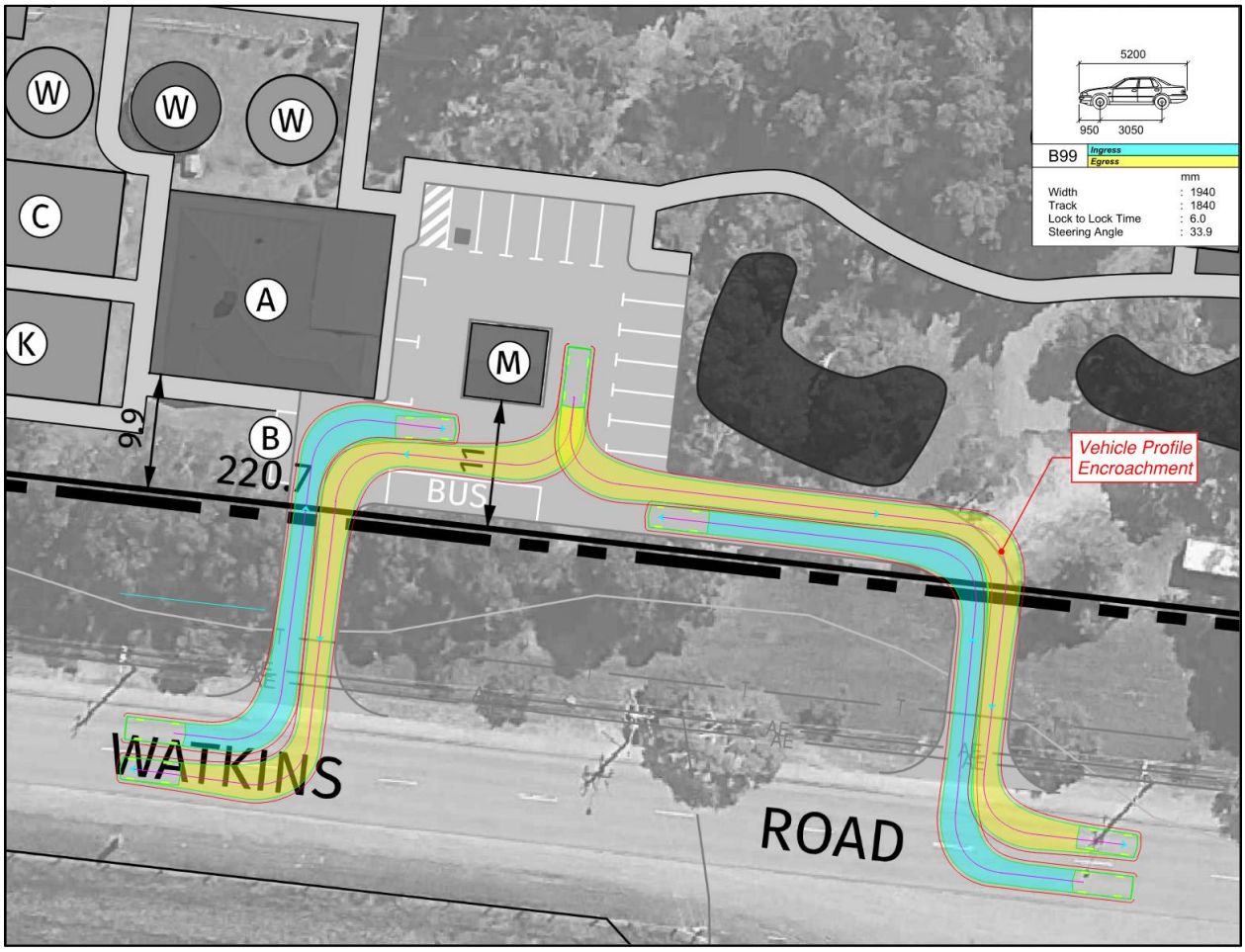
4.0 SWEPT PATH ANALYSIS

Swept path analyses were conducted to verify the manoeuvrability of various vehicles within the proposed development's parking layout and driveway. The B99 design vehicle was primarily used in this assessment; the results of these analyses are provided below in **Figure 4-1** to **Figure 4-6**.

4.1 INTERNAL TRAFFIC CIRCULATION

The internal flow or order of circulation within the parking area is yet to be defined and finalized by the Client. Swept path analysis was conducted to verify vehicle manoeuvrability along the aisle widths of the proposed parking layout and is shown in **Figure 4-1**.

Figure 4-1 Internal Traffic Circulation

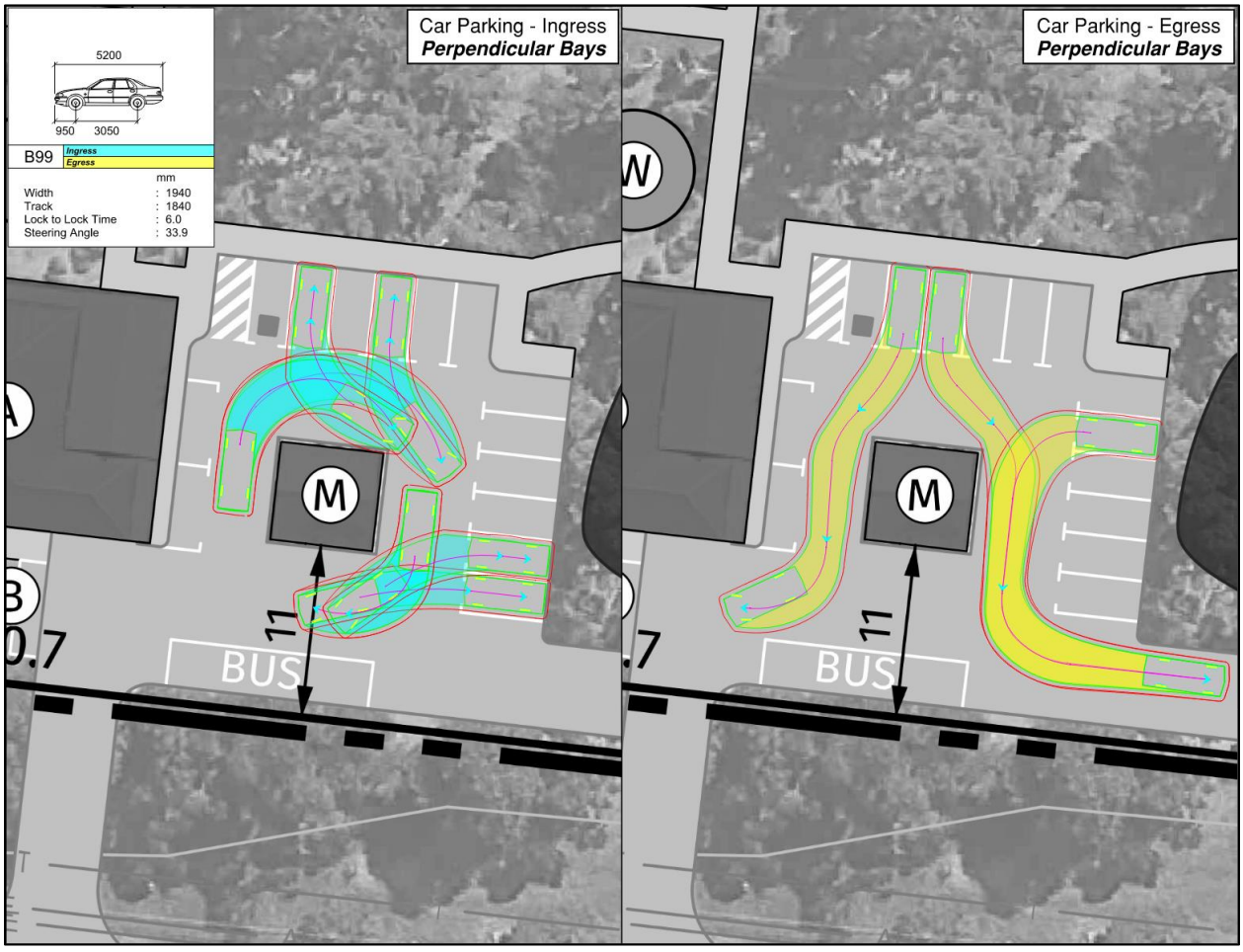


The figure above provides an indicative circulation of vehicles within the proposed development's parking area. As shown, B99 design vehicles can access both of the proposed driveways. However, the egress

profile of the design vehicle at the 90-degree bend on the western driveway suggests an encroachment beyond the pavement as its outer curve radius is too large to accommodate two-way traffic flow. In addition, turning movements are constricted by the limited space available due to the presence of a maintenance shed in the middle of the parking lot. Although the aisle widths were found to be sufficient to accommodate two-way traffic, it is recommended that the Site adopts a one-way traffic flow to provide adequate space for turning vehicles along the corners of the parking lot. The one-way scheme is especially applicable on the aisle adjacent to the parallel parking bays as it is narrow and would require vehicles to encroach on it to safely complete a turning movement and avoid hitting the maintenance shed.

4.2 CAR PARKING BAYS

Figure 4-2 Swept Path - Perpendicular Car Parking Bays



Car parking bays were also subjected to swept path checks to verify the proposed dimensions and manoeuvrability of vehicles in getting in and out of the parking bays. Given the space restrictions (i.e., maintenance shed), it was found that it is more difficult to park a vehicle nose-in along the perpendicular

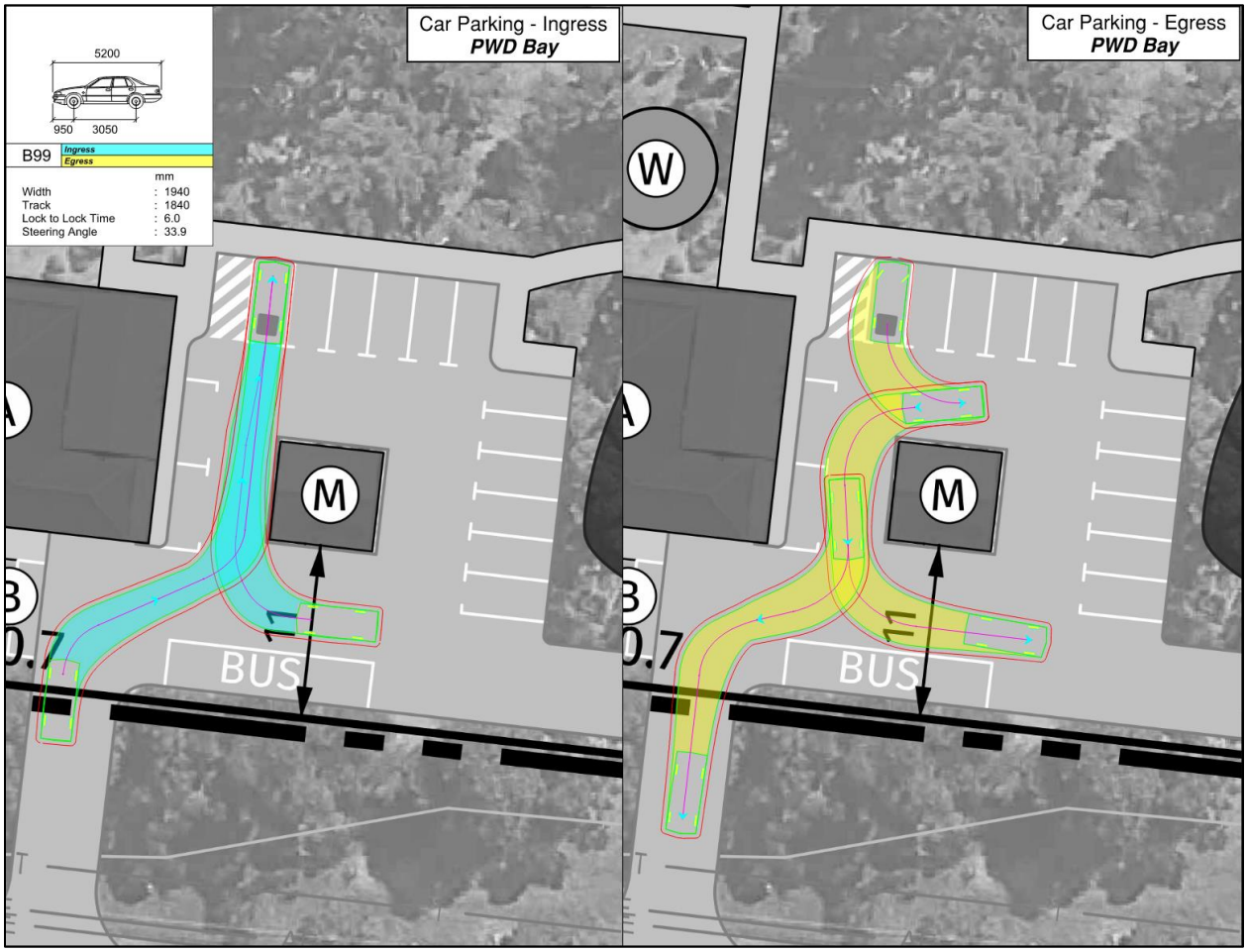
bays. As such, much of the swept path checks were conducted assuming that vehicles will be parked with the vehicle's nose/hood out. As shown in the figure above, parking bay dimensions and aisle widths are sufficient to accommodate parking manoeuvres at perpendicular bays.

Figure 4-3 Swept Path - Parallel Car Parking Bays

As shown in the figure above, entry to parallel parking bays require several manoeuvres along a limited space. Cars expecting to use these bays are recommended to park facing Watkins Road for convenience. The bay nearest to the disability parking space should be accessed by a car by first manoeuvring around the maintenance shed to reach the narrow aisle and reverse-in towards the parking bay. The other bay can be accessed on either driveway as long as it reverses in towards the bay to face Watkins Road. Egressing from the parallel bays require fewer manoeuvres as compared to parkin in it thus lessening the risk of crashes with other vehicles.

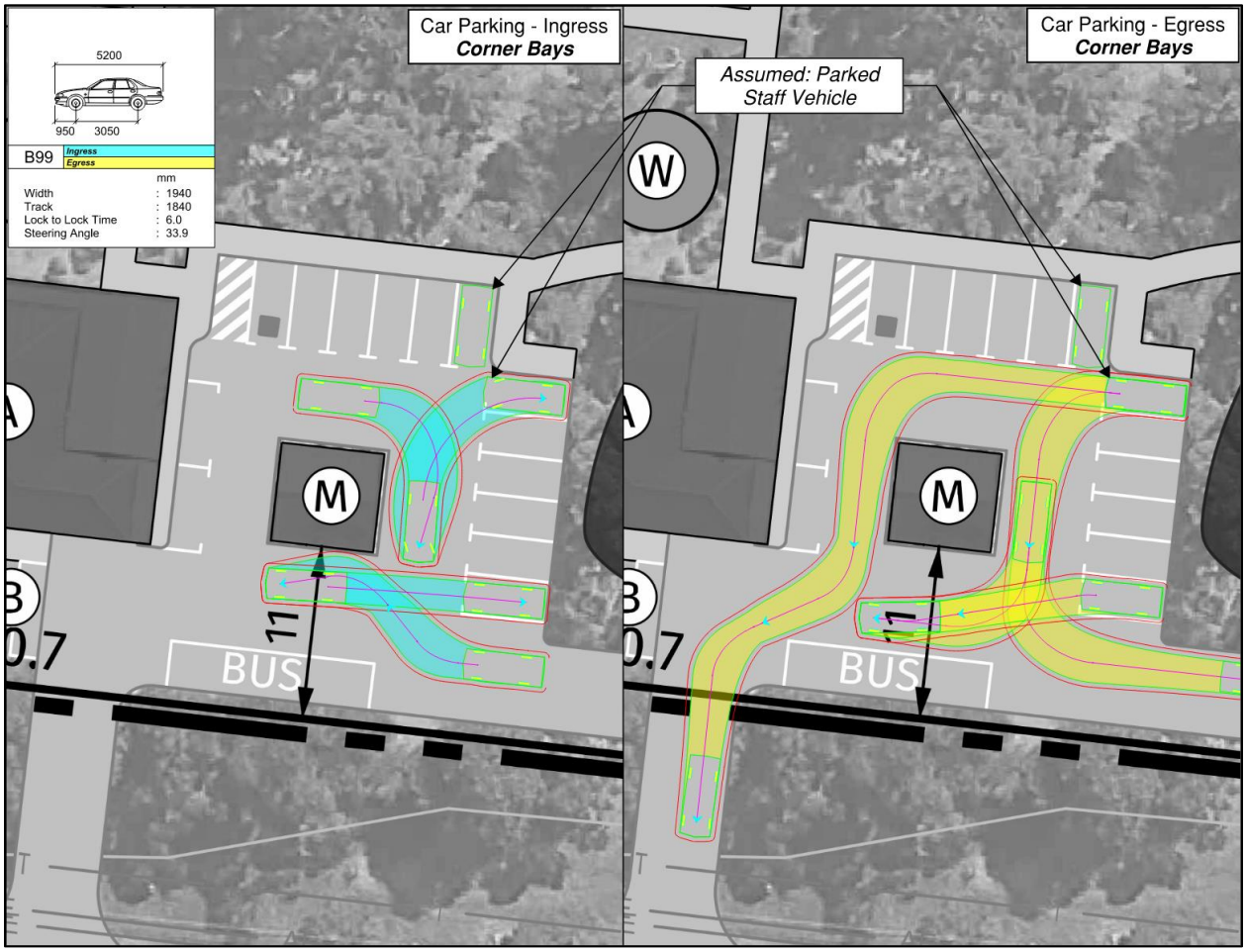
Proposed Educational Establishment – Lot 9 Watkins Road, Mundijong
4.0 Swept Path Analysis

Figure 4-4 Swept Path - Disabled Car Parking Bay



Following a clockwise flow pattern for the parking lot, the disabled parking bay can be easily accessed. However, the figure above shows a nose-in parked vehicle and would require reversing manoeuvres to egress. An exception can be made for egressing vehicles coming from the disabled parking bay wherein it could encroach the parallel parking bays temporarily (assuming that it is not occupied) to conveniently exit the parking area. Vehicles may also park nose-out on the PWD bay so that egress is more convenient and quicker.

Figure 4-5 Swept Path - Corner Car Parking Bays



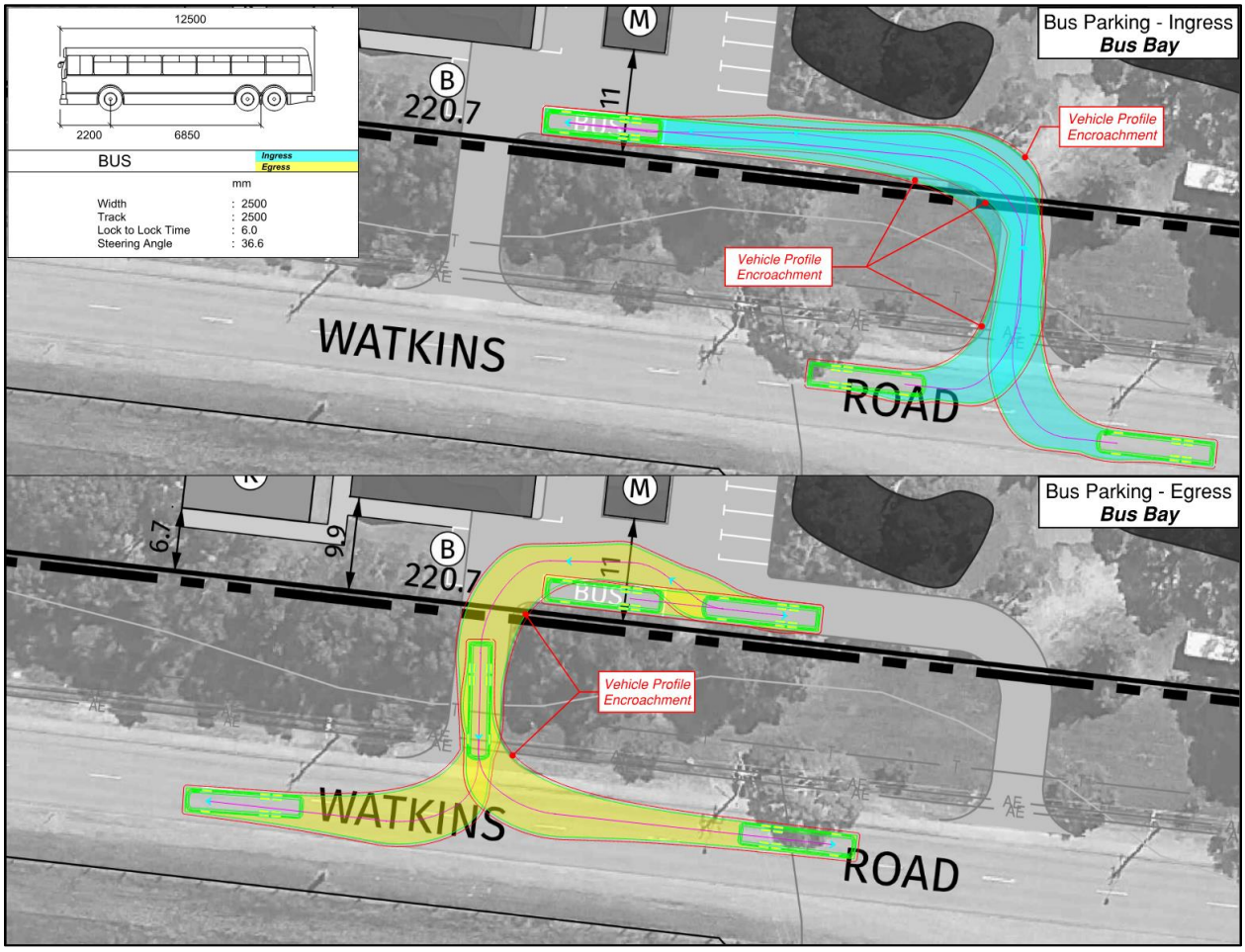
Given the uncertainty on whether parking bays at the corners of the lot will be utilised, swept path checks were also conducted. It was found that these parking bays may be utilised given that a vehicle will be parked nose-out. The corner parking bays can be allocated for staff parking since vehicles would occupy it for a much longer period, thus requiring fewer manoeuvres throughout the day. Moving in and out of these spaces is expected to be simpler for staff since there will be more space to use at the start or end of the day.

4.3 BUS PARKING BAY

A single bus bay is proposed and was assessed for geometric requirements as shown in **Table 3-6**. It was found that small and medium rigid vehicles (SRVs and MRVs) were suitable to utilise the parking bay. **Figure 4-6** provides the swept path result using an MRV as a design vehicle.

Proposed Educational Establishment – Lot 9 Watkins Road, Mundijong
4.0 Swept Path Analysis

Figure 4-6 Swept Path - Bus Parking Bay



The figure above illustrates that the design vehicle (i.e., bus of 12.5m length) requires a lot of space to access the bus bay, especially along the proposed driveways. As discussed in **Section 3.2**, buses are proposed to access the Site via the driveway on the right side of Site and egress it by using the driveway on the left. Swept path checks indicate encroachment of design vehicles beyond the driveways. Particularly, the inner curve radius at the driveway bend was insufficient to accommodate a left-turn movement during ingress. The egress manoeuvre required reversing first out of the bus bay in order to gain enough space to conduct a left turn movement. However, similar to the ingress case, the curve radius at the corner of the bus bay was also too small to accommodate a left-turn movement. It is recommended that the driveway bends and radiuses be redesigned based on the profile of the design vehicle used in the analysis above to ensure safe manoeuvrability within the proposed development.

5.0 ANALYSIS OF TRANSPORT NETWORK

5.1 TRIP GENERATION

For this assessment, a trip generated is defined by the ingress and egress movement of vehicles relative to the Site. If a vehicle is to enter and exit the Site within a day, the vehicle is considered to generate 2 trips per day (for entering and exiting the Site).

As discussed in **Section 3.1**, there will be a maximum of 50 students and 5 staff members within the proposed development. Assuming that students will be dropped off and pick-up daily, 100 daily car trips are expected to be generated by the Site by the students (with their parent or guardian driving the vehicle). Taking note of the number of staff present on-site as well, 10 daily car trips can be added to the number of Site-generated trips. **Table 5-1** provides a tabular summary of the estimated trips of the proposed development.

Table 5-1 Estimated Trip Generation

Trip Generator	Estimated No. of Trips *(8 hours of operation per day)*		
	Daily	*AM Peak Hour*	*PM Peak Hour*
Student *(50 pax)*	100	50	50
Staff *(5 pax)*	10	5	5
Total Trips	***110***	***55***	***55***

From the table above, the Site is expected to generate 110 car trips daily. On peak hour periods, it is estimated that 55 trips will be generated in the morning and afternoon peak hour periods. Take note that the values above were estimated based on limits provided by the Client. Hence, trips in and out of the Site on any given day may be observed as estimated from the table above or at values much lesser than estimated.

5.2 TRAFFIC DISTRIBUTION

The vehicular trips generated by the Site are expected to primarily come from the residential areas and the town centre west of the proposed development. Conflicts between inbound and outbound movements are expected to be minimal due to the low number of trips estimated to occur in the peak hour period. In addition, the majority of the trips generated by the Site come from the students. Assuming that students will be dropped off (and later picked up in the afternoon) by their parent/guardian, this kiss-and-drop procedure is expected to be considerably short, and it is unlikely to cause congestion on the surrounding road network.

5.3 IMPACT ON THE SURROUNDING ROAD NETWORK

As shown in **Table 5-1**, the proposed development is expected to generate 110 trips daily. Referencing available traffic data along the surrounding road network in **Section 2.4**, it can be construed that the proposed development is unlikely to have a significant effect on the surrounding road network. In addition, the *WAPC Transport Impact Guidelines* specify that any development generating trips between 10 to 100 during peak hour periods are considered to have a moderate impact. Considering the estimated number of trips at peak hour period of 55, the proposed development is expected to only have a minimal impact on the existing road network.

6.0 SUMMARY

This Transport Impact Assessment outlines the transport aspects of the proposed development including trip generation, access, and car parking. Included also are discussions regarding pedestrian, cycle, and public transport considerations.

This statement has been prepared in accordance with the *WAPC Transport Assessment Guidelines for Developments: Volume 4 – Individual Developments (2016).*

The following are conclusions about the proposed development:

- The proposal is for an Educational Establishment at the Site, comprising a maximum of 50 students and 5 staff;
- Of the 25 proposed structures on the Site, 18 are proposed to be built while 7 are existing structures to be retained;
- Car parking provisions are sufficient with an estimated excess of 4 car parking bays. This excess however can be allocated to the staff members;
- Parking geometry assessment indicates minor non-compliance with statutory requirements;
- Swept path checks suggest constricted turning movements for vehicles due to the retention of a maintenance shed in the middle of the parking area; as such, it is recommended that a one-way traffic flow or scheme be adopted to reduce conflict and mismanagement within the parking area;
- Given the maximum number of students and staff members to utilise the Site, the proposed development is expected to generate 110 trips per day, or an estimated 55 trips during peak hour periods.

Overall, the proposed development of an educational establishment along Watkins Road is unlikely to result in any substantial impact on the surrounding road network; where the background traffic is relatively low when compared with the overall road and intersection capacity.

APPENDICES

Appendix A WAPC CHECKLIST

Item	Status	Comments/Proposals
Proposed Development		
Proposed Land Use	Section 3	
Existing Land Uses	Section 1	
Context with Surrounds	Section 1	
Vehicular Access and Parking		
Access Arrangements	Section 3	
Public, Private, and Disabled Parking Set Down / Pick-up	Section 3 / 4	
Service Vehicles (non-residential)		
Access Arrangements	N/A	
On/Off-site Loading Facilities	N/A	
Service Vehicles (residential)		
Rubbish Collection and Emergency Vehicle Access	N/A	
Hours of Operation (non-residential only)	Section 3	
Traffic Volumes		
Daily or Peak Traffic Volumes	Section 2	
Type of Vehicles (e.g., cars, trucks)	Section 3 / 4	
Traffic Management on Frontage Streets	N/A	
Public Transport Access		
Nearest Bus/Train Routes	Section 2	
Nearest Bus Stops/Train Stations	Section 2	
Pedestrian/Cycle Links to Bus Stops/Train Station	Section 2	
Pedestrian Access/Facilities		
Existing Pedestrian Facilities Within The Development (If Any)	N/A	
Proposed Pedestrian Facilities Within Development	N/A	
Existing Pedestrian Facilities On Surrounding Roads	Section 2	
Proposals To Improve Pedestrian Access	Section 2	
Cycle Access/Facilities		
Existing Cycle Facilities Within The Development (If Any)	N/A	
Proposed Cycle Facilities Within The Development	N/A	
Existing Cycle Facilities On Surrounding Roads	Section 2	
Proposals To Improve Cycle Access	Section 2	
Site-specific Issues	N/A	
Safety Issues		
Identify Issues	N/A	
Remedial Measures	N/A	

Proposed Educational Establishment – Lot 9 Watkins Road, Mundijong
Appendix B Site Plan

Appendix B SITE PLAN

HERRING STORER ACOUSTICS

HARLEY DYKSTRA

PROPOSED EDUCATION FACILITY
LOT 9 WATKINS ROAD, MUNDIJONG

ENVIRONMENTAL ACOUSTIC ASSESSMENT

MAY 2023

REFERENCE: 30986-1-23080

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
HERRING STORER ACOUSTICS
P.O. Box 219, Como, W.A. 6952
(08) 9367 6200
hsa@hsacoustics.com.au

DOCUMENT CONTROL PAGE

ENVIRONMENTAL ACOUSTIC ASSESSMENT
PROPOSED EDUCATION FACILITY

Job No: 23080

Document Reference: 30986-1-23080

FOR

HARLEY DYKSTRA

DOCUMENT INFORMATION			
Author:	Geoffrey Harris	**Checked By:**	Paul Daly
Date of Issue :	05 May 2023		

REVISION HISTORY				
Revision	**Description**	**Date**	**Author**	**Checked**

DOCUMENT DISTRIBUTION				
Copy No.	**Version No.**	**Destination**	**Hard Copy**	**Electronic Copy**
1	1	Harley Dykstra Attn: Jayde Sleight Email: jaydes@harleydykstra.com.au		✓

CONTENTS

1.0 INTRODUCTION

Herring Storer Acoustics was commissioned to undertake an acoustic review of the proposed education facility school to be located at Lot 9 Watkins Road, Mundijong.

It is noted that the National Construction Code (NCC) does not have acoustic requirements for school buildings.

Educational Facilities Schedule 2 – Community Noise section of the *Environmental Protection (Noise) Regulations 1997* allows for the emission of noise from the premises other than mechanical equipment (excluding musical instruments). It is interpreted that the noise emission should not be 'unreasonable' if emitted as part of normal educational facility activity.

The conceptual plan for the school is shown on Figure 1. The closest neighbouring residences are located at Lot 443 to the West, Lot 2 to the North West and Lot 10 to the North East.

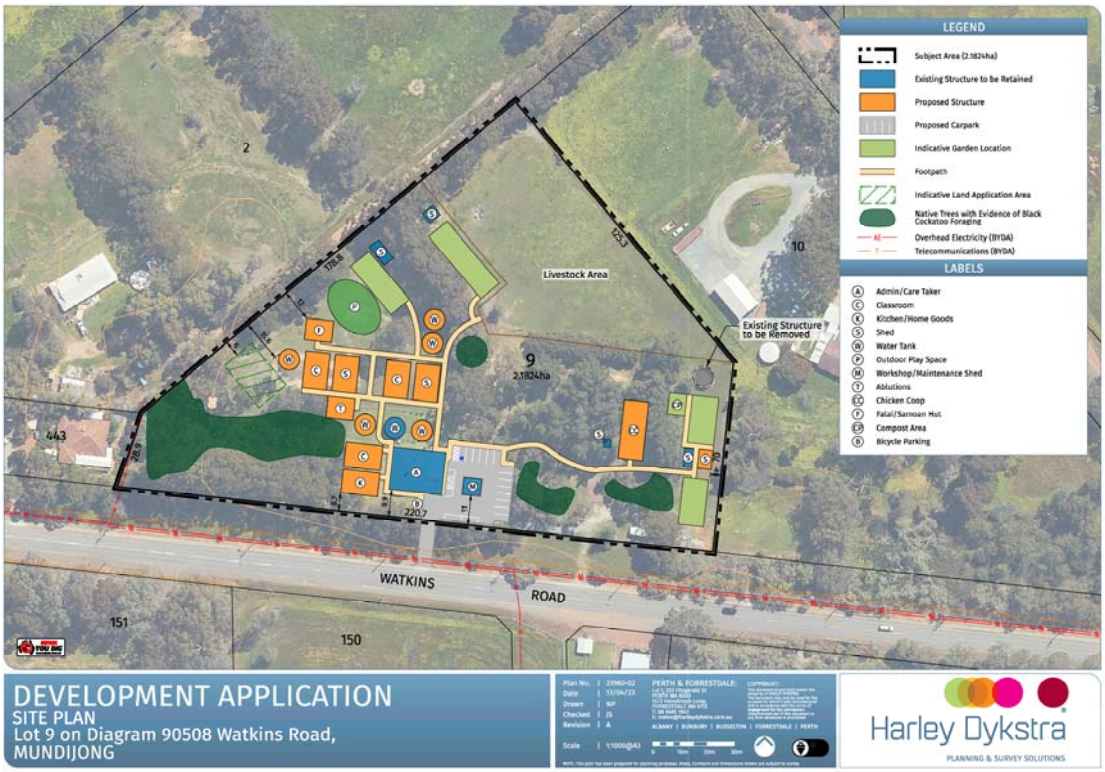


FIGURE 1 – CONCEPT DESIGN FOR EDUCATION FACILITY

The purpose of this review is to provide some guidance with regards to noise emissions from the school.

2.0 CRITERIA

2.1 COMMUNITY NOISE

Under the Environmental Protection (Noise) Regulations 1997, noise emissions from schools are considered as community noise and the acoustic requirements are outlined in Regulations 16 – Community Noise. In summary Regulation 16, under Clause 2 states :

> *(2) Nothing in this regulation —*
>
> *(a) affects the application of regulations 5 and 15 and sections 79 to 81A of the Act; or*
>
> *(b) applies to noise emitted in accordance with an approval granted under regulation 18B or 18.*
>
> *(3) Regulation 7 does not apply to community noise.*

Under the Regulations, Community noise means a noise of a type listed in Schedule 2. Section 4 of Schedule 2 relates to schools and states :

> *4. Noise emitted as a consequence of a recreational or educational activity from premises occupied for educational purposes if the activity —*
>
> *(a) is conducted under the control of the occupier of the premises; and*
>
> *(b) does not include the use of mechanical equipment other than musical instruments.*

However, there is a condition to the above, as outlined in Clause 4 of Regulation 16, which states :

> *(4) If the CEO is satisfied that —*
>
> *(a) a type of community noise has increased, or has increased its effect on the environment, since the coming into operation of these regulations; or*
>
> *(b) a type of community noise has, or is likely to have, a detrimental effect on the environment that exceeds the benefit to the community of the activity that gives rise to that noise,*
>
> *the CEO may cause to be served on the owner or the occupier, or on both the owner and the occupier, of the premises or public place a noise control notice in respect of the community noise.*

Even though noise emissions from the school would effectively be exempt, they would still need to be considered reasonable. We also understand that this would only relate to the noise received at the existing residences, as for any future residence the school would be the existing premises and thus their "environment" would include noise emissions from the school.

Additional to the above, noise from the mechanical services would need to comply with Regulation 7 or the assigned noise levels.

2.2 ASSIGNED NOISE LEVELS

The criteria used is in accordance with the *Environmental Protection (Noise) Regulations 1997 (as amended).* These regulations stipulate maximum allowable external noise levels determined by the calculation of an influencing factor. The influencing factor is calculated for the usage of land within the two circles, having radii of 100m and 450m from the premises of concern. For industrial and utility premises, the assigned noise levels are fixed for all hours. Table 2.1 lists the base assigned noise levels for the "highly sensitive area" of residence and the fixed assigned noise level for the other types of receivers.

TABLE 2.1 – ASSIGNED OUTDOOR NOISE LEVELS

Type of premises receiving noise	Time of day	Assigned level (dB)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
Noise sensitive premises: highly sensitive area (i.e within 15m of a dwelling)	0700 to 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
	0900 to 1900 hours Sunday and public holidays	40 + IF	50 + IF	65 + IF
	1900 to 2200 hours all days	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + IF	45 + IF	55 + IF
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial premises	All hours	60	75	80
Industrial premises	All hours	65	80	90

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
The L_{A1} noise level is the noise that is exceeded for 1% of the time.
The L_{Amax} noise level is the maximum noise level recorded.
IF = Influencing Factor

It is a requirement that noise from the site be free of annoying characteristics (tonality, modulation and impulsiveness) at other premises, defined as per Regulation 9.

Where the above characteristics are present and cannot be practicably removed, the following adjustments are made to the measured or predicted level at other premises.

TABLE 2.2 – ADJUSTMENTS FOR ANNOYING CHARACTERISTICS WHEN MUSIC IS NOT PRESENT

Where tonality is present	Where modulation is present	Where impulsiveness is present
+ 5 dB	+ 5 dB	+ 10 dB

Where the noise emission is music, then any measured level is adjusted to Table 2.3 below.

TABLE 2.3 - ADJUSTMENTS TO MEASURED MUSIC NOISE LEVELS

Where **impulsiveness** is not present	Where **impulsiveness** is present
+10 dB(A)	+15 dB(A)

At the neighbouring receptors, the Influencing Factor would be 0. Thus, the assigned noise levels would be as listed in Table 2.4.

TABLE 2.4 –ASSIGNED OUTDOOR NOISE LEVELS

Type of premises receiving noise	Time of day	Assigned level (dB)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
Noise sensitive premises: highly sensitive area (i.e within 15m of a dwelling)	0700 to 1900 hours Monday to Saturday	45	55	65
	0900 to 1900 hours Sunday and public holidays	40	50	65
	1900 to 2200 hours all days	40	50	55
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35	45	55
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
The L_{A1} noise level is the noise that is exceeded for 1% of the time.
The L_{Amax} noise level is the maximum noise level recorded.

3.0 NOISE LEVELS

Although noise emission from schools (excluding mechanical plant) are exempt from compliance with the assigned noise levels, we believe that it is possible that council may require that noise received at the existing residences from school activities comply with the assigned noise levels. Upon reviewing the school, we believe that the noise that would most likely to need to be considered would be that associated with:

- 1) Powered Workshop – Hand tools and Fixed Plant.
- 2) Hobby Farm – Aquaponics
- 3) Mechanical Plant – Air conditioning

Based on the above, noise levels associated with

TABLE 3.1 – SOUND POWER LEVELS

Location	Sound Power Level, (dB(A))
Workshop	100 (Inside)
Aquaponics	55
Mechanical Plant*	64

*Assumed; once final selection is made an updated acoustic report should be provided.

4.0 ASSESSMENT

Based on the provided site plan and the above noise levels, noise modelling software SoundPLAN has been used to ascertain noise levels at the adjacent noise sensitive premises.

TABLE 4.1 – CALCULATED NOISE LEVELS

Location	Workshop	Aquaponics	Mechanical Plant
A – Lot 443	8	0	14
B – Lot 2	7	1	14
C – Lot 10	12	12	20

Due to the nature of the emissions, noise received at neighbours could potentially be tonal in nature, as a result the +5 adjustment for annoying characteristics has been applied.

TABLE 4.2 – ADJUSTED NOISE LEVELS

Location	Workshop	Aquaponics	Mechanical Plant
A – Lot 443	13	5	19
B – Lot 2	12	6	19
C – Lot 10	17	17	25

As the education facility is only proposed to operate during the "Day Period" Table 4.2, 4.3 and 4.4 compares the assessable noise against the relevant L_{A10} assigned noise levels.

TABLE 4.3 – ASSESMENT OF WORKSHOP NOISE LEVELS

Location	Assessable Noise Level, dB(A)	Assigned Noise Level, L_{A10} dB		Exceedance to Assigned Noise Level
		Time of Day	L_{A10} dB	
A – Lot 443	13	Day Period	45	Complies
B – Lot 2	12	Day Period	45	Complies
C – Lot 10	17	Day Period	45	Complies

TABLE 4.4 – ASSESMENT OF AQUAPONICS NOISE LEVELS

Location	Assessable Noise Level, dB(A)	Assigned Noise Level, L_{A10} dB		Exceedance to Assigned Noise Level
		Time of Day	L_{A10} dB	
A – Lot 443	5	Day Period	45	Complies
B – Lot 2	6	Day Period	45	Complies
C – Lot 10	17	Day Period	45	Complies

TABLE 4.5 – ASSESMENT OF MECHANAICAL PLANT NOISE LEVELS

Location	Assessable Noise Level, dB(A)	Assigned Noise Level, L_{A10} dB		Exceedance to Assigned Noise Level
		Time of Day	L_{A10} dB	
A – Lot 443	19	Day Period	45	Complies
B – Lot 2	19	Day Period	45	Complies
C – Lot 10	25	Day Period	45	Complies

Based on the above, noise emissions associated with the proposed education facility are deemed to comply during operational hours.

HERRING STORER ACOUSTICS

HARLEY DYKSTRA

PROPOSED EDUCATION FACILITY
LOT 9 WATKINS ROAD, MUNDIJONG

SPP 5.4 NOISE MANAGEMENT PLAN

MAY 2023

OUR REFERENCE: 30974-1-23080

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
HERRING STORER ACOUSTICS
P.O. Box 219, Como, W.A. 6952
(08) 9367 6200
hsa@hsacoustics.com.au

DOCUMENT CONTROL PAGE

SPP 5.4 NOISE MANAGEMENT PLAN
LOT 9 WATKINS ROAD, MUNDIJONG

Job No: 23080

Document Reference: 30974-1-23080

FOR

HARLEY DYKSTRA

DOCUMENT INFORMATION			
Author:	Geoffrey Harris	**Checked By:**	Paul Daly
Date of Issue:	3 May 2023		

REVISION HISTORY

Revision	Description	Date	Author	Checked

DOCUMENT DISTRIBUTION

Copy No.	Version No.	Destination	Hard Copy	Electronic Copy
1	1	Harley Dykstra Attn: Jayde Sleight Email: jaydes@harleydykstra.com.au		✓

CONTENTS

APPENDICES

1. INTRODUCTION

Herring Storer Acoustics were commissioned by Harley Dykstra to carry out an acoustic study with regards to traffic related noise for the proposed education facility at Lot 9, Watkins Road, Mundijong.

The purpose of the study was to:

- Assess the noise that would be received within the development area from vehicles travelling on the adjacent "Australind" rail line for future traffic volumes.
- Compare the results with accepted criteria and if exceedances exist, develop the framework for the management of noise.

A plan is attached in Appendix A.

2. ACOUSTIC CRITERIA

2.1 NOISE

The Western Australian Planning Commission (WAPC) released on 6th September 2019 State Planning Policy 5.4 *"Road and Rail Noise".* The requirements of State Planning Policy 5.4 are outlined below.

POLICY APPLICATION (Section 4)

When and where it applies (Section 4.1)

SPP 5.4 applies to the preparation and assessment of planning instruments, including region and local planning schemes; planning strategies, structure plans; subdivision and development proposals in Western Australia, where there is proposed:

a) *noise-sensitive land-use within the policy's trigger distance of a transport corridor as specified in* ***Table 1****;*
b) *New or major upgrades of roads as specified in* ***Table 1*** *and maps* ***(Schedule 1,2 and 3);*** *or*
c) *New railways or major upgrades of railways as specified in maps (****Schedule 1, 2 and 3);*** *or any other works that increase capacity for rail vehicle storage or movement and will result in an increased level of noise.*

Policy trigger distances (Section 4.1.2)

Table 1 *identifies the State's transport corridors and the trigger distances to which the policy applies.*

The designation of land within the trigger distances outlined in ***Table 1*** *should not be interpreted to imply that land is affected by noise and/or that areas outside the trigger distances are un-affected by noise.*

*Where any part of the lot is within the specified trigger distance, an assessment against the policy is required to determine the likely level of transport noise and management/ mitigation required. An initial screening assessment (****guidelines: Table 2: noise exposure forecast****) will determine if the lot is affected and to what extent."*

TABLE 1: TRANSPORT CORRIDOR CLASSIFICATION AND TRIGGER DISTANCES

Transport corridor classification	***Trigger distance***	***Distance measured from***
Roads		
Strategic freight and major traffic routes *Roads as defined by Perth and Peel Planning Frameworks and/or roads with either 500 or more Class 7 to 12 Austroads vehicles per day, and/or 50,000 per day traffic volume*	*300 metres*	*Road carriageway edge*
Other significant freight/traffic routes *These are generally any State administered road and/or local government road identified as being a future State administered road (red road) and other roads that meet the criteria of either >=23,000 daily traffic count (averaged equivalent to 25,000 vehicles passenger car units under region schemes)*	*200 metres*	*Road carriageway edge*
Passenger railways		
	100 metres	*Centreline of the closest track*
Freight railways		
	200 metres	*Centreline of the closest track*

Proponents are advised to consult with the decision making authority as site specific conditions (significant differences in ground levels, extreme noise levels) may influence the noise mitigation measures required, that may extend beyond the trigger distance.

POLICY MEASURES (Section 6)

The policy applies a performance-based approach to the management and mitigation of transport noise. The policy measures and resultant noise mitigation will be influenced by the function of the transport corridor and the type and intensity of the land-use proposed. Where there is risk of future land-use conflict in close proximity to strategic freight routes, a precautionary approach should be applied. Planning should also consider other broader planning policies. This is to ensure a balanced approach takes into consideration reasonable and practical considerations.

Noise Targets (Section 6.1)

***Table 2** sets out noise targets that are to be achieved by proposals under which the policy applies. Where exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.*

In the application of the noise targets the objective is to achieve:

- *indoor noise levels as specified in **Table 2** in noise sensitive areas (for example, bedrooms and living rooms of houses, and school classrooms); and*
- *a reasonable degree of acoustic amenity for outdoor living areas on each residential lot. For non-residential noise-sensitive developments, for example schools and child care centres the design of outdoor areas should take into consideration the noise target.*

It is recognised that in some instances, it may not be reasonable and/or practicable to meet the outdoor noise targets. Where transport noise is above the noise targets, measures are expected to be implemented that balance reasonable and practicable considerations with the need to achieve acceptable noise protection outcomes.

TABLE 2: NOISE TARGETS

Proposals	***New/Upgrade***	***Noise Targets***		
		Outdoor		***Indoor***
		Day (L_{Aeq}(Day) dB) (6 am-10 pm)	***Night (L_{Aeq}(Night)dB) (10 pm-6 am)***	***(L_{Aeq} dB)***
Noise-sensitive land-use and/or development	*New noise sensitive land use and/or development within the trigger distance of an existing/proposed transport corridor*	*55*	*50*	*L_{Aeq} (Day) 40(Living and work areas) L_{Aeq} (Night) 35 (bedrooms)*
Roads	*New*	*55*	*50*	*N/A*
	Upgrade	*60*	*55*	*N/A*
Railways	*New*	*55*	*50*	*N/A*
	Upgrade	*60*	*55*	*N/A*

Notes:

- *The noise target is to be measured at one metre from the most exposed, habitable façade of the proposed building, which has the greatest exposure to the noise-source. A habitable room has the same meaning as defined in State Planning Policy 3.1 Residential Design Codes.*
- *For all noise-sensitive land-use and/or development, indoor noise targets for other room usages may be reasonably drawn from Table 1 of Australian Standard/New Zealand Standard AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors (as amended) for each relevant time period.*
- *The 5dB difference in the criteria between new and upgrade infrastructure proposals acknowledges the challenges in achieving noise level reduction where existing infrastructure is surrounded by existing noise-sensitive development.*
- *Outdoor targets are to be met at all outdoor areas as far as is reasonable and practical to do so using the various noise mitigation measures outlined in the guidelines. For example, it is likely unreasonable for a transport infrastructure provider to achieve the outdoor targets at more than 1 or 2 floors of an adjacent development with direct line of sight to the traffic.*

<u>Noise Exposure Forecast (Section 6.2)</u>

*When it is determined that SPP 5.4 applies to a planning proposal as outlined in Section 4, proponents and/or decision makers are required to undertake a preliminary assessment using **Table 2**: noise exposure forecast in the guidelines. This will provide an estimate of the potential noise impacts on noise-sensitive land-use and/ or development within the trigger distance of a specified transport corridor. The outcomes of the initial assessment will determine whether:*

- *no further measures is required;*
- *noise-sensitive land-use and/or development is acceptable subject to deemed-to-comply mitigation measures; or*
- *noise-sensitive land-use and/or development is not recommended. Any noise-sensitive land-use and/ or development is subject to mitigation measures outlined in a noise management plan."*

3. NOISE LEVEL MODELLING

Although no measurements of the existing Australind Passenger train were conducted, In accordance with the WAPC guidelines contained in SPP5.4, the noise that would be received within the development in the future (20 years hence) from trains travelling on the freight line, was determined by adjusting the train movements to a maximum of 1 per hour (24 per day) hence, due to the variations in criteria for day (55 dB(A)) and night (50 dB(A)), the night period becomes the more critical for compliance.

Input for the freight train movements was calibrated against previously measured noise levels, as per Table 3.1.

Analysis of these time periods resulted in train passes which lasted approximately 70 to 90 seconds at each monitoring point. From these passes the L_{AeqT} noise level of each train pass has been determined. Table 3.1 details each train pass event for the monitoring period with Figure 3.1 showing a time history plot of a typical train event.

TABLE 3.1 – PREVIOUSLY MEASURED INDIVIDUAL TRAIN EVENT NOISE LEVELS

Event	Condition	Parameter	Time Seconds	Logger A 40m Overall dB(A)	Logger B 85m Overall dB(A)
Train 1	Loaded	L_{AeqT}	109	71	62
Train 2	Unloaded	L_{AeqT}	100	77	69
Train 3	Loaded	L_{AeqT}	96	72	63
Train 4	Unloaded	L_{AeqT}	76	79	74
Train 5	Loaded	L_{AeqT}	68	71	62
Train 6	Unloaded	L_{AeqT}	70	78	70
Train 7	Loaded	L_{AeqT}	81	71	62
	Average		***86***	***75***	***69***

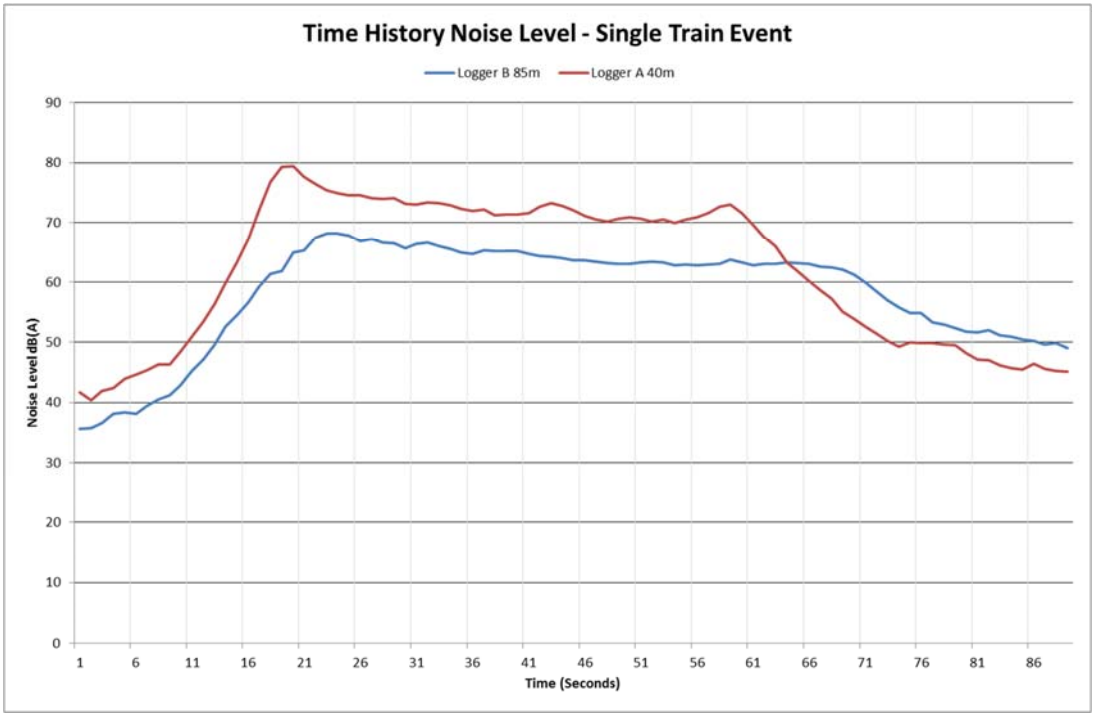


FIGURE 3.1 – TIME HISTORY NOISE LEVEL SINGLE TRAIN PASS

Based on the freight train pass-by noise level (at 40m) of $L_{Aeq(86\ seconds)}$ 75 dB(A), the calculated $L_{Aeq(1\ hour)}$ noise level at 40m is 59 dB(A).

Using the calibrated noise levels above, noise modelling was undertaken using SoundPlan. Noise modelling was undertaken for the following scenarios:

1. Current Train Movement for calibration.
2. Future noise level (1 train per hour).
3. Future noise levels with noise amelioration at the boundary.

Other input data for the model included:

- Nordic Rail Prediction Method (Kilde 130-1984)
- Noise source heights for the rail source strings (Locomotive and wagons) are +4.0, and +0.8m.
- Topographical data, with the ground level within the development based on natural ground levels as per Google Earth.
- A +2.5 dB adjustment to allow for façade reflection.
- Development receiver heights at 1.4m above ground level.

4. TRAFFIC NOISE ASSESSMENT

Using the data contained in Tables 4.1 and 4.2, noise modelling was conducted and the highest noise level at the development has been calculated to be 49 dB(A). As a result, no Quiet House Design required for this development.

It is noted that all requirements pertain to only acoustic advice in regard to *State Planning Policy 5.4* and may be superceded by other requirements (BAL, Thermal, etc).

5. CONCLUSION

In accordance with the WAPC Planning Policy 5.4, an assessment of the noise that would be received within the development of Lot 9 Watkins Road, Mundijong, from vehicles travelling on "Australind" Rail Line has been undertaken.

In accordance with the Policy, the following would be the acoustic criteria applicable to this project:

External	
Day	55 dB(A) L_{Aeq}
Night	50 dB(A) L_{Aeq}
Internal	
Sleeping Areas	35 dB(A) $L_{Aeq(night)}$
Living Areas	40 dB(A) $L_{Aeq(day)}$

The results of the acoustic assessment indicate that noise received at the development from future traffic, would not exceed external noise level criteria. Therefore, no upgraded construction would be required for this development.

APPENDIX A

Plans

DEVELOPMENT APPLICATION

SITE PLAN

Lot 9 on Diagram 90508 Watkins Road,
MUNDIJONG

Plan No. | 23560-02
Date | 13/04/23
Drawn | NP
Checked | IS
Revision | A

Scale | 1:1000@A3

PERTH & FORRESTDALE:

ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

Harley Dykstra

PLANNING & SURVEY SOLUTIONS

Bushfire Management Plan:
Development Application: Lot 9 Watkins Road, Mundijong

Sowilo Community High School

ecological AUSTRALIA
A TETRA TECH COMPANY

BPAD Bushfire Planning & Design Accredited Practitioner Level 3
www.ecoaus.com.au

DOCUMENT TRACKING

Project Name	Bushfire Management Plan: Development Application: Lot 9 Watkins Road, Mundijong
Project Number	22PER4467
Project Manager	Daniel Panickar
Prepared by	Maitland Ely
Reviewed by	Daniel Panickar (BPAD Level 3 – 37802)
Approved by	Eva Cronin (BPAD Level 2 – 45482)
Status	Draft
Version Number	v2
Last saved on	8 September 2023

This report should be cited as 'Eco Logical Australia 2022. *Bushfire Management Plan: Development Application: Lot 9 Watkins Road, Mundijong*. Prepared for Sowilo Community High School.

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Sowilo Community High School (the client) & Harley Dykstra.

Template 2.8.1

Version control	
Version	**Purpose**
v1	Draft – Submission to client
v2	Final – Response to DFES comments

Contents

List of Figures

List of Tables

1. Introduction

1.1 Proposal details

Eco Logical Australia (ELA) was commissioned by Sowilo Community High School to prepare a Bushfire Management Plan (BMP) to support a development application for Lot 9 Watkins Road, Mundijong (hereafter referred to as the subject site, Figure 1). The proposed development will result in an intensification of land use and involves the development of an Education Establishment (School) (Figure 2).

The subject site is within a designated bushfire prone area as per the *Western Australia State Map of Bush Fire Prone Areas* (DFES 2021; Figure 3), which triggers bushfire planning requirements *under State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7; Western Australian Planning Commission (WAPC) 2015) and reporting to accompany submission of the development application in accordance with the associated *Guidelines for Planning in Bushfire Prone Areas v 1.4* (the Guidelines; WAPC 2021).

The subject site is located in Mundijong, within the Shire of Serpentine-Jarrahdale and is currently comprised of a mixture of managed and unmanaged, classifiable vegetation and developed areas. Classifiable vegetation is located on all sides of the site with the surrounding area being dominated by large rural blocks.

This assessment has been prepared by ELA Bushfire Consultant Maitland Ely with quality assurance undertaken by Principal Bushfire Consultant Daniel Panickar (FPAA BPAD Level 3 Certified Practitioner No. BPAD37802). Quality assurance for minor amendments to this BMP (version 2) has been undertaken by ELA Senior Bushfire Consultant Eva Cronin (FPAA BPAD Level 2 Certified Practitioner No. BPAD37802) and Daniel Panickar (FPAA BPAD Level 3 Certified Practitioner No. BPAD37802).

1.2 Purpose and application of the plan

The primary purpose of this BMP is to act as a technical supporting document to inform planning assessment. This BMP is also designed to provide guidance on how to plan for and manage the bushfire risk to the subject site through implementation of a range of bushfire management measures in accordance with the Guidelines.

The subject site associated with this BMP is categorised as a vulnerable land use due to the activities planned on site and the definitions within the Guidelines (WAPC 2021). A Bushfire Emergency Evacuation Plan (BEEP) is required to be submitted with the development application and will be required to be updated and maintained prior to the occupancy of the school. This BMP and BEEP are to be used in conjunction with one another to ensure that the intent of SPP 3.7 is achieved.

1.3 Environmental considerations

SPP 3.7 policy objective 5.4 recognises the need to consider bushfire risk management measures alongside environmental, biodiversity and conservation values.

No revegetation is proposed within the subject site, and landscaping will be maintained in a low-threat state.

Native trees with evidence of Black Cockatoo foraging have been identified within the subject site and will remain present post development. To reduce the bushfire risk associated with these wooded areas, the understory will be managed to a low threat state. This is discussed further in section 3.2.1.

Figure 1: Site Overview

Subject site
100m site assessment
150m site assessment

N

0 100 200 400
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4467-JP Date: 26/04/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY

DEVELOPMENT APPLICATION

SITE PLAN

Lot 9 on Diagram 90508 Watkins Road,
MUNDIJONG

Plan No.	23560-02
Date	10/05/23
Drawn	NP
Checked	JS
Revision	B
Scale	1:1000@A3

PERTH & FORRESTDALE:
Lvl 1, 252 Fitzgerald St
PERTH WA 6000
15/2 Hensbrook Loop,
FORRESTDALE WA 6112
T: 09 9401 1947
E: metro@harleydykstra.com.au
ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

0 10m 20m 30m

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey.

Harley Dykstra
PLANNING & SURVEY SOLUTIONS

Figure 2: Site Plan

Figure 3: Bushfire Prone Areas

Subject site
100m site assessment
150m site assessment
Bushfire Prone Mapping (DFES 2021)

N

0 100 200 400
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4467-JP Date: 16/05/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY

2. Bushfire assessment results

2.1 Bushfire assessment inputs

The following section is a consideration of spatial bushfire risk and has been used to inform the bushfire assessment in this report.

2.1.1 Fire Danger Index

A blanket Fire Danger Index (FDI) 80 is adopted for Western Australia, as outlined in Australian Standard *AS 3959: 2018 Construction of Buildings in Bushfire Prone Areas* (SA 2018) and endorsed by Australasian Fire and Emergency Service Authorities Council (AFAC).

2.1.2 Vegetation classification and slope under vegetation

Vegetation and effective slope (i.e. slope under vegetation) within the subject site and surrounding 150 m (the assessment area) were assessed in accordance with the Guidelines and *AS 3959: 2018* with regard given to the *Visual guide for bushfire risk assessment in Western Australia* (DoP 2016). Site assessment was undertaken on 14 March 2023.

The classified vegetation and effective slope for the proposed development from each of the identified vegetation plots are identified below in Table 1 and Figure 4.

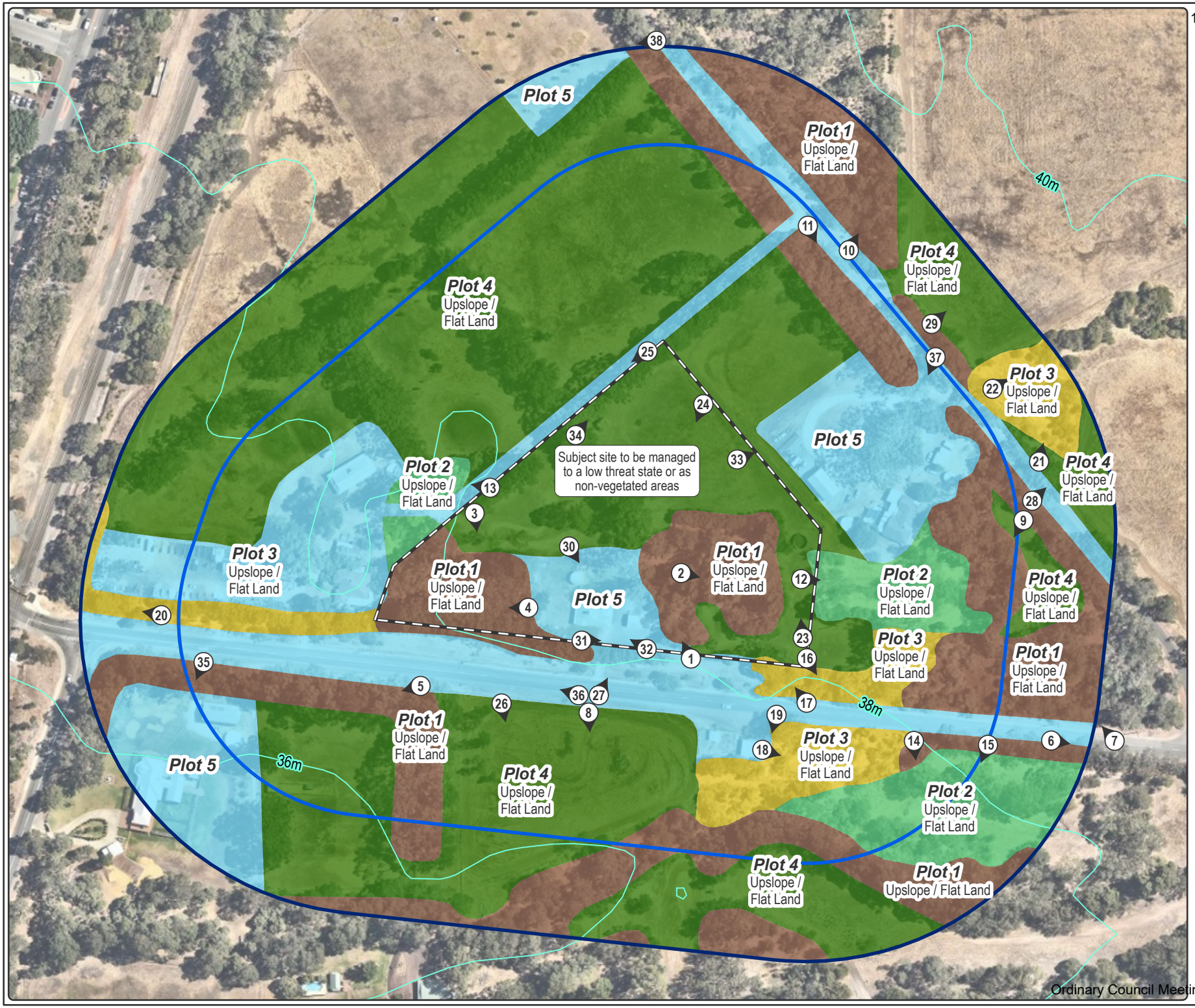
Table 1: Classified vegetation as per AS 3959: 2018

Plot	Vegetation Classification	Effective Slope
1	Class A Forest	All upslopes and flat land (0 degrees)
2	Class B Woodland	All upslopes and flat land (0 degrees)
3	Class D Scrub	All upslopes and flat land (0 degrees)
4	Class G Grassland	All upslopes and flat land (0 degrees)
5	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)	-

Photographs relating to each area and vegetation type are included in Appendix A.

Vegetation within the subject site will be removed and/or managed to a low threat state as part of development. This is detailed in section 2.2.

Vegetation present outside of the subject sites southern boundary is currently classified as Class A Forest, however, this area is a single line of trees and once internal management/maintenance is completed, this line of trees will be considered low threat vegetation under clause 2.2.3.2 of the guidelines and therefore, excludable.



Legend

- Subject site
- 100m site assessment
- 150m site assessment
- Photo location
- Contour (2m)

Vegetation classification

- Class A Forest
- Class B Woodland
- Class D Scrub
- Class G Grassland
- Excluded as per clause 2.2.3.2 (e) and (f)

Figure 4: Vegetation Classification

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4467-JP Date: 15/05/2023

N

ecological AUSTRALIA A TETRA TECH COMPANY

2.2 Bushfire assessment outputs

A Bushfire Attack Level (BAL) assessment has been undertaken in accordance with SPP 3.7, the Guidelines, AS 3959: 2018 and the bushfire assessment inputs in Section 2.1.

2.2.1 BAL assessment

All land located within 100 m of the classified vegetation depicted in Figure 4 is considered bushfire prone and is subject to a BAL assessment in accordance with AS 3959: 2018.

A Method 1 BAL assessment (as outlined in AS 3959: 2018) has been completed for the proposed development and incorporates the following factors:

- Fire Danger Index (FDI) rating;
- Vegetation class;
- Slope under classified vegetation; and
- Distance between proposed development area and the classified vegetation.

Based on the identified BAL, construction requirements for proposed buildings can then be assigned. The BAL rating gives an indication of the expected level of bushfire attack (i.e. radiant heat flux, flame contact and ember penetration) that may be received by proposed buildings and subsequently informs the standard of construction required to increase building survivability.

2.2.2 Method 1 BAL assessment

Table 2 and Figure 5 display the Method 1 BAL assessment (in the form of BAL contours) that has been completed for the proposed development in accordance with AS 3959: 2018 methodology.

Table 2: Method 1 BAL calculation (BAL contours)

Plot	Vegetation Classification	Effective Slope	Separation distances required				
			BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
1	Class A Forest	All upslopes and flat land (0 degrees)	<16	16-<21	21-<31	31-<42	42-<100
2	Class B Woodland	All upslopes and flat land (0 degrees)	<10	10-<14	14-<20	20-<29	29-<100
3	Class D Scrub	All upslopes and flat land (0 degrees)	<10	10-<13	13-<19	19-<27	27-<100
4	Class G Grassland	All upslopes and flat land (0 degrees)	<6	6-<8	8-<12	12-<17	17-<50
5	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)	-	No separation distances required – BAL-LOW				

Based on the site assessment inputs and BAL assessment, all proposed and existing habitable buildings within the subject site (i.e. classrooms, admin/caretaker building, kitchen/home goods, workshop/maintenance shed and ablutions) have BAL ratings of BAL-12.5 (Table 3). One existing, and one proposed non-habitable building (sheds) are located within areas subject to BAL ratings >BAL-29. This is discussed further in section 2.3.

The Guidelines state:

> *The bushfire construction requirements of the Building Code of Australia only apply to certain types of residential buildings (being Class 1, 2 or 3 buildings and/or Class 10a buildings or decks associated with a Class 1, 2 or 3 building) in designated bushfire prone areas. As such, AS 3959 does not apply to all buildings. Only vulnerable or high-risk land uses that fall within the relevant classes of buildings as set out in the Building Code of Australia will be required to comply with the bushfire construction requirements of the Building Code of Australia. As such, the planning process focuses on the location and siting of vulnerable and high-risk land uses rather than the application of bushfire construction requirements.*

As none of the proposed structures is a Class 1, 2 or 3 building and/or Class 10a building or deck associated with a Class 1, 2 or 3 building, construction to AS 3959: 2018 is not required for this proposal. However, given the vulnerable nature of the development, ELA recommends that the habitable buildings (i.e. all C, A, K, M and T structures) within the school be constructed to BAL-19 standards.

Table 3: BAL rating for proposed buildings apart of the school within the subject site

Proposed/Existing buildings and structures	Plot most affecting BAL rating	Separation Distance (m)	BAL Rating
Proposed			
S1 (proposed)	Plot 2	48.3	BAL-12.5
S2 (proposed)	Plot 2	67.2	BAL-12.5
S3 (proposed)	Plot 2	4	BAL-FZ
C1 (proposed)	Plot 2	35.1	BAL-12.5
C2 (proposed)	Plot 4	48.6	BAL-12.5
C3 (proposed)	Plot 2	58.7	BAL-12.5
W1 (proposed)	Plot 2	58.6	BAL-12.5
W3 (proposed)	Plot 2	78.9	BAL-12.5
W4 (proposed)	Plot 2	23.6	BAL-19
W5 (proposed)	Plot 4	46.1	BAL-12.5
W6 (proposed)	Plot 2	69.2	BAL-12.5
F (proposed)	Plot 4	11.1	BAL-29
CC (proposed)	Plot 2	29.4	BAL-12.5
T (proposed)	Plot 2	50.6	BAL-12.5
K (proposed)	Plot 4	39.4	BAL-12.5

Proposed/Existing buildings and structures	Plot most affecting BAL rating	Separation Distance (m)	BAL Rating
Existing			
S4 (existing)	Plot 2	11	BAL-40
S5 (existing)	Plot 2	41.6	BAL-12.5
S6 (existing)	Plot 4	13.7	BAL-19
S7 (existing)	Plot 4	17	BAL-12.5
W2 (existing)	Plot 2	69.1	BAL-12.5
A (existing)	Plot 4	42.2	BAL-12.5
M (existing)	Plot 4	42.8	BAL-12.5

A = ADMIN/CARETAKER; C = CLASSROOM; K = KITCHEN/HOME GOODS; S = SHED; W = WATER TANK; M = WORKSHOP/MAINTENANCE SHED; T = ABLUTIONS; CC = CHICKEN COOP; AND F = FALAI/SAMOAN HUT

2.3 Identification of issues arising from the BAL assessment

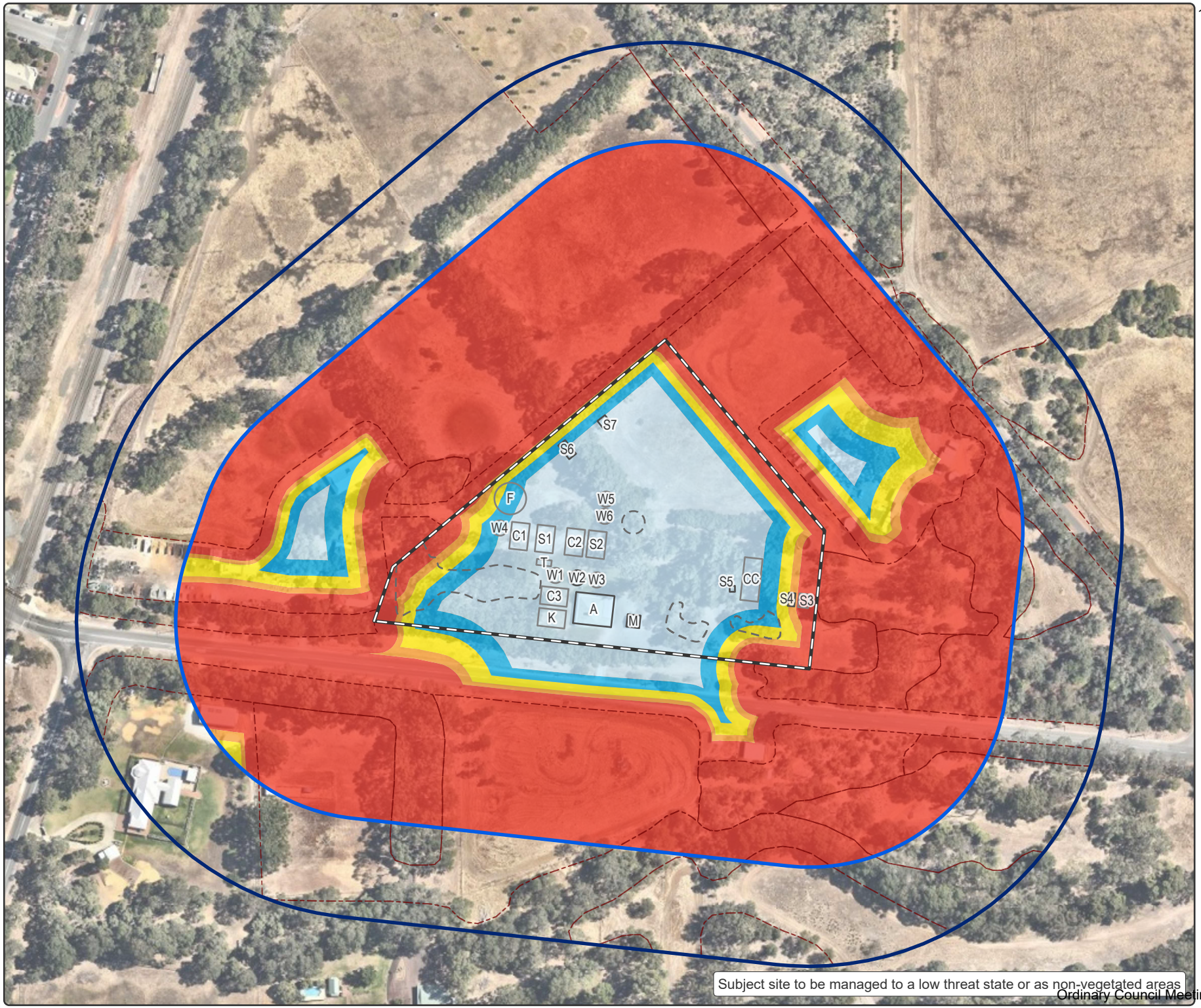
One existing, and one proposed non-habitable building (sheds) are located within areas subject to BAL ratings >BAL-29.

The existing shed within the site is subject to a BAL rating of BAL-40 and the proposed shed is subject to a BAL rating of BAL-FZ. Both buildings are non-habitable and will be used to store tools/equipment. Due to site constraints neither building is able to be relocated. Given the proposed use of both these buildings and their separation from any existing or proposed habitable buildings, ELA do not believe that their BAL ratings result in non-compliance with SPP 3.7 or the Guidelines.

Should there be any changes in development design or vegetation/hazard extent that requires a modified bushfire management response, then the above BAL ratings will need to be reassessed for the affected areas and documented in a brief addendum to this BMP.

The proposed development has areas of natural vegetation onsite that have not been managed for a number of years. In future, management of fuel loads and onsite vegetation may reduce the potential bushfire risk and reduction of radiant heat affecting the development.

Vegetation present outside of the subject sites southern boundary is currently classified as Class A Forest, however, this area is a single line of trees and once internal management/maintenance is completed, this line of trees will be considered low threat vegetation under clause 2.2.3.2 of the guidelines and therefore, excludable.



Legend

- Subject site
- 100m site assessment
- 150m site assessment
- Existing Structures
- Proposed Structures
- Native Trees with Evidence of Black Cockatoo Foraging
- Bushfire hazard interface

Bushfire Attack Level (BAL)

- BAL - FZ
- BAL - 40
- BAL - 29
- BAL - 19
- BAL - 12.5
- BAL - LOW

Figure 5: Bushfire Attack Level (BAL) Contours

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4467-JP Date: 22/05/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

3. Assessment against the Bushfire Protection Criteria

3.1 Compliance

The proposed development is required to comply with policy measures 6.2, 6.5 and 6.6 of SPP 3.7 and the Guidelines. Implementation of this BMP is expected to meet objectives 5.1-5.4 of SPP 3.7.

In response to the above requirements of SPP 3.7 and the Guidelines, bushfire risk management measures, as outlined, have been devised for the proposed development in accordance with Guideline acceptable solutions to meet compliance with bushfire protection criteria.

Table 4 outlines the Acceptable Solutions (AS) that are relevant to the proposal and summarises how the intent of each Bushfire Protection Criteria has been achieved. No Performance Solutions (PS) have been proposed for this proposal. These management measures are depicted in Figure 6 where relevant.

Table 4: Summary of solutions used to achieve bushfire protection criteria

Bushfire Protection Criteria	AS	PS	N/A	Comment
Element 1: Location A1.1 Development location	☒	☐	☐	Two structures within the subject site, one proposed and one existing shed will be located in an area subject to BAL ratings of >BAL-29. As both these buildings are non-habitable, their location is not considered to be non-compliant with A1.1. Refer to Section 2.3 for further detail. All remaining proposed structures within the subject site will be located in an area subject to BAL ratings of ≤BAL-29 (Figure 5; Figure 6). The proposed development is considered to be compliant with A1.1.
Element 2: Siting and design of development A2.1 Asset Protection Zone (APZ)	☒	☐	☐	The proposed development has an APZ sufficient for the potential radiant heat flux to not exceed 29kW/m^2 for all habitable buildings and will be managed in accordance with the requirements of '*Standards for Asset Protection Zones*' (WAPC 2021; Appendix B) or a low threat state as per 2.2.3.2 (f) of AS 3959 (refer to section 3.2.1). The APZ can be contained within the boundaries of the lot or managed in perpetuity in a low fuel state (Figure 6). The proposed development is considered to be compliant with A2.1.
Element 3: Vehicular access A3.1 Public Roads	☒	☐	☐	The subject site is accessed via Watkins Road. The Guidelines do not prescribe values for the trafficable (carriageway/pavement) width of public roads as they should be in accordance with the class of road as specified in the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards and/or any applicable standard in the local government area. ELA are not traffic/civil engineers so cannot comment on whether these existing roads comply with Local Government Guidelines for Subdivisional Development (IPWEA Subdivision Guidelines), Liveable

Bushfire Protection Criteria	AS	PS	N/A	Comment
				Neighbourhoods, Austroad standards and/or any applicable standards for the local government area. ELAs assessment, however, has identified that the roads surrounding the development are bitumen with estimated width of the sealed surface achieving a minimum width of 6 m and therefore consider the existing road network would provide suitable access and egress for the community and emergency services personnel in the event of a bushfire. Vehicular access technical requirements in accordance with the Guidelines are detailed in Appendix C. The proposed development is considered to be compliant with A3.1.
A3.2a Multiple access routes	☒	☐	☐	Two access routes to/from the subject site are available (Figure 6). Refer to A3.1 above for details regarding vehicular access technical requirements for public roads. The proposed development is considered to be compliant with A3.2a.
A3.2b Emergency Access way	☐	☐	☒	No emergency access ways are required or proposed.
A3.3 Through-roads	☐	☐	☒	This acceptable solution does not apply to Development Applications.
A3.4a Perimeter roads	☐	☐	☒	This acceptable solution does not apply to Development Applications.
A3.4b Fire service access route	☐	☐	☒	This acceptable solution does not apply to Development Applications.
A3.5 Battle-axe access legs	☐	☐	☒	This acceptable solution does not apply to Development Applications.
A3.6 Private driveways	☒	☐	☐	The subject site is serviced by reticulated water, the proposed internal road network complies with the requirements outlined in the Guidelines (Appendix A). The proposed development is considered to be Compliant with A3.5.
A4.2 Provision of water for firefighting purposes	☒	☐	☐	An existing water tank is present within the subject site with five additional tanks proposed. The nearest existing hydrant is located west of the subject site over 120 m away (Figure 6). Due to distance to nearest hydrant, one of the proposed water tanks will be a dedicated fire service water tank. The proposed fire service water tank will be constructed and maintained to meet the requirements outlined in the Guidelines. The proposed development is considered to be compliant with A4.2.
Element 5: Vulnerable tourism land uses	☐	☐	☒	This development application is not considered vulnerable tourism land use. Element 5 is not applicable to this proposed development.

NOTE – AS- ACCEPTABLE SOLUTION, PS- PERFORMANCE SOLUTION, N/A- NOT APPLICABLE

3.2 Additional Bushfire Requirements

Due to nearest hydrant being over 120 m away an onsite fire serve water tank will be required. The fire service water tank will meet the following requirements:

- Minimum 10,000 litres dedicated to firefighting purposes. The storage tank must not facilitate sharing the water for domestic use due to the danger of contamination;
- It is advised the water tank is constructed from concrete or metal;
- All above-ground exposed water supply pipes and fittings should be metal;
- Hardstand and turn-around areas suitable for a type 3.4 fire appliance (i.e. kerb to kerb 17.5 metres) are provided within three metres of each water tank; and
- Tanks are to be fitted with a full flow gate valve (not ball valve) and a 50mm cam-lock coupling of metal/alloy construction.

Note in Figure 6 the location of all the proposed water tanks is shown, with the dedicated fire service water tank currently being decided. The tank will be located within the site, along with the appropriate vehicle access including hardstand.

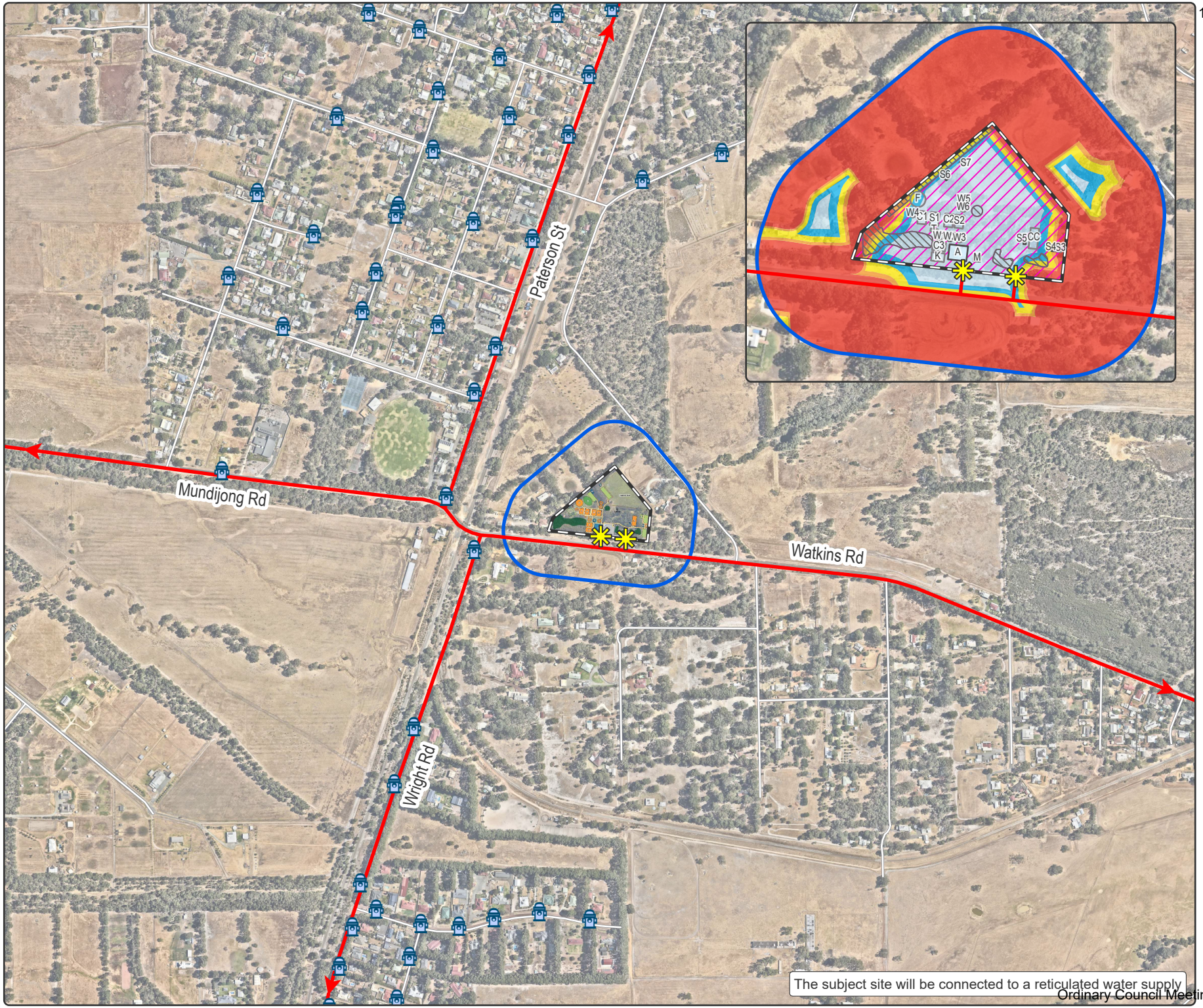
A BEEP has been prepared for the proposed school in accordance with SPP 3.7 and '*A Guide to developing a Bushfire Emergency Evacuation Plan*' (WAPC 2019). This BEEP (ELA 2023) details evacuation procedures in the event of a bushfire.

Due to the vulnerable nature of the land use, the increased bushfire risk of the area and the potential emergency evacuation requirements in the event of a bushfire, ELA recommend the proposed habitable buildings be constructed to BAL-19 standard with existing building retrofitted to BAL-19 where possible.

All landscaping areas within the subject site will be maintained in accordance with Standards for Asset Protection Zones (Appendix B) or low threat state as per 2.2.3.2 (f) of AS3959 (see section 3.2.1 below).

3.2.1 Wooded area within site vegetation management

Native trees with evidence of Black Cockatoo foraging have been identified within the site. Given the environmental value of these areas, the trees will be retained (Figure 6). These areas will be regularly maintained to a low threat state according to Excluded as per Clauses 2.2.3.2 (f) under AS 3959, by the two onsite caretakers. This will entail removal of understorey vegetation and leaf litter, as well as trimming and removal of any tree branches within 2 m of ground level.



Legend

- Subject site
- 100m site assessment
- Existing Structures
- Proposed Structures
- Vegetation present to be Excluded as per clause 2.2.3.2 (f)
- APZ
- Hydrant
- Access point
- Access / egress route

Bushfire Attack Level (BAL)

- BAL - FZ
- BAL - 40
- BAL - 29
- BAL - 19
- BAL - 12.5
- BAL - LOW

Figure 6: Spatial representation of the bushfire management strategies

0 100 200 400
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4467-JP Date: 22/05/2023

N

eco logical AUSTRALIA A TETRA TECH COMPANY

4. Implementation and enforcement

Implementation of the BMP applies to the developer, future owners within the subject site and the local government to ensure bushfire management measures are adopted and implemented on an ongoing basis. A summary of the bushfire management measures described in Section 3, as well as a works program, is provided in Table 5. These measures will be implemented to ensure the ongoing protection of life and property assets is achieved. Timing and responsibilities are also defined to assist with implementation of each measure.

Table 5: Proposed work program

No	Bushfire management measure	Responsibility
Prior to occupancy		
1	Ensure all proposed and existing habitable buildings are located outside of areas subject to BAL-FZ and BAL-40 as per the design in Figure 6.	Sowilo Community High School
2	Establish and maintain APZ as depicted in Figure 6.	Sowilo Community High School
3	Install a dedicated fire service water tank to the specifications provided in section 3.2 of this BMP and ensure this tank's location is shown on site plans.	Sowilo Community High School
4	Ensure landscaping within the subject site is maintained to a low threat state as per exclusion clause 2.2.3.2 of AS 3959: 2018 (Figure 6).	Sowilo Community High School
5	Construct internal road network as per plan in Figure 6.	Sowilo Community High School
6	Implement the Bushfire Emergency Evacuation Plan (BEEP) (Section 3.2).	Sowilo Community High School
Ongoing management		
7	Maintain APZs to the standard in the Guidelines	Owners
8	Maintain landscaping within the subject site to a low threat state.	Owners
9	Review the BEEP prepared for the development on an annual basis and updated details/procedures as required.	Owners

5. Conclusion

In the author's professional opinion, the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed development. As such, the proposed development is consistent with the aim and objectives of SPP 3.7 and associated guidelines and is recommended for approval.

6. References

Department of Fire and Emergency Services (DFES), 2021, *Map of Bush Fire Prone Areas, [Online]*, Government of Western Australia, available from: http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx

Department of Planning (DoP), 2016, *Visual guide for bushfire risk assessment in Western Australia*. DoP, Perth.

Shire of Serpentine Jarrahdale (SoSJ), 2022, Fire Hazard Reduction Notice, [Online], available from: 23265_-_Fire_Hazard_Reduction_Notice_-_2022-23_FINAL.pdf (sjshire.wa.gov.au).

Standards Australia (SA), 2018, *Construction of buildings in bushfire-prone areas, AS 3959-2018*. SAI Global, Sydney.

Western Australian Planning Commission (WAPC), 2015, *State Planning Policy 3.7 Planning in Bushfire Prone Areas*. WAPC, Perth.

Western Australian Planning Commission (WAPC), 2021, *Guidelines for Planning in Bushfire Prone Areas Version 1.4 (including appendices),* WAPC, Perth.

Western Australian Planning Commission (WAPC), 2019, *A guide to developing a Bushfire Emergency Evacuation Plan, October 2019*.

Appendix A – Classified Vegetation Photos

Plot	1	Classification or Exclusion Clause	Class A Forest

Photo Point 1

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of grasses and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot	1	Classification or Exclusion Clause	Class A Forest

Photo Point 2

Classifiable vegetation within this plot is comprised of a pine plantation with trees up to 30 m tall and foliage cover of 30% to 70%. Understorey is comprised of grasses.

Slope under this plot was assessed as upslope/flat land.

Plot	1	Classification or Exclusion Clause	Class A Forest

Photo Point 3

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of grasses and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot 1	Classification or Exclusion Clause	Class A Forest

Photo Point 4

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of grasses and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Vegetation within Plot 4 present outside of the subject sites southern boundary is currently classified as Class A Forest (pre-development scenario), however, this area is a single line of trees and once internal management/maintenance is completed, this line of trees will be considered low threat vegetation under clause 2.2.3.2 of the guidelines and therefore, excludable (post-development scenario).

Plot 1	Classification or Exclusion Clause	Class A Forest

Photo Point 5

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of grasses and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot 1	Classification or Exclusion Clause	Class A Forest

Photo Point 6

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of multi-tiered layers of vegetation consisting of grasses, shrubs and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot	1	Classification or Exclusion Clause	Class A Forest

Photo Point 7

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of multi-tiered layers of vegetation consisting of grasses, shrubs and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot	1	Classification or Exclusion Clause	Class A Forest

Photo Point 8

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of multi-tiered layers of vegetation consisting of grasses, shrubs and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot	1	Classification or Exclusion Clause	Class A Forest

Photo Point 9

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of multi-tiered layers of vegetation consisting of grasses, shrubs and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot 1	Classification or Exclusion Clause	Class A Forest

Photo Point 10

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of multi-tiered layers of vegetation consisting of grasses, shrubs and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot 1	Classification or Exclusion Clause	Class A Forest

Photo Point 11

Classifiable vegetation within this plot is comprised of trees up to 30 m tall with foliage cover of 30% to 70%. Understorey is comprised of multi-tiered layers of vegetation consisting of grasses, shrubs and juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot 2	Classification or Exclusion Clause	Class B Woodland

Photo Point 12

Classifiable vegetation within this plot is comprised of trees 10 m to 30 m tall with foliage cover of 10%-30% foliage cover. Understorey is comprised of grasses and isolated shrubs/juvenile trees.

Slope under this plot was assessed as upslope/flat land.

Plot	2	Classification or Exclusion Clause	Class B Woodland

Photo Point 13

Classifiable vegetation within this plot is comprised of trees 10 m to 30 m tall with foliage cover of 10%-30% foliage cover. Understorey is comprised of grasses.

Slope under this plot was assessed as upslope/flat land.

Plot	2	Classification or Exclusion Clause	Class B Woodland

Photo Point 14

Classifiable vegetation within this plot is comprised of trees 10 m to 30 m tall with foliage cover of 10%-30% foliage cover. Understorey is comprised of grasses.

Slope under this plot was assessed as upslope/flat land.

Plot	2	Classification or Exclusion Clause	Class B Woodland

Photo Point 15

Classifiable vegetation within this plot is comprised of trees 10 m to 30 m tall with foliage cover of 10%-30% foliage cover. Understorey is comprised of grasses.

Slope under this plot was assessed as upslope/flat land.

Plot 3	Classification or Exclusion Clause	Class D Scrub

Photo Point 16

Classifiable vegetation within this plot is comprised of shrubs greater than 2 m high with >30% foliage cover.

2 m height pole present within the associated photo.

Slope under this plot was assessed as upslope/flat land.

Plot 3	Classification or Exclusion Clause	Class D Scrub

Photo Point 17

Classifiable vegetation within this plot is comprised of shrubs greater than 2 m high with >30% foliage cover.

2 m height pole present within the associated photo.

Slope under this plot was assessed as upslope/flat land.

Plot 3	Classification or Exclusion Clause	Class D Scrub

Photo Point 18

Classifiable vegetation within this plot is comprised of shrubs greater than 2 m high with >30% foliage cover.

Slope under this plot was assessed as upslope/flat land.

Plot	3	Classification or Exclusion Clause	Class D Scrub

Photo Point 19

Classifiable vegetation within this plot is comprised of shrubs greater than 2 m high with >30% foliage cover.

Slope under this plot was assessed as upslope/flat land.

Plot	3	Classification or Exclusion Clause	Class D Scrub

Photo Point 20

Classifiable vegetation within this plot is comprised of shrubs greater than 2 m high with >30% foliage cover.

2 m height pole present within the associated photo.

Slope under this plot was assessed as upslope/flat land.

Plot	3	Classification or Exclusion Clause	Class D Scrub

Photo Point 21

Classifiable vegetation within this plot is comprised of shrubs greater than 2 m high with >30% foliage cover.

Slope under this plot was assessed as upslope/flat land.

Plot 3	Classification or Exclusion Clause	Class D Scrub

Photo Point 22

Classifiable vegetation within this plot is comprised of shrubs greater than 2 m high with >30% foliage cover.

Relevant plot can be seen in background of associated photo.

Slope under this plot was assessed as upslope/flat land.

Plot 4	Classification or Exclusion Clause	Class G Grassland

Photo Point 23

Classifiable vegetation within this plot is comprised of grasses.

Slope under this plot was assessed as upslope/flat land.

Plot 4	Classification or Exclusion Clause	Class G Grassland

Photo Point 24

Classifiable vegetation within this plot is comprised of grasses.

Slope under this plot was assessed as upslope/flat land.

Plot 4	Classification or Exclusion Clause	Class G Grassland

Photo Point 25

Classifiable vegetation within this plot is comprised of grasses. Isolated trees in form of a windbreak present within this plot.

Slope under this plot was assessed as upslope/flat land.

Plot 4	Classification or Exclusion Clause	Class G Grassland

Photo Point 26

Classifiable vegetation within this plot is comprised of grasses.

Slope under this plot was assessed as upslope/flat land.

Plot 4	Classification or Exclusion Clause	Class G Grassland

Photo Point 27

Classifiable vegetation within this plot is comprised of grasses.

Slope under this plot was assessed as upslope/flat land.

Plot 4	Classification or Exclusion Clause	Class G Grassland

Photo Point 28

Classifiable vegetation within this plot is comprised of grasses.

Slope under this plot was assessed as upslope/flat land.

Plot 4	Classification or Exclusion Clause	Class G Grassland

Photo Point 29

Classifiable vegetation within this plot is comprised of grasses.

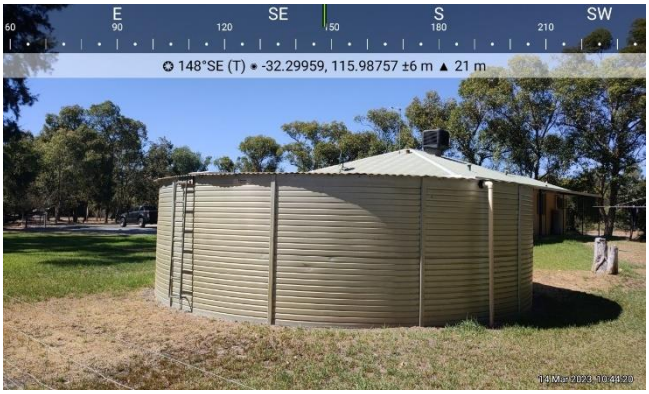
Slope under this plot was assessed as upslope/flat land.

Plot 5	Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)

Photo Point 30

Non-vegetated area that is permanently cleared of vegetation (i.e., a water tank and residential development).

Vegetation within this plot is regarded as low threat due to factors such as flammability, moisture content and fuel load as it is managed grass (managed yard).



Plot 5	Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)

Photo Point 31

Non-vegetated area that is permanently cleared of vegetation (i.e., roads and a driveway).

Vegetation within this plot is regarded as low threat due to factors such as flammability, moisture content and fuel load as it is managed grass (managed landscaping and road reserve).

Plot 5	Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e)

Photo Point 32

Non-vegetated area that is permanently cleared of vegetation (i.e., driveway, residential development and a shed.

Plot 5	Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e)

Photo Point 33

Non-vegetated area that is permanently cleared of vegetation (i.e., driveway, residential development and a shed.

Relevant plot can be seen in background of associated photo.

Plot	5	Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e)

Photo Point 34

Non-vegetated area that is permanently cleared of vegetation (i.e., driveway).

Plot	5	Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)

Photo Point 35

Non-vegetated area that is permanently cleared of vegetation (i.e., driveway, shed and residential development).

Vegetation within this plot is regarded as low threat due to factors such as flammability, moisture content and fuel load as it is managed grass (managed yard).

Plot	5	Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e)

Photo Point 36

Non-vegetated area that is permanently cleared of vegetation (i.e., roads).

Plot	5	Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e)

Photo Point 37

Non-vegetated area that is permanently cleared of vegetation (i.e., roads, driveway, residential development and sheds).

Plot	5	Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (f)

Photo Point 38

Vegetation within this plot is regarded as low threat due to factors such as flammability, moisture content and fuel load as it is managed grass within rural block.

Appendix B – Standards for Asset Protection Zones

The following standards have been extracted from the *Guidelines for Planning in Bushfire Prone Areas v 1.4* (WAPC 2021).

Every habitable building is to be surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the following requirements:

a. Width: Measured from any external wall or supporting post or column of the proposed building, and of sufficient size to ensure the potential radiant heat impact of a fire does not exceed 29kW/m² (BAL-29) in all circumstances.

b. Location: the APZ should be contained solely within the boundaries of the lot on which a building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity (see explanatory notes).

c. Management: the APZ is managed in accordance with the requirements of '*Standards for Asset Protection Zones*' (below):

- Fences within the APZ:
  - Should be constructed from non-combustible materials or bushfire-resisting timber referenced in Appendix F of AS 3959.
- Fine fuel load (Combustible, dead vegetation matter <6 millimetres in thickness):
  - Should be managed and removed on a regular basis to maintain a low threat state;
  - Should be maintained at <2 tonnes per hectare (on average); and
  - Mulches should be non-combustible (e.g. stone, gravel or crushed mineral earth) or wood mulch >6 millimetres in thickness.
- Trees (>6 metres in height):
  - Trunks at maturity should be a minimum distance of six metres from all elevations of the building;
  - Branches at maturity should not touch or overhand a building or powerline;
  - Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation;
  - Canopy cover within the APZ should be <15 per cent of the total APZ area; and
  - Tree canopies at maturity should be at least five metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ.

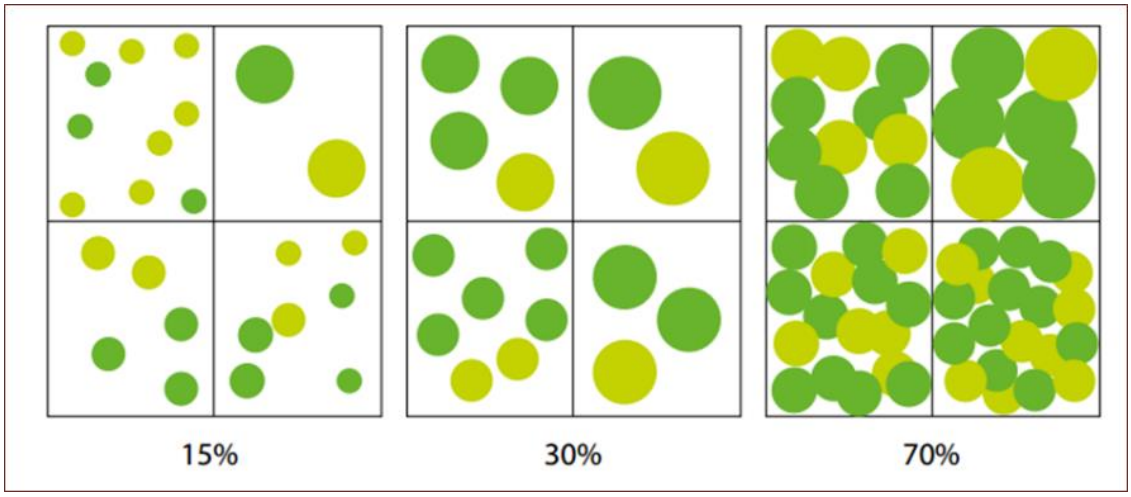


Figure 7: Illustrated tree canopy cover projection (WAPC 2021)

- Shrub and scrub 0.5 metres to six metres in height (shrub or scrub >6 metres in height are to be treated as trees):
  - Should not be located under trees or within three metres of buildings;
  - Should not be planted in clumps >5 square metres in area; and
  - Clumps should be separated from each other and any exposed window or door by at least 10 metres.
- Ground covers <0.5 metres in height (ground covers >0.5 metres in height are to be treated as shrubs):
  - Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above; and
  - Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
- Grass:
  - Grass should be maintained at a height of 100 millimetres or less, at all times; and
  - Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
- Defendable space:
  - Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.
- LP Gas Cylinders:
  - Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building;
  - The pressure relief valve should point away from the house;
  - No flammable material within six metres from the front of the valve; and
  - Must site on a firm, level and non-combustible base and be secured to a solid structure.

Additional notes

The Asset Protection Zone (APZ) is an area surrounding a building that is managed to reduce the bushfire hazard to an acceptable level. Hazard separation in the form of using subdivision design elements or excluded and low threat vegetation adjacent to the lot may be used to reduce the dimensions of the APZ within the lot.

The APZ should be contained solely within the boundaries of the lot on which the building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity. The APZ may include public roads, waterways, footpaths, buildings, rocky outcrops, golf courses, maintained parkland as well as cultivated gardens in an urban context, but does not include grassland or vegetation on a neighbouring rural lot, farmland, wetland reserves and unmanaged public reserves.

Plant flammability, landscaping design and maintenance should also be considered for trees, shrub, scrub and ground covers with the APZ. Please refer to explanatory notes 'E2 Managing an Asset Protection Zone (APZ) to a low threat state,' 'E2 Landscaping and design of an asset protection zone,' and 'E2 Plant flammability' in the Guidelines for further information relating to APZ standards.

Appendix C - Vehicular access technical requirements (WAPC 2021)

Technical requirements	Public road	Emergency access way[1]	Fire service access route[1]	Battle-axe and private driveways[2]
Minimum trafficable surface (m)	In accordance with A3.1	6	6	4
Minimum horizontal clearance (m)	N/A	6	6	6
Minimum vertical clearance (m)	4.5			
Minimum weight capacity (t)	15			
Maximum grade unsealed road[3]	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%)		
Maximum grade sealed road[3]	As outlined in the IPWEA Subdivision Guidelines	1:7 (14.3%)		
Maximum average grade sealed road	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%)		
Minimum inner radius of road curves (m)	As outlined in the IPWEA Subdivision Guidelines	8.5		

[1] To have crossfalls between 3 and 6 %.

[2] Where driveways and battle-axe legs are not required to comply with the widths in A3.5 or A3.6, they are to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision.

[3] Dips must have no more than a 1 in 8 (12.5% -7.1 degree) entry and exit angle

ecological AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au

Bushfire Emergency Evacuation Plan Development Application: Lot 9 Watkins Road, Mundijong

Sowlio Community High School

IN CASE OF A BUSHFIRE EMERGENCY, FOLLOW THE EVACUATION PLAN LOCATED IN APPENDIX A WHICH SHOULD ALSO BE PLACED IN PROMINENT STAFF LOCATIONS.

THIS REPORT IS TO SUPPORT THE PLANNING APPROVAL PROCESS AND SUPPORTING DETAIL TO THE EVACUATION PLAN

eco logical AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au

DOCUMENT TRACKING

Project Name	Bushfire Emergency Evacuation Plan Development Application: Lot 9 Watkins Road, Mundijong
Project Number	22PER4467
Project Manager	Daniel Panickar
Prepared by	Maitland Ely
Reviewed by	Daniel Panickar (BPAD Level 3- 37802)
Approved by	Daniel Panickar (BPAD Level 3- 37802)
Status	Draft
Version Number	v1
Last saved on	22 May 2023

This report should be cited as 'Eco Logical Australia 2023. *Bushfire Emergency Evacuation Plan*. Prepared for Sowlio Community High School.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Sowilo Community High School (the client) and Harley Dykstra.

Template 2.8.1

Version control	
Version	Purpose
v1	Draft – Submission to client

Contents

List of Tables

1. Facility Details

This Bushfire Emergency Evacuation Plan (BEEP) is for a proposed Educational Establishment (school) at Lot 9 Watkins Road, Mundijong within the Shire of Serpentine Jarrahdale and has been designed to assist management to protect life and property in the event of a bushfire. The proposed school is comprised of multiple different structures: A = Admin/Caretaker; C = Classroom; K = Kitchen/Home Goods; S = Shed; W = Water Tank; M = Workshop/Maintenance Shed; T = Ablutions; CC = Chicken Coop; and F = Falai/Samoan Hut.

This plan was developed in line with *'A Guide to developing a Bushfire Emergency Evacuation Plan'* (WAPC 2019) to support the Development Application to construct new buildings at the proposed School. Some items are listed as To Be Confirmed (TBC) as the required information was not available during the time this plan was developed. It is critical that this plan be updated with all required information prior to the occupation of this proposed facility.

This plan assumes that the Bushfire Management Plan prepared for the development will be implemented, including construction recommendations to achieve a Bushfire Attack Level (BAL) of BAL-19 for proposed A, C, K, T and M structures.

This plan outlines procedures for both evacuation and shelter-in-place to enhance the protection of occupants from the threat of a bushfire.

The primary bushfire management action is:

EARLY CLOSURE OF THE FACILITY UNDER EXTREME (FBI≥75 AND ON ADVICE BY DFES) and CATASTROPHIC FIRE DANGER RATINGS

The primary action to follow in a bushfire emergency is to:

EVACUATE OFF-SITE (ONLY IF TIME TO BUSHFIRE ARRIVAL IS GREATER THAN 100 MINUTES OR AS OTHERWISE ADVISED BY EMERGENCY SERVICES).

The secondary action to follow in a bushfire emergency is to:

SHELTER-IN-PLACE

Table 1: Facility Details

Name of on-site contact person:	Kath Wainwright
Phone number:	0412 037 276
Type of facility:	Education Establishment (School)
Number of buildings:	16 (6 water tanks)
Number of employees:	5
Number of occupants:	up to 65 (50 children, 5 staff and some visitors)
Number of vulnerable occupants/with support needs:	50 children

Estimated maximum number of visitors:	10 people

Description of support needs: The proposed School will be caring for children that require on going supervision. Staff onsite are trained and are familiar with the requirements to care for these children.

1.1 Site risks, assumptions and recommendations

In consideration of the risk to the site and occupants' characteristics the following points were considered in determining the evacuation requirements of the proposed School:

- Site risk:
  - Vegetation that poses the greatest bushfire threat to this site is located to the north, east and south of the site;
  - The vegetation to the east is a patch of remanent forest vegetation comprised of tall trees and a dense understory. The vegetation located north and south of site is comprised of remanent forest. Nearby adjacent vegetation to the site is comprised of grassland and patches of woodland, resulting in a BAL-12.5 for the A,C, K, T and M structures apart of the school;
  - Bushfire hazards are separated from the development site by an Asset Protection Zone (APZ) and low threat landscaped areas within the site;
  - Potential ignition sources are from nearby vehicles using major roads or people accessing the nearby bushland;
  - It is possible that impacts could be expected before occupants have had the opportunity to undertake safe evacuation off-site (i.e. bushfire scenarios which occur with limited warning and result in insufficient time to evacuate before bushfire attack is experienced);
- Occupant characteristics:
  - 50 children and 5 staff;
- Evacuation timing:
  - Time for notification of an approaching bushfire and that evacuation is required – 15 minutes;
  - Time for assembly and mobilisation of all children and staff – 40 minutes;
  - Off-site evacuation is via BUS to Mundijong Sports Pavilion, approximately 850 m to the west;
  - Time to travel to off-site evacuation location – 10 minutes
    - Total time to load and travel – 65 minutes;
  - Adding a safety factor of 1.5 results in total evacuation time of 100 minutes;
  - In a rapid onset bushfire scenario, the safest option is to remain on site.
  - The accuracy of evacuation timing is TBC with the proposed School operator and the BEEP must be updated prior to occupancy.
- Limitations
  - In times of stressful situations such as evacuation and fire, children's behaviour can be erratic;

  - Traffic conditions in a bushfire emergency may impact on the time required (and safety) of the evacuation to the Mundijong Sports Pavilion;
  - Smoke and heat from a bushfire (particularly in a rapid-onset event) may limit the ability for evacuation to the Mundijong Sports Pavilion;
- Given the possibility for multiple bushfire scenarios to affect the proposed School, multiple bushfire risk management measures are proposed, which include:
  - BAL-19 construction for A, C, K, T and M structures, all with BAL-12.5 exposure;
  - APZ that limits A, C, K, T and M structures exposure to BAL-12.5;
  - Closure on site based on the highest FDR ratings; and
  - An evacuation plan that identifies clear triggers and actions.

Based on the above analysis, the following actions are recommended

1. The primary bushfire management action is **EARLY CLOSURE OF THE FACILITY UNDER EXTREME (FBI≥75 AND ON ADVICE BY DFES) and CATASTROPHIC FIRE DANGER RATINGS.**
2. The primary action to follow in a bushfire emergency is **EVACUATE OFF-SITE (ONLY IF TIME TO BUSHFIRE ARRIVAL IS GREATER THAN 100 MINUTES OR AS OTHERWISE ADIVSED BY EMERGENCY SERVICES).**
3. The secondary action of follow in a bushfire emergency is **SHELTER-IN-PLACE.**

If shelter-in-place is required, the proposed Admin/Care taker building has been determined to be a suitable on-site safer location based on the following inputs:

- The proposed Admin/Care taker building must be large enough to provide floor space for the maximum 65 users on site. Minimum recommended floor space is 0.75 m^2 person per (ABCB 2014) which equals 50 m^2 (rounded up). The total floor space of the proposed Admin/Care taker building is 304m^2, therefore, the building is expected to have a minimum useable floor space (excluding cabinetry, etc.) of 50m^2 to be deemed a suitable on-site safer location. The useable floor space within the proposed Admin/Care taker building is TBC with the operator prior to occupancy;
- The proposed Admin/Care taker building will have an APZ sufficient to ensure the maximum radiant heat flux exposure of the building will be ≤12.5 kW/m^2;
- The proposed Admin/Care taker building will be built to a BAL-19 construction standard in line with AS 3959: 2018; and
- The proposed Admin/Care taker building is easily accessible by emergency services through use of the proposed carpark and driveway and direct access to Watkins Road.

Any direct and specific evacuation messages regarding this site from DFES or other emergency personnel will override the above actions.

2. Responsibilities

The following outlines who has responsibility for implementing the emergency procedures in the event of a bushfire.

Table 2: Staff requirements in event of bushfire emergency

Position	Name of Person	Building/area of Responsibility	Responsibility	Phone Number
Principal	TBC	Whole Facility	Contact with DFES; Evacuation of staff and students	TBC
Chief Fire Warden	TBC	Whole Facility	Ensure all doors and windows closed; Notify all Staff on activities and tasks on advice from Principal of actions; Collect Visitors sign in book and student roll onsite	TBC
Secondary Fire Warden	TBC	Ground Facility	All doors and windows closed; Account for all patrons	TBC
Gardener/landscape contractor	TBC	Outside Grounds	Irrigation system enabled if impact of fire imminent; Maintenance of landscaping as per Section 4 of this BEEP	TBC

3. Emergency Contacts

3.1 Emergency External Contacts

Name Organisation	Office/Contact	Contact Details
Fire, Police, Ambulance	Fire or Emergency	000
Department of Fire & Emergency Services	Emergency information	13 33 37 (13 DFES)
Emergency WA	Warnings and Incidents	www.emergency.wa.gov.au
SES	Emergency Assistance	132 500
Police Station	Mundijong	(08) 9526 5111
Armadale Heath Service	Local Hospital	(08) 9391 2000
Bureau of Meteorology (BoM)	Recorded Information	1300 659 213

3.2 Emergency Internal Contacts

Name or Organisation	Office/Contact	Contact Details
TBC	Principal	TBC
TBC	Chief Fire Warden	TBC
TBC	Secondary Fire Warden	TBC

4. Bushfire Preparedness, Awareness and Pre-Emptive Procedures

The following actions are to be undertaken by the proposed School at the specified times.

4.1 Ongoing actions (year-round)

Ensure the landscaped grounds are maintained to the requirements of *Standards for Asset Protection Zones (WAPC, 2021)* with the following items checked prior to November of each year:

- **Fences within the APZ:**
  - Should be constructed from non-combustible materials or bushfire-resisting timber referenced in Appendix F of AS 3959.
- **Fine fuel load (Combustible, dead vegetation matter <6 millimetres in thickness):**
  - Should be managed and removed on a regular basis to maintain a low threat state;
  - Should be maintained at <2 tonnes per hectare (on average); and
  - Mulches should be non-combustible (e.g. stone, gravel or crushed mineral earth) or wood mulch >6 millimetres in thickness.
- **Trees (>6 metres in height):**
  - Trunks at maturity should be a minimum distance of six metres from all elevations of the building;
  - Branches at maturity should not touch or overhand a building or powerline;
  - Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation;
  - Canopy cover within the APZ should be <15 per cent of the total APZ area; and
  - Tree canopies at maturity should be at least five metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ.
- **Shrub and scrub 0.5 metres to six metres in height (shrub or scrub >6 metres in height are to be treated as trees):**
  - Should not be located under trees or within three metres of buildings;
  - Should not be planted in clumps >5 square metres in area; and
  - Clumps should be separated from each other and any exposed window or door by at least 10 metres.
- **Ground covers <0.5 metres in height (ground covers >0.5 metres in height are to be treated as shrubs):**
  - Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above; and
  - Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
- **Grass:**
  - Grass should be maintained at a height of 100 millimetres or less, at all times; and
  - Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.

- **Defendable space:**
  - Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.
- **LP Gas Cylinders:**
  - Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building;
  - The pressure relief valve should point away from the house;
  - No flammable material within six metres from the front of the valve; and
  - Must site on a firm, level and non-combustible base and be secured to a solid structure.

Detailed information and checklists are available on the DFES website including the '*The Homeowner's Bushfire Survival Manual*'[1] and the '*Bushfire Preparedness Toolkit*'[2] published by DFES:

[1] https://uploads-ssl.webflow.com/60e2792443b87e449110e8f1/60e2a193c4447934c9beaf40_DFES_Bushfire-Homeowners_Survival_Manual.pdf

[2] https://publications.dfes.wa.gov.au/publications/bushfire-preparedness-toolkit

4.2 Actions immediately prior to the bushfire season

- Review Emergency Evacuation Plan to ensure details, procedures and contact phone numbers are correct and up to date;
- Ensure employees and other occupants are informed and familiar with the procedures laid out in the Emergency Evacuation Plan;
- Place current version of Bushfire emergency evacuation poster plan (Appendix A) in facility in visible location(s);
- Ensure adequate levels of drinking water are available in the facility in case of emergency;
- Ensure any firefighting equipment (hoses etc.) is serviceable and available;
- Ensure no hazards are present (for example, rubbish piles) that could contribute to increased fire intensity;
- Ensure property access is kept clear and easily trafficable;
- Ensure first aid kits, fire extinguishers, emergency lighting and other emergency resources are current, serviceable and accessible;
- Ensure roof and gutters are free from leaf litter and debris;
- Ensure an emergency evacuation kit has been prepared and is easily accessible by staff;
- Contact with school bus contractors to be made prior to November annually with commitment to provide bus transport in the event of emergency evacuation for up to 55 staff and children. School bus contractor to be placed on standby for possible evacuation (min 55 seat capacity) when FDR is Extreme or higher; and
- Brief all staff on the bushfire evacuation procedures with updated advice provided when fire warnings are issued by Emergency Services (currently DFES) for the locality.

4.3 Ongoing actions during the bushfire season

- Maintain the landscaped grounds and APZs to the requirements of *Standards for Asset Protection Zones*;
- Maintain compliance with the local government's annual firebreak and fuel load notice issued under section 33 of the *Bush Fires Act 1954*;
- Ensure defendable spaces around buildings and assembly points are maintained; and
- Update contact details of the emergency management team and employees.

4.4 Fire Danger Rating System

Additional critical preparedness actions are to be undertaken under certain Fire Danger Ratings (FDRs) and/or Total Fire Bans as detailed below.

The FDR indicates the potential level of danger should a bushfire start, providing information so that action can be taken to protect lives from the potentially dangerous impacts of bushfires. During the Bushfire Danger Period the forecast FDR for the following day is typically released around 4pm but can be changed as weather conditions unfold. The current and predicted FDR, for the following day, are available via the DFES and BoM websites[3].

The Fire Danger Rating determined for a district on any given day is underpinned by the Fire Behaviour Index (FBI). The FBI is a scale of potential fire behaviour (ranging from 0 to 100+) that has been developed using the latest fire science.

On Extreme (FBI≥75 and on advice by DFES) and Catastrophic FDRs, the school will be closed with all staff and parents/guardians notified in advance.

The Bushfire Preparedness Matrix in Table 3 provides a guide of monitoring actions to be completed during the Bushfire Danger Period to allow situational awareness of potential bushfires and triggers for shelter in place or evacuation. This preparedness matrix and other supporting information is also contained within the Bushfire emergency evacuation poster plan in Appendix A.

Table 3: Bushfire Preparedness Matrix

ACTION	NO RATING	MODERATE	HIGH	EXTREME	CATASTROPHIC
Principal, Facility Manager or delegate to monitor Emergency WA / or DFES website or ABC Radio for fire incidents		Min. 1 pm	Min. 1 pm, 3 pm	Min. 9 am, 11 am, 1 pm, 3 pm (or more frequently if fire event in locality); and Facility closure when FBI≥75 and on advice from DFES.	Facility closed
Complete building preparedness checks			By 10 am	By 8 am	
Additional controls – Total Fire Ban	In the event of a Total Fire Ban being declared for the area in which the facility is located the Facility Manager or delegate should check the DFES Emergency WA website (https://www.emergency.wa.gov.au/) at 9 am, 11 am, 1 pm, 3 pm (or more frequently if fire event in locality).				

The Shire of Serpentine Jarrahdale and DFES have the ability to put in place Total Fire Bans (TFB) based on the predicted extreme fire weather for any part of a day. The TFB is announced by DFES and with information to be found on their website[4] or call the TFB hotline on 1800 709 35

[3] http://www.bom.gov.au/wa/forecasts/fire-danger.shtml or https://www.emergency.wa.gov.au/#firedangerratings

[4] https://www.emergency.wa.gov.au/

5. Emergency Procedures

The primary bushfire management action is **EARLY CLOSURE OF THE PROPOSED SCHOOL UNDER EXTREME (FBI≥75 AND ON ADVICE BY DFES) and CATASTROPHIC FIRE DANGER RATINGS.**

Procedures for evacuation and shelter-in-place are below. Any direct and specific evacuation messages regarding this site from DFES or other emergency personnel will override these procedures.

5.1 Evacuation

The primary action in the event of a bushfire impacting the proposed School is to **EVACUATE OFF-SITE (ONLY IF TIME TO BUSHFIRE ARRIVAL IS GREATER THAN 100 MINUTES OR AS OTHERWISE ADVISED BY EMERGENCY SERVICES).**

If off-site evacuation becomes a viable option, the recommended evacuation point is the Mundijong Sports Pavilion, approximately a 850 m to the west (refer to Appendix AAppendix A for preferred route).

5.1.1 Evacuation trigger

In the event of a bushfire occurring within the area, the trigger to enact **EVACUATION PROCEDURES OCCURS WHEN DFES ISSUE A WATCH & ACT ALERT FOR THE AREA IN WHICH THE PROPOSED SCHOOL IS LOCATED AND THE FIRE IS NOT WITHIN ADJACENT VEGETATION**. On the issue of this alert, the relevant actions in Table 4 are to be undertaken.

5.2 Shelter-in-place

In the event of bushfire impacting the proposed School and there has been insufficient time to safely evacuate the children and staff, all occupants will be required to **SHELTER-IN-PLACE** due to the vulnerable nature of the patrons of the facility and the potential time to evacuate.

The proposed School is located in an area subject to a Bushfire Attack Level (BAL) rating of BAL-12.5. The proposed A, C, K, T and M structures will be constructed to BAL-19 standard to provide appropriate protection from bushfire attack.

5.2.1 Shelter-in-place triggers

In the event of a bushfire occurring within the area, the trigger to enact **SHELTER-IN-PLACE PROCEDURES OCCURS WHEN DFES ISSUE:**

- **A WATCH & ACT ALERT FOR THE AREA IN WHICH THE PROPOSED SCHOOL IS LOCATED AND THE FIRE IS WITHIN ADJACENT VEGETATION;** OR
- **AN EMERGENCY WARINGIN ALERT FOR THE AREA IN WHICH THE PROPOSED SCHOOL IS LOCATED.**

On the issue of these alerts, the relevant actions in Table 4 are to be undertaken.

5.3 Bushfire warning system and alerts

The following actions Table 4 are to be undertaken in addition to the Bushfire Warning instructions issued by DFES.

Off-site evacuation is always safer, provided adequate time is available to complete it safely. Confirm with Lead Agency (DFES or other Emergency Service) prior to evacuating and follow all directions. Sheltering on site is a last resort option, where there is inadequate time to evacuate the site safely.

Table 4: Evacuation process

ALERT	DESCRIPTION	ACTION
Advice	A fire has started but there is no known danger, this is general information to keep you informed and up to date with developments.	• If a fire is spotted, report immediately to 000 and then Principal/Facility Manager. • Establish regular communication between the Principal/Facility Manager or delegate for the facility and all staff, children, contractors and visitors to provide awareness of potential bushfire threat; • Principal/Facility Manger or delegate to inform parents/guardians of the bushfire threat and advise them not to attend the proposed School and to keep updated with the DFES advice via Emergency WA website; and • Continually monitor DFES alerts for change in conditions and advice and prepare for evacuation.
Watch and Act	There is a possible threat to lives and homes. Conditions are changing, you need to leave the area or prepare to actively defend.	WATCH AND ACT WITH **NO FIRE** IN ADJACENT VEGETATION • If a fire is spotted, report immediately to 000 and then Principal/Facility Manager; • Request information from DFES regarding bushfire time to arrival and if off-site evacuation to the Mundijong Sports Pavilion should be undertaken; • Principal/Facility Manager or delegate to nominate a sole liaison officer to contact DFES immediately to determine appropriate course of action and inform all staff, children, contractors and visitors; • All occupants to stay indoors and prepare for evacuation; • Principal/Facility Manager or delegate to advise on evacuation to offsite location; and • All visitors and non-essential contractors to be asked to leave the facility if safe to do so. WATCH AND ACT **WITH FIRE** IN ADJACENT VEGETATION • Principal/Facility Manager or delegate to contact 000 to inform shelter in place has been enacted and request further instructions; • Principal/Facility Manager to ensure all occupants are located indoors, onsite within the Shelter In Place building; • Ensure all windows/doors are closed; • All flammable material and equipment are removed away from windows, doors and air-conditioner units; and • Instruct all staff to prepare the facility and occupants for potential bushfire impacts.
Emergency Warning	You are in danger as your area will be impacted by fire. You need to take immediate action to survive. Listen carefully as you will be advised whether you can leave the area or if you must shelter where you are as the fire burns through your area. An emergency warning may be supported with a siren sound called the Standard Emergency Warning Signal (SEWS). These factors should be reviewed on	• Principal/Facility Manager or delegate to contact 000 to inform shelter in place has been enacted and request further instructions; • Principal/Facility Manager to ensure all occupants are located indoors, onsite within the Shelter In Place building; • Ensure all windows/doors are closed; • All flammable material and equipment are removed away from windows, doors and air-conditioner units; and • Instruct all staff to prepare the facility and occupants for potential bushfire impacts.

ALERT	DESCRIPTION	ACTION
	a regular basis as they may change at any time and without notice.	
All clear	The danger has passed, and the fire is under control, but you need to remain vigilant in case the situation changes. It may still not be safe to return.	• If a fire is spotted, report immediately to 000 and then Principal/Facility Manager; and • Remain vigilant and ensure regular communication is established between the Principal/Facility Manager or delegate and all occupants to confirm personnel locations and consider evacuation strategies in the event of a change in warning level. • Principal/Facility Manager to contact parents/guardians and advise them not to attend the Proposed School unless DFES advice indicates otherwise.

Where there is sufficient time to evacuate safely off-site evacuation is to occur as follows (or otherwise if advised by emergency services):

- All occupants are to assemble ready for transport with youngest children to leave first;
- All occupants are to relocate via the bus to the off-site Evacuation Location, currently nominated as the Mundijong Sports Pavilion; or
- Leaving the site via bus in the direction advised by emergency services.

Allow for 100 minutes to assemble all occupants (including children, staff and visitors) and travel to the Mundijong Sports Pavilion. This is a conservative estimate that allows for fire detection, pre-movement, movement and evacuation as per the Australia Fire Engineering Guidelines (ABCB, 2021). Refer to section 1.1 of this BEEP for details of timings this estimate has been based on.

Obtain further advice from DFES or the local emergency services once at the Mundijong Sports Pavilion.

Evacuation well in advance of a fire's predicted arrival time is safer than remaining on-site.

5.4 Primary off-site refuge location and transportation requirements

Transport and directions to be utilised in the event of an offsite evacuation being instigated are to utilise the information in Table 5 and in Appendix A.

Table 5: Primary offsite evacuation location details

ALERT	DESCRIPTION
Name and address of venue	6 Cockram Street, Mundijong WA 6123
Nearest cross street	Paterson Steet
Venue phone number	(08) 9526 1111
Primary route to location	Head west along Watkins Road, head north along Paterson Street followed by a turn to the west along Cockram Street. Destination is located along Cockram Street on the southern side (~850 m, 10 mins).
Number of vehicles required	One bus (60 person)
Estimated travelling time to destination	~10 mins, ~850 m

5.5 Shelter in Place Building

Evacuating to the nominated onsite Shelter in Place building may be required where it is not possible to evacuate to the off-site refuge with the triggers shown within Table 4.

The on-site Shelter in Place building **is the New Admin/Care Taker building.**

All staff, students and visitors when instructed by the Principal or delegate to assemble in the onsite Shelter in Place building with all people onsite to be accounted for by the Principal or delegate.

The Shelter in Place building will be constructed to a BAL-19 standard, will be surrounded by an Asset Protection Zone (APZ) compliant with BAL-12.5, is accessible by emergency service vehicles and has an approximate floor space of 304 m^2 (minimum floor space recommended is 0.75 m^2 per person (ABCB, 2014) therefore, a minimum total of 50 m^2 (rounded up) is recommended based on 50 students, 5 staff and up to 5 visitors).

6. Recovery

Following a bushfire emergency event impacting on the school, the following actions should be undertaken:

- Ensure the safety of all people and seek medical assistance for those requiring it;
- If off-site evacuation occurred, no person should re-enter building until it is deemed safe to do so (this may be advised by emergency services and power/gas supply technicians);
- Follow the directions of emergency services personnel at all times;
- The fire warden (or person responsible) to arrange the movement of occupants back to the facility;
- All occupants are to be accounted for on their return;
- Inform the police/emergency service of the return of persons to the proposed school;
- Review the Emergency Evacuation Plan for effectiveness, make note of weaknesses and amend as necessary; and
- In the event of the proposed school being impacted by a bushfire, critical incident stress support should be provided to all staff, children and parents/guardians.

7. References

Australian Building Codes Board (ABCB). 2014. *Design and Construction of Community Bushfire Refuges: Information Handbook*. ABCB.

Australian Building Codes Board (ABCB). 2021. *Australian Fire Engineering Guidelines*. ABCB.

Eco Logical Australia (ELA). 2023. *Bushfire Management Plan: Development Application:* Lot 9 (25) Watkins Road, Mundijong. Prepared for Sowilo Community High School.

Western Australian Planning Commission (WAPC). 2021. Guidelines for Planning in Bushfire Prone Areas Version 1.4 (including appendices), WAPC, Perth.

Western Australian Planning Commission (WAPC). 2019. A guide to developing a Bushfire Emergency Evacuation Plan, October 2019

Appendix A : Bushfire Emergency Evacuation Poster Plan

1. Location details

Facility type:

- Educational Establishment (school)

Location:

- Lot 9 Watkins Road, Mundijong, Western Australia

Infrastructure:

- Proposed Admin building (A), Classrooms (C), Kitchen (K), Sheds (S), Water Tanks (W), Workshop (M), Ablutions (T), Chicken Coop (CC) and Samoan Hut (F)

Occupation / Visitation (number of people):

- Maximum staff and visitors: 65 people (5 staff, 50 children and 10 visitors)

Access:

- Watkins Road

Fire Weather Forecast Area:

- South West Western Australia Fire Weather District
- Swan Costal South District

2. Communications

Mobile:

- Mobile reception is available – however, mobile communications can become unreliable during bushfire/emergency events due to the volume of usage

Landline / NBN:

- Landline number: TBC

Radio:

- ABC: 720 AM

Internet Sites:

- Preparing your Property – https://publications.dfes.wa.gov.au/publications/preparing-your-property
- Emergency WA – www.emergency.wa.gov.au
- DFES on Facebook - www.facebook.com/dfeswa
- DFES on Twitter - www.twitter.com/dfes_wa

3. Contacts

Fire reporting	000	
Principal/Facility Manager	TBC	TBC
DFES (Emergency Information)	13 33 37	
SES (Emergency Assistance)	132 500	
WA Police	000	
WA Ambulance	000	
Bureau of Meteorology (BoM) Recorded Information	1300 659 213	

4. Evacuation preparedness

The Bushfire Preparedness Matrix (overleaf) provides a guide of monitoring actions to be completed during the Bushfire Danger Period to allow situational awareness of potential bushfires and triggers for shelter in place or evacuation. Additional preparedness procedures to be enacted at certain period of the year are provided in the BEEP report

The FDR indicates the potential level of danger should a bushfire start, providing information so that action can be taken to protect lives from the potentially dangerous impacts of bushfires. During the Bushfire Danger Period the forecast FDR for the following day is typically released around 4pm but can be changed as weather conditions unfold. The current and predicted FDR, for the following day, are available via the DFES and BoM websites.

On Extreme (FBI≥75 and on advice by DFES) and Catastrophic FDRs, the school will be closed.

ACTION	NO RATING	MODERATE	HIGH	EXTREME	CATASTROPHIC
Principal, Facility Manager or delegate to monitor Emergency WA / or DFES website or ABC Radio for fire incidents		Min. 1 pm	Min. 1 pm, 3 pm	Min. 9 am, 11 am, 1 pm, 3 pm (or more frequently if fire event in locality); and Facility closure when FBI≥75 and on advice from DFES.	Facility closed
Complete building preparedness checks			By 10 am	By 8 am	
Additional controls – Total Fire Ban	In the event of a Total Fire Ban being declared for the area in which the facility is located the Facility Manager or delegate should check the DFES Emergency WA website (https://www.emergency.wa.gov.au/) at 9 am, 11 am, 1 pm, 3 pm (or more frequently if fire event in locality).				

5. Evacuation triggers

The primary evacuation option is **Evacuate Off-Site** via bus.

If off-site evacuation is a viable option, the recommended evacuation point is the **Mundijong Sports Pavilion**, approximately 850 m to the west.

The second option is to **shelter-in-place** if there is insufficient time to safely evacuate the children and staff.

SEE EVACUATION DECISION MATRIX (OVERLEAF) FOR TRIGGERS AND PROCEDURES

6. Evacuation Procedures

Actions for offsite evacuation and shelter-in-place have been aligned to triggers associated with bushfire warnings and are detailed in the **evacuation matrix (overleaf)**.

Any direct and specific evacuation messages regarding this site from DFES or other emergency personnel will override these procedures.

7.Children and staff welfare during shelter in place

- Staff will be in charge of onsite children welfare. Serious medical needs will require emergency response via 000.

8. Building Preparedness Checks

- Include such tasks as ensuring reduced fuel loads around buildings, routine maintenance is up to date including cleaning of gutters, fire breaks are in place, and water supply is available.
- Detailed information and checklists are available on the DFES website including the 'The Homeowner's Bushfire Survival Manual' and the 'Fire Chat Bushfire Preparedness Toolkit' published by DFES https://uploadsssl.webflow.com/60e2792443b87e449110e8f1/60e2a193c4447934c9beaf40_DFES_Bushfire-Homeowners_Survival_Manual.pdf

  https://publications.dfes.wa.gov.au/publications/bushfire-preparedness-toolkit; and
- Additional preparedness procedures to be enacted at certain period of the year are provided in the BEEP report.

9. What to do if caught in a bushfire

The following provide current guidelines* on what to do if caught in a bushfire in a building or on foot. Each requires a different response involving critical decisions for your survival.

What to do if caught in a bushfire IN A BUILDING

Outside your building

- Ensure you drink plenty of water so you do not dehydrate
- Block your downpipes, (a sock full of sand/soil will help) and fill your gutters with water
- Move flammable items such as outdoor furniture, doormats,
- Gas cylinders should have the valve facing away from the building
- Do not stand on the roof with a hose. In bush fires, often more people are injured by falling from roofs than suffering burns
- Patrol the outside of the building, putting out any embers and spot fires that may start. An ember or spark can reach your home hours before the fire front arrives
- Just before the fire arrives, wet down timber decks and gardens close to the building
- Move any firefighting equipment to a place where it will not get burnt.

Inside your building

- Continue to drink water so you do not dehydrate
- Close doors, windows, vents, blinds and curtains to prevent flames, smoke and embers from entering
- Put tape across the inside of the windows so they stay in place if they break
- Shut off gas at the meter or bottle
- Move furniture away from the windows to prevent any embers that enter the building from igniting
- Fill sinks, bath and buckets with water for putting out any fires that may start inside
- Place wet towels around window and door edges to stop smoke and embers from entering
- Put a ladder next to the access hole to the roof space so you can check for spot fires.

During the fire

- When the fire arrives, go inside to protect you from the radiant heat
- Ensure you have torches ready as it is likely to become completely dark and you will not be able to see
- Patrol the inside of the building, including the roof space for sparks and embers
- Remember – if your life is at risk, call Triple Zero (000) immediately.

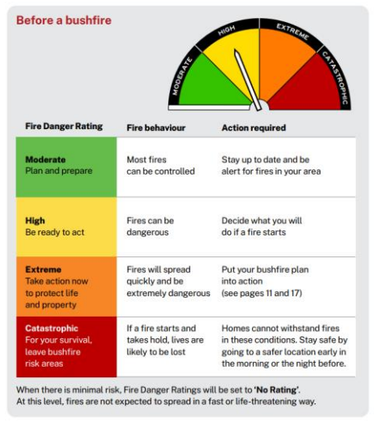
After the fire

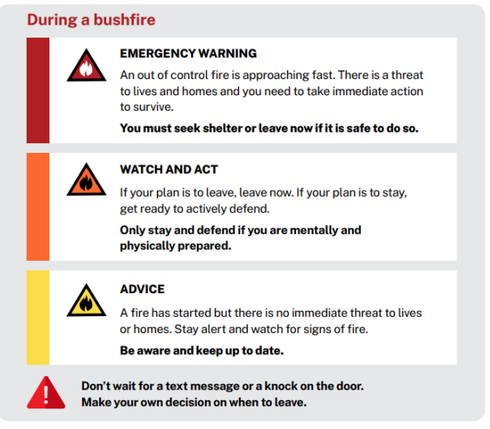
- Once the fire has passed, you may need to patrol the property for hours. Go outside and put out any part of the building which is alight.
- An ember or spark from a fire can impact on a building many hours after the main fire front has passed and small spot fires can quickly get out of control.

What to do if caught in a bushfire ON FOOT/ IN VEHICLE

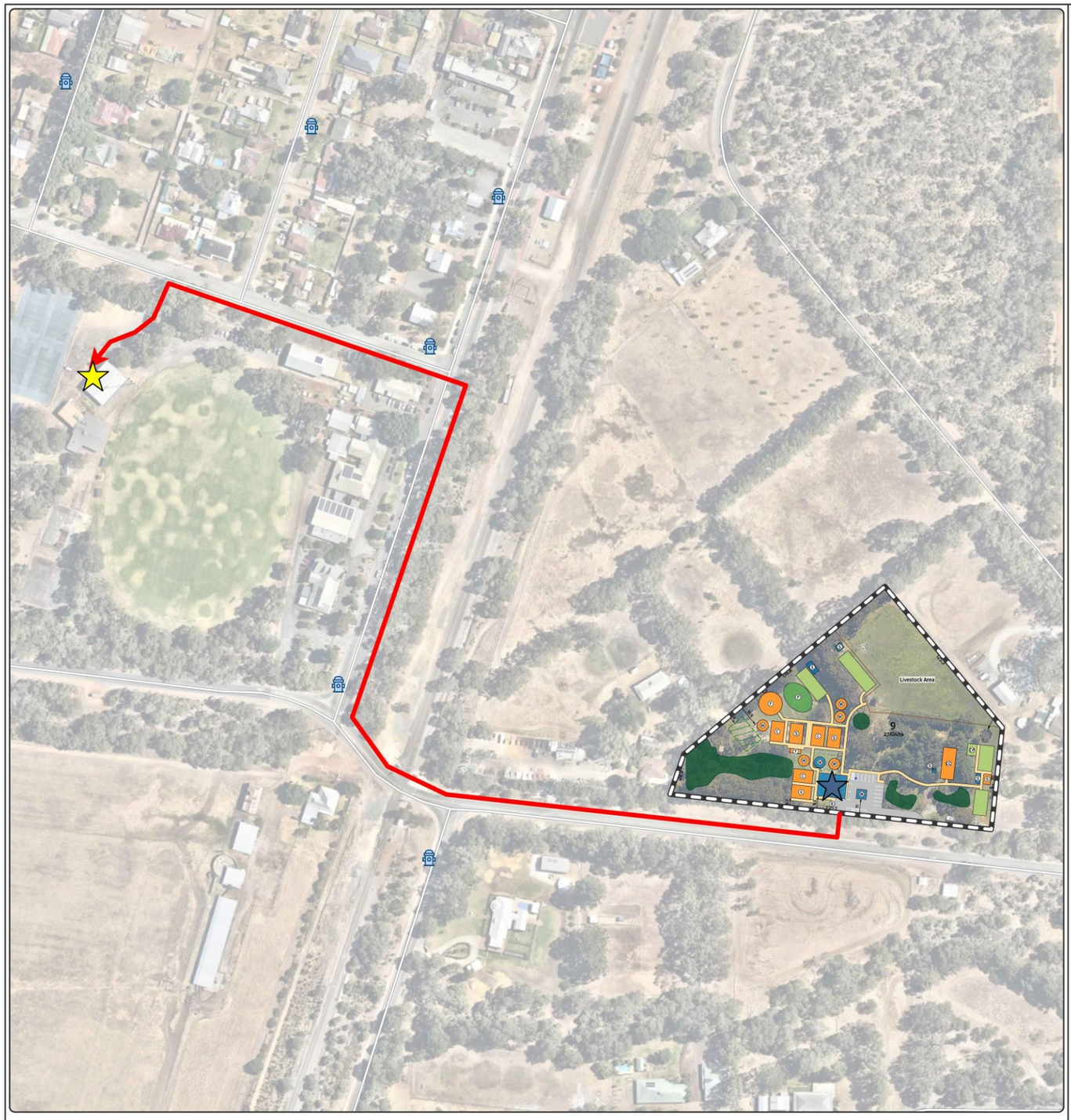
- Try to move on to bare or burnt ground at least 100 m from where fire is likely to burn, if this is not feasible find the largest bare or burnt ground possible
- Do not run uphill or away from the fire unless you know a safe refuge is able to be reached before the fire arrives. Try and position yourself downhill of the on-coming fire.
- Move across the slope out of the path of the fire front and work your way downslope towards the back of the fire or onto burnt ground.
- Do not attempt to run through flames unless you can see clearly behind them. This generally means that the flames are less than 1 metre high and less than 1 to 2 metres deep at the back or on the flanks of the fire.
- Lulls in the fire often result in the flames in these parts being low enough to step or run through to the burnt ground beyond.
- When conditions become severe use every possible means to protect yourself from radiation. On bare ground cover yourself, use wheel ruts, depressions, large rocks or logs to give protection.
- Take refuge in ponds, running streams or culverts, but behind solid objects such a rock
- Remain calm and do not run blindly from the fire. If you become exhausted, you are much more prone to heat stroke and you may easily overlook a safe refuge. Consider an alternative course of action.

* adapted from NSW RFS bushfire training modules.





DFES warning and Fire Danger Rating information



Bushfire Emergency Evacuation Plan

Subject site
Hydrant
Off-site evacuation
Shelter-in-place
Evacuation route

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER4467-SM Date: 18/05/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

ALERT	DESCRIPTION	ACTION
Advice	A fire has started but there is no known danger, this is general information to keep you informed and up to date with developments.	• If a fire is spotted, report immediately to 000 and then Principal/Facility Manager. • Establish regular communication between the Principal/Facility Manager or delegate for the facility and all staff, children, contractors and visitors to provide awareness of potential bushfire threat; • Principal/Facility Manger or delegate to inform parents/guardians of the bushfire threat and advise them not to attend the proposed School and to keep updated with the DFES advice via Emergency WA website; and • Continually monitor DFES alerts for change in conditions and advice and prepare for evacuation.
Watch and Act	There is a possible threat to lives and homes. Conditions are changing, you need to leave the area or prepare to actively defend.	WATCH AND ACT WITH **NO FIRE** IN ADJACENT VEGETATION • If a fire is spotted, report immediately to 000 and then Principal/Facility Manager; • Request information from DFES regarding bushfire time to arrival and if off -site evacuation to the Mundijong Sports Pavilion should be undertaken; • Principal/Facility Manager or delegate to nominate a sole liaison officer to contact DFES immediately to determine appropriate course of action and inform all staff, children, contractors and visitors; • All occupants to stay indoors and prepare for evacuation; • Principal/Facility Manager or delegate to advise on evacuation to offsite location; and • All visitors and non-essential contractors to be asked to leave the facility if safe to do so. WATCH AND ACT **WITH FIRE** IN ADJACENT VEGETATION • Principal/Facility Manager or delegate to contact 000 to inform shelter in place has been enacted and request further instructions; • Principal/Facility Manager to ensure all occupants are located indoors, onsite within the Shelter In Place building; • Ensure all windows/doors are closed; • All flammable material and equipment are removed away from windows, doors and air-conditioner units; and • Instruct all staff to prepare the facility and occupants for potential bushfire impacts.
Emergency Warning	You are in danger as your area will be impacted by fire. You need to take immediate action to survive. Listen carefully as you will be advised whether you can leave the area or if you must shelter where you are as the fire burns through your area. An emergency warning may be supported with a siren sound called the Standard Emergency Warning Signal (SEWS). These factors should be reviewed on a regular basis as they may change at any time and without notice.	• Principal/Facility Manager or delegate to contact 000 to inform shelter in place has been enacted and request further instructions; • Principal/Facility Manager to ensure all occupants are located indoors, onsite within the Shelter In Place building; • Ensure all windows/doors are closed; • All flammable material and equipment are removed away from windows, doors and air-conditioner units; and • Instruct all staff to prepare the facility and occupants for potential bushfire impacts.
All clear	The danger has passed, and the fire is under control, but you need to remain vigilant in case the situation changes. It may still not be safe to return.	• If a fire is spotted, report immediately to 000 and then Principal/Facility Manager; and • Remain vigilant and ensure regular communication is established between the Principal/Facility Manager or delegate and all occupants to confirm personnel locations and consider evacuation strategies in the event of a change in warning level. • Principal/Facility Manager to contact parents/guardians and advise them not to attend the Proposed School unless DFES advice indicates otherwise.

Appendix B : DFES Fire Danger Rating and Warning Systems

Refer to DFES Bushfire Preparedness Tool kit and DFES website for further details[5]

1 Australian Fire Danger Ratings System

The Fire Danger Ratings describe the potential danger level you could face if a bushfire starts, while the Bushfire Warnings System provides information about what to do during a bushfire.

Fire Danger Ratings provide you with important information so you can take action to protect yourself and others from the potentially dangerous impacts of bushfires.

Before a bushfire

Fire Danger Rating	Fire behaviour	Action required
Moderate Plan and prepare	Most fires can be controlled	Stay up to date and be alert for fires in your area
High Be ready to act	Fires can be dangerous	Decide what you will do if a fire starts
Extreme Take action now to protect life and property	Fires will spread quickly and be extremely dangerous	Put your bushfire plan into action (see pages 11 and 17)
Catastrophic For your survival, leave bushfire risk areas	If a fire starts and takes hold, lives are likely to be lost	Homes cannot withstand fires in these conditions. Stay safe by going to a safer location early in the morning or the night before.

When there is minimal risk, Fire Danger Ratings will be set to **'No Rating'**.
At this level, fires are not expected to spread in a fast or life-threatening way.

[5]https://publications.dfes.wa.gov.au/publications/bushfire-preparedness-toolkit

2 Australian Warning System – Bushfire

During a bushfire, emergency services will issue a warning if the fire is impacting, or likely to impact the community.

There are three levels of warning. These change to reflect the increasing risk to your life or property, and the decreasing amount of time you have until the fire arrives.

During a bushfire

EMERGENCY WARNING

An out of control fire is approaching fast. There is a threat to lives and homes and you need to take immediate action to survive.

You must seek shelter or leave now if it is safe to do so.

WATCH AND ACT

If your plan is to leave, leave now. If your plan is to stay, get ready to actively defend.

Only stay and defend if you are mentally and physically prepared.

ADVICE

A fire has started but there is no immediate threat to lives or homes. Stay alert and watch for signs of fire.

Be aware and keep up to date.

Don't wait for a text message or a knock on the door. Make your own decision on when to leave.

Stay informed at emergency.wa.gov.au

Emergency WA is the primary and most up to date source of emergency information for:

- Current warnings
- Fire Danger Ratings
- Total Fire Bans

See back cover for other information sources.