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FLOOD REPORTS

Stormwater Management Report For Proposed Childcare Centre At

4- 8 Eliza Place, Picton

For – Environmental Property Services

My reference – 200774

Rev B

Date: 26 May 2022

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1. Introduction

1.1. Generally

This Stormwater Management Report has been prepared by Sean Lucey of D & M Consulting to investigate the impacts that the proposed childcare centre at 4-8 Eliza Place, Picton may have on Wollondilly Shire Council's existing stormwater infrastructure, the existing drainage easement and the neighbouring residences in relation to water quality and quantity.

1.2. Scope

This report outlines the following:

- Assessment of the proposed development including onsite detention requirements, erosion and sediment controls, water quality and flooding

1.3. Planning controls

The following planning control and engineering design standards have been used:

- Wollondilly Shire Council's Engineering Design Specification
- Australian Rainfall and Runoff 2019
- Stonequarry Creek Flood Management Plan

2. Site Description

2.1. Existing Site Description and land use

The subject site comprises of Lots 502 - 503 in DP1201968 and Lot 506 in DP1201969 and is hatchet shaped with a total site area of 2835.4m^2. The site has a north eastern access handle to Eliza Place and a frontage to Argyle Street along the western boundary. Currently on site are two concrete driveways with a kerb inlet pit on Lot 502 and surface inlet pits on all three lots. The site is burdened by stormwater easements 1.5m wide. The site falls to Argyle Street at a grade of approximately 10%. The subject site can be seen below in Figure 1.

Figure 1 - 4-8 Eliza Place, Picton Site Location (6Maps Spatial Information Exchange)

2.2. Proposed Site Layout

The proposal is to construct a childcare centre including a driveway, car parking facilities, shade structures, walkways, ramps and retaining walls. The proposed site layout by Accurate Design & Drafting can be seen in Figure 2. Lots 502-503 in DP 1201968 and Lot 506 in DP 1201969 are to be consolideated into a single lot and therefore the existing drainage easement servicing the right of way which burdens Lots 506 in DP1201969 and benefits Lot 502-503 in DP1201968 is to be removed along with the existing driveways as can be seen in Figure 3.

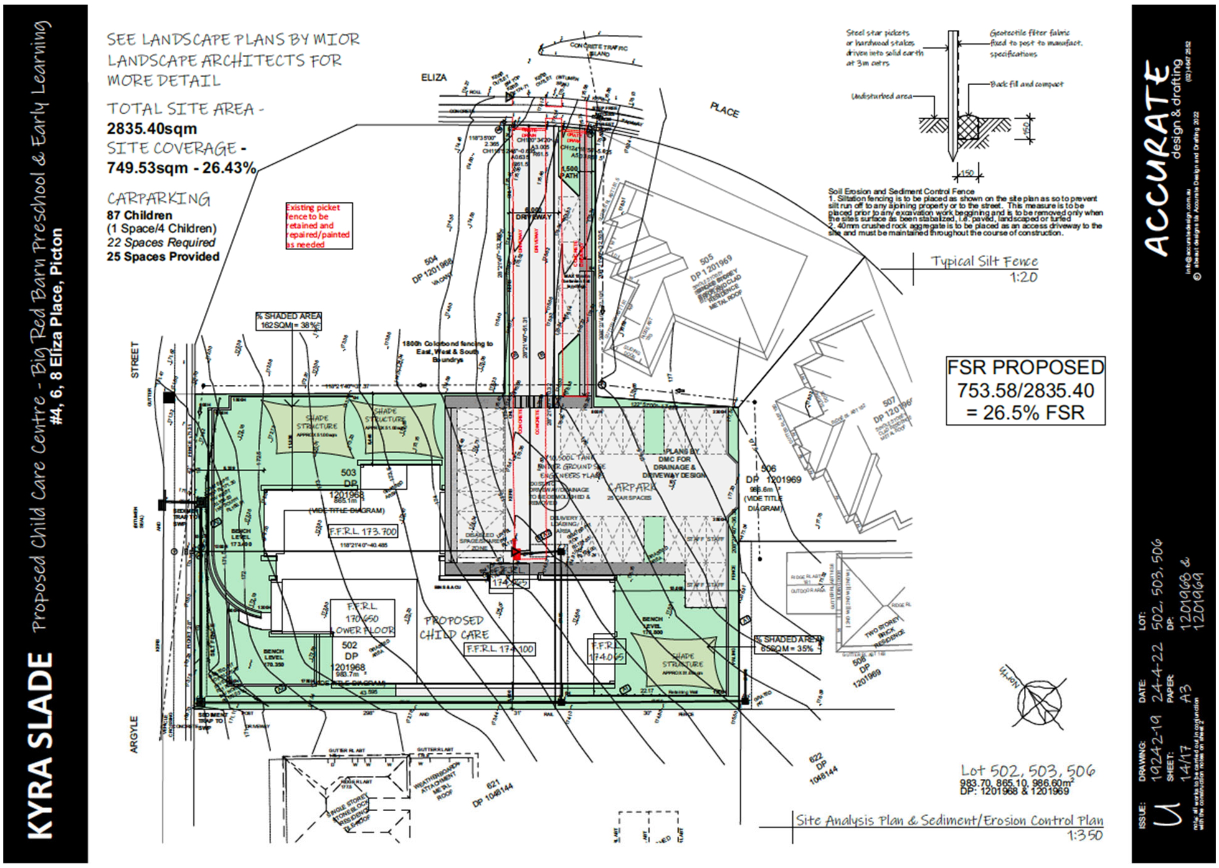

Figure 2 - Proposed Site Plan by Accurate Design & Drafting

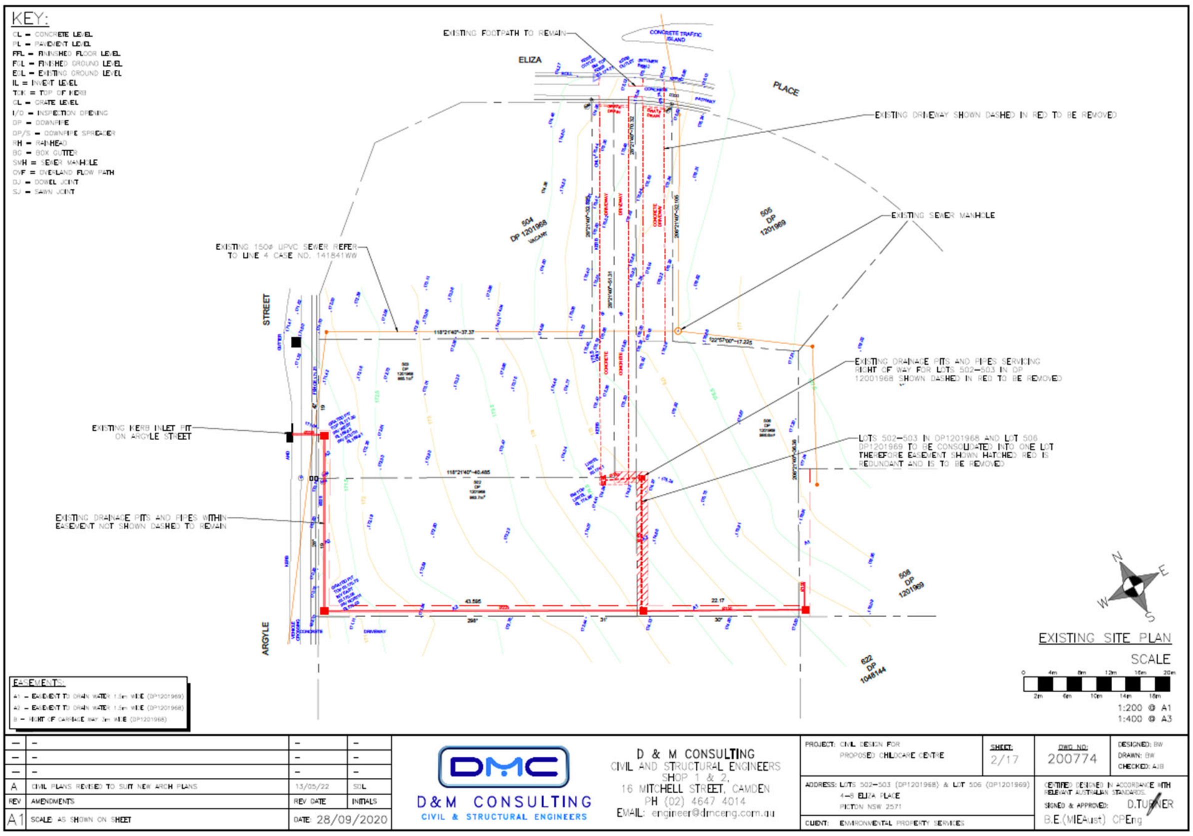

Figure 3 - Existing Site Plan

2.3. Topography and Hydrology

The site falls to the west to Argyle Street at a gradient of approximately 10%. The soil profile within the site has been identified as a clay soil type. There is an existing kerb inlet pit in the driveway on Lot 502 and surface inlet pits within the easements on the subject site.

2.4. Vegetation

The site is a greenfields site which is mostly grassed. There are two existing vehicle crossings on the north eastern boundary on Eliza Place.

3. Stormwater Management

3.1. Overview

This assessment has been completed to analyse the impact of the proposed development on council existing stormwater infrastructure and the existing easement which burdens the lot to determine measures to reduce any negative impact through on-site detention and drainage analysis.

3.2. Hydrology Methodology

Drainage analysis of the proposed childcare centre has been performed on the subject site, the drainage model that has been set up to analyse the drainage system of the subject site, the existing drainage easement and the existing council infrastructure. The model has been established to analyse pre-development conditions and compare them to post-development conditions.

3.3. Catchments

The total catchment for the drainage system on the subject site is 2835.4m^2. The total catchment to asses the existing easement for Lots 507 and 508 in DP1201969 is 1520m^2. The existing subject site has two concrete driveways of various areas and is predominantly grassed.

3.4. Model Setup

A drainage model for the proposed development site has been prepared. The model has been undertaken to model the current catchment (pre-development) and to model the proposed development to analyse the impacts of the proposed development (post-development) has on the existing drainage system. The analyse for the drainage model was done using Drains hydraulic modelling software by Watercom Pty Ltd. The model analyses several storm events from a minor storm event 10% AEP up to a major storm event 1% AEP.

Drains require several values and information to be added to the program to analyse the runoff from the site.

Rainfall Data: Intensity Frequency Duration (IFD 2019) for Picton has been used. Using the Bureau of Meteorology AR&R2019 IFD program. This information is loaded into Drains to analyse the required storm events.

Soil Type: Drains require a soil type to be entered. Soil types range from type 1 (sand/gravel soils with high infiltration rates and low runoff potential) to type 4 (heavy clay soils / solid rock with very slow infiltration rate and high runoff potential). For this model, a soil type of type 3 has been selected, this is due to the clay present on site, this will allow for low infiltration and high runoff potential.

Moisture Conditions: To model, the losses due to soil infiltration Drains program uses Antecedent Moisture Conditions (AMC) (See AMC Table below). Antecedent rainfall is the rainfall that occurs prior to the start of a storm event. It increases soil moisture levels and affects the rates of infiltration into the soil. For this model, an AMC of 3 has been selected, this will give a more conservative result, as the soil will have a low infiltration rate when the storm event occurs.

Number	**Description**	**Total rainfall in 5 days preceding the storm (mm)**
1	Completely dry	0
2	Rather dry	0 to 12.5
3	Rather wet	12.5 to 25
4	Saturated	Over 25

Table 1 - AMC Table

4. Post-Development Model

4.1. Model for the Proposed Development.

A pre and post-development model has been created to analyse the performance of the proposed development's drainage system. The site falls to Argyle Street and as such the proposed drainage system is to flow to the existing drainage easement on Lot 503 before discharging to the existing kerb inlet pit on Argyle Street by gravity. With the proposed development an increase in the total impervious areas will increase the peak flow rate from the site. To mitigate this increase in flow rate, an on-site detention (OSD) is to be incorporated into the drainage system so as to limit the post-development flow rate to that of the pre-development flow rate.

The 29,000 litre underground OSD system is comprised of two 14,500 litre tanks and is noted as OSD 1/3 on the civil plans. The underground tanks serves a dual purpose, with a minimum of 10,000 litres for re-use and a minimum of 19,000 litres for OSD. Approximately 752.1m^2 of roof area of the proposed development is to discharge to the OSD tank. The reuse component of the tank will be connected to all outdoor taps and internal toilets. The tank has been designed to adequately hold all storm events up to and including the 1% AEP storm events within the tank. An orifice plate is to be installed over the outlet of the tank to assist in the reduction of the post-development flow rate to those of the pre-development flows.

Rain water that falls on site is to be captured by the various surface inlet pits around the site. The majority of the water that is captured on site is to be directed to the Spel Ecoceptor 1500 series water quality device to treat the stormwater prior to it being discahrged to the kerb inlet pit on Argyle Street. Stormwater that is captured in courtyard by the lower floor is to discharge to the kerb and gutter on Argyle Street bypassing the water treatment device. A second pit has been added to this lower floor courtyard in the event that the first pit or pipe were to become blocked to ensure water will not ingress into the childcare centre. These two pits have been incorporated into the design to prevent water entering the childcare centre as the finished ground level of the court yard is lower than the existing and surrounding areas surface levels. The post-development model can be seen below in Figure 4.

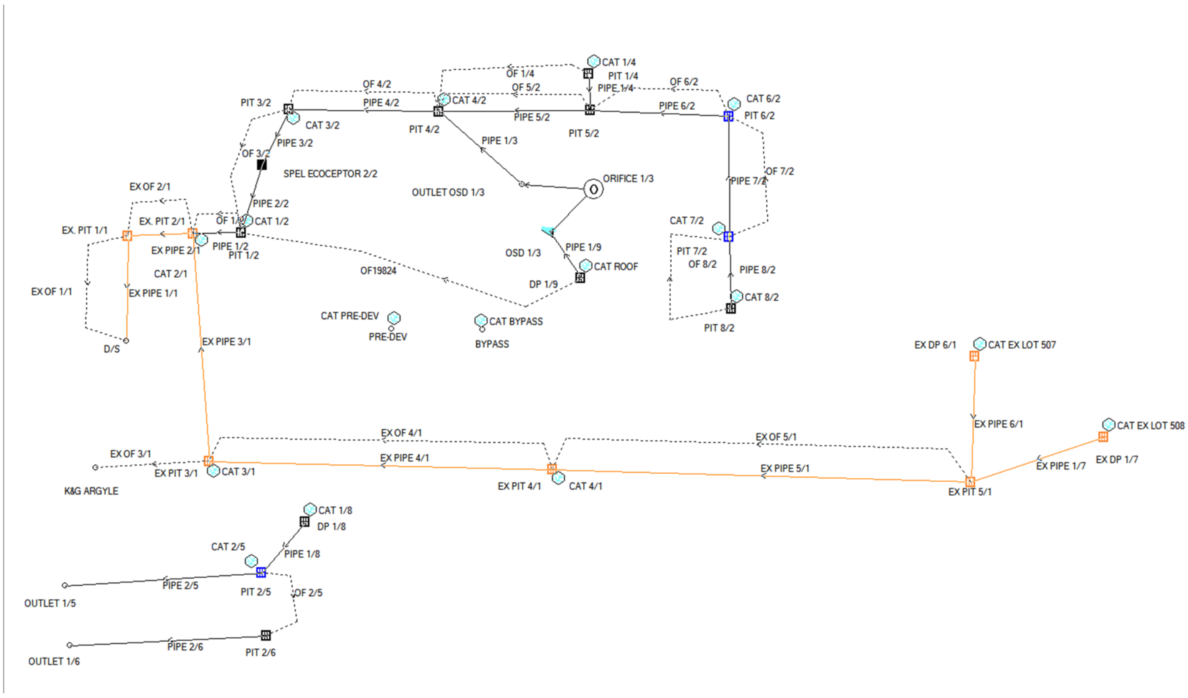

Figure 4 - Post-Development Model

4.2. Model for the Pre-Development Conditions

The drainage easement has been modelled to analyse both the pre-development and post-development flows within the pits and pipes. For the pre-development scenario it has been modelled that each lot that is benefited by the easement is modelled to be discharging into a single line. The percentage of impervious area for each catchment has been calculated in accordance with Table D5.1 of Wollondilly Shire Council's Stormwater Drainage Design Guideline. As the lots are initially residential and have an area between 700m^2 - 1400m^2 the total impervious area of each lot has been calculated as 50% of the entire catchment. The pre-development model of the drainage easement can be seen below in Figure 5.

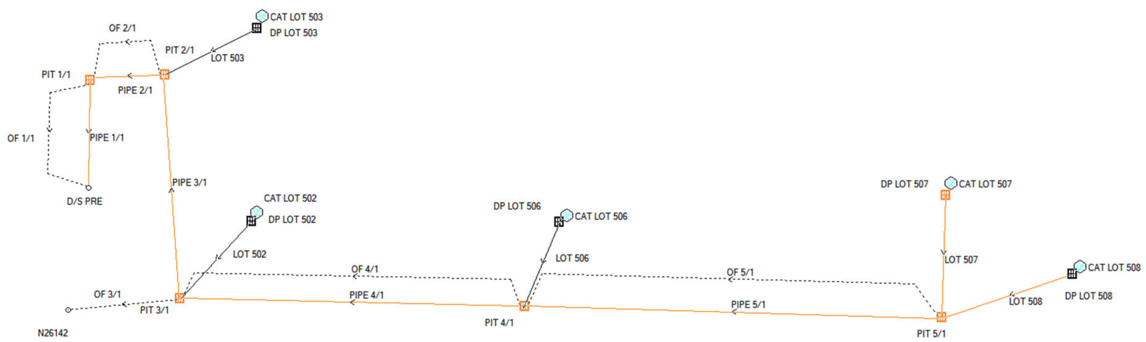

Figure 5 - Pre-Development Model of Drainage Easement

4.3. Post-Development Results

During minor storm events, 10% AEP (1 in 10yr) the internal drainage system performs adequately with limited overflow and stormwater bypass from pits. The water level inside the underground water tank during the minor storm is RL = 172.91m AHD with a maximum volume of 22,490 litres of storage within the tank. The proposed OSD drainage system performs adequately in reducing the post-development flow rate to no greater than the pre-deveopment flow rate Q_{10} = 130L/sec. The discharge to the kerb inlet pit within Argyle Street is Q_{10} = 95L/sec with a bypass flow rate of Q_{10} = 1L/sec. The discharge to the kerb an gutter on Argyle Street is Q_{100} = 3L/sec. The total bypass flow rate from the existing drainage easement from existing Pit 3/1 is Q_{10} = 25L/sec. Therefore the total site discharge flow rate is Q_{10} = 124L/sec. When comparing the bypass from the easement at the existing Pit 3/1 the pre-development flow rate was Q_{10} = 38L/sec. The results from the post-development and pre-development model for the 10% AEP storm event can be seen below.

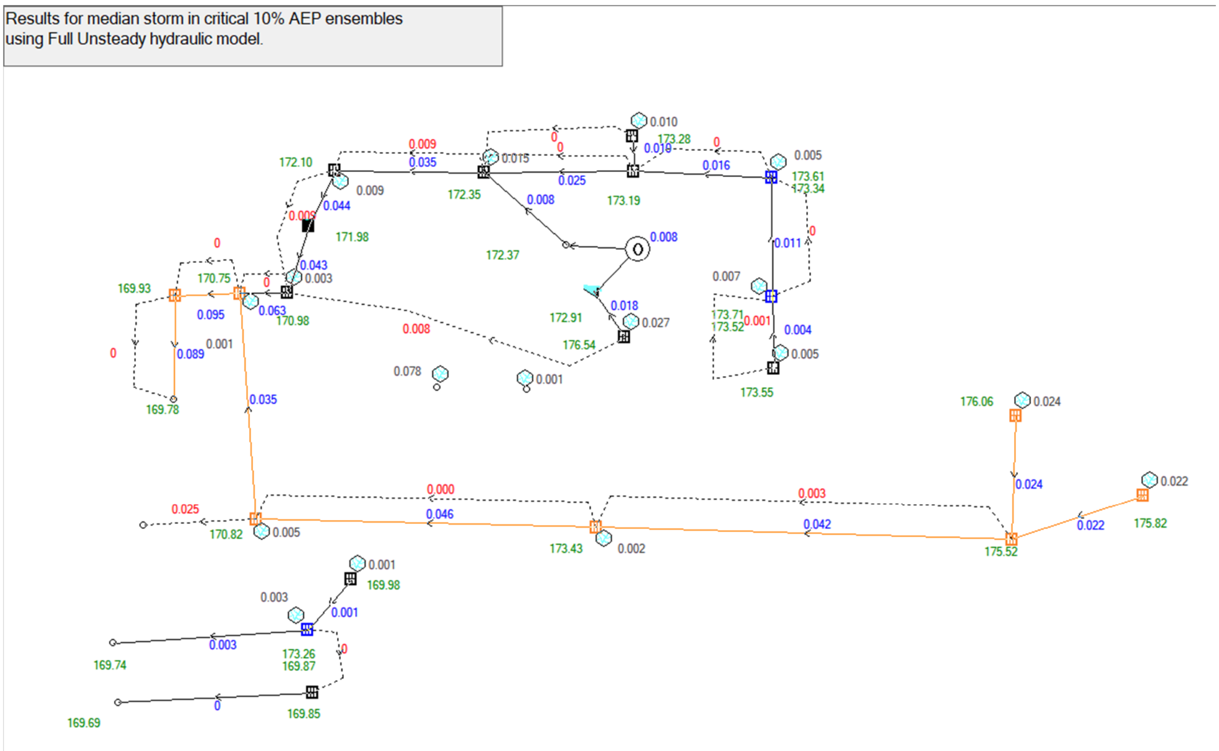

Figure 6 - Post-Development 10% AEP Results

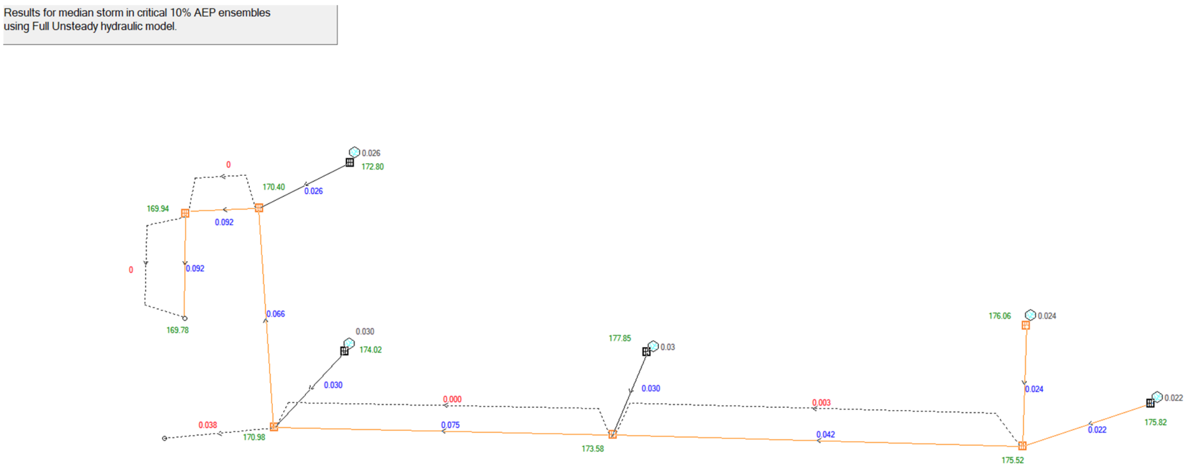

Figure 7 - Pre-Development 10% AEP Results

During major storm events, 1% AEP (1 in 100yr) the internal drainage system performs adequately with limited overflow and stormwater bypass from pits. The water level inside the underground water tank during the minor storm is RL = 173.17m AHD with a maximum volume of 28,570 litres of storage within the tank. The proposed OSD drainage system performs adequately in reducing the post-development flow rate to no greater than the pre-deveopment flow rate Q_{100} = 177L/sec. The discharge to the kerb inlet pit within Argyle Street is Q_{100} = 126L/sec with a bypass flow rate of Q_{100} = 1L/sec. The discharge to the kerb an gutter on Argyle Street is Q_{100} = 5L/sec. The total bypass flow rate from the existing drainage easement from existing Pit 3/1 is Q_{100} = 44L/sec. Therefore the total site discharge flow rate is Q_{100} = 176L/sec. When comparing the bypass from the easement at the existing Pit 3/1 the pre-development flow rate was Q_{100} = 66L/sec. The results from the post-development and pre-development model for the 1% AEP storm event can be seen below.

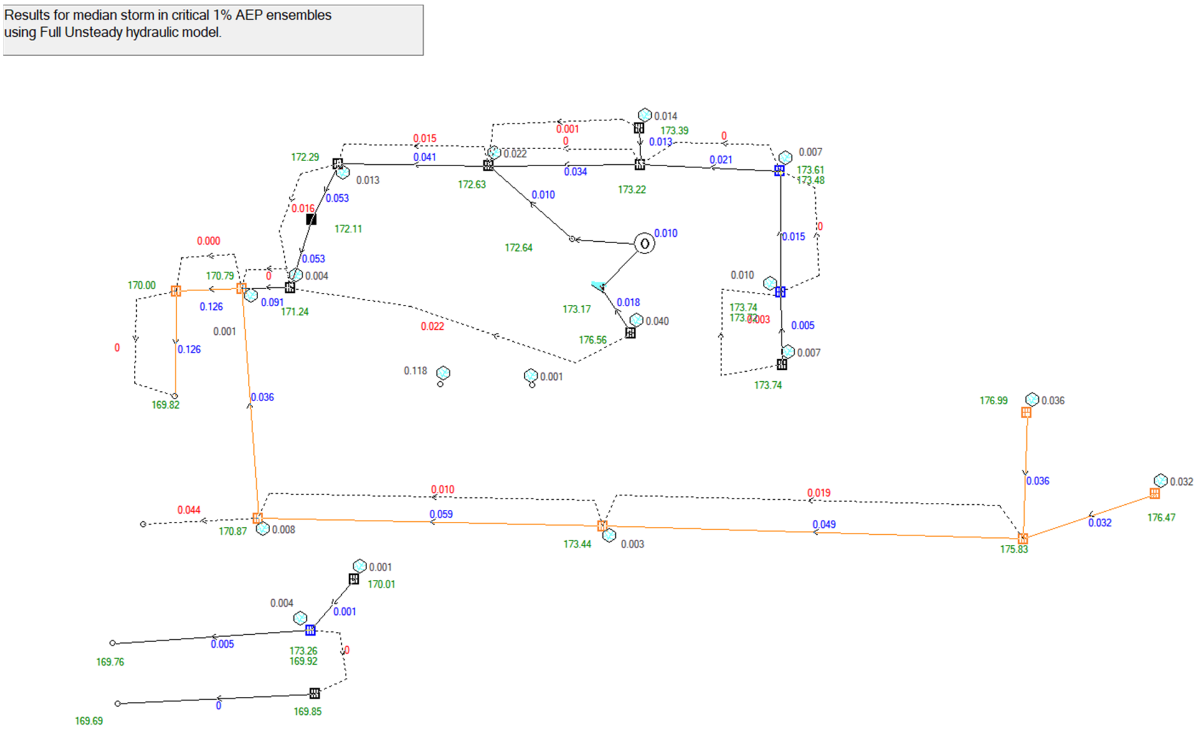

Figure 8 - Post-Development 1% AEP Results

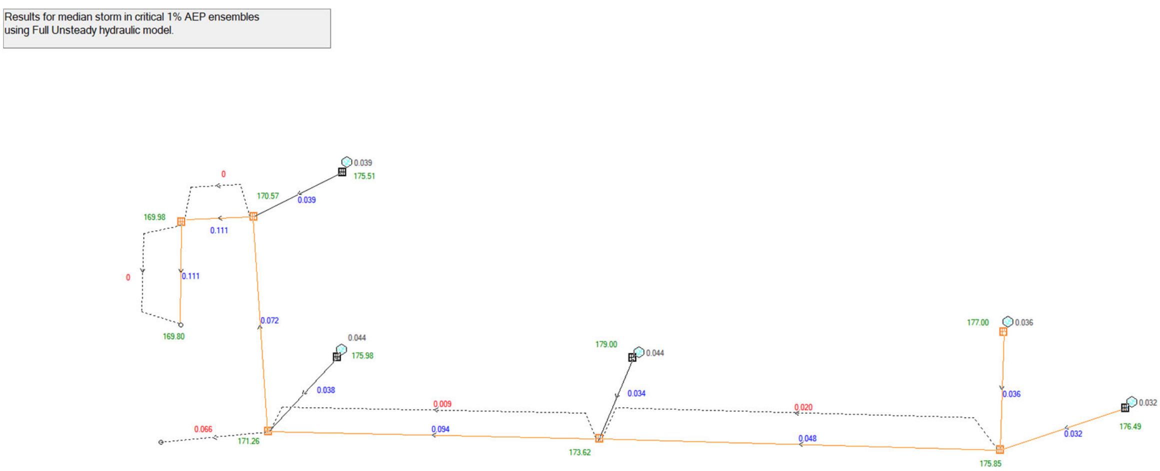

Figure 9 - Pre-development 1% AEP Results

5. Water Quality

5.1 Water quality

As part of the drainage concept for the proposed childcare centre, a number of water quality treatment methods have been utilised to control and remove pollutants from the stormwater system. For a relatively small development area and with the nature of the proposed development being a childcare centre, providing raingardens and other above ground water treatment devices are not ideal especially with young children around. For that reason underground treatment devices have been proposed for this development. A MUSIC model has been prepared to analyse the total effectiveness of the treatment training including the rainwater tank and Spel Ecoceptor 1500 Series. The MUSIC model and results can be seen below in Figure 10 and Table 2 respectively.

5.2 Treatment Devices

5.2.1 Rainwater Tanks

As part of the construction of the new childcare centre, two 14,500 litre tanks are provided for the dual purpose of re-use and OSD, with a minimum of 10,000 litres for reuse. The tank is to collect 752.1m^2 of roof area and is to be plumbed to all internal toilets and external taps. Manholes have been provided to access the tank to perform any maintenance within the tank.

5.2.2 Gross Pollutant Trap

A gross pollutant trap (GPT) is to be installed downstream of the on-site detention tank before discharging into the kerb inlet pit on Argyle Street, its purpose is to remove pollutants from the stormwater system. All of the impervious cathment from the driveway and carpark is to discharge to the GPT. The proposed drainage concept plans have nominated the Spel Ecoceptor 1500 Series water quality device. The Spel Ecoceptor 1500 Series has an average removal efficiency for Gross Pollutants 95%, Total Suspended Solids 71%, Total Nitrogen 47% and Total Phosphorus 69%.

Other devices with equivalent performance can be used such as the Humeceptor STC-2.

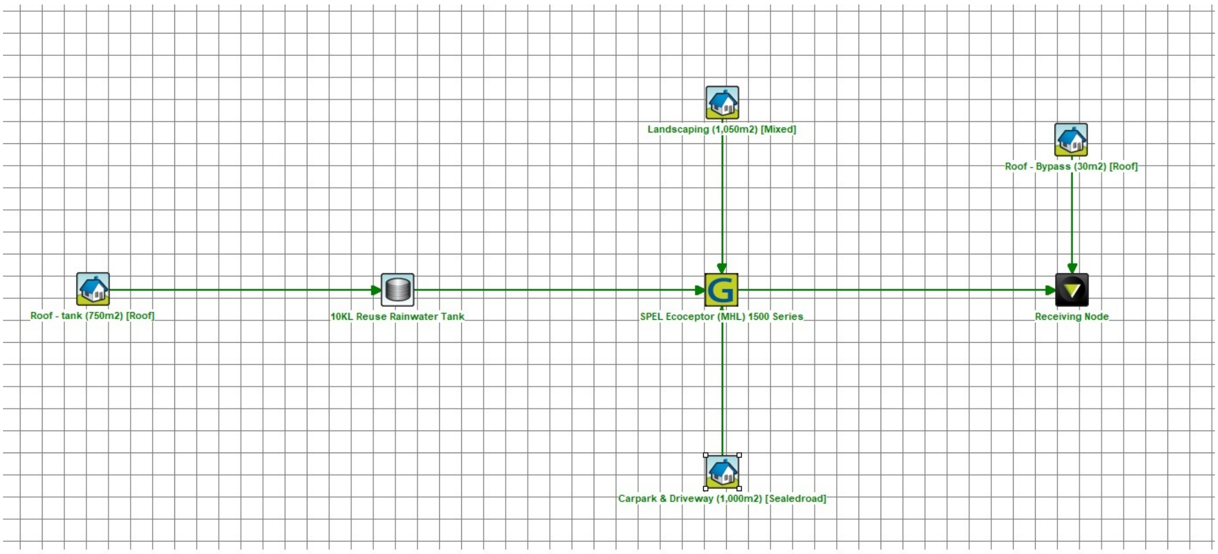

Figure 10 - MUSIC Model Treatment Train

Spel Ecoceptor				
	Annual Pollutant Loading (kg/yr)			
	TSS	TP	TN	GP
Pre-Treatment Train	406.00	0.785	4.93	53.80
Post-Treatment Train	116.00	0.236	2.38	2.39
Difference	290.00	0.55	2.55	51.41
Reduction (%)	71.4%	69.9%	51.7%	95.6%
Target (%)	70.0%	45.0%	45.0%	70.0%
	YES	YES	YES	YES

Table 2 - Water Quality Results

6. Flood Management

Wollondilly Shire Council has identified the site as being affected by flooding, from the Stonequarry Creek Flood report. In the flood report it indicated that Eliza Place was affected from flooding by overland flow off of Vault Hill. As part of the proposed development the traffic island on Eliza Place would need to be modified in order to allow vehicles to enter and exit the site (Refer to the Traffic Management Report by Terraffic Pty Ltd). The traffic island in its current state prevents overland flow from Vault Hill from entering the site by diverting it away to the kerb and gutter down stream. With the proposed modification to the traffic island, overland flow can now possibly enter the site. For this reason it was pertinent to analyse the possibility of flooding in the form of overland flow entering the site. This was analysed by modelling the pre and post-development flooding using HEC RAS 6.0 (2d).

The pre-development model was simulated with the traffic island how it is currently during the 1% AEP and probable maximum flood (PMF) flood events. During the 1% AEP and the PMF flood event the maximum flood level as measured from the invert of the kerb was 140mm and 180mm respectively. The flooding during the pre-development scenario is wholly within the road reserve and doesn't impact on any of the neighbouring properties. The results for the pre-development flood analysis can be seen below.

Figure 11 - Pre-development 1% AEP Flood Event

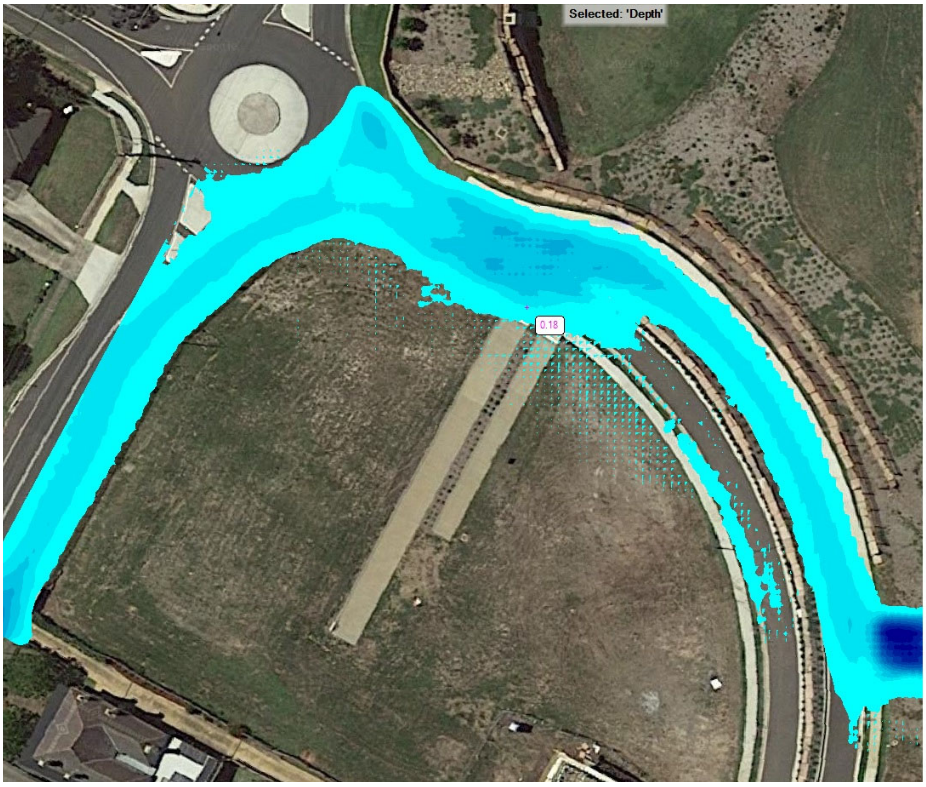

Figure 12 - Pre-development PMF Flood Event

The post-development model with the modified traffic island was then modelled for the 1% AEP and PMF flood events. During the 1% AEP and the PMF flood event the maximum flood level as measured from the invert of the kerb was 180mm and 230mm respectively. The hazard category along Elzia Place is H1 Low Hazard (depth less than 300mm, Velocity less than 2.0m/s) See below Hazard Classification Table Figure 15 and Post Development Flood Hazard Plan Figure 16. The post-development 1% AEP flood remains within the road reserve and does not enter the property unlike during the PMF event flood waters exceeds the depth and level at the boundary allowing floodwater to enter the site and flow down the driveway, the depth of flooding on site being 40mm. The results for the post-development flood analysis can be seen below.

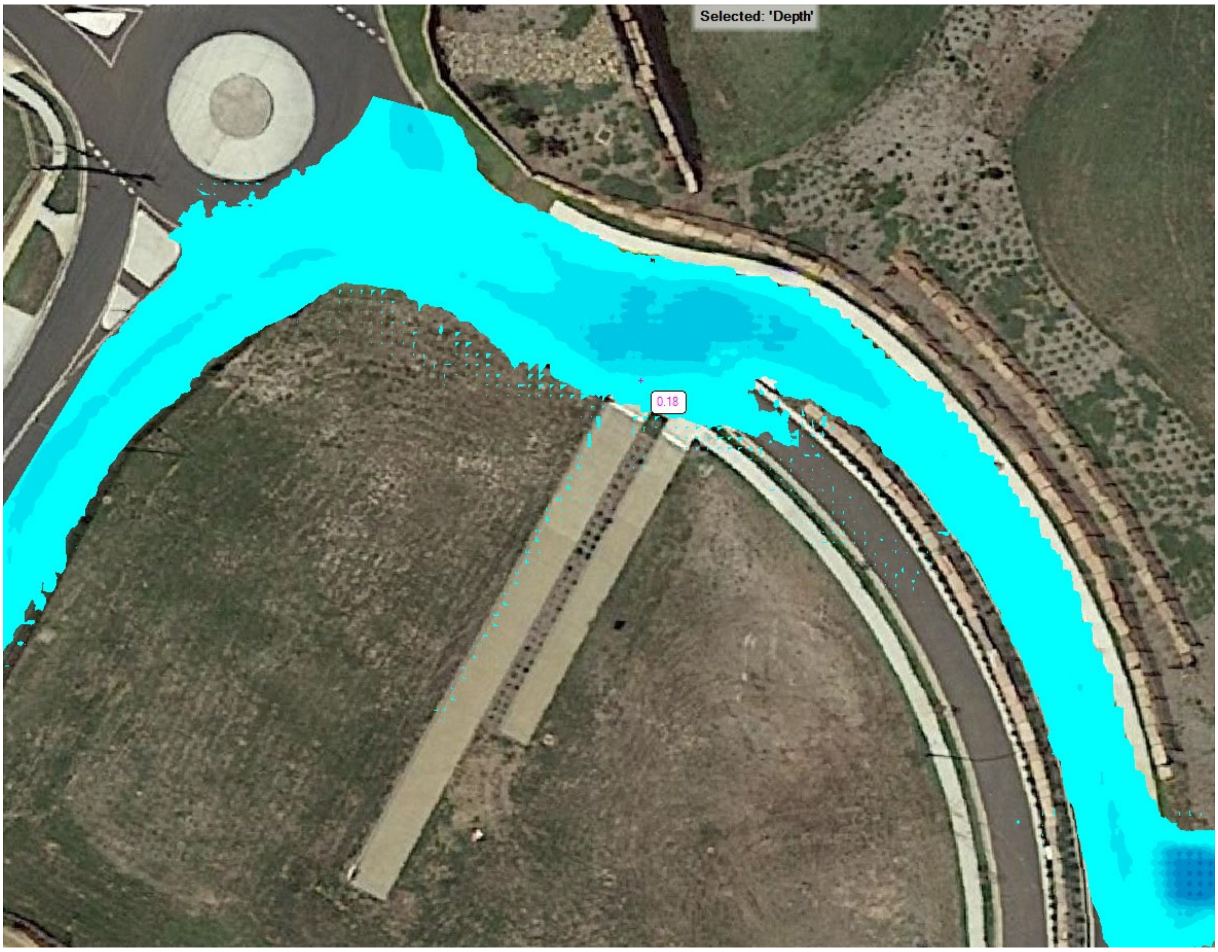

Figure 13 - Post-development 1% AEP Flood Event

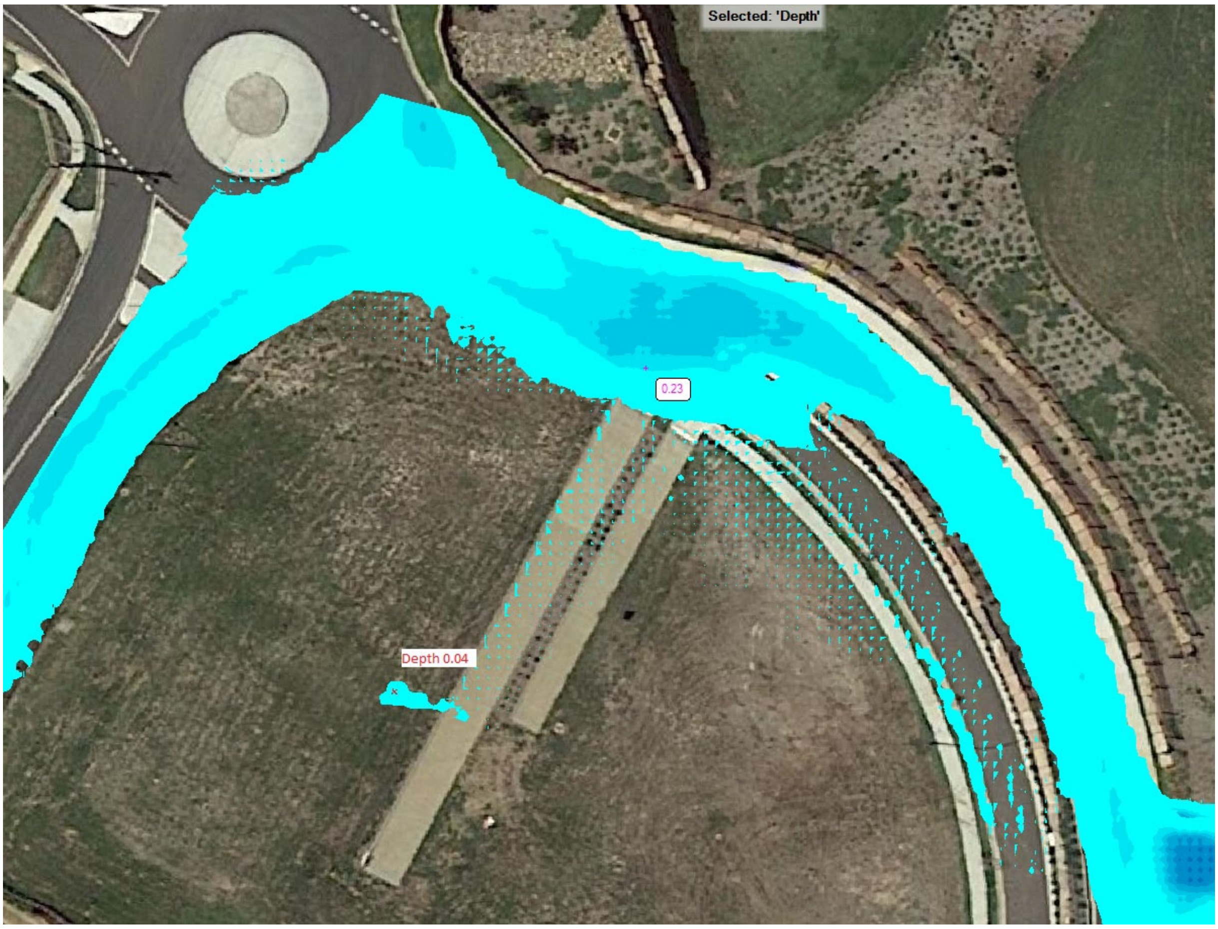

Figure 14 - Post-development PMF Flood Event

The flooding as shown in the post-development models does not pose any significant risk to the occupants within the childcare centre with the car park designed to fall away from the childcare centre. The Childcare Centre will provide a place of refuge during a PMF stormevent with the FFL 173.70 (Junior Pre Room) 200mm above the PMF flood level in the car park. Entry and exit to the site is still possible during the 1% and the PMF flood event. From reviewing Figure 17 the depth to velocity ratio is considered safe for small vehicles. The depth of flooding is less than 300mm and velocity less than 1m/s.

Hazard Classification	Description (and defined limits)
H1	Relatively benign flow conditions. No vulnerability constraints. (D < 0.3 m, V < 2.0 m/s, or V x D < 0.3)
H2	Unsafe for small vehicles. (D < 0.5 m, V < 2.0 m/s, or V x D < 0.6)
H3	Unsafe for all vehicles, children and the elderly. (D < 1.2 m, V < 2.0 m/s, or V x D < 0.6)
H4	Unsafe for all pedestrians and vehicles. (D < 2.0 m, V < 2.0 m/s, or V x D < 1.0)
H5	Unsafe for all pedestrians and vehicles. Buildings require special engineering design and construction. (D < 4.0 m, V < 4.0 m/s, or V x D < 4.0)
H6	Unconditionally dangerous. Not suitable for any type of development or evacuation access. All building types considered vulnerable to failure. (D > 4.0 m, V > 4.0 m/s, or V x D > 4.0)

Figure 15 - Hazard Classification Table

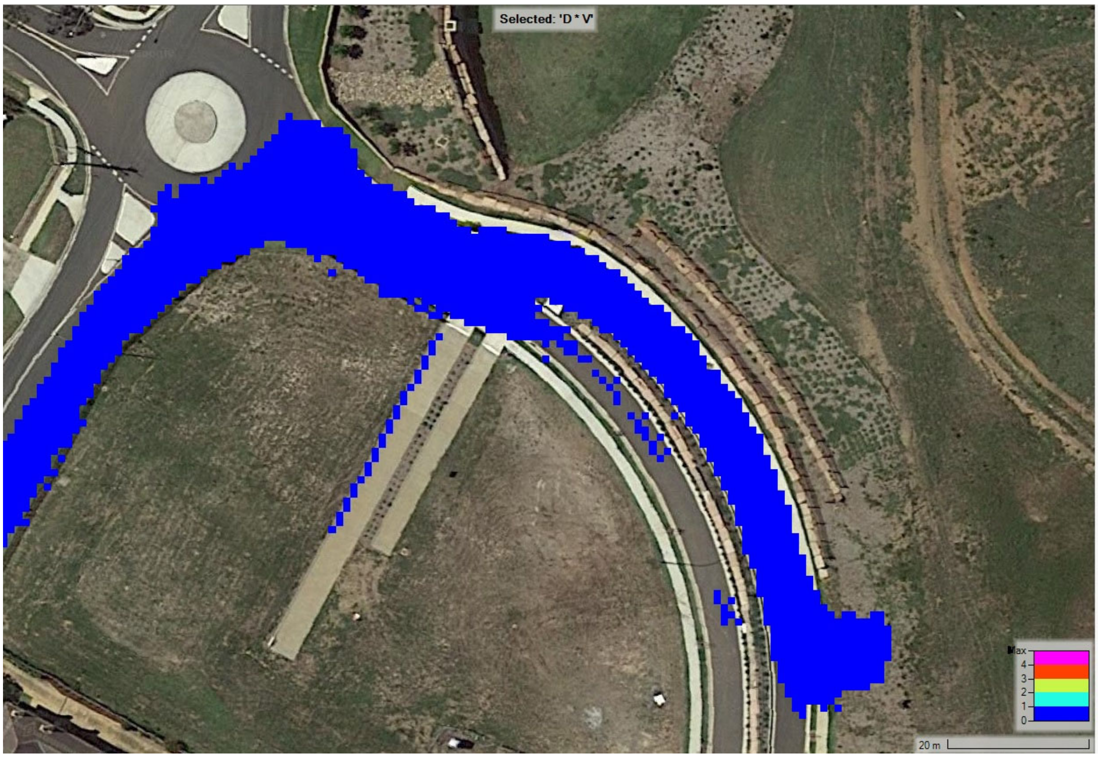

Figure 16 – Post Development Flood Hazard

Class of vehicle	Length (m)	Kerb Weight (kg)	Ground clearance (m)	Limiting still water depth[1]	Limiting high velocity flow depth[2]	Limiting velocity[3]	Equation of stability
Small passenger	< 4.3	< 1250	< 0.12	0.3	0.1	3.0	$DV \leq 0.3$
Large passenger	> 4.3	> 1250	> 0.12	0.4	0.15	3.0	$DV \leq 0.45$
Large 4WD	> 4.5	> 2000	> 0.22	0.5	0.2	3.0	$DV \leq 0.6$

[1]At velocity = 0 ms^{-1}; [2]At velocity = 3.0 ms^{-1}; [3]At low depth

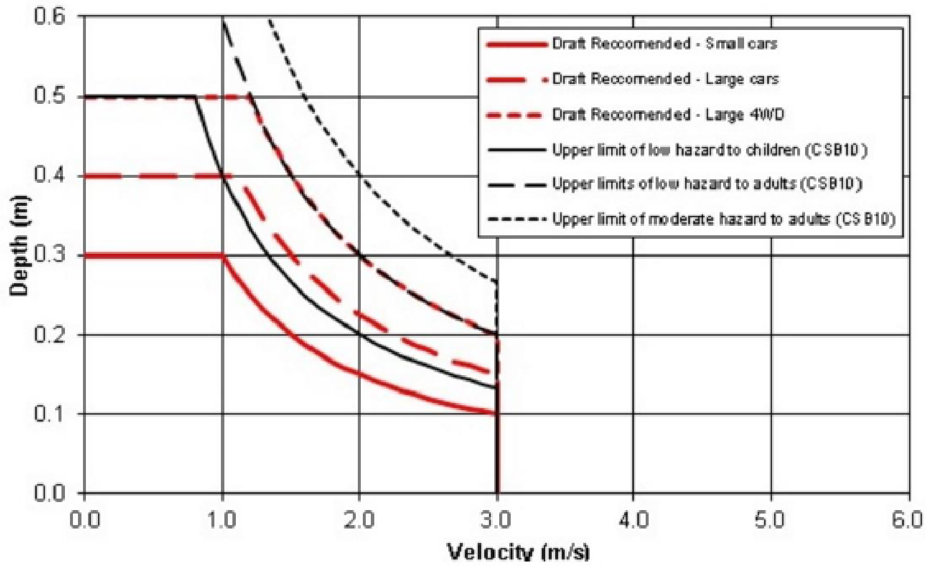

Figure 17 - Flood Hazard for Vehicles

7. Conclusions

The proposal is to construct a childcare centre including a driveway, car parking facilities, shade structures, walkways, ramps and retaining walls. The proposed childcare centre is shown to have no negative impact on the existing council drainage system, existing drainage easement or the neighbouring properties regarding stormwater drainage and overland flow. As demonstrated the proposed drainage system within the development site can adequately drain the proposed childcare centre. The existing council drainage system and drainage easement is adequate in all storm events up to and including the 1% AEP without impacting on the pipe capacity and cause overland flow that could negatively impact neighbouring properties. The proposed drainage system even reduces the amount of overland flow that spills from the existing Pit 3/1.

The proposed drainage system provides an underground OSD system to reduce the post-development peak flow discharge during all storm events to be lesser than or equal to the pre-development peak discharge. The total on-site detention volume specified for the site is 19,000 litres provided by two 14,500 litre underground concrete tanks. The post-development peak discharge off the site is lesser than the pre-development peak discharge for all storm events up to and including the 1% AEP storm event.

As part of the proposed drainage system, a number of water quality measure have been proposed with a 29,000 litre below ground tank that can store a minimum of 10,000 litres of water onsite for reuse in all toilets and external taps. Water quality targets are able to be met due to the incorporation of a gross pollutant trap into the drainage system. For the proposed drainage plan a SPEL Ecoceptor 1500 Series has been selected to treat the storm water captured on site.

As part of the proposed childcare centre the traffic island in Eliza Place has been identified by the traffic consultant as needing to be modified to allow vehicles to enter and exit site. The site has been identified as being affected by flooding and due to the proposed modifications to the traffic island there where concerns that flood waters in the form of overland flow from Vault Hill may enter site. Flood modelling was performed to analyse the affect of modifying the traffic island and compare the pre and post-develoment flooding. During the post-development model flooding in the 1% AEP flood event remains within the road reserve, it is only in the PMF flood event that flood waters overtop the boundary and flow down into site to a depth of 40mm. The Childcare

Centre will provide a place of refuge during a PMF stormevent with the FFL 173.70 (Junior Pre Room) 200mm above the PMF flood level in the car park. Flooding within the road reserve does not pose any significant risk to occupants entering and exiting site during the 1% and PMF flood events.

Should anything in this report be unclear please contact the author for clarification.

Yours Faithfully,

Sean Lucey

B.E. Civil MIEA.

David Turner

B.E. MIEA. (C.P Eng. Civil & Structural 275717) MEEM

Appendix A Architectural Site Plans

KYRA SLADE

Notes:
1. Levels shown are approx. and should be verified on site
2. Figured dimensions are to be taken in preference to scaling
3. All measurements are in mm unless otherwise stated
4. Window sizes are nominal only. Final window sizes by builder
5. Dimensions are to be verified on site by builder before commencement of work
6. Centre line of downpipes to be 350mm from corner of face brickwork (unless specified on elevation)
7. Refer to the builders project specification for inclusions
8. Construction to be in accordance with the Relevant BCA/NCC and other relevant Australian standards
9. All service positions, air conditioning droppers, outlets, return air grills, manholes and bulkheads to be determined on site by supervisor
10. Termite protection to Australian standards
11. Brick sill to be greater than 18'
12. Refer to Basix page for energy requirements
13. 20mm tolerance to be allowed for frames that are built to the low side of the slab
14. All upstairs windows with a sill height less than 1700mm to have a max opening width of 125mm or fitted with a screen with secure fittings to comply with BCA
15. Final AJ's to engineers specifications
16. Plus or minus 200mm to floor level

Amendments

Issue	Changes	Date	Signed/Requested Date Requested	Drawing Number
A	Sketch	18-12-19	B.S. S.G.	19242
B	DA Plans	02-03-20	S.G.	19242-1
C	Room changes	19-03-20	S.G.	19242-2
D	Areas amended	20-05-20	A.C.	19242-3
E	Survey added and minor changes	09-06-20	S.G.	19242-4
F	Ramped access	15-06-20	S.G.	19242-5
G	Plans amended to suit email dated 02-07-20	09-07-20	S.G.	19242-6
H	Name added	10-07-20	S.G.	19242-7
I	Fire Safety	14-07-20	S.G.	19242-8
J	Exit signs & Sediment control plan	16-07-20	S.G.	19242-9
K	Plans amended as per access details	27-07-20	S.G.	19242-10
L	Path notes	27-07-20	S.G.	19242-11
M	Plans amended to suit council request	09-11-20	S.G.	19242-12
N	Levels amended as per engineers plans	23-11-20	S.G.	19242-13
O	Toilets for visitors and window to change table	23-11-20	S.G.	19242-13
P	Amended design	11-02-22	B.S. S.G.	19242-14
Q	New Design	15-02-22	S.G.	19242-15
R	Alterations	26-02-22	BS	19242-16
S	Additional information	7-3-22	BS	19242-17
T	add site info	29-03-22	BS SG	19242-18
U	add NOTES	23-04-22	BS SG	19242-19
V	Small amendment	10-05-22	SG	19242-20

THESE NOTES MUST BE READ AND UNDERSTOOD BY ALL INVOLVED IN THE PROJECT.

THIS INCLUDES (but is not limited): OWNER, BUILDER, SUBCONTRACTORS, CONSULTANTS, RENOVATORS, OPERATORS, MAINTAINERS, DEMOLISHERS.

1 FALLS, SLIPS, TRIPS

a) WORKING AT HEIGHTS
DURING CONSTRUCTION
Wherever possible, components for this building should be prefabricated off-site or at ground level to minimize the risk of workers falling more than two meters. However, construction of this building will require workers to be working at heights where a fall in excess of two meters is possible and injury is likely to result from such a fall. The builder should provide such a barrier wherever a person is required to work in a situation where falling more than two meters is a possibility.

DURING OPERATION OR MAINTENANCE
For houses or other low-rise buildings when scaffolding is appropriate:
Cleaning and maintenance of windows, walls, roof or other components of this building will require persons to be situated where a fall from a height in excess of two meters is possible. Where this type of activity is required scaffolding, ladders or trestles should be used in accordance with relevant codes of practice, regulations or legislation.
Cleaning and maintenance of windows, walls, roof or other components of this building will require persons to be in situations where a fall from a height in excess of two meters is possible. Where this type of activity is required, scaffolding fall barriers or Personal Protective Equipment (PPE) should be used in accordance with relevant codes of practice, regulations or legislations.

b) SLIPPERY OR UNEVEN SURFACES
FLOOR FINISHES Specified
If finishes have been specified by the designer these have been selected to minimize the risk of floors and paved areas becoming slippery when wet or when walked on with wet shoes/feet. Any changes to The specified finished should be made in consultation with the designer, or if this is not practical, surfaces with an equivalent or better slip resistance should be chosen.
FLOOR FINISHES By Owner
If a designer has not been involved in the selection of surface finishes in the pedestrian trafficable areas of this building then surfaces should be selected in accordance with AS HB 197:1999 and AS/NZ 4586:2004.
STEPS, LOOSE OBJECTS AND UNEVEN SURFACES
Due to design restrictions for building, steps and/or ramps are included in the building which may be a hazard to workers carrying objects or otherwise occupied. Steps should be clearly marked with both visual and tactile warning during construction, maintenance, demolition and at all times when the building operates as a workplace.
Building owners and occupiers should monitor the pedestrian access ways and in particular access to areas where maintenance is routinely carried out to ensure that surfaces have not moved or cracked so that they become uneven and present a trip hazard. Spills, loose material, stray objects or any other matter that may cause a slip or trip hazard should be cleaned or removed from assess ways.
Contractors should be required to maintain a tidy work site during construction, maintenance or demolition to reduce the risk of trips and falls in the workplace. Materials for construction or maintenance should be sorted in designated areas away from access ways and work areas.

2. FALLING OBJECTS

LOOSE MATERIALS OR SMALL OBJECTS
Construction, maintenance or demolition work on or around this building is likely to involve persons working above ground level or above floor levels. Where this occurs one or more of the following measures should be taken to avoid objects falling from the area where the works is being carried out onto persons below.

1. Prevent or restrict access to areas below where the works is being carried out.
2. Provide tie boards to scaffolding or work platforms.
3. Provide protective structure below the work area.
4. Ensure that all persons below the work area have Personal Protective Equipment (PPE)

BUILDING COMPONENTS
During construction, renovation or demolition of this building, parts of the structure including fabricated steelwork, heavy panels and many other components will remain standing prior to or after the support parts are in place. Contractors should ensure that temporary bracing or other required support is in place at all times to avoid a collapse, which may injure persons in the area.

Mechanical lifting of materials and components during construction, maintenance or demolition presents a risk of falling objects. Contractors should ensure that appropriate lifting devices are used, that loads are properly secured and that access to areas below the load is prevented or restricted.

3. TRAFFIC MANAGEMENT

For building on a major, narrow or steeply sloping road:
Parking of vehicles or loading/unloading of vehicles on this roadway may cause a traffic hazard. During construction, maintenance or demolition of this building designated parking for workers and loading areas should be provided. Trained traffic management personnel should be responsible for the supervision of these areas.
For building where on-site loading/unloading is restricted:
Construction of this building will require loading and unloading of materials on the roadway. Deliveries should be planned to avoid congestion of loading areas and trained traffic management personnel should be used to supervise loading/unloading areas.
For all building:
Busy construction and demolition sites present a risk of collision where deliveries and other traffic are moving within the site. A traffic management plan supervised by trained traffic management personnel should be adopted for the work site.

4. SERVICES

GENERAL
Rapture of services during excavation or other activity creates a variety of risks including release of hazardous materials. Existing services are located on or around the site. Where known, these are identified on the plans but the exact location and extent of services may vary from that indicated. Services should be located using an appropriate service (such as Dial Before You Dig), appropriate excavation practice should be used and, where necessary, specialist contractors should be used.
Locations with underground power lines:
Underground power lines MAY be located near or on this site. These pose a risk of electrocution if struck or approached by lifting devices or other plant and persons working above ground level. Where there is a danger of this occurring power lines should be, where practical, disconnected or relocated. Where this is not practical adequate warning in the form of bright coloured tape or signage should be used or a protective barrier provided.

5. MANUAL TASKS

Components within this design with a mass in excess of 25kg should be lifted by two or more workers or by a mechanical lifting device. Where this is not practical, suppliers or fabricators should be required to limit the component mass. All material packaging, building and maintenance components should clearly show the total mass of packages and where practical all items should be sorted on site in a way which minimizes bending before lifting. Advice should be provided about unsafe lifting methods in areas where lifting may occur. Construction, maintenance and demolition of this building will require the use of portable tools and equipment. These should be fully maintained in accordance with manufacturers specifications and not used when faulty or (in the case of electrical equipment) not carrying a current electrical safety tag. All safety guards or devices should be regularly checked and Personal Protective Equipment should be used in an accordance with the manufacturer's specification.

6. HAZARDOUS SUBSTANCES

ASBESTOS
For alterations to a building constructed prior to:
1990 - It therefore may contain asbestos
1986 - It therefore is likely to contain asbestos
Either in cladding material or in fire retardant insulation material. In either case, the builder should check and, if necessary, take appropriate action before demolishing, cutting, sanding drilling or otherwise disturbing the existing structure.

POWDERED MATERIALS
Many materials used in the construction of this building can cause harm if inhaled in a powder form. Persons working on or in the building during construction, operational maintenance or demolition should ensure food ventilation and wear Personal Protective Equipment including protection against inhalation while using powdered material or when sanding, drilling, cutting or otherwise disturbing or creating powdered material.

TREATED TIMBER
The design of this building may include provision for the inclusion of treated timber within the structure. Dust or fumes from this material can be harmful. Persons working on or in the building during construction, operational maintenance or demolition should ensure good ventilation and wear Personal Protective Equipment including protection against inhalation of harmful materials when sanding, drilling, cutting or using treated timber in any way that may cause harmful material to be released. Do not burn treated timber.

VOLATILE ORGANIC COMPOUNDS
Man typed of glue, solvents, spray back, paints, vanishes, and some cleaning materials and disinfectants have dangerous emissions. Areas where these are used should be kept well ventilated while the material is being used and for a period after installation. Personal Protective Equipment may also be required. The manufacturer's recommendations for use must be carefully considered at all times.

SYNTHETIC MINERAL FIBRE
Fiberglass, Rockwell, ceramics and other material used for thermal or sound insulation may contain synthetic mineral fiber which may be harmful if inhaled or if it comes in contact with the skin, eyes or other sensitive parts of the body. Personal Protective Equipment including protection against inhalation of harmful materials should be used when installing, removing or working near bulk insulation material.

TIMBER FLOORS
This building may contain timber floors which have an applied finish. Areas where finishes are applied should be kept well ventilated during sanding and application and for a period after installation. Personal Protective Equipment may also be required. The manufacturer's recommendation for use must be carefully considered at all times.

7. CONFINED SPACES

EXCAVATIONS
Construction of this building and some maintenance of the building will require excavation and installation of items within excavation. Where practical, installation should be carried out using methods which do not require workers to enter the excavations. Where this is not practical, adequate support for the excavated area should be provided to prevent a collapse. Warning signs and barriers to prevent accidental or unauthorized access to all excavations should be provided.

ENCLOSED SPACES
For buildings with enclosed spaces where maintenance or other access may be required:
Enclosed spaces within this building may be present a risk to persons entering for construction, maintenance or any other purpose. The design documentation calls for warning signs and barriers to unauthorized access. These should be maintained throughout the life of the building. Where workers are required to enter enclosed spaces, air testing equipment and Personal Protective Equipment should be provided.

SMALL SPACES
For buildings with small spaces where maintenance or other access may be required:
some small spaces within this building will require access by construction or maintenance workers. The design documentation calls for warning signs and barriers to unauthorized access. These should be maintained throughout the life of the building. Where workers are required to enter small spaces they should be scheduled so that access is for short periods. Manual lifting and other manual activity should be restricted in small spaces.

8. PUBLIC ACCESS

Public access to construction and demolition sites and to areas under maintenance causes risk to workers and public. Warning signs and secure barriers to unauthorized access should be provided. Where electrical installations, excavations, plant or loose materials are present they should be secure when not gully supervised.

9. OPERATIONAL USE OF BUILDING RESIDENTIAL BUIDLINGS

This building has been designed as a residential building. If it, at a later date, is used or intended to be used as a workplace, the provisions of the Work Health and Safety Act 2011 or subsequent replacement Act should be applied to the new use.

10. OTHER HIGH RISK ACTIVITY

All electrical work should be carried out in accordance with the Code of Practice:
Managing Electrical Risks at the Workplace, AS/NZ 3012 and all licensing requirements.
All work using Plant should be carried out in accordance with the Code of Practice:
Managing Risks of Plant at the Workplace.
All work should be carried out in accordance with the Code of Practice: Managing Noise and Preventing Hearing Loss at Work. Due to the history of serious incidents it is recommended that particular care be exercised when undertaking work involving steel construction and concrete placement

Sheet Number	Sheet Name
01	Cover Page
02	Perspective View
03	Perspective View
04	Perspective View
05	Perspective View
06	Perspective View
07	Perspective View
08	Perspective View
09	Perspective View
10	Lower Floor Plan
11	Ground Floor Plan
12	Front & Rear Elevations
13	Side Elevations
14	Site Plan
15	Schedule Of External Colours
16	Site Sections
17	Site Sections

Proposed Child Care Centre - Big Red Barn Preschool & Early Learning
#4, 6, 8 Eliza Place, Picton

ACCURATE design & drafting
info@accuratedesign.com.au
(02) 4647 2552

KYRA SLADE

ISSUE: V

DRAWING: 19242-20

SHEET: 2/17

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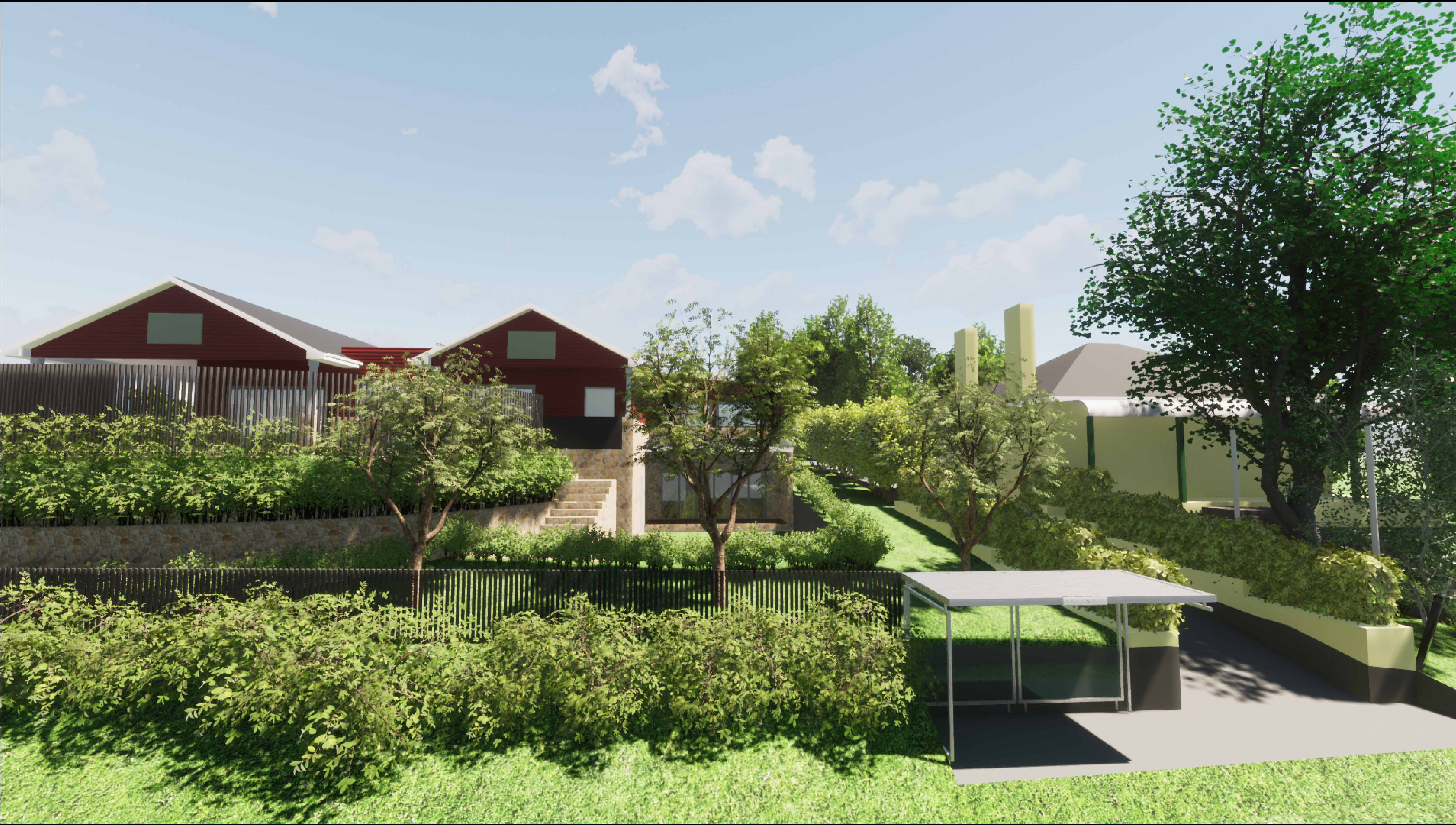

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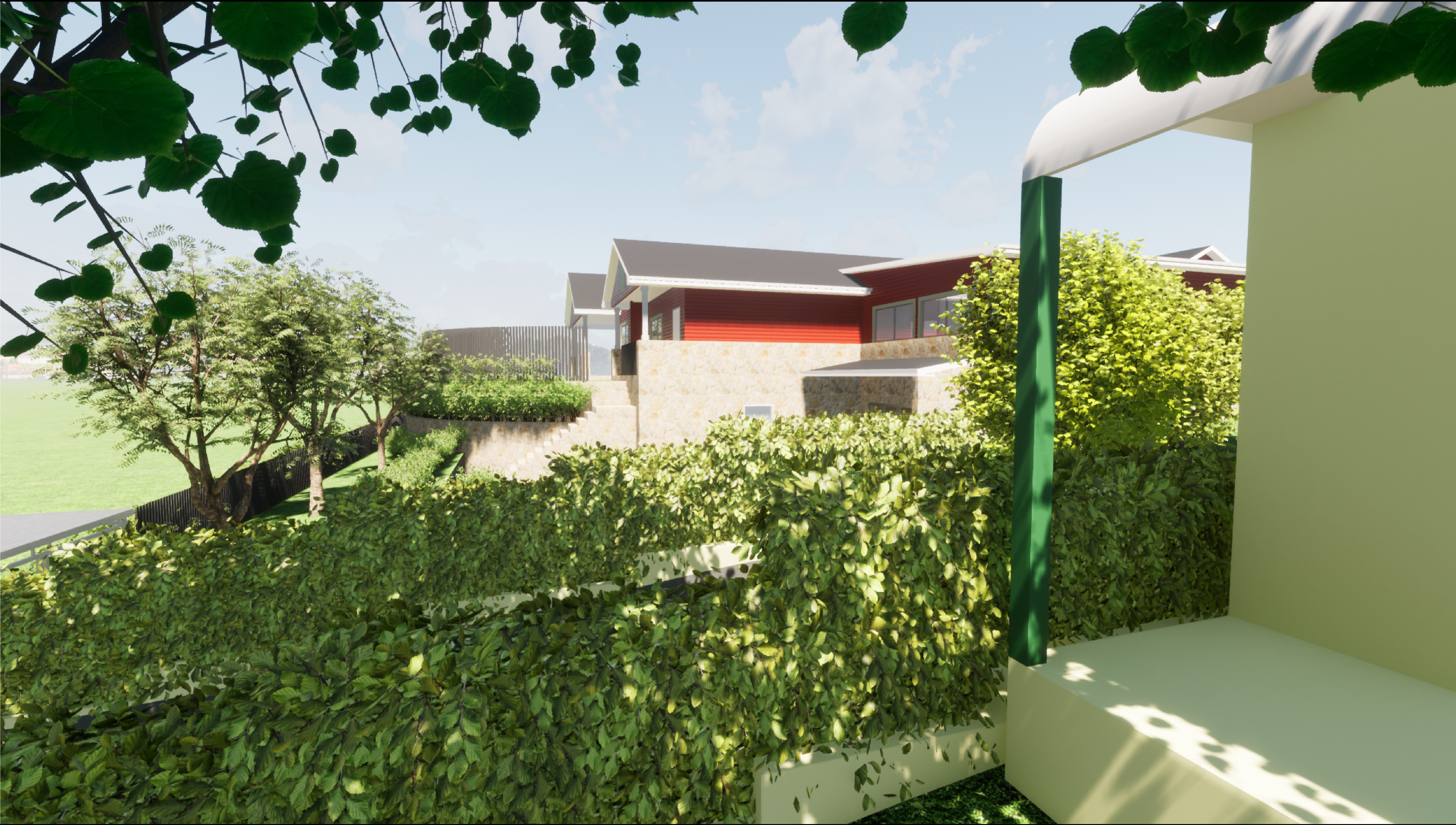

ISSUE: V

DRAWING: 19242-20

SHEET: 4/17

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ISSUE: V

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SHEET: 6/17

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SHEET: 7/17

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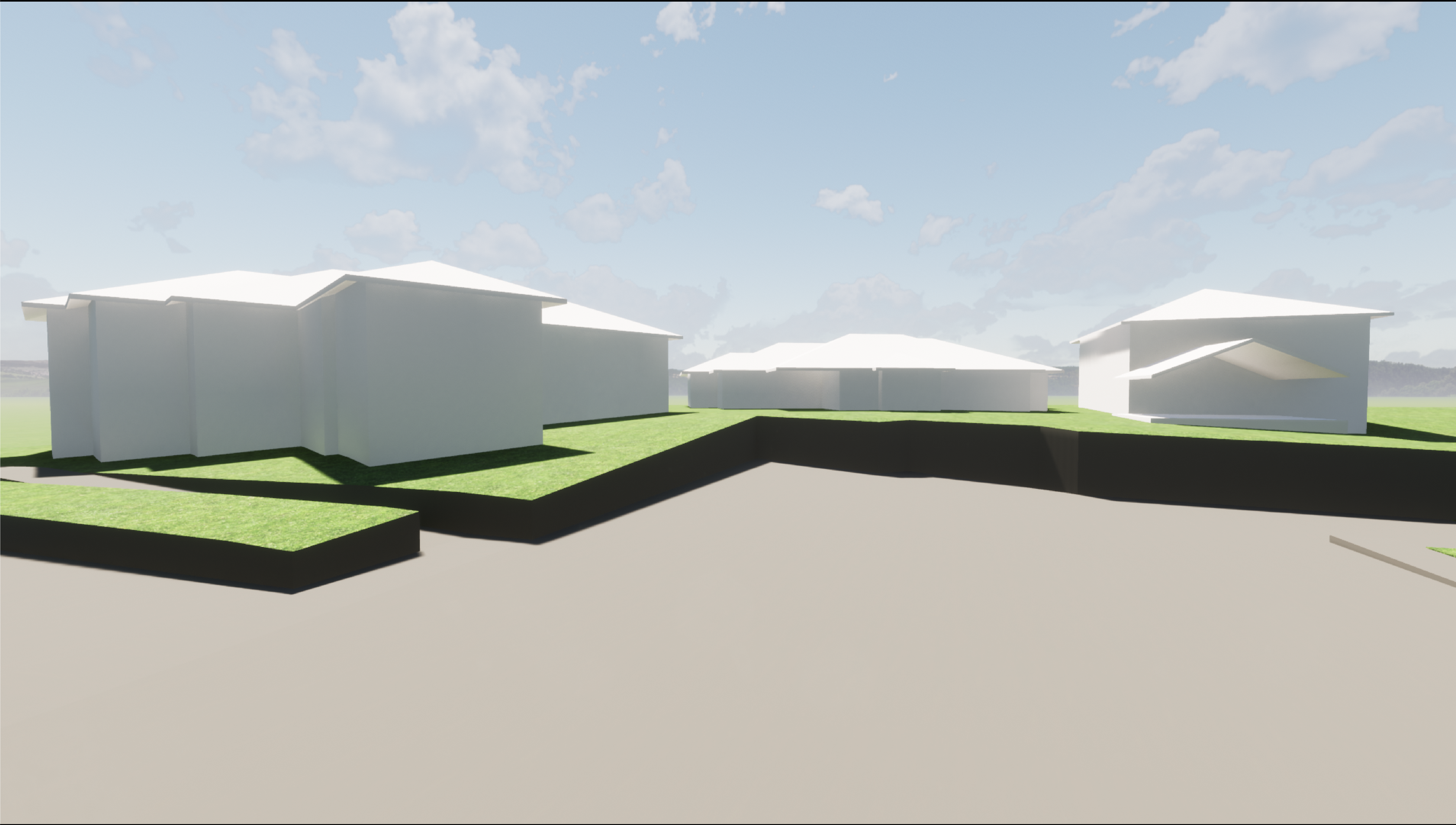

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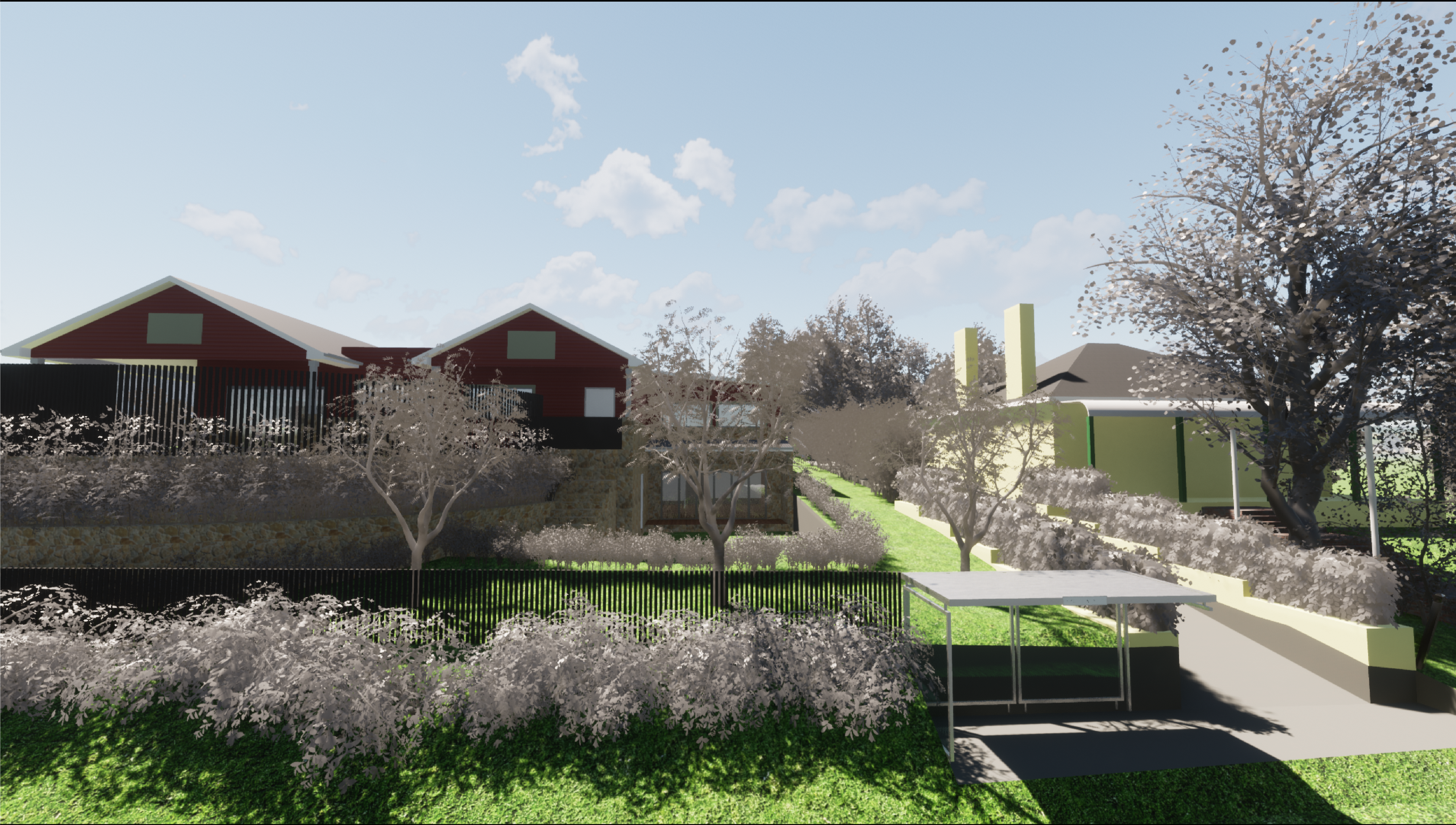

ISSUE: V

DRAWING: 19242-20

SHEET: 9/17

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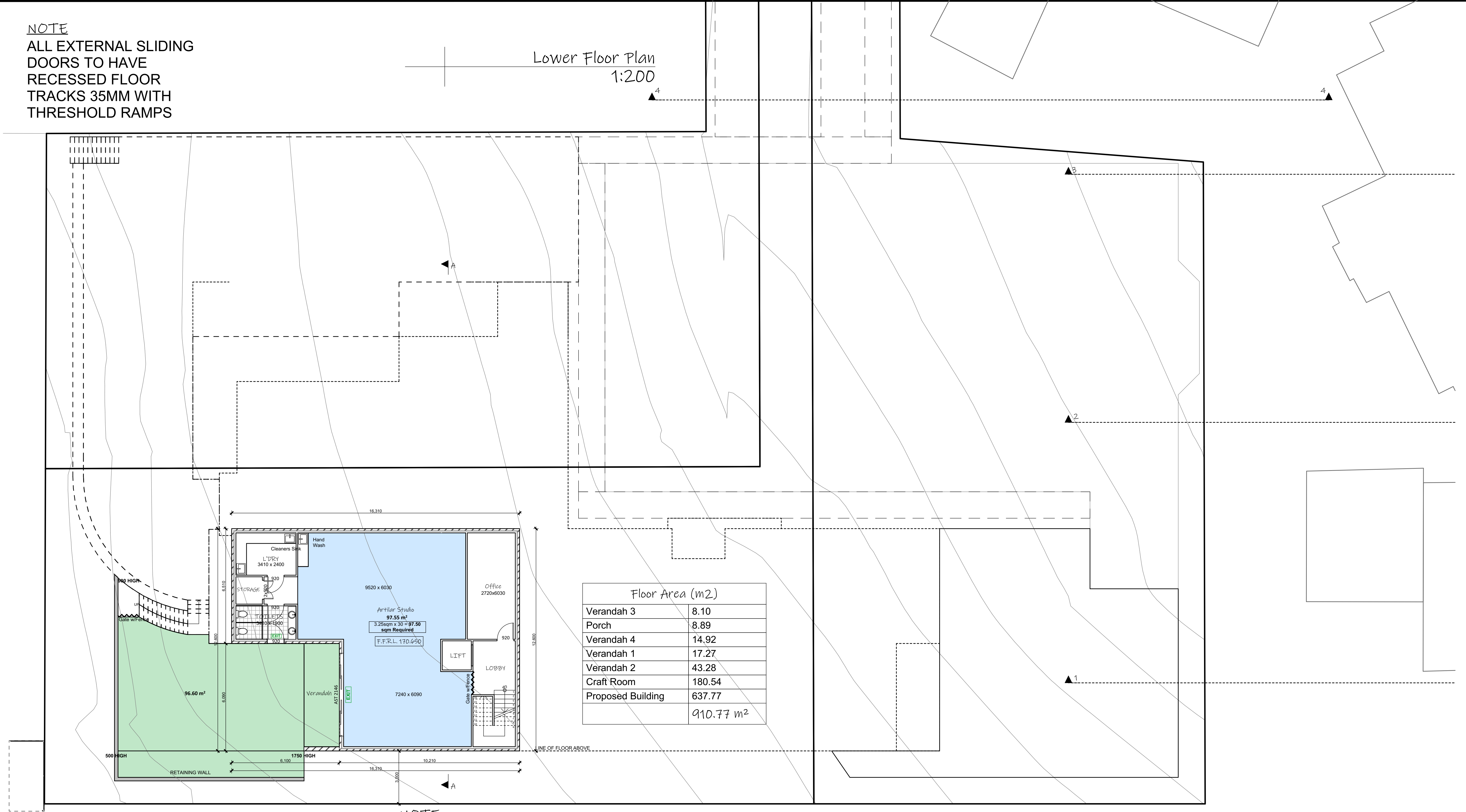
NOTE
ALL EXTERNAL SLIDING DOORS TO HAVE RECESSED FLOOR TRACKS 35MM WITH THRESHOLD RAMPS



Floor Area (m2)	
Verandah 3	8.10
Porch	8.89
Verandah 4	14.92
Verandah 1	17.27
Verandah 2	43.28
Craft Room	180.54
Proposed Building	637.77
	910.77 m²

NOTE
FINAL KITCHEN & PREP DETAILS TO COMPLY WITH AUSTRALIAN STANDARDS 4674 DESIGN, CONSTRUCTION & FIT-OUT OF ROOF PREMISES

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V	19242-20	10-05-22	502, 503, 506
	SHEET:	PAPER:	DP:
	10/17	A3	1201968 & 1201969

note: all works to be carried out in conjunction with the construction notes on sheet 2

Proposed Child Care Centre - Big Red Barn Preschool & Early Learning
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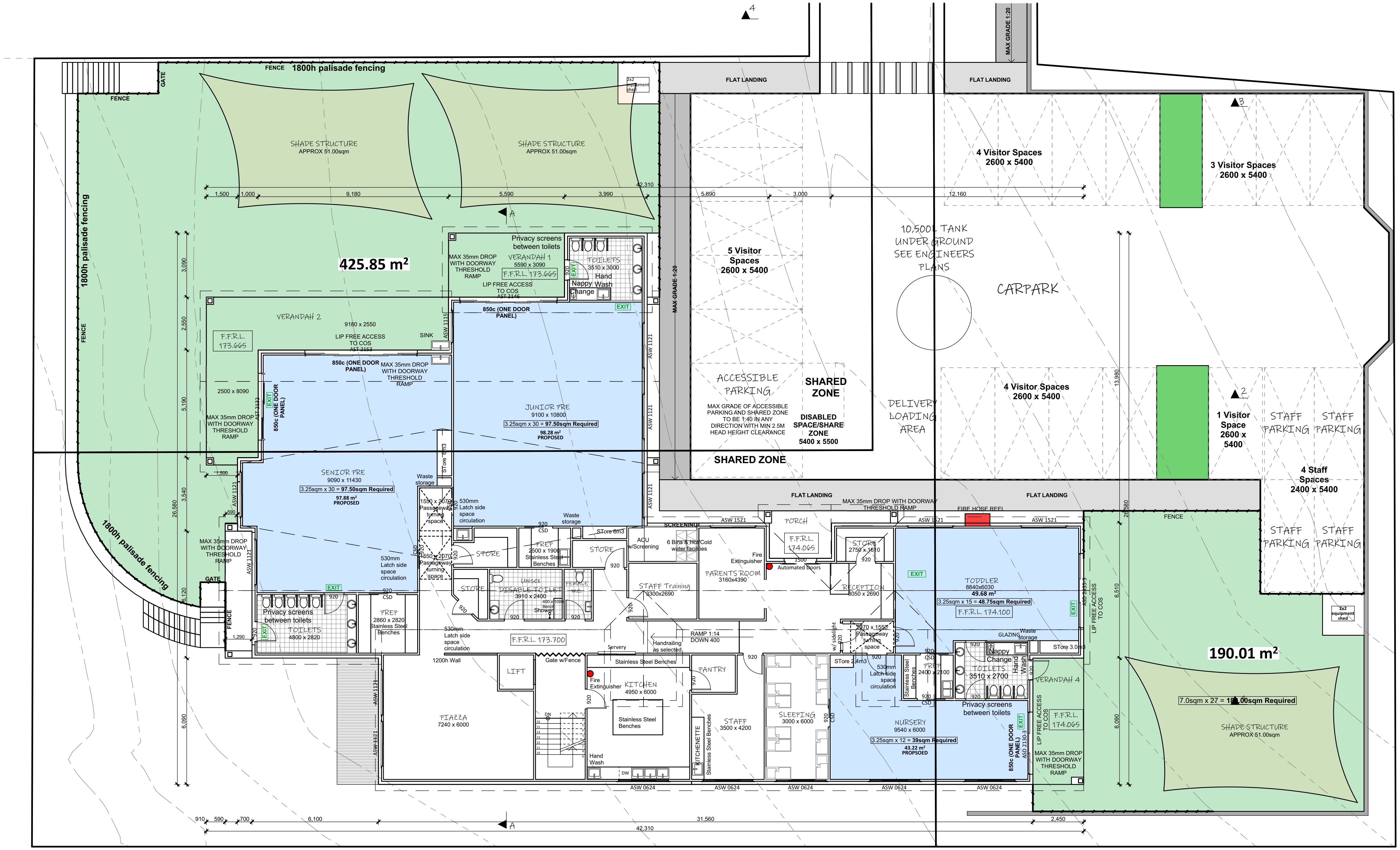
ACCURATE design & drafting

info@accuratedesign.com.au (02) 4647 2552

KYRA SLADE

LOCATION	REQUIRED SPACE	PROPOSED SPACE
NURSERY (12 CHILDREN)	39.00sqm 3.25sqm/Child	43.90sqm 3.25sqm/Child
TODDLER (15 CHILDREN)	48.75sqm 3.25sqm/Child	51.09sqm 3.25sqm/Child
JUNIOR PRE (30 CHILDREN)	97.50sqm 3.25sqm/Child	98.28sqm 3.25sqm/Child
SENIOR PRE (30 CHILDREN)	97.50sqm 3.25sqm/Child	99.76sqm 3.25sqm/Child



Ground Floor Plan
1:200

NOTE
ALL EXTERNAL SLIDING DOORS TO HAVE RECESSED FLOOR TRACKS 35MM WITH THRESHOLD RAMPS

Floor Area (m2)	
Verandah 3	8.10
Porch	8.89
Verandah 4	14.92
Verandah 1	17.27
Verandah 2	43.28
Craft Room	180.54
Proposed Building	637.77
	910.77 m²

NOTE
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LOT: 502, 503, 506
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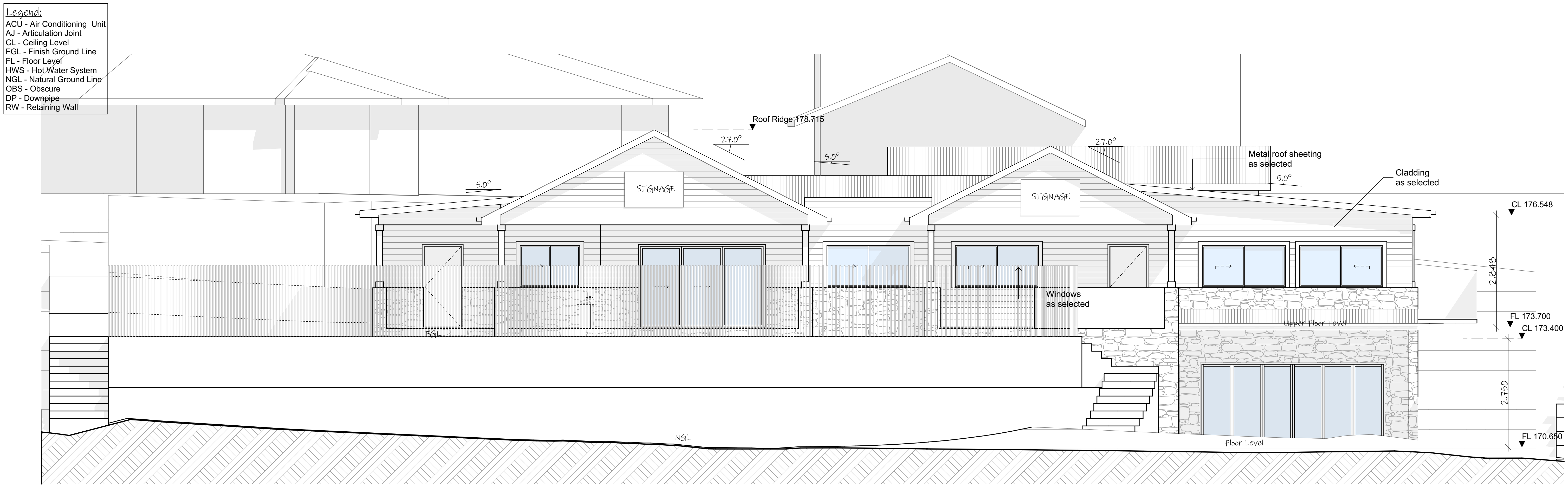
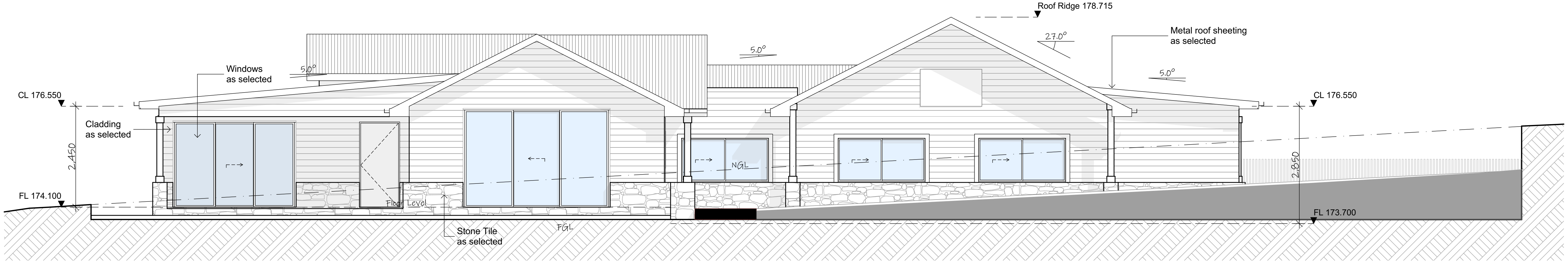


Front West Elevation
1:100



Rear East Elevation
1:100

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SHEET: 12/17
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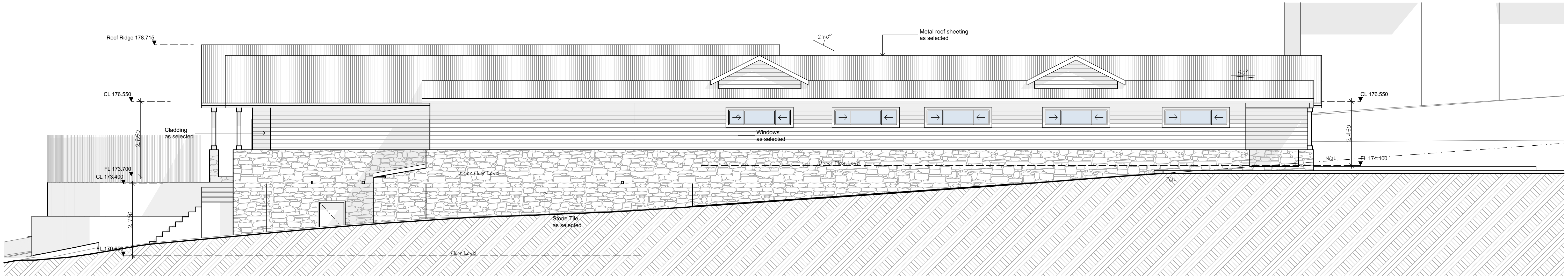
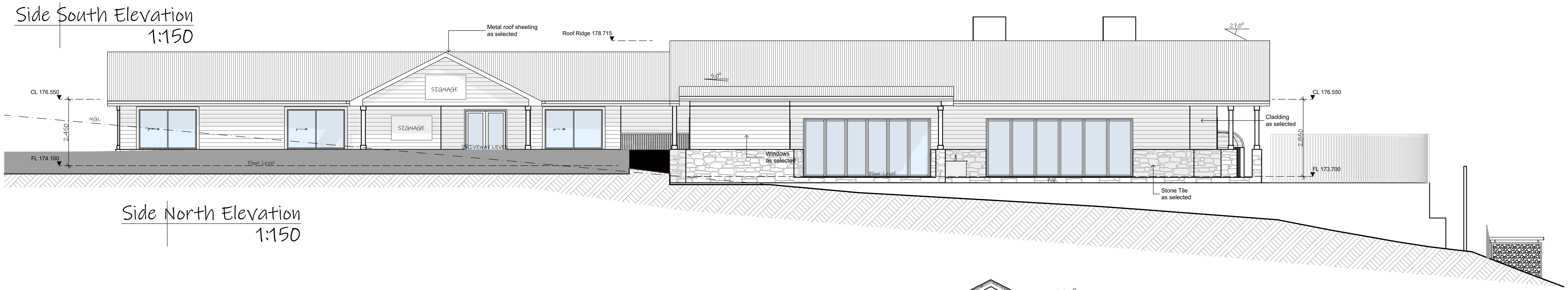
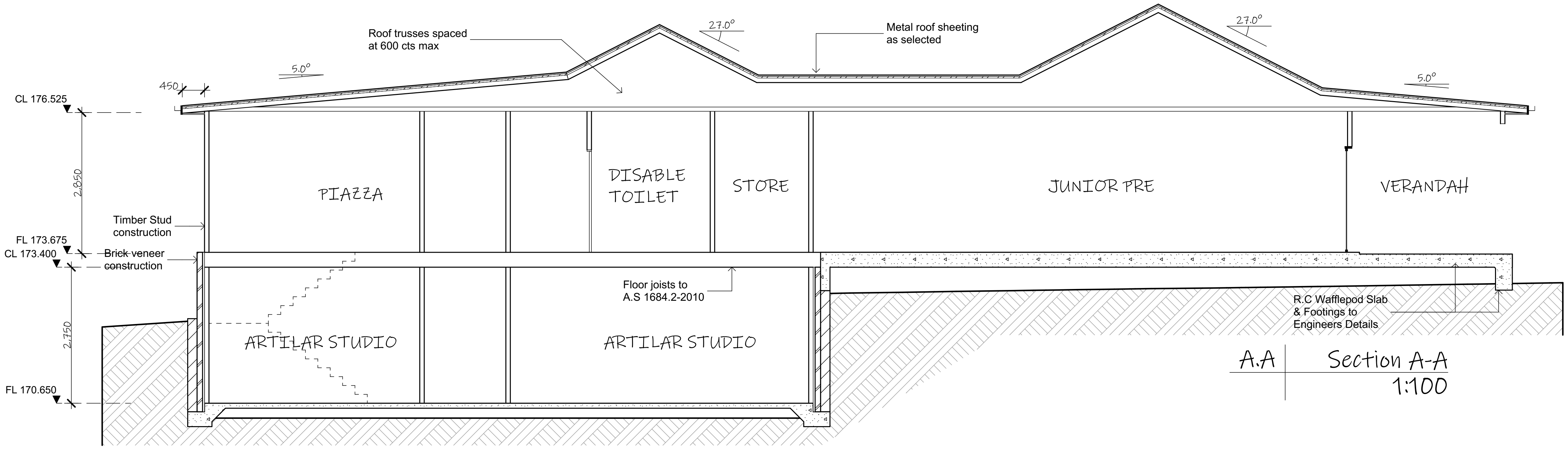


Side South Elevation
1:150



Side North Elevation
1:150



A.A | Section A-A
1:100

Legend:
ACU - Air Conditioning Unit
AJ - Articulation Joint
CL - Ceiling Level
FGL - Finish Ground Line
FL - Floor Level
HWS - Hot Water System
NGL - Natural Ground Line
OBS - Obscure
DP - Downpipe
RW - Retaining Wall

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SHEET: 13/17
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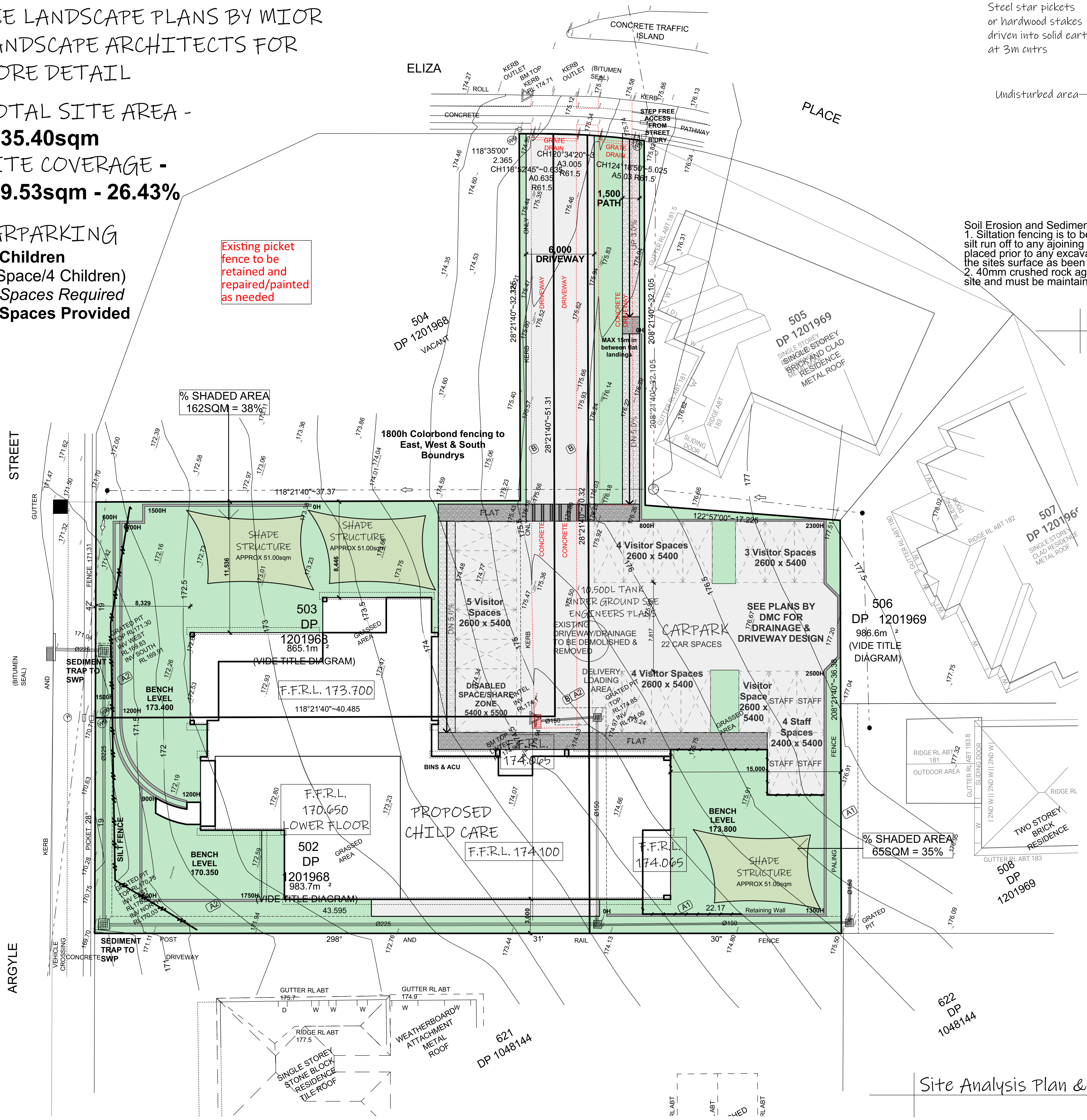
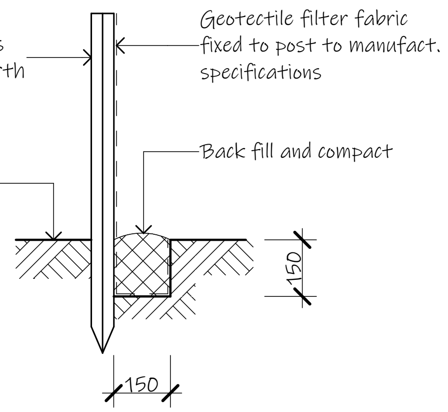
SEE LANDSCAPE PLANS BY MIOR LANDSCAPE ARCHITECTS FOR MORE DETAIL

TOTAL SITE AREA -
2835.40sqm
SITE COVERAGE -
749.53sqm - 26.43%

CARPARKING
87 Children
(1 Space/4 Children)
22 Spaces Required
25 Spaces Provided





Soil Erosion and Sediment Control Fence
1. Siltation fencing is to be placed as shown on the site plan as so to prevent silt run off to any ajoining property or to the street. This measure is to be placed prior to any excavation work beggining and is to be removed only when the sites surface as been stabalized, i.e. paved, landscaped or turfed
2. 40mm crushed rock aggregate is to be placed as an access driveway to the site and must be maintained throughout the course of construction.

Typical Silt Fence
1:20

FSR PROPOSED
753.58/2835.40
= 26.5% FSR

Lot 502, 503, 506
983.70, 865.10, 986.60m²
DP: 1201968 & 1201969

Site Analysis Plan & Sediment/Erosion Control Plan
1:350

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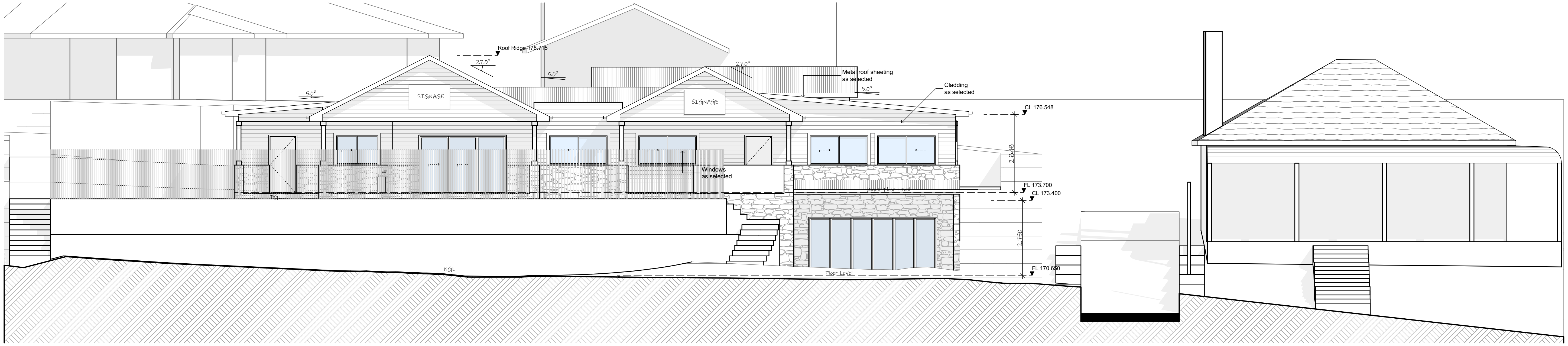

Streetscape
1:150

VENETIAN RED

Colorbond Metal Cladding
Downpipes

FRENCH GREY

Timber posts/trims

BASALT

Colorbond Metal Roof
Gutter
Fascia
Windows

NATURAL STONE

Stone Tile/Feature

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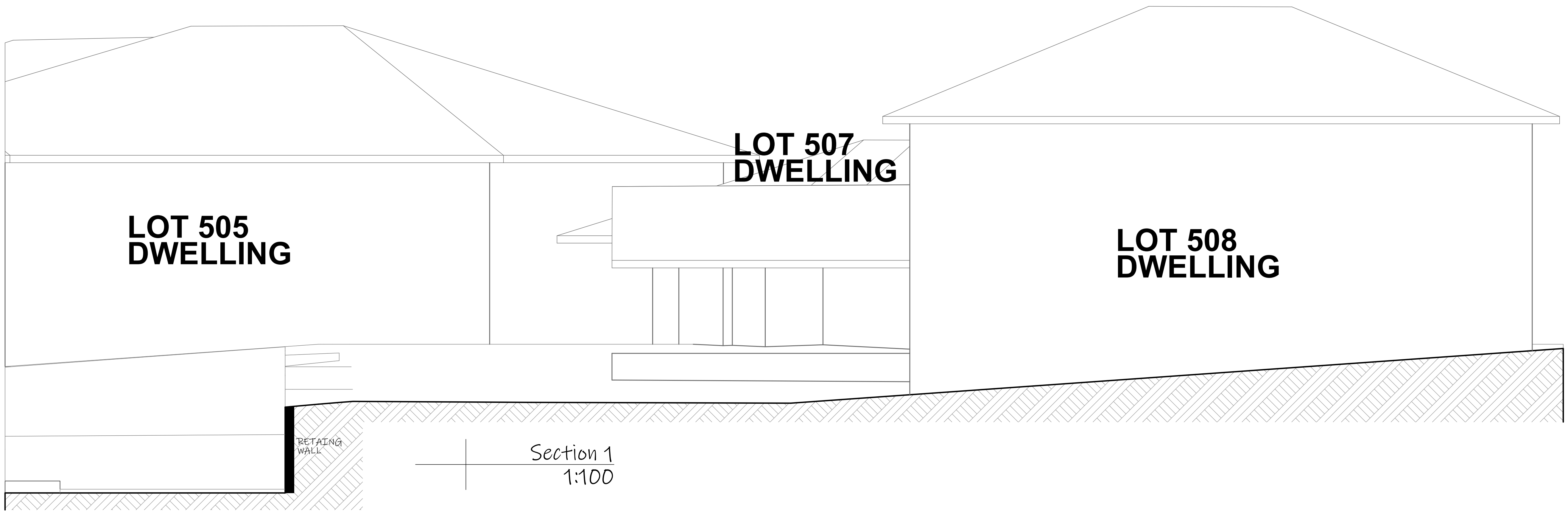
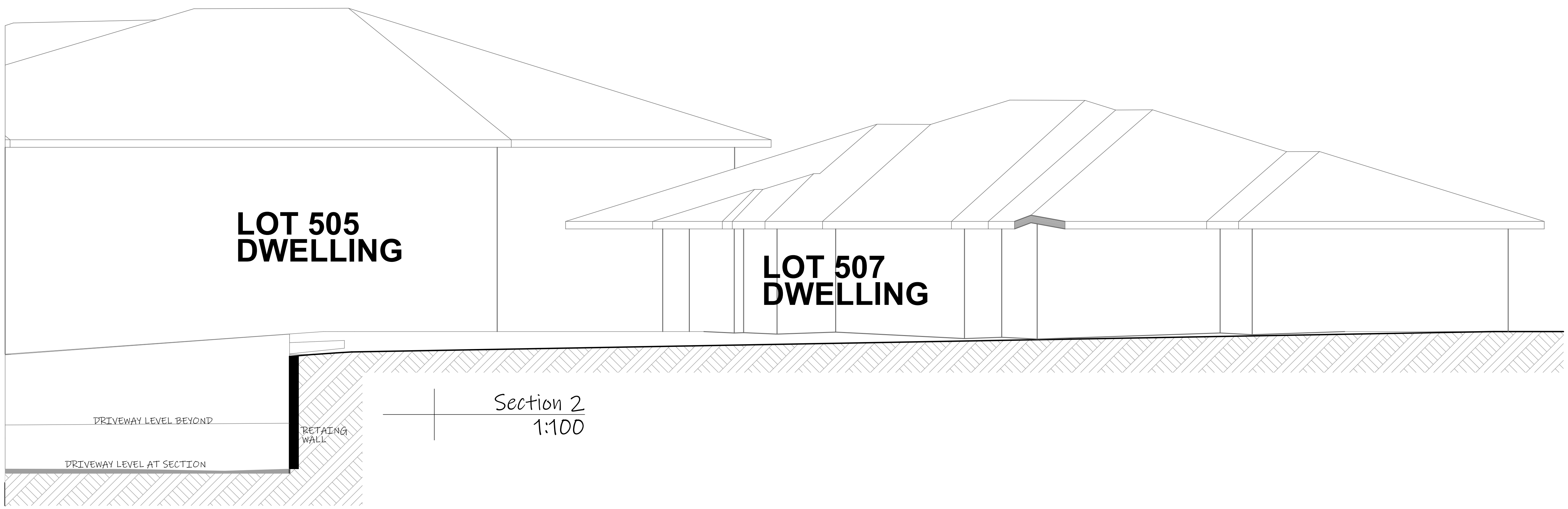


Section 1
1:100



Section 2
1:100

ISSUE:	DRAWING:	DATE:	LOT:
V	19242-20	10-05-22	502, 503, 506
	SHEET:	PAPER:	DP:
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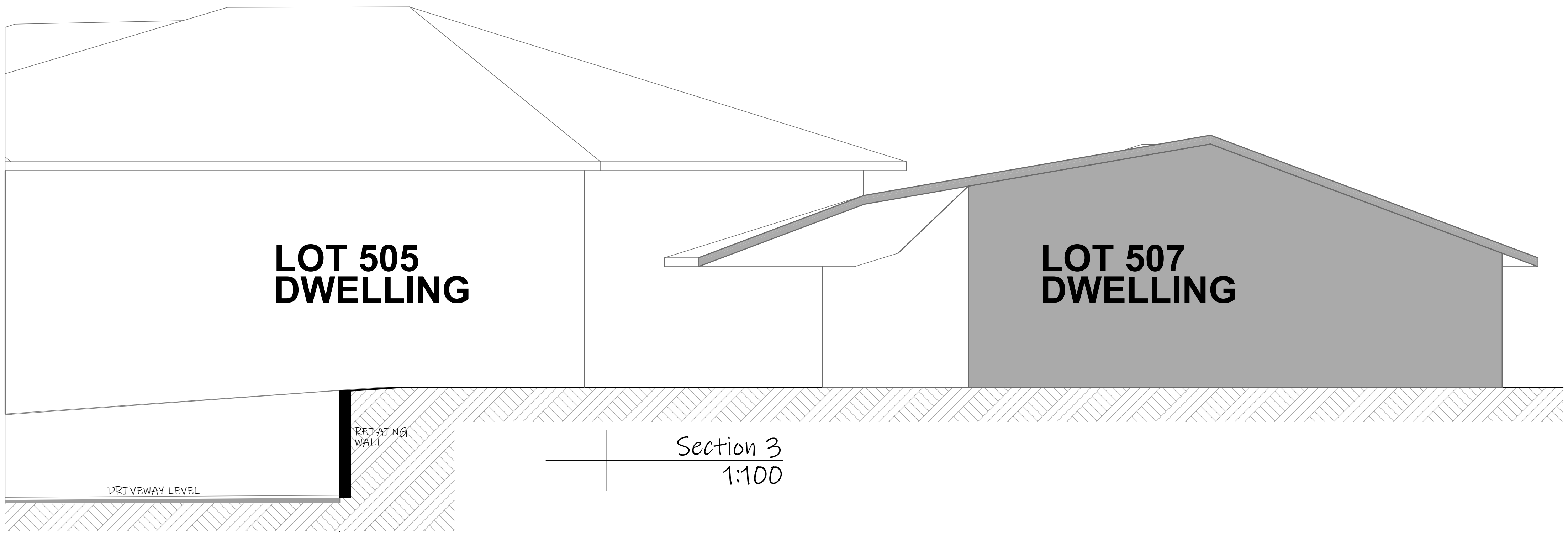
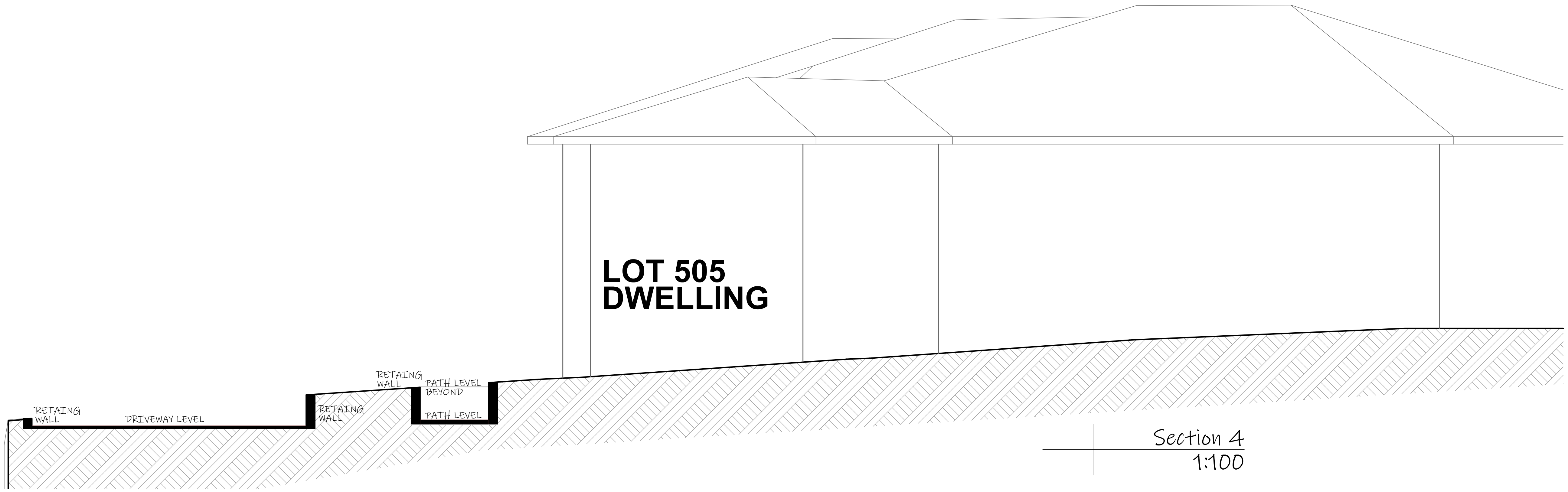


Section 3
1:100



Section 4
1:100

ISSUE:	DRAWING:	DATE:	LOT:
V	19242-20	10-05-22	502, 503, 506
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Proposed Child Care Centre - Big Red Barn Preschool & Early Learning
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Appendix B Civil Concept Plans

CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE
4, 6 & 8 ELIZA PLACE, PICTON NSW 2571
(LOTS 502 & 503 DP 1121442 LOT 506 1201969)

NOTE:
IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES PRIOR TO COMMENCEMENT OF WORKS

DIAL BEFORE YOU DIG
www.1100.com.au

NOTES

PRIOR TO COMMENCEMENT OF WORKS THE CONTRACTOR SHALL:

1. PRODUCE REGISTRATION/ PERMITS FOR ALL PLANT TO BE USED ON THE ROAD RESERVE INC FOOTPATH.
2. PRODUCE INSURANCES REQUIRED AS DEVELOPMENT CONSENT CONDITIONS.
3. HAVE SITE MEETING WITH COUNCILS DEVELOPMENT SECTION.
4. INSTALL SEDIMENT AND EROSION CONTROL DEVICES, AND OBTAIN A COPY OF "URBAN EROSION AND SEDIMENT CONTROL – FIELD GUIDE" AS PUBLISHED BY CALM.
5. BE AWARE OF THE FOLLOWING:
   - THESE NOTES DO NOT REPLACE THE NEED TO READ COUNCILS CONSTRUCTION SPECIFICATION.
   - THE NEED FOR THE PROVISION OF A WORK–AS–EXECUTED PLAN AND SUPERVISION BY THE THE PERSON DOING THE WORK–AS–EXECUTED PLAN.
   - TAKE SPECIAL NOTE OF THE ROLL KERB AND GUTTER PROFILE AND THE SPECIAL ROOF WATER OUTLET.
   - ONLY PLASTIC GUIDEPOSTS ARE TO BE USED, OF A TYPE APPROVED BY THE ENGINEER.
   - ERRORS AND OVERSIGHTS ON PLANS ARE TO BE RECTIFIED AT THE ENGINEERS DISCRETION.
   - TEST RESULTS ARE TO BE SENT TO COUNCIL'S SUPERVISING ENGINEER IMMEDIATELY.
   - PROPOSED VARIATIONS TO THE PLANS ARE TO BE REFERRED BACK TO COUNCIL FOR APPROVAL.
   - THE CONTRACTOR SHOULD BE AWARE THAT IF HE PROVIDES THE MAINTENANCE BOND ON BEHALF OF THE DEVELOPER, THEN IF THIS IS THE ONLY BOND HELD, IT WILL BE USED TO GUARANTEE PERFORMANCE OF ALL WORK REQUIRED FOR THE DEVELOPMENT, REGARDLESS OF WHO WAS RESPONSIBLE FOR CARRYING OUT THE WORK.

PAVEMENT TESTING NOTES

1. THE ROLLER TEST WILL BE CARRIED OUT BY COUNCILS SUPERVISING ENGINEER, USING A THREE POINT ROLLER (ALSO DESCRIBED AS A STEAM–ROLLER)
2. DENSITY TEST, BEAM TESTS AND CBR TESTS ARE TO BE CARRIED OUT BY A COUNCIL APPROVED NATA REGISTERED LABORATORY (BEAM TESTS ARE ABLE TO BE CARRIED OUT BY COUNCIL – CONTACT MAY BE MADE WITH COUNCILS PAVEMENTS ENGINEER FOR A QUOTE).
3. TEST RESULTS ARE TO BE SENT IMMEDIATELY TO THE COUNCILS SUPERVISING ENGINEER.
4. "STANDARD" COMPACTION TESTING TO BE USED.
5. A THREE POINT ROLLER (ALSO DESCRIBED AS A STEAM–ROLLER), IN ACCORDANCE WITH COUNCILS CONSTRUCTION SPECIFICATION , IS TO BE USED ON ALL BUT THE NARROWEST SHOULDERS, FOR ROLLER TESTING.

STORMWATER DRAINAGE NOTES

1. ALL STORMWATER PIPES 375MM DIA AND GREATER TO BE RUBBER RING JOINTED CLASS "2" OR HIGHER CLASS AS NOTED. FOR SMALLER PIPES, UPVC (SOLVENT WELD – WITH SOME RESTRICTIONS) OR VCP (RRJ) MAY BE USED.
2. TRENCH WIDTH MIN = OUTSIDE DIA OF COLLAR + 200MM.
3. PIPES IN FILL GROUND ARE TO BE PLACED AFTER COMPLETION AND APPROVAL OF FILLING.

EROSION CONTROL DEVICES

1. PROVIDE KERB INLET SEDIMENT TRAPS AT ALL RM10 TYPE PITS. TO RM 23 OF COUNCIL SPEC.

GENERAL NOTES

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL SPEC AND TO THE SATISFACTION OF THE ENGINEER.
2. ATTENTION IS DRAWN TO COUNCIL "TREE PRESERVATION ORDER" UNDER WHICH NO TREES ARE TO BE REMOVED OTHER THAN THOSE AFFECTED BY ROAD, LANDFILL (OR CUT) OR DRAINAGE WORKS. COUNCILS SUPERVISING ENGINEER WILL DETERMINE WHETHER TREES ARE DEEMED TO BE AFFECTED BY THIS CLAUSE.
3. INSPECTION AND APPROVAL OF THE WORKS IS REQUIRED BY THE ENGINEER AT THE FOLLOWING STAGES:
   - WHEN DRAINAGE LINES HAVE BEEN LAID, JOINTED AND BEDDED PRIOR TO BACKFILLING.
   - WHEN ROADWORKS HAVE BEEN EXCAVATED TO SUBGRADE LEVEL PRIOR TO PLACEMENT OF PAVEMENT MATERIAL. (SEE TESTING)
   - WHEN PART (AS SPECIFIED BY COUNCILS SUPERVISING ENGINEER) OF THE PAVEMENT DEPTH HAS BEEN INSTALLED. (SEE TESTING)
   - AT COMPLETION OF KERB AND GUTTER SUBGRADE. (SEE TESTING)
   - AT COMPLETION OF PAVEMENT SHAPING AND CONSOLIDATION PRIOR TO PRIMING. (SEE TESTING)
   - AT SEALING (NOTE 24 HOURS REQUIRED BETWEEN PRIMING AND SEALING.
   - AT COMPLETION OF ALL WORK.

NOTE: A MIN 24 HOURS NOTICE IS REQUIRED FOR ALL INSPECTIONS.

4. PAVEMENT TESTING TO BE CARRIED OUT AT THE FOLLOWING STAGES:
   - SUBGRADE – DENSITY AND ROLLER TESTS.
   - AT INTERMEDIATE LEVELS(IF REQUIRED BY COUNCILS SUPERVISING ENGINEER) – DENSITY AND ROLLER TEST.
   - AT KERB AND GUTTER SUBGRADE – ROLLER TEST.
   - AT FINISHED PAVEMENT LEVEL : DENSITY , ROLLER AND BENKLEMAN BEAM TESTS.
5. SERVICES SHOWN ON THE PLAN ARE APPROX ONLY AND HAVE BEEN LOCATED FROM SITE INVESTIGATION AND THE RELEVANT AUTHORITY. ALL SERVICES ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
6. ANY ADJUSTMENT TO PUBLIC UTILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR/DEVELOPER.
7. PUBLIC UTILITY SERVICES (WATER, GAS, ELECTRICITY, TELEPHONE, ETC.) REQUIRE TO BE INSTALLEDIN CONJUNCTION WITH THE WORK , ARE TO BE INSTALLED PRIOR TO THE LAYING OF ANY ROAD PAVEMENT MATERIAL, AS ARE CONDUITS FOR BOTH PUBLIC UTILITIES AND INDIVIDUAL ALLOTMENT SERVICES.
8. SUBSOIL DRAINS ARE TO BE CONSTRUCTED TO THE SATISFACTION OF THE SHIRE ENGINEER AND WHERE DIRECTED BY THE SHIRE ENGINEER.
9. A SMOOTH JUNCTION IS TO BE PROVIDED WITH EXISTING WORK.
10. UNSUITABLE MATERIAL IS TO BE REMOVED FROM ROADS AND LOTS PRIOR TO FILLING.
11. STRIP AND STOCKPILE TOPSOIL FROM ROADWAYS AND SITE REGRADING AREAS AND RE–SPREAD ON FOOTPATHS, BATTERS AND FILL AREAS TO A MAXIMUM DEPTH OF 300MM WITH A MINIMUM DEPTH OF 100MM.
12. DURING CONSTRUCTION NOTIFY THIS OFFICE IF ANY QUERIES ARISE – NEVER ASSUME.
13. LIMIT OF CONSTRUCTION AS SHOWN ON PLANS.
14. ALL PAVEMENTS TO BE CONSTRUCTED IN ACCORDANCE WITH COUNCIL CONSTRUCTION SPECIFICATION.
15. DISTURBED AREAS TO BE BITUMEN STRAW MULCH THEN SPRAY GRASS.
16. PROVIDE A 1M WIDE TURF STRIP BEHIND THE PROPOSED KERB.

LOCALITY PLAN (NTS)

N

SHEET NO.	DRAWING TITLE
1	NOTE SHEET
2	SITE PLAN
3	DRIVEWAY PLAN
4	DRIVEWAY LAYOUT
5	PAVEMENT DETAILS
6	DRAINAGE PLANS
7	DRAINAGE SCHEDULES
8	OSD TANK DETAILS
9	WATER QUALITY
10	MINOR CALCULATIONS
11	MAJOR CALCULATIONS
12	RETAINING WALL PLAN
13	SEWER PLAN
14	SEWER SECTIONS 1
15	SEWER SECTIONS 2
16	CUT & FILL PLAN
17	TRAFFIC ISLAND MODIFICATION PLAN

NOTE:
ALL BOUNDARIES SHOWN ARE APPROXIMATE ONLY AND ARE SUBJECT TO FINAL SURVEY BY A REGISTERED SURVEYOR AND THE POSITION SHOWN ON THESE PLANS AND SPATIALLY IN ANY DATA ISSUED HAS BEEN SUPPLIED TO D&M CONSULTING BY 3RD PARTIES. AS SUCH D&M CONSULTING HAVE NO CONTROL OVER THE ACCURACY OF SUCH DATA OR IT'S FITNESS FOR PURPOSE.

CIVIL SETOUT OF WORKS INCLUDING DRAINAGE AND RETAINING WALL POSITIONS IS NOT RELATED SPACIALLY TO THE FINAL SURVEYED BOUNDARIES AND MUST BE ADJUSTED ACCORDINGLY SUCH THAT THE ENTIRE WALL, TOE AND FOOTINGS ARE ENTIRELY CONTAINED WITHIN THE BOUNDARIES OF THE LOT WHICH THE WALL IS RETAINING IN FAVOR OF.

THE CONTRACTOR SHALL CONTACT THE COUNCIL'S INFRASTRUCTURE PLANNING DEPARTMENT IN WRITING A MINIMUM OF 7 DAYS PRIOR TO COMMENCING WORK AND APPLY FOR A 138 CONSENT (SECTION 138 OF THE ROADS ACT FOR APPROVAL TO WORK ON A PUBLIC ROAD) AND INCLUDE COPIES OF CURRENT PUBLIC LIABILITY INSURANCE FOR A VALUE OF $20,000,000 AND PAYMENT OF THE CURRENT FEE. REFERENCES FOR PREVIOUS WORK EXPERIENCE MAY BE REQUESTED BY COUNCIL

REV	AMENDMENTS	REV DATE	INITIALS
–	–	–	–
–	–	–	–
B	DRIVEWAY LAYOUT AMENDED	25/05/22	SDL
A	CIVIL PLANS REVISED TO SUIT NEW ARCH PLANS	13/05/22	SDL
A1	SCALE: AS SHOWN ON SHEET	DATE: 28/09/2020	

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SHOP 1 & 2,
16 MITCHELL STREET, CAMDEN
PH (02) 4647 4014
EMAIL: engineer@dmceng.com.au

PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 1/17

DWG NO: 200774

DESIGNED: BW
DRAWN: BW
CHECKED: AJB

ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969)
4–8 ELIZA PLACE
PICTON NSW 2571

CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.

SIGNED & APPROVED: D.TURNER
B.E.(MIEAust) CPEng

CLIENT: ENVIRONMENTAL PROPERTY SERVICES

KEY:

- CL = CONCRETE LEVEL
- PL = PAVEMENT LEVEL
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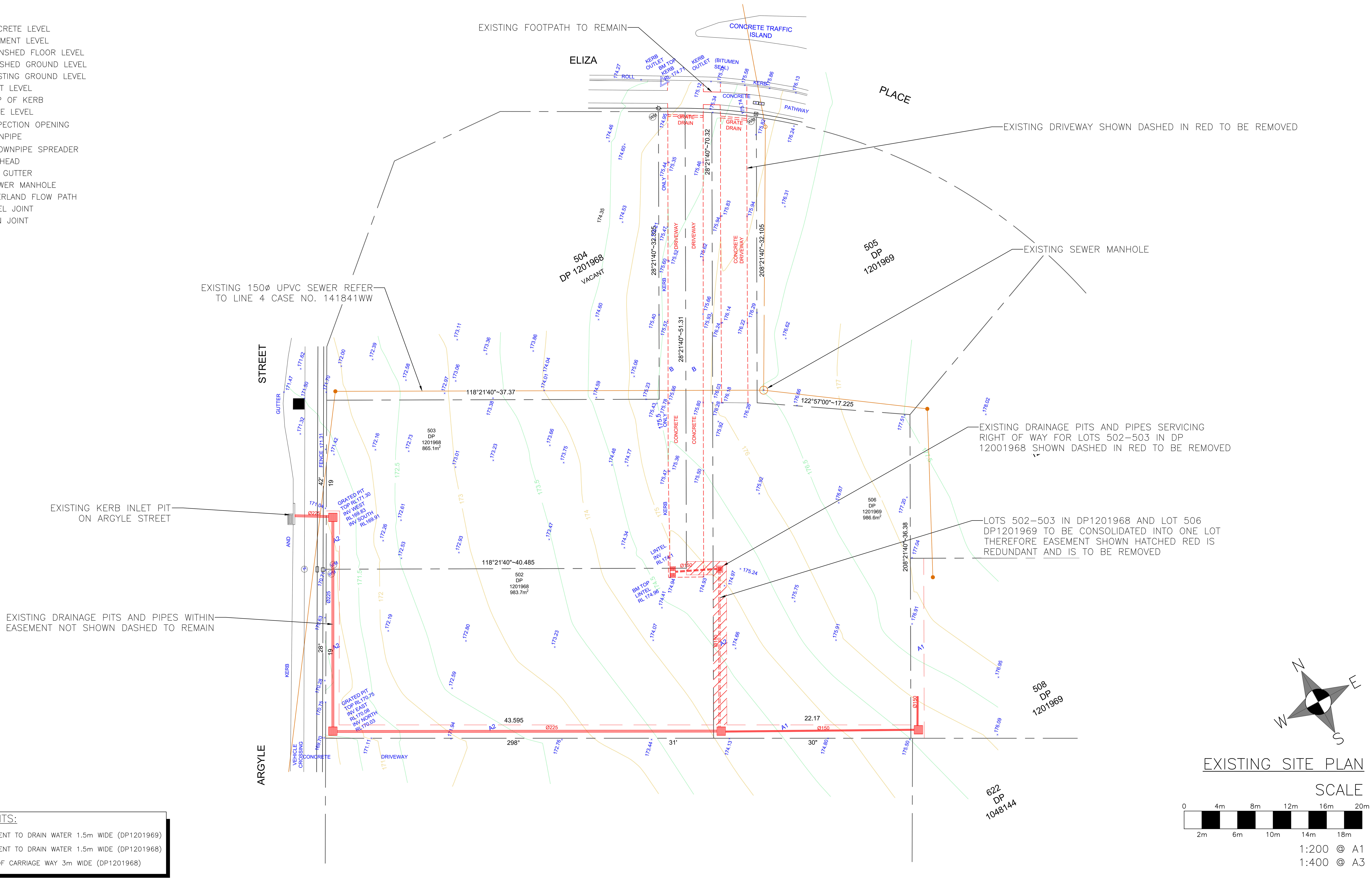

EXISTING SITE PLAN

SCALE

0 4m 8m 12m 16m 20m
2m 6m 10m 14m 18m

1:200 @ A1
1:400 @ A3

EASEMENTS:

- A1 – EASEMENT TO DRAIN WATER 1.5m WIDE (DP1201969)
- A2 – EASEMENT TO DRAIN WATER 1.5m WIDE (DP1201968)
- B – RIGHT OF CARRIAGE WAY 3m WIDE (DP1201968)

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PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 2/17

DWG NO: 200774

DESIGNED: BW
DRAWN: BW
CHECKED: AJB

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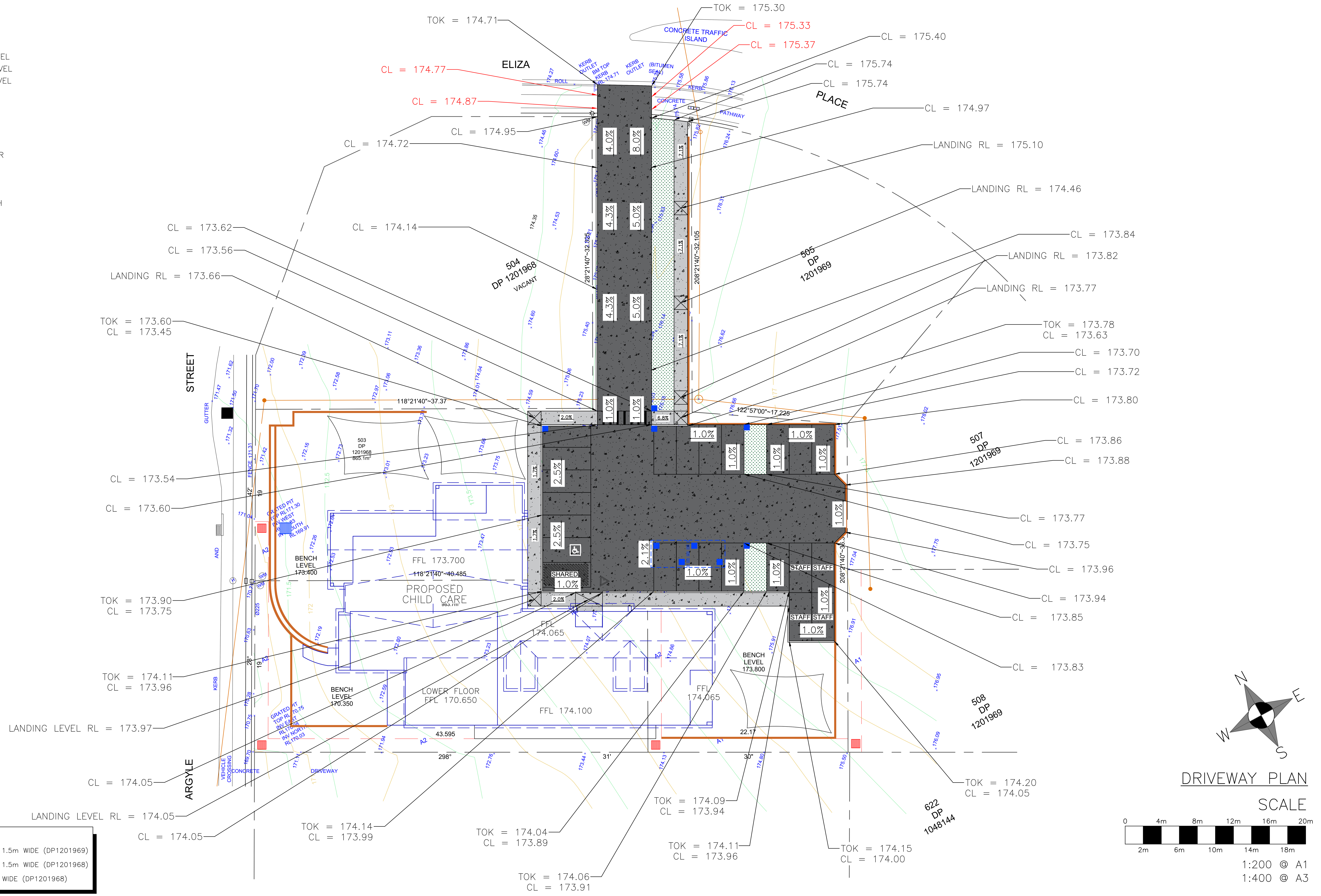

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LEGEND

DRIVEWAY/CARPARK PAVEMENT

FOOTPATH PAVEMENT

NOTE:

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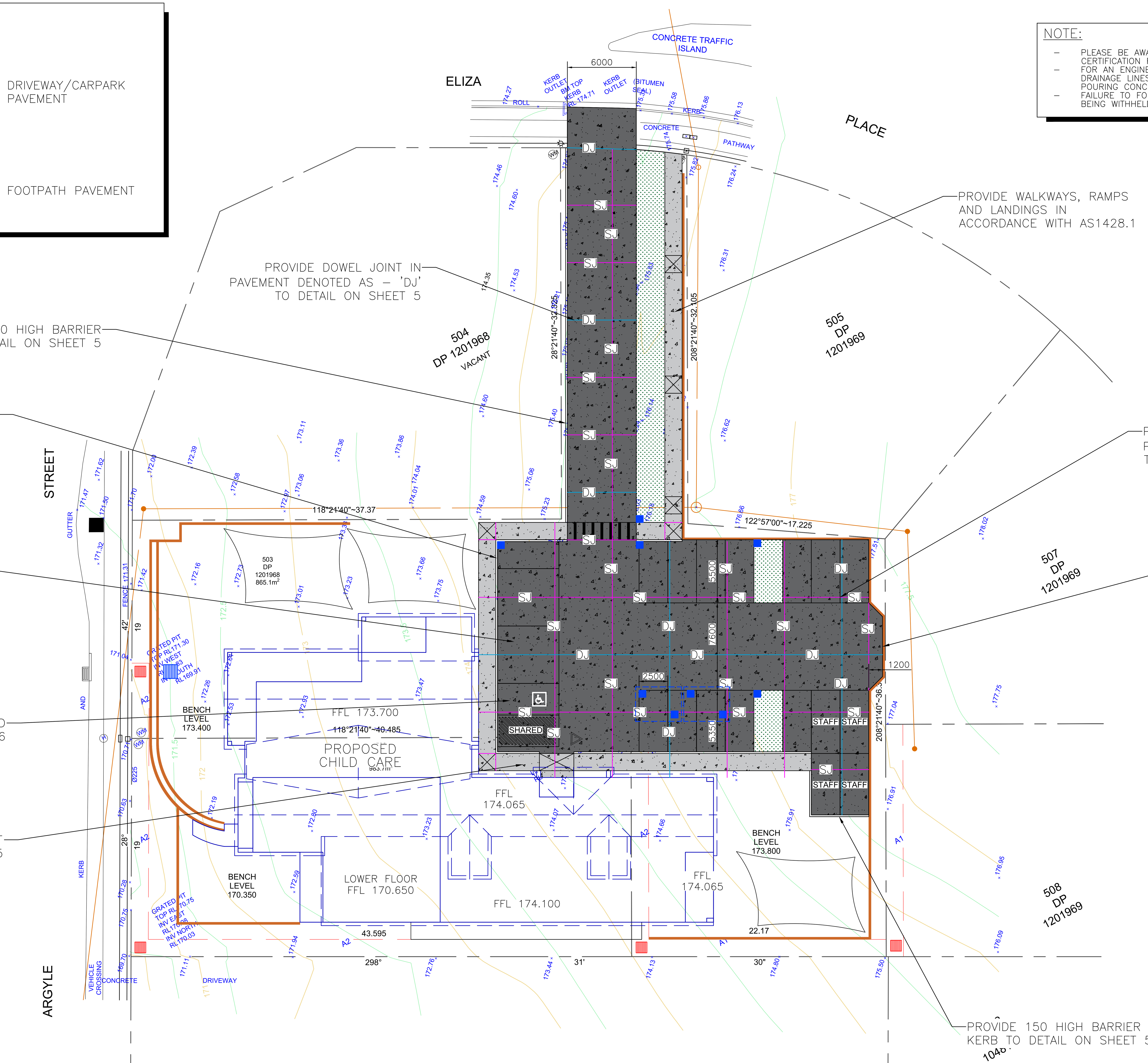

DRIVEWAY LAYOUT

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2m 6m 10m 14m 18m

1:200 @ A1
1:400 @ A3

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PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 4/17

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CHECKED: AJB

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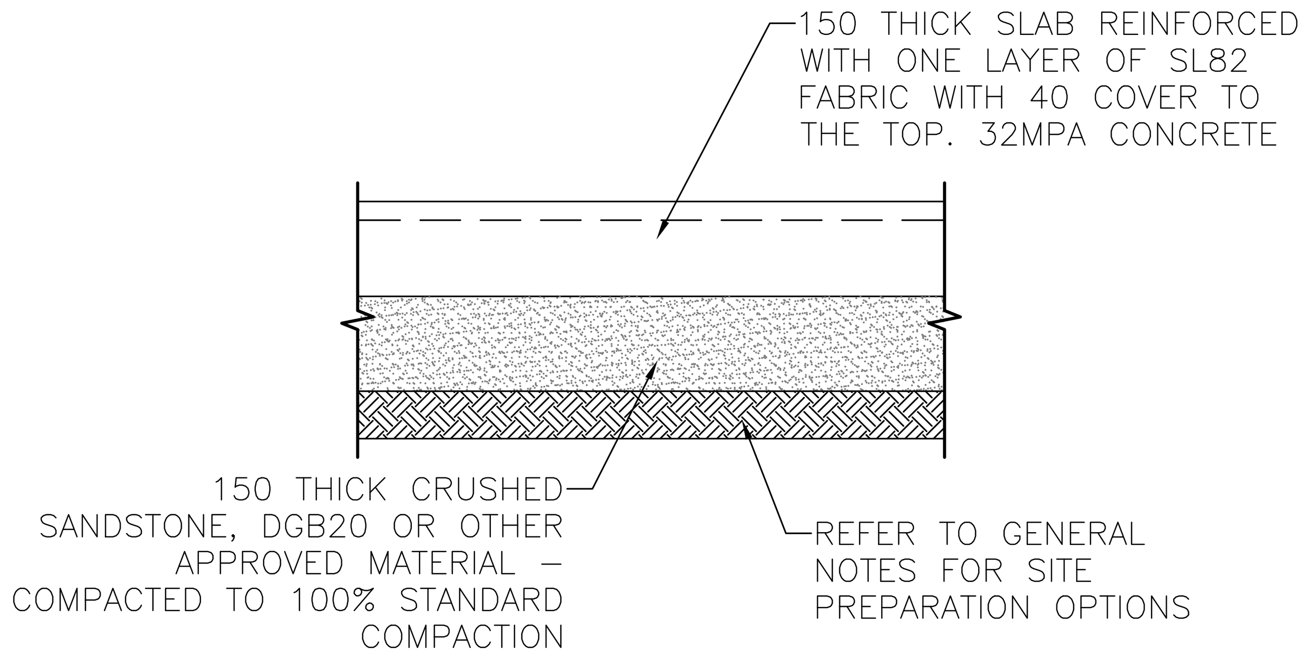
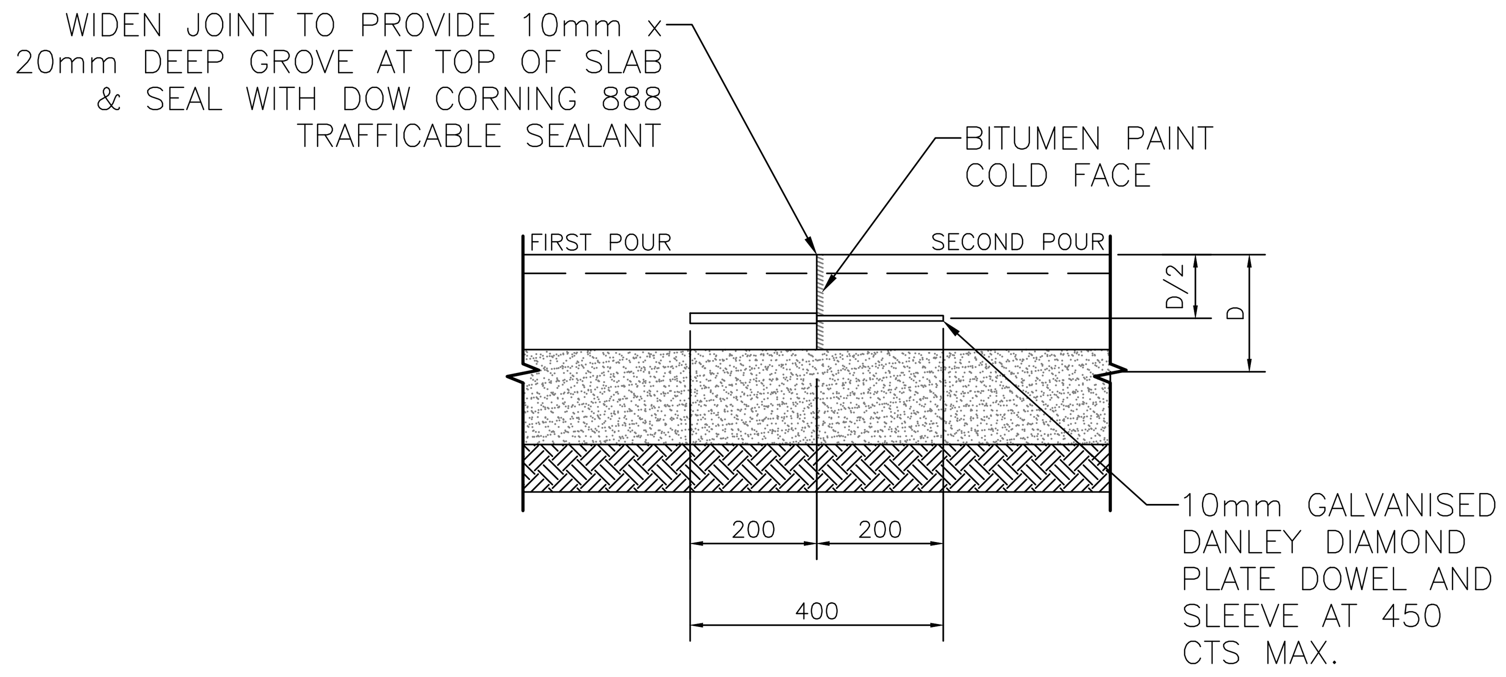


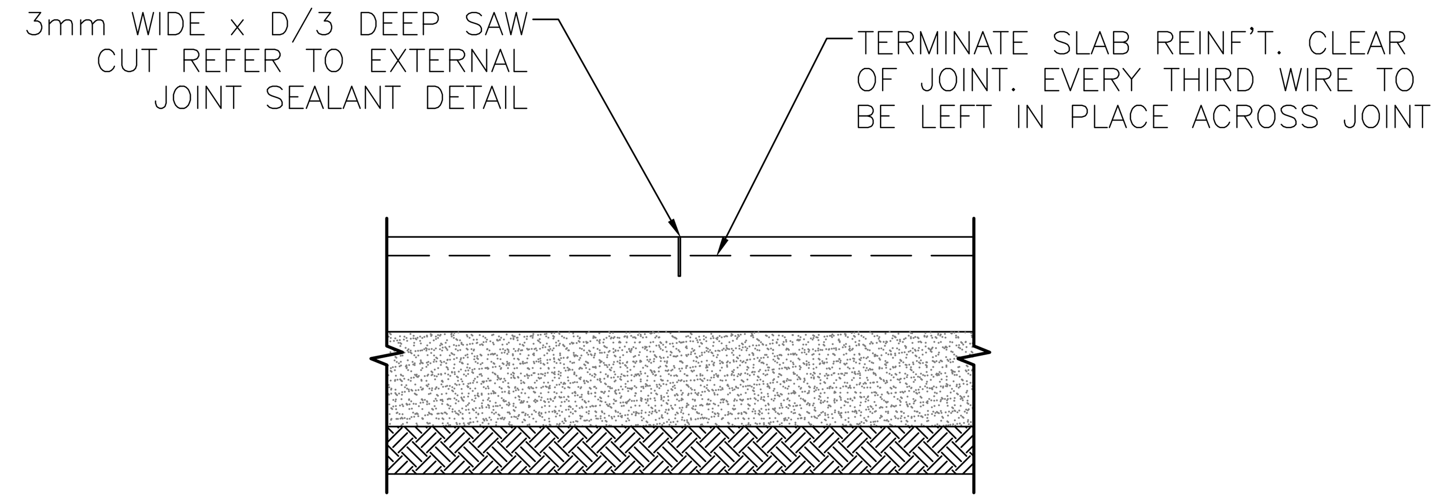
CARPARK SLAB PROFILE – TYPICAL DETAIL

SCALE 1:10



SLAB DOWELED JOINT – DJ

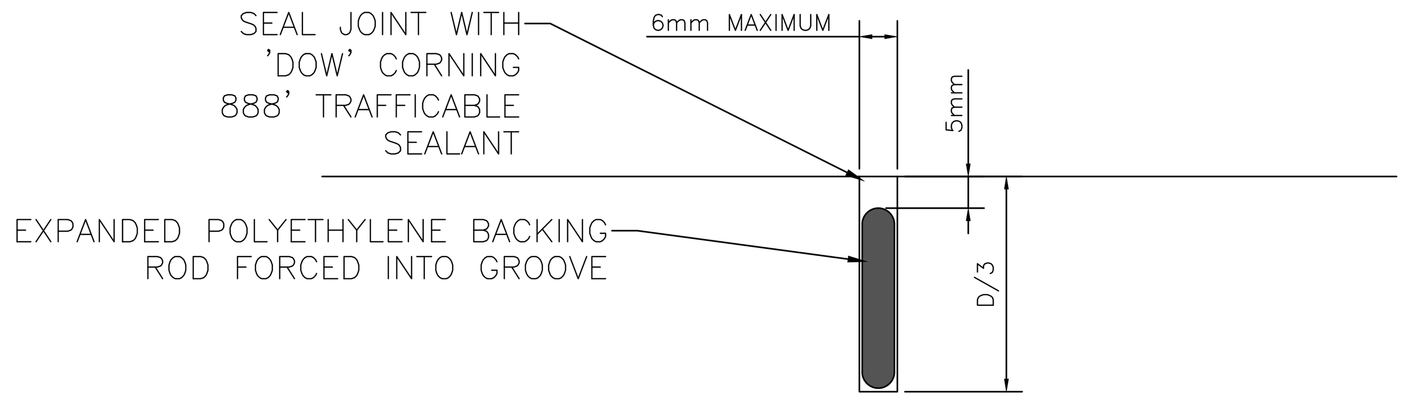
SCALE 1:10



INITIAL SAWCUTS TO BE CARRIED OUT WITHIN 10–24 HOURS AFTER POUR. THE CUTS ARE TO BE MADE BEFORE ANY CRACKING TO HE SLAB OCCUR. THE CONTRACTOR IS RESPONSIBLE FOR THE TIMING OF THE SAWCUTS. ENSURE SAWCUTS EXTEND FOR FULL LENGTH TO FACE OF WALLS

SLAB SAWN JOINT – SJ

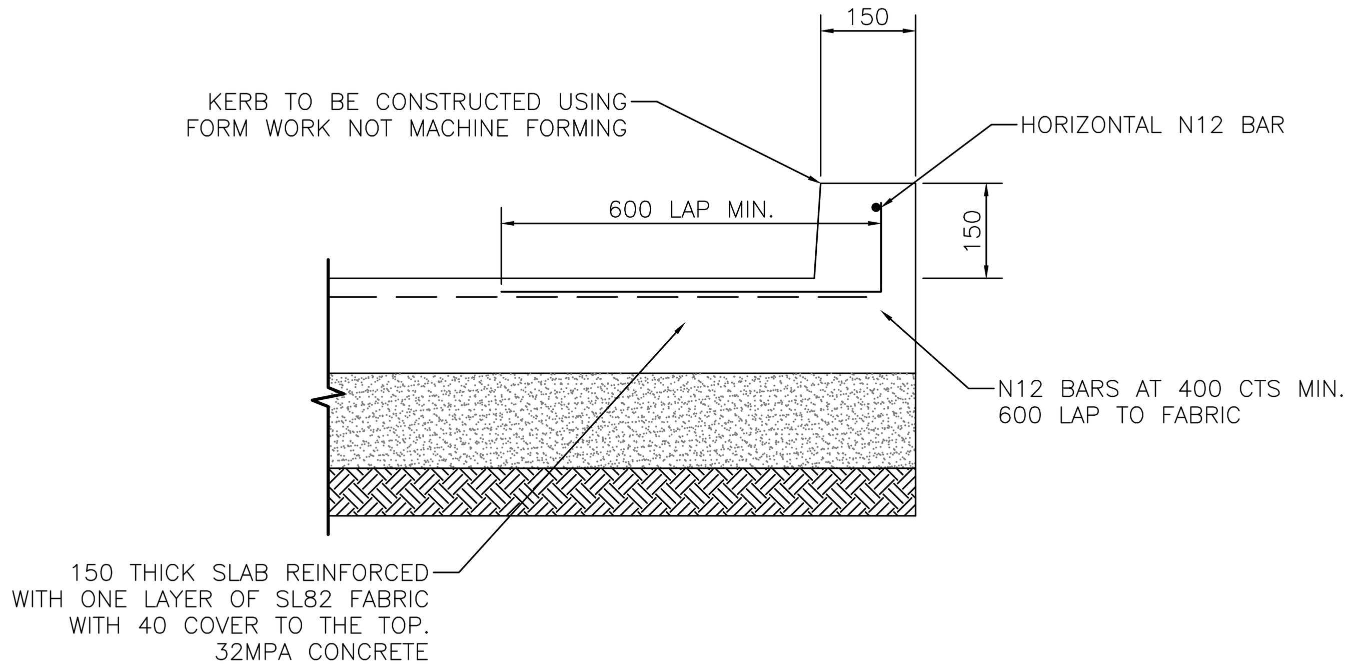
SCALE 1:10



JOINT TO BE SEALED WITHIN SIX WEEKS OF PLACING CONCRETE. JOINT SEALANT TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS

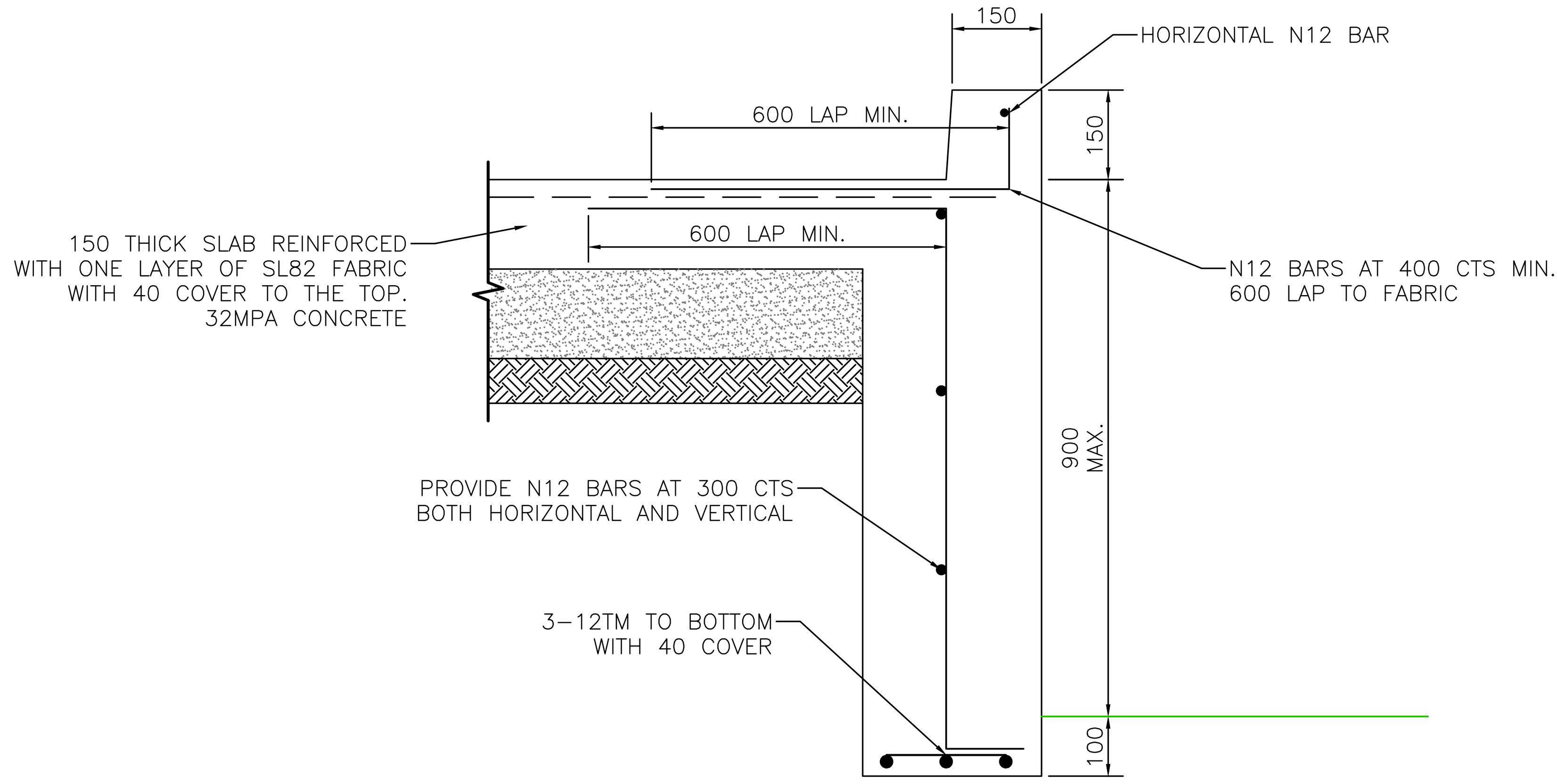
INTERNAL/EXTERNAL PAVEMENT JOINT SEALANT DETAIL

NOT TO SCALE



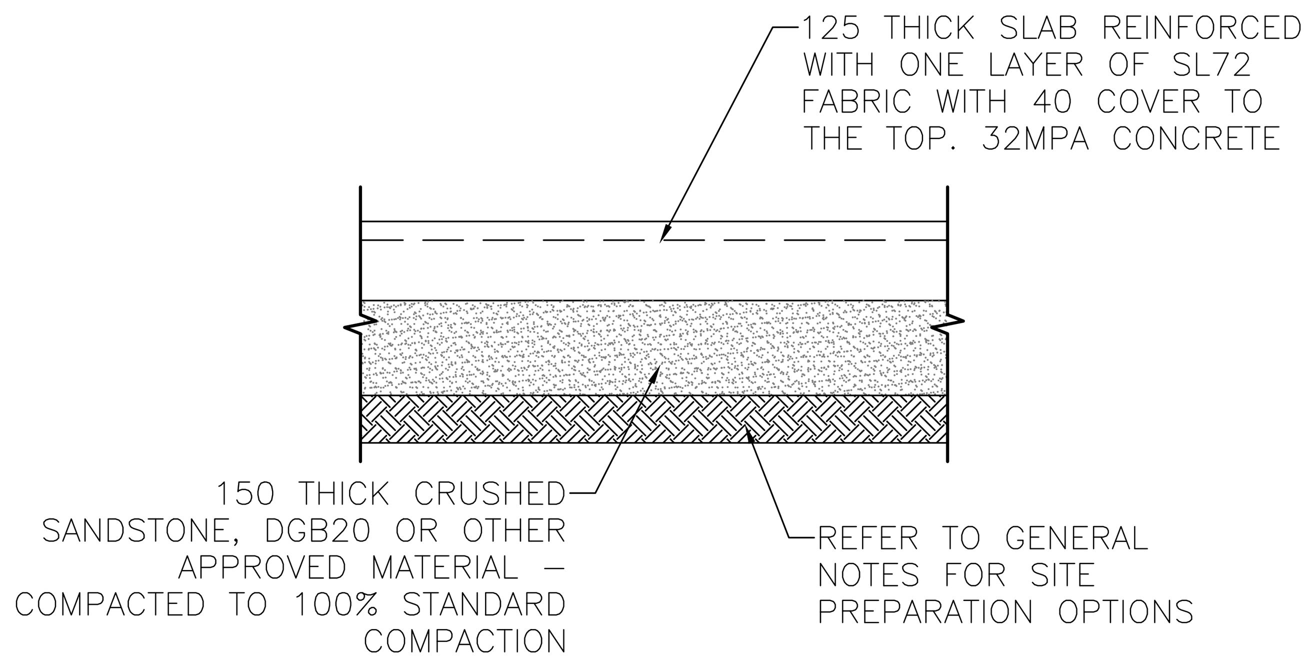
150 HIGH BARRIER KERB DETAIL

SCALE 1:10



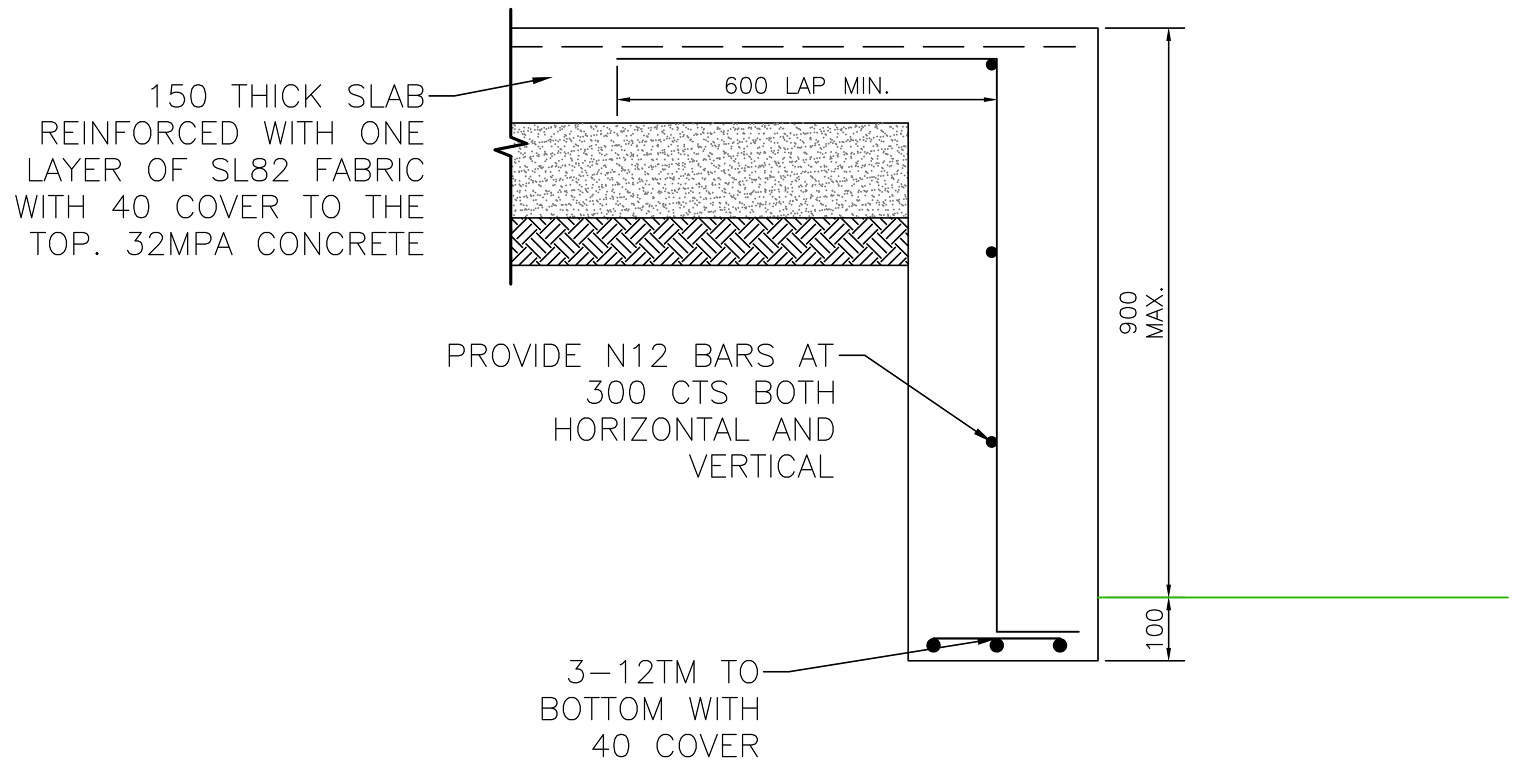
TYPICAL PAVEMENT DROP EDGE BEAM WITH KERB DETAIL

SCALE 1:10



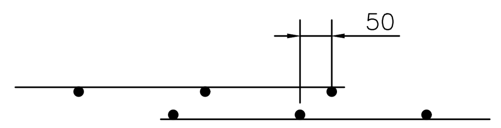
FOOTPATH SLAB PROFILE – TYPICAL DETAIL

SCALE 1:10



TYPICAL PAVEMENT DROP EDGE BEAM WITHOUT KERB DETAIL

SCALE 1:10



STEEL FABRIC REINFORCEMENT LAP DETAIL

SCALE 1:10

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PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 5/17

DWG NO: 200774

DESIGNED: BW
DRAWN: BW
CHECKED: AJB

ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969) 4–8 ELIZA PLACE PICTON NSW 2571

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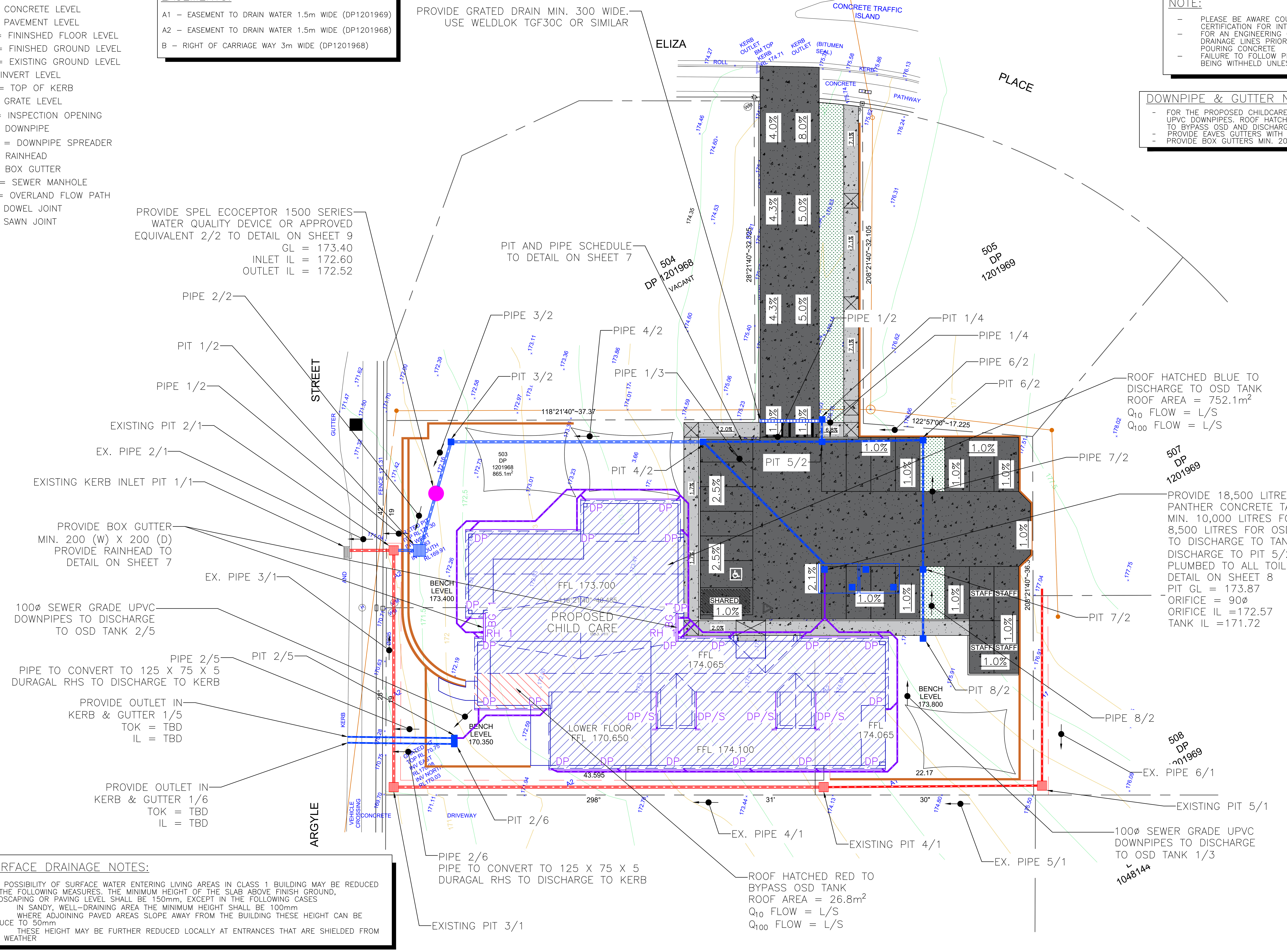
DOWNPIPE & GUTTER NOTES:

- FOR THE PROPOSED CHILDCARE CENTRE PROVIDE MIN. TWENTY TWO (22) 100ø SEWER GRADE UPVC DOWNPIPES. ROOF HATCHED BLUE TO DISCHARGE TO OSD TANK 1/3, ROOF HATCHED RED TO BYPASS OSD AND DISCHARGE TO PIT 2/5
- PROVIDE EAVES GUTTERS WITH MIN. CROSS-SECTIONAL AREA OF 8,200mm²
- PROVIDE BOX GUTTERS MIN. 200 (W) X 200 (D) AT MIN. GRADIENT 1:200

NOTES:

– ALL PITS TO BE LOCKED CLOSED.
– LOCATION OF SERVICE TO BE CHECKED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORK.
– ALL CHARGED PIPES TO BE 100ø UPVC SEWER GRADE PIPES.
– ALL REDUNDANT PIPELINE WITHIN FOOTPATH AREA THAT ARE DISCHARGING TO KERB AND GUTTER MUST BE REMOVED AND FOOTPATH REINSTATED.
– PITS WITHIN TRAFFICABLE AREAS TO BE CALLS C WITH METAL GRATE
– PITS WITHIN LANDSCAPING TO BE MIN CLASS A GRATE
– PIPES WITH <300mm COVER TO BE STEEL DURAGAL PIPES



N E S W

DRIVEWAY PLAN

SCALE

0 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m

1:200 @ A1
1:400 @ A3

SURFACE DRAINAGE NOTES:

THE POSSIBILITY OF SURFACE WATER ENTERING LIVING AREAS IN CLASS 1 BUILDING MAY BE REDUCED BY THE FOLLOWING MEASURES. THE MINIMUM HEIGHT OF THE SLAB ABOVE FINISH GROUND, LANDSCAPING OR PAVING LEVEL SHALL BE 150mm, EXCEPT IN THE FOLLOWING CASES
a) IN SANDY, WELL-DRAINING AREA THE MINIMUM HEIGHT SHALL BE 100mm
b) WHERE ADJOINING PAVED AREAS SLOPE AWAY FROM THE BUILDING THESE HEIGHT CAN BE REDUCE TO 50mm
c) THESE HEIGHT MAY BE FURTHER REDUCED LOCALLY AT ENTRANCES THAT ARE SHIELDED FROM THE WEATHER

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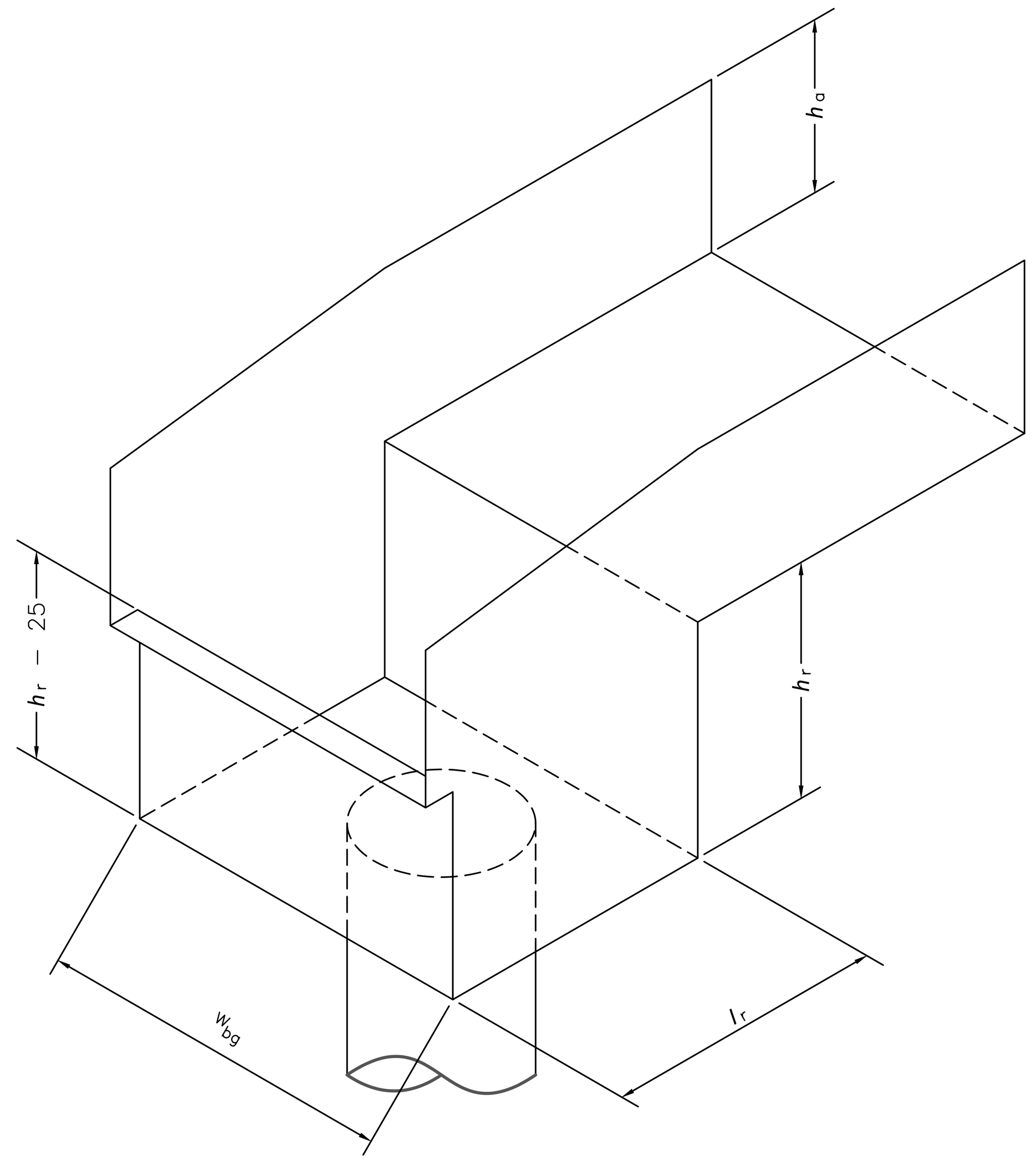
PIT SCHEDULE		
NAME	TYPE	GRATE LEVEL (m AHD)
EX. PIT 1/1	1.8m LINTEL KERB INLET PIT	TBD
EX. PIT 2/1	600SQ INLET PIT	171.30
EX. PIT 3/1	600SQ INLET PIT	170.75
EX. PIT 4/1	600SQ INLET PIT	173.90
EX. PIT 5/1	600SQ INLET PIT	175.50
PIT 1/2	1,200SQ INLET PIT	173.30
PIT 2/2	SPEL ECOCEPTOR GPT	173.40
PIT 3/2	600SQ INLET PIT	173.35
PIT 4/2	600SQ INLET PIT	173.45
PIT 5/2	600SQ INLET PIT	173.60
PIT 6/2	600SQ INLET PIT	173.60
PIT 7/2	600SQ INLET PIT	173.70
PIT 8/2	600SQ INLET PIT	173.75
PIT 1/3	600SQ SEALED INSPECTION PIT	173.60
PIT 1/4	600SQ INLET PIT	173.62
PIT 1/5	600SQ INLET PIT	170.25
PIT 1/6	600SQ INLET PIT	170.30

PIPE SCHEDULE							
NAME	SIZE	UPSTREAM IL (m AHD)	DOWNSTREAM IL (m AHD)	LENGTH (m)	GRADE	Q_{10} FLOW (L/SEC)	CAPACITY (L/S)
EX. PIPE 1/1	375ø RCP	TBD	TBD	TBD	MIN. 1%		190
EX. PIPE 2/1	225ø UPVC	169.83	169.78	3.8	1.1%		64
EX. PIPE 3/1	225ø UPVC	170.03	169.91	23.8	0.5%		43
EX. PIPE 4/1	225ø UPVC	173.34	170.08	43.5	7.5%		168
EX. PIPE 5/1	150ø UPVC	175.02	173.38	21.9	7.5%		57
EX. PIPE 6/1	150ø UPVC	175.24	175.03	20.2	1.0%		21
PIPE 1/2	225ø UPVC	170.80	170.70	2.2	4.5%		130
PIPE 2/2	225ø UPVC	172.52	172.45	4.6	1.5%		75
PIPE 3/2	225ø UPVC	172.65	172.60	4.4	1.1%		64
PIPE 4/2	225ø UPVC	172.95	172.70	25.0	1.0%		61
PIPE 5/2	225ø UPVC	173.07	172.95	11.5	1.0%		61
PIPE 6/2	150ø UPVC	173.20	173.10	9.6	1.0%		21
PIPE 7/2	150ø UPVC	173.38	173.25	12.5	1.0%		21
PIPE 8/2	150ø UPVC	173.45	173.38	6.4	1.0%		21
PIPE 1/3	150ø UPVC		173.00	4.8			
PIPE 1/4	150ø UPVC	173.12	173.10	1.7	1.2%		23
PIPE 1/5	100ø UPVC	169.80	169.69	10.5	1.0%		7
PIPE 1/6	100ø UPVC	169.85	169.69	10.5	1.5%		8



NOTES:

1. THIS FIGURE APPLIES TO $h_r \geq 1.25D_e$ OR $1.25D_i$
2. FOR h_r AND l_r, SEE FIGURE 13
3. THE WIDTH OF THE RAINHEAD IS EQUAL TO THE WIDTH OF THE BOX GUTTER.
4. THE RAINHEAD SHALL BE FULLY SEALED TO THE BOX GUTTER AND THE FRONT OF THE RAINHEAD LEFT OPEN ABOVE THE OVERFLOW WEIR.

RAINHEAD SCHEDULE				
RAINHEAD	h_o (mm)	h_r (mm)	l_r (mm)	w_{bg} (mm)
RH1	200	260	220	200

TYPICAL RAINHEAD DETAIL

NOT TO SCALE

REV	AMENDMENTS	REV DATE	INITIALS
–	–	–	–
–	–	–	–
B	DRIVEWAY LAYOUT AMENDED	25/05/22	SDL
A	CIVIL PLANS REVISED TO SUIT NEW ARCH PLANS	13/05/22	SDL

A1 SCALE: AS SHOWN ON SHEET — DATE: 28/09/2020

D&M CONSULTING
CIVIL & STRUCTURAL ENGINEERS

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CIVIL AND STRUCTURAL ENGINEERS
SHOP 1 & 2,
16 MITCHELL STREET, CAMDEN
PH (02) 4647 4014
EMAIL: engineer@dmceng.com.au

PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 7/17

DWG NO: 200774

DESIGNED: BW
DRAWN: BW
CHECKED: AJB

ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969)
4–8 ELIZA PLACE
PICTON NSW 2571

CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.

SIGNED & APPROVED: D.TURNER

B.E.(MIEAust) CPEng

CLIENT: ENVIRONMENTAL PROPERTY SERVICES

NOTE:

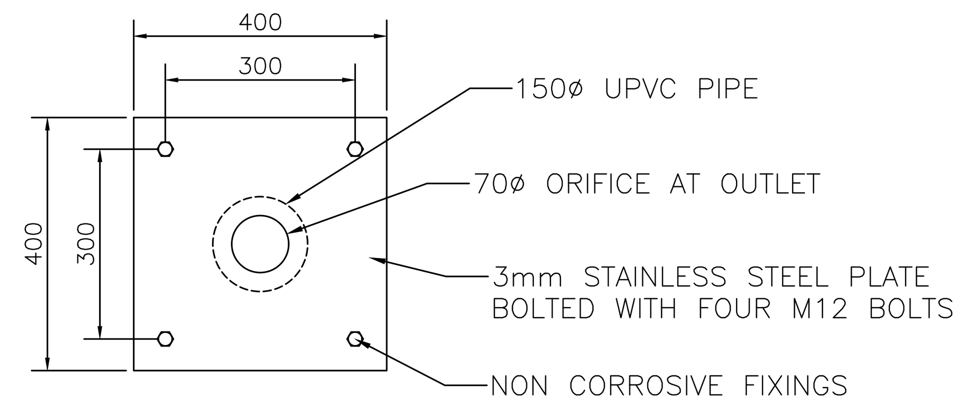
OSD TANK DESIGN BASED ON THE DETAILS AND SPECIFICATIONS OF 14,500 LITRE CONCRETE TANK BY PANTHERS CONCRETE TANK

NOTE:
ACCESS COVER TO BE PROVIDED EVERY 5m FOR BELOW GROUND TANK

OSD TANK 14,500 LITRES
EXTERNAL – 3m (W) X 4m (L) X 1.65m (D)
INTERNAL – 2.8m (W) X 3.8m (L) X 1.36m (D)

OSD TANK 1/3 USING TWO 14,500 LITRE TANKS SECTION DETAIL

SCALE
AT A1 – 1:20
AT A3 – 1:40



ORIFICE PLATE 1/3 DETAIL

SCALE
AT A1 – 1:10
AT A3 – 1:20

PRE AND POST TABLE

	5 YEAR FLOW RATE (L/s)	10 YEAR FLOW RATE (L/s)	20 YEAR FLOW RATE (L/s)	50 YEAR FLOW RATE (L/s)	100 YEAR FLOW RATE (L/s)
PRE DEVELOPMENT	105	130	150	165	177
POST DEVELOPMENT	96	124	144	162	176
POST DEVELOPMENT PEAK DISCHARGE INCREASE PERCENTAGE	8.57%	4.62%	4.00%	1.82%	0.56%

REV	AMENDMENTS	REV DATE	INITIALS
–	–	–	–
–	–	–	–
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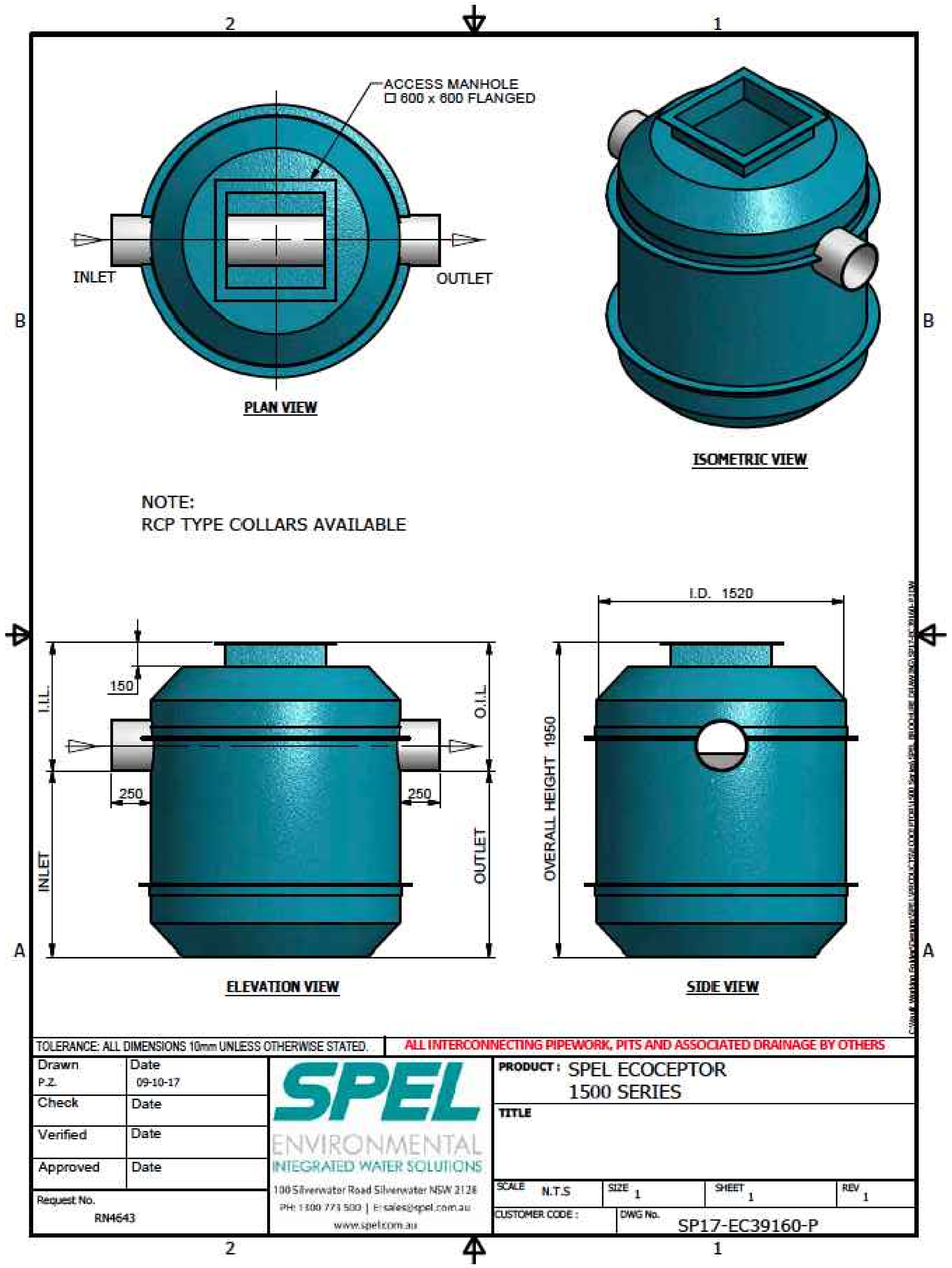


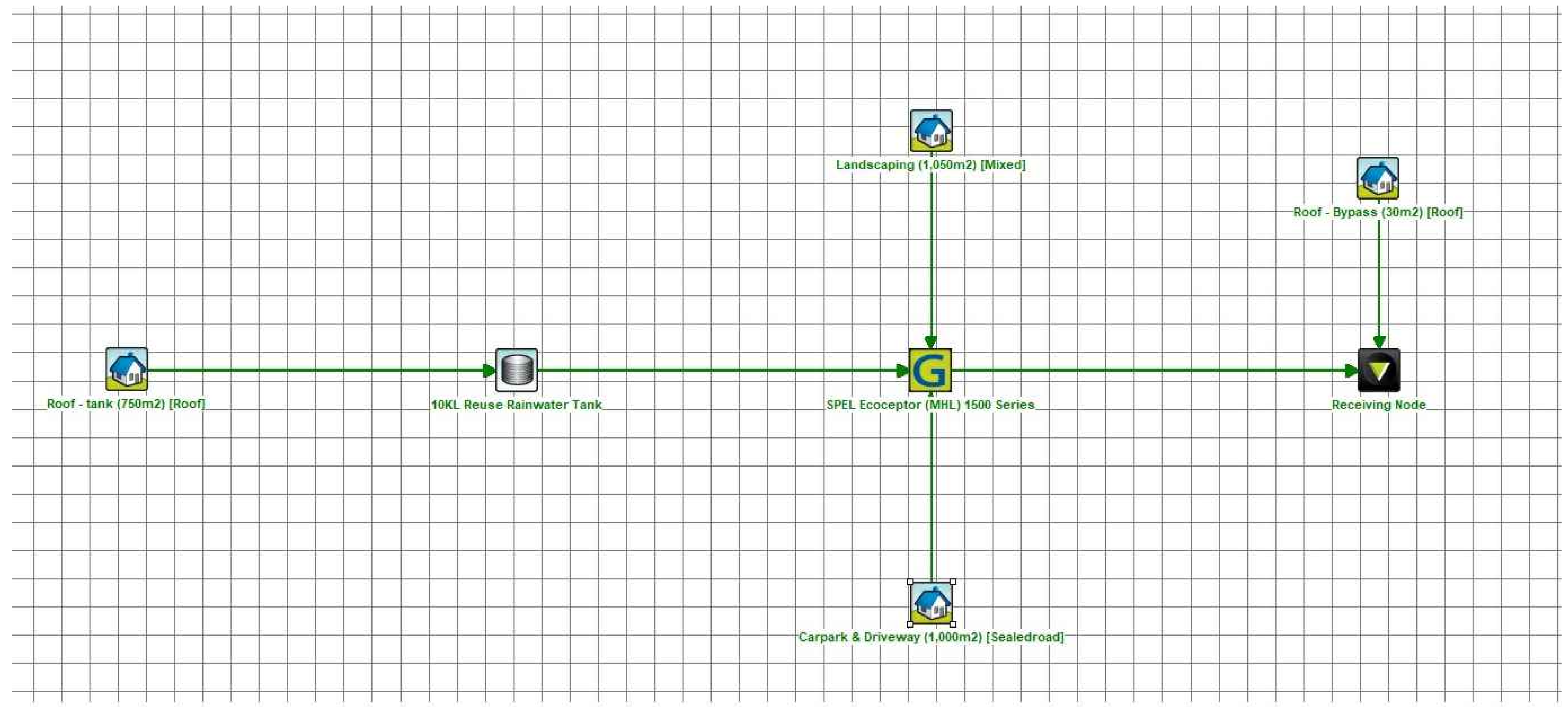
SPEL ECOCEPTOR 1500 SERIES

NOT TO SCALE

Spel Ecoceptor				
	Annual Pollutant Loading (kg/yr)			
	TSS	TP	TN	GP
Pre-Treatment Train	406.00	0.785	4.93	53.80
Post-Treatment Train	116.00	0.236	2.38	2.39
Difference	290.00	0.55	2.55	51.41
Reduction (%)	71.4%	69.9%	51.7%	95.6%
Target (%)	70.0%	45.0%	45.0%	70.0%
	YES	YES	YES	YES

MUSIC RESULTS

NOT TO SCALE



MUSIC MODEL

NOT TO SCALE

REV	AMENDMENTS	REV DATE	INITIALS
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–	–	–	–
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A1	SCALE: AS SHOWN ON SHEET	DATE: 28/09/2020	

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CLIENT: ENVIRONMENTAL PROPERTY SERVICES

1 IN 10 YEAR (10% AEP) – MINOR CALCULATIONS

ILSAX CALCULATION SUMMARY SHEET

DRAINS results prepared from Version 2022.01

Soil Type	3			**Entire Catchment Area**	
		Paved		0.507 ha	(43.9%)
		Supplementary		0 ha	(0%)
AMC	3	Grassed		0.647 ha	(56%)
		Total Area		1.154 ha	

LOCATION AND LAND-USE (columns 1–5) · **TIME AND RUNOFF** (columns 6–11) · **INLET DESIGN** (columns 12–21)

1 Design AEP	2 Pit Name	3 Sub-Catchment Area (ha)	4 Land-Use	5 Percent-age	6 Constant Flow Time (minutes)	7 Length (m)	8 Kinematic Wave or Friends Formula Parameters Slope (%)	9 Roughness n	10 Total Time tc (minutes)	11 Peak Sub-Catchment Flowrate (m³/s) *worst storm	12 Origin of Approach Flows	13 Overflows Approaching Pit Flowrate (m³/s)	14 Flow Width (m)	15 Depth x Velocity (m²/s)	16 Inlet Family
10%	**PIT 1/4**	0.0281	Paved Supp. Grassed	89 0 11	5 2 5				5 5	0.01					Grated Drain
10%	**PIT 5/2**		Paved Supp. Grassed								PIT 6/2	0	0	0	Surface Inlet Pits - Paved
10%	**PIT 4/2**	0.0413	Paved Supp. Grassed	100 0 0	5 2 5				5 5	0.015	PIT 1/4 PIT 5/2	0 0	0 0	0 0	Surface Inlet Pits - Paved
10%	**PIT 3/2**	0.0318	Paved Supp. Grassed	12 0 88	5 2 5				5 5	0.009	PIT 4/2	0.009	1.54	0.01	Surface Inlet Pits - Grass
10%	**L ECOCEPTOR 2/2**		Paved Supp. Grassed												Junction Pit or Manhole (se
10%	**PIT 1/2**	0.0102	Paved Supp. Grassed	0 0 100	5 2 5				5 5	0.003	PIT 3/2 DP 1/9	0.009 0.008	1.54 0.58	0.01 0.03	Large Pit
10%	**EX. PIT 2/1**	0.0036	Paved Supp. Grassed	0 0 100	5 2 5				5 5	0.001	PIT 1/2	0	0	0	Surface Inlet Pits - Grass
10%	**EX. PIT 1/1**		Paved Supp. Grassed								EX. PIT 2/1	0	0	0	Sutherland Council Inlet, 1%
10%	**PIT 8/2**	0.0185	Paved Supp. Grassed	0 0 100	5 2 5				5 5	0.005					Surface Inlet Pits - Grass
10%	**PIT 7/2**	0.0202	Paved Supp. Grassed	88 0 12	5 2 5				5 5	0.007	PIT 8/2	0.001	0.3	0	Surface Inlet Pits - Grass
10%	**PIT 6/2**	0.0143	Paved Supp. Grassed	90 0 10	5 2 5				5 5	0.005	PIT 7/2	0	0	0	Surface Inlet Pits - Grass
10%	**PIT 2/6**		Paved Supp. Grassed								PIT 2/5	0	0	0	Surface Inlet Pits - Grass
10%	**EX DP 1/7**	0.072	Paved Supp. Grassed	50 0 50	5 2 5				5 5	0.022					Downpipe
10%	**EX PIT 5/1**		Paved Supp. Grassed												Surface Inlet Pits - Grass
10%	**EX PIT 4/1**	0.0062	Paved Supp. Grassed	1 0 99	5 2 5				5 5	0.002	EX PIT 5/1	0.003	0.42	0.02	Surface Inlet Pits - Grass
10%	**EX PIT 3/1**	0.019	Paved Supp. Grassed	12 0 88	5 2 5				5 5	0.005	EX PIT 4/1	0	0	0	Surface Inlet Pits - Grass
10%	**EX DP 6/1**	0.08	Paved Supp. Grassed	50 0 50	5 2 5				5 5	0.024					Downpipe
10%	**DP 1/9**	0.0752	Paved Supp. Grassed	100 0 0	5 2 0				5 0	0.027					Downpipe
10%	**DP 1/8**	0.0027	Paved Supp. Grassed	100 0 0	5 2 5				5 5	0.001					Downpipe
10%	**PIT 2/5**	0.0093	Paved Supp. Grassed	12 0 88	5 2 5				5 5	0.003					Surface Inlet Pits - Grass
10%	**DP LOT 507**	0.08	Paved Supp. Grassed	50 0 50	5 2 5				5 5	0.024					Downpipe
10%	**PIT 5/1**		Paved Supp. Grassed												Surface Inlet Pits - Grass
10%	**PIT 4/1**		Paved Supp. Grassed								PIT 5/1	0.003	0.42	0.02	Surface Inlet Pits - Grass
10%	**PIT 3/1**		Paved Supp. Grassed								PIT 4/1	0	0	0	Surface Inlet Pits - Grass
10%	**PIT 2/1**		Paved Supp. Grassed												Surface Inlet Pits - Grass
10%	**PIT 1/1**		Paved Supp. Grassed								PIT 2/1	0	0	0	Sutherland Council Inlet, 1%
10%	**DP LOT 508**	0.072	Paved Supp. Grassed	50 0 50	5 2 5				5 5	0.022					Downpipe
10%	**DP LOT 506**	0.0987	Paved Supp. Grassed	50 0 50	5 2 5				5 5	0.03					Downpipe
10%	**DP LOT 502**	0.0984	Paved Supp. Grassed	50 0 50	5 2 5				5 5	0.03					Downpipe
10%	**DP LOT 503**	0.0865	Paved Supp. Grassed	50 0 50	5 2 5				5 5	0.026					Downpipe
10%	**OSD 1/3**		Paved Supp. Grassed												

PIPE SYSTEM DESIGN (columns 22–30) · **PIT RESULTS** (columns 31–36)

2 Pit Name	17 Inlet Size	18 Total Approach Flow (m³/s)	19 Bypass Flow (m³/s)	20 Overflow Leaving Pit Flow Width (m)	21 Depth x Velocity (m²/s)	22 Peak Flow in Pipe (m³/s)	23 Reach Length (m)	24 Pipe Slope (m)	25 Pipe Diameter (mm)	26 U/S Pipe Invert Level (m)	27 D/S Pipe Invert Level (m)	28 U/S HGL in Pipe (m)	29 D/S HGL in Pipe (m)	30 Pipe Flow Velocity (m/s)	31 Pressure Change Coeff. Ku	32 Water Surface Elevation (m)	33 Surface Level (m)	34 Free-board (m)	35 Pit Name	36 Remarks
PIT 1/4	4.5m Wide x 0.3	0.01	0	0	0	0.01	1.7	1.18	150	173.12	173.1	173.21	173.2	0.87	5.9	173.28	173.62	0.34	**PIT 1/4**	
PIT 5/2	600 Square Pit	0	0	0	0	0.025	11.5	1.04	225	173.07	172.95	173.2	173.06	1.25	0.3	173.19	173.6	0.41	**PIT 5/2**	
PIT 4/2	600 Square Pit	0.015	0.009	1.54	0.01	0.035	25	1	225	172.05	171.8	172.2	172.1	1.14	5.5	172.35	173.45	1.1	**PIT 4/2**	
PIT 3/2	600 Square Pit	0.018	0.009	1.54	0.01	0.044	4.4	1.14	225	171.8	171.75	172	171.98	1.06	2.1	172.1	173.35	1.25	**PIT 3/2**	
L ECOCEPTOR 2/2	Junction Pit or M	0				0.043	4.6	1.52	225	171.67	171.6	171.84	171.73	1.68	4.8	171.98	173.4	1.42	**ECOCEPTOR 2/2**	
PIT 1/2	Large Pit	0.02	0	0	0	0.063	2.2	4.55	225	170.6	170.5	170.8	170.75	1.52	2.2	170.98	173.3	2.32	**PIT 1/2**	
EX. PIT 2/1	600 Square Pit	0.001	0	0	0	0.095	3.8	1.11	225	169.83	169.788	170.13	170.02	2.12	1.5	170.75	171.3	0.55	**EX. PIT 2/1**	
EX. PIT 1/1	Sutherland 1.8 m	0	0	0	0	0.089	10	1	375	169.7	169.6	169.92	169.78	1.69	1.4	169.93	171	1.07	**EX. PIT 1/1**	
PIT 8/2	600 Square Pit	0.005	0.001	0.3	0	0.004	6.4	1.09	150	173.45	173.38	173.53	173.52	0.39	5.9	173.55	173.75	0.2	**PIT 8/2**	
PIT 7/2	600 Square Pit	0.008	0	0	0	0.011	12.5	1.04	150	173.38	173.25	173.48	173.34	1	5.9	173.52	173.7	0.18	**PIT 7/2**	
PIT 6/2	600 Square Pit	0.005	0	0	0	0.016	9.6	1.04	150	173.2	173.1	173.32	173.21	1.08	1.4	173.34	173.6	0.26	**PIT 6/2**	
PIT 2/6	600 Square Pit	0				0	10.5	1.52	100	169.85	169.69	169.85	169.69	0	1.5	169.85	173.3	3.45	**PIT 2/6**	
EX DP 1/7	Downpipe	0.022				0.022	10	1	150	175.13	175.03	175.67	175.52	1.17	2.1	175.82	183.8	7.98	**EX DP 1/7**	
EX PIT 5/1	600 Square Pit	0	0.003	0.42	0.02	0.042	21.9	7.49	150	175.02	173.38	175.17	173.49	2.89	1.9	175.52	175.5	0	**EX PIT 5/1**	
EX PIT 4/1	600 Square Pit	0.005	0	0	0	0.046	43.5	7.49	225	173.34	170.08	173.43	170.82	3.03	0	173.43	173.9	0.47	**EX PIT 4/1**	
EX PIT 3/1	600 Square Pit	0.005	0.025	1.37	0.04	0.035	23.8	0.5	225	170.03	169.91	170.8	170.75	0.75	1.5	170.82	170.75	0	**EX PIT 3/1**	
EX DP 6/1	Downpipe	0.024				0.024	20.2	1.04	150	175.24	175.03	175.9	175.52	1.3	1.9	176.06	180	3.94	**EX DP 6/1**	
DP 1/9	Downpipe	0.027	0.008	0.58	0.03	0.018	40	-2.13	100	172.2	173.05	176.14	173.16	2.1	1.8	176.54	176.55	0.01	**DP 1/9**	
DP 1/8	Downpipe	0.001				0.001	10	1	100	169.95	169.85	169.98	169.88	0.56	5.9	169.98	176.55	6.57	**DP 1/8**	
PIT 2/5	600 Square Pit	0.003	0	0	0	0.003	10.5	1.05	100	169.8	169.69	169.86	169.74	0.76	5.9	169.87	173.25	3.38	**PIT 2/5**	
DP LOT 507	Downpipe	0.024				0.024	20.2	1.04	150	175.24	175.03	175.9	175.52	1.3	1.9	176.06	180	3.94	**P LOT 507**	
PIT 5/1	600 Square Pit	0	0.003	0.42	0.02	0.042	21.9	7.49	150	175.02	173.38	175.17	173.58	2.24	1.9	175.52	175.5	0	**PIT 5/1**	
PIT 4/1	600 Square Pit	0.003	0	0	0	0.075	43.5	7.49	225	173.34	170.08	173.55	170.98	1.75	1.1	173.58	173.9	0.32	**PIT 4/1**	
PIT 3/1	600 Square Pit	0	0.038	1.76	0.05	0.066	23.8	0.5	225	170.03	169.91	170.7	170.4	1.44	2.7	170.98	170.75	0	**PIT 3/1**	
PIT 2/1	600 Square Pit	0	0	0	0	0.092	3.8	1.11	225	169.83	169.788	170.07	170.01	2.06	1.4	170.4	171.3	0.9	**PIT 2/1**	
PIT 1/1	Sutherland 1.8 m	0	0	0	0	0.092	10	1	375	169.7	169.6	169.92	169.78	1.71	1.6	169.94	171	1.06	**PIT 1/1**	
DP LOT 508	Downpipe	0.022				0.022	10	1	150	175.13	175.03	175.67	175.52	1.17	2.1	175.82	183.8	7.98	**P LOT 508**	
DP LOT 506	Downpipe	0.03				0.03	10	1	100	173.49	173.39	175.6	173.58	3.46	4	177.85	179	1.15	**P LOT 506**	
DP LOT 502	Downpipe	0.03				0.03	10	1	100	170.23	170.13	173.01	170.98	3.45	1.8	174.02	176	1.98	**P LOT 502**	
DP LOT 503	Downpipe	0.026				0.026	10	1	100	170.06	169.96	172.01	170.4	3.03	1.8	172.8	176.5	3.7	**P LOT 503**	
OSD 1/3		0																	**OSD 1/3**	

REV	AMENDMENTS	REV DATE	INITIALS
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1 IN 100 YEAR (1% AEP) – MAJOR CALCULATIONS

ILSAX CALCULATION SUMMARY SHEET

DRAINS results prepared from Version 2022.01

Soil Type	3		**Entire Catchment Area**
		Paved	0.507 ha	(43.9%)
		Supplementary	0 ha	(0%)
AMC	3	Grassed	0.647 ha	(56%)
		Total Area	1.154 ha	

LOCATION AND LAND-USE					TIME AND RUNOFF						INLET DESIGN										PIPE SYSTEM DESIGN									PIT RESULTS					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Design AEP	Pit Name	Sub-Catchment Area	Land-Use	Percent-age	Constant Flow Time	Length	Kinematic Wave or Friends Formula Parameters Slope	Roughness	Total Time tc	Peak Sub-Catchment Flowrate	Origin of Approach Flows	Flowrate	Overflows Approaching Pit Flow Width	Depth x Velocity	Inlet Family	Inlet Size	Total Approach Flow	Bypass Flow	Overflow Leaving Pit Flow Width	Depth x Velocity	Peak Flow in Pipe	Reach Length	Pipe Slope	Pipe Diameter	U/S Pipe Invert Level	D/S Pipe Invert Level	U/S HGL in Pipe	D/S HGL in Pipe	Pipe Flow Velocity	Pressure Change Coeff.	Water Surface Elevation	Surface Level	Free-board	Pit Name	Remarks
		(ha)			(minutes)	(m)	(%)	n	(minutes)	(m^3/s) *worst storm		(m^3/s)	(m)	(m^2/s)			(m^3/s)	(m^3/s)	(m)	(m^2/s)	(m^3/s)	(m)	(m)	(mm)	(m)	(m)	(m)	(m)	(m/s)	Ku	(m)	(m)	(m)		
1%	PIT 1/4	0.0281	Paved	89	5				5	0.014					Grated Drain	4.5m Wide x 0.3	0.014	0.001	1.97	0	0.013	1.7	1.18	150	173.12	173.1	173.23	173.22	0.95	5.9	173.39	173.62	0.23	PIT 1/4	
			Supp.	0	2				5																										
			Grassed	11	5																														
1%	PIT 5/2		Paved								PIT 6/2	0	0	0	Surface Inlet Pits - Paved	600 Square Pit	0	0	0	0	0.034	11.5	1.04	225	173.07	172.95	173.22	173.08	1.37	0.3	173.22	173.6	0.38	PIT 5/2	
			Supp.																																
			Grassed																																
1%	PIT 4/2	0.0413	Paved	100	5				5	0.022	PIT 1/4	0.001	1.97	0	Surface Inlet Pits - Paved	600 Square Pit	0.023	0.015	4	0.02	0.041	25	1	225	172.05	171.8	172.41	172.29	0.89	5.5	172.63	173.45	0.82	PIT 4/2	
			Supp.	0	2				5		PIT 5/2	0	0	0																					
			Grassed	0	5																														
1%	PIT 3/2	0.0318	Paved	12	5				5	0.013	PIT 4/2	0.015	4	0.02	Surface Inlet Pits - Grass	600 Square Pit	0.028	0.016	4	0.01	0.053	4.4	1.14	225	171.8	171.75	172.15	172.11	1.15	2.1	172.29	173.35	1.06	PIT 3/2	
			Supp.	0	2				5																										
			Grassed	88	5																														
1%	L ECOCEPTOR 2/2		Paved												Junction Pit or Manhole (se	Junction Pit or M	0				0.053	4.6	1.52	225	171.67	171.6	171.86	171.75	1.74	4.8	172.11	173.4	1.29	ECOCEPTOR 2/2	
			Supp.																																
			Grassed																																
1%	PIT 1/2	0.0102	Paved	0	5				5	0.004	PIT 3/2	0.016	4	0.01	Large Pit	Large Pit	0.042	0	0	0	0.091	2.2	4.55	225	170.6	170.5	170.84	170.79	1.99	2.2	171.24	173.3	2.06	PIT 1/2	
			Supp.	0	2				5		DP 1/9	0.022	1.02	0.04																					
			Grassed	100	5																														
1%	EX. PIT 2/1	0.0036	Paved	0	5				5	0.001	PIT 1/2	0	0	0	Surface Inlet Pits - Grass	600 Square Pit	0.001	0	0	0	0.126	3.8	1.11	225	169.83	169.788	170.18	170.03	2.73	1.5	170.79	171.3	0.51	EX. PIT 2/1	
			Supp.	0	2				5																										
			Grassed	100	5																														
1%	EX. PIT 1/1		Paved								EX. PIT 2/1	0	0	0	Sutherland Council Inlet, 1%	Sutherland 1.8 m	0	0	0	0	0.126	10	1	375	169.7	169.6	169.96	169.82	1.84	1.4	170	171	1	EX. PIT 1/1	
			Supp.																																
			Grassed																																
1%	PIT 8/2	0.0185	Paved	0	5				5	0.007					Surface Inlet Pits - Grass	600 Square Pit	0.007	0.003	0.6	0.01	0.005	6.4	1.09	150	173.45	173.38	173.72	173.72	0.27	5.9	173.74	173.75	0.01	PIT 8/2	
			Supp.	0	2				5																										
			Grassed	100	5																														
1%	PIT 7/2	0.0202	Paved	88	5				5	0.01	PIT 8/2	0.003	0.6	0.01	Surface Inlet Pits - Grass	600 Square Pit	0.013	0	0	0	0.015	12.5	1.04	150	173.38	173.25	173.55	173.48	0.8	5.9	173.72	173.7	0	PIT 7/2	
			Supp.	0	2				5																										
			Grassed	12	5																														
1%	PIT 6/2	0.0143	Paved	90	5				5	0.007	PIT 7/2	0	0	0	Surface Inlet Pits - Grass	600 Square Pit	0.007	0	0	0	0.021	9.6	1.04	150	173.2	173.1	173.37	173.23	1.25	1.4	173.48	173.6	0.12	PIT 6/2	
			Supp.	0	2				5																										
			Grassed	10	5																														
1%	PIT 2/6		Paved								PIT 2/5	0	0	0	Surface Inlet Pits - Grass	600 Square Pit	0				0	10.5	1.52	100	169.85	169.69	169.85	169.69	0	1.5	169.85	173.3	3.45	PIT 2/6	
			Supp.																																
			Grassed																																
1%	EX DP 1/7	0.072	Paved	50	5				5	0.032					Downpipe	Downpipe	0.032				0.032	10	1	150	175.13	175.03	176.16	175.83	1.73	2.1	176.47	183.8	7.33	EX DP 1/7	
			Supp.	0	2				5																										
			Grassed	50	5																														
1%	EX PIT 5/1		Paved												Surface Inlet Pits - Grass	600 Square Pit	0	0.019	1.05	0.06	0.049	21.9	7.49	150	175.02	173.38	175.17	173.53	2.62	1.9	175.83	175.5	0	EX PIT 5/1	
			Supp.																																
			Grassed																																
1%	EX PIT 4/1	0.0062	Paved	1	5				5	0.003	EX PIT 5/1	0.019	1.05	0.06	Surface Inlet Pits - Grass	600 Square Pit	0.022	0.01	1.87	0.03	0.059	43.5	7.49	225	173.34	170.08	173.44	170.87	3.25	0	173.44	173.9	0.46	EX PIT 4/1	
			Supp.	0	2				5																										
			Grassed	99	5																														
1%	EX PIT 3/1	0.019	Paved	12	5				5	0.008	EX PIT 4/1	0.01	1.87	0.03	Surface Inlet Pits - Grass	600 Square Pit	0.018	0.044	1.91	0.05	0.036	23.8	0.5	225	170.03	169.91	170.84	170.79	0.78	1.5	170.87	170.75	0	EX PIT 3/1	
			Supp.	0	2				5																										
			Grassed	88	5																														
1%	EX DP 6/1	0.08	Paved	50	5				5	0.036					Downpipe	Downpipe	0.036				0.036	20.2	1.04	150	175.24	175.03	176.64	175.83	1.92	1.9	176.99	180	3.01	EX DP 6/1	
			Supp.	0	2				5																										
			Grassed	50	5																														
1%	DP 1/9	0.0752	Paved	100	5				5	0.04					Downpipe	Downpipe	0.04	0.022	1.02	0.04	0.018	40	-2.13	100	172.2	173.05	176.19	173.17	2.11	1.8	176.56	176.55	0	DP 1/9	
			Supp.	0	2				0																										
			Grassed	0	0																														
1%	DP 1/8	0.0027	Paved	100	5				5	0.001					Downpipe	Downpipe	0.001				0.001	10	1	100	169.95	169.85	170	169.92	0.36	5.9	170.01	176.55	6.54	DP 1/8	
			Supp.	0	2				5																										
			Grassed	0	5																														
1%	PIT 2/5	0.0093	Paved	12	5				5	0.004					Surface Inlet Pits - Grass	600 Square Pit	0.004	0	0	0	0.005	10.5	1.05	100	169.8	169.69	169.87	169.76	0.83	5.9	169.92	173.25	3.33	PIT 2/5	
			Supp.	0	2				5																										
			Grassed	88	5																														
1%	DP LOT 507	0.08	Paved	50	5				5	0.036					Downpipe	Downpipe	0.036				0.036	20.2	1.04	150	175.24	175.03	176.65	175.85	1.92	1.9	177	180	3	P LOT 507	
			Supp.	0	2				5																										
			Grassed	50	5																														
1%	PIT 5/1		Paved												Surface Inlet Pits - Grass	600 Square Pit	0	0.02	1.07	0.06	0.048	21.9	7.49	150	175.02	173.38	175.22	173.62	2.6	1.9	175.85	175.5	0	PIT 5/1	
			Supp.																																
			Grassed																																
1%	PIT 4/1		Paved								PIT 5/1	0.02	1.07	0.06	Surface Inlet Pits - Grass	600 Square Pit	0.02	0.009	4	0.03	0.094	43.5	7.49	225	173.34	170.08	173.57	171.26	2.1	1.1	173.62	173.9	0.28	PIT 4/1	
			Supp.																																
			Grassed																																
1%	PIT 3/1		Paved								PIT 4/1	0.009	4	0.03	Surface Inlet Pits - Grass	600 Square Pit	0.009	0.066	4	0.05	0.072	23.8	0.5	225	170.03	169.91	170.92	170.57	1.57	2.7	171.26	170.75	0	PIT 3/1	
			Supp.																																
			Grassed																																
1%	PIT 2/1		Paved												Surface Inlet Pits - Grass	600 Square Pit	0	0	0	0	0.111	3.8	1.11	225	169.83	169.788	170.12	170.03	2.42	1.4	170.57	171.3	0.73	PIT 2/1	
			Supp.																																
			Grassed																																
1%	PIT 1/1		Paved								PIT 2/1	0	0	0	Sutherland Council Inlet, 1%	Sutherland 1.8 m	0	0	0	0	0.111	10	1	375	169.7	169.6	169.94	169.8	1.79	1.6	169.98	171	1.02	PIT 1/1	
			Supp.																																
			Grassed																																
1%	DP LOT 508	0.072	Paved	50	5				5	0.032					Downpipe	Downpipe	0.032				0.032	10	1	150	175.13	175.03	176.17	175.85	1.73	2.1	176.49	183.8	7.31	P LOT 508	
			Supp.	0	2				5																										
			Grassed	50	5																														
1%	DP LOT 506	0.0987	Paved	50	5				5	0.044					Downpipe	Downpipe	0.044				0.034	10	1	100	173.49	173.39	176.16	173.62	3.93	4	179	179	0	P LOT 506	
			Supp.	0	2				5																										
			Grassed	50	5																														
1%	DP LOT 502	0.0984	Paved	50	5				5	0.044					Downpipe	Downpipe	0.044				0.038	10	1	100	170.23	170.13	174.42	171.26	4.42	1.8	175.98	176	0.02	P LOT 502	
			Supp.	0	2				5																										
			Grassed	50	5																														
1%	DP LOT 503	0.0865	Paved	50	5				5	0.039					Downpipe	Downpipe	0.039				0.039	10	1	100	170.06	169.96	173.88	170.57	4.47	1.8	175.51	176.5	0.99	P LOT 503	
			Supp.	0	2				5																										
			Grassed	50	5																														
1%	OSD 1/3		Paved														0																	OSD 1/3	
			Supp.																																
			Grassed																																

REV	AMENDMENTS	REV DATE	INITIALS
–	–	–	–
–	–	–	–
B	DRIVEWAY LAYOUT AMENDED	25/05/22	SDL
A	CIVIL PLANS REVISED TO SUIT NEW ARCH PLANS	13/05/22	SDL
A1	SCALE: AS SHOWN ON SHEET	DATE: 28/09/2020	

DMC
D & M CONSULTING
CIVIL & STRUCTURAL ENGINEERS

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CIVIL AND STRUCTURAL ENGINEERS
SHOP 1 & 2,
16 MITCHELL STREET, CAMDEN
PH (02) 4647 4014
EMAIL: engineer@dmceng.com.au

PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 11/17

DWG NO: 200774

DESIGNED: BW
DRAWN: BW
CHECKED: AJB

ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969)
4–8 ELIZA PLACE
PICTON NSW 2571

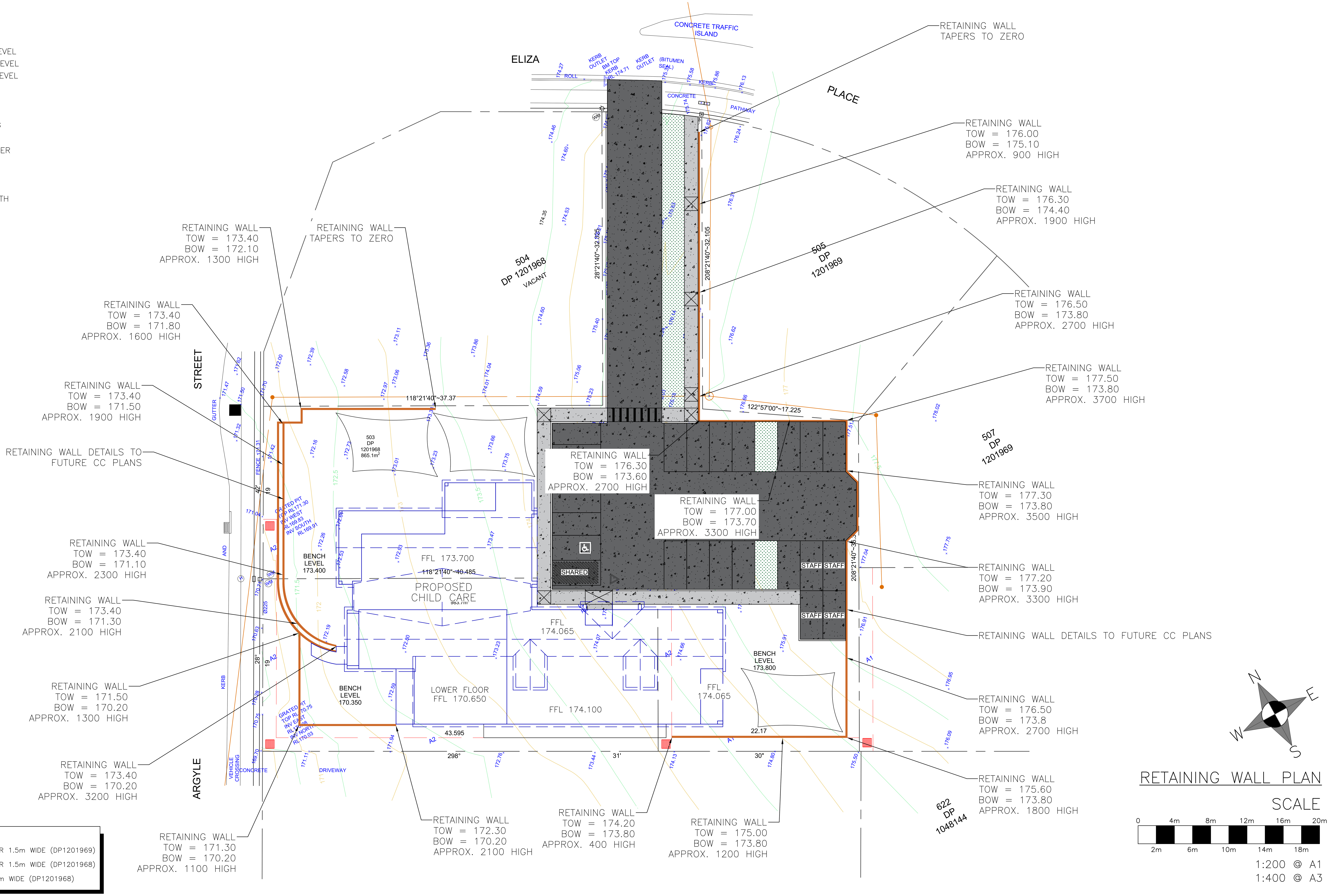
CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.

SIGNED & APPROVED: D.TURNER
B.E.(MIEAust) CPEng

CLIENT: ENVIRONMENTAL PROPERTY SERVICES

KEY:

CL = CONCRETE LEVEL
PL = PAVEMENT LEVEL
FFL = FININSHED FLOOR LEVEL
FGL = FINISHED GROUND LEVEL
EGL = EXISTING GROUND LEVEL
IL = INVERT LEVEL
TOK = TOP OF KERB
GL = GRATE LEVEL
I/O = INSPECTION OPENING
DP = DOWNPIPE
DP/S = DOWNPIPE SPREADER
RH = RAINHEAD
BG = BOX GUTTER
SMH = SEWER MANHOLE
OVF = OVERLAND FLOW PATH
DJ = DOWEL JOINT
SJ = SAWN JOINT



RETAINING WALL PLAN

SCALE

0 4m 8m 12m 16m 20m
2m 6m 10m 14m 18m

1:200 @ A1
1:400 @ A3

EASEMENTS:

A1 – EASEMENT TO DRAIN WATER 1.5m WIDE (DP1201969)
A2 – EASEMENT TO DRAIN WATER 1.5m WIDE (DP1201968)
B – RIGHT OF CARRIAGE WAY 3m WIDE (DP1201968)

REV	AMENDMENTS	REV DATE	INITIALS
–	–	–	–
–	–	–	–
B	DRIVEWAY LAYOUT AMENDED	25/05/22	SDL
A	CIVIL PLANS REVISED TO SUIT NEW ARCH PLANS	13/05/22	SDL

A1 SCALE: AS SHOWN ON SHEET — DATE: 28/09/2020

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EMAIL: engineer@dmceng.com.au

PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 12/17

DWG NO: 200774

DESIGNED: BW
DRAWN: BW
CHECKED: AJB

ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969)
4–8 ELIZA PLACE
PICTON NSW 2571

CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.

SIGNED & APPROVED: D.TURNER
B.E.(MIEAust) CPEng

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KEY:

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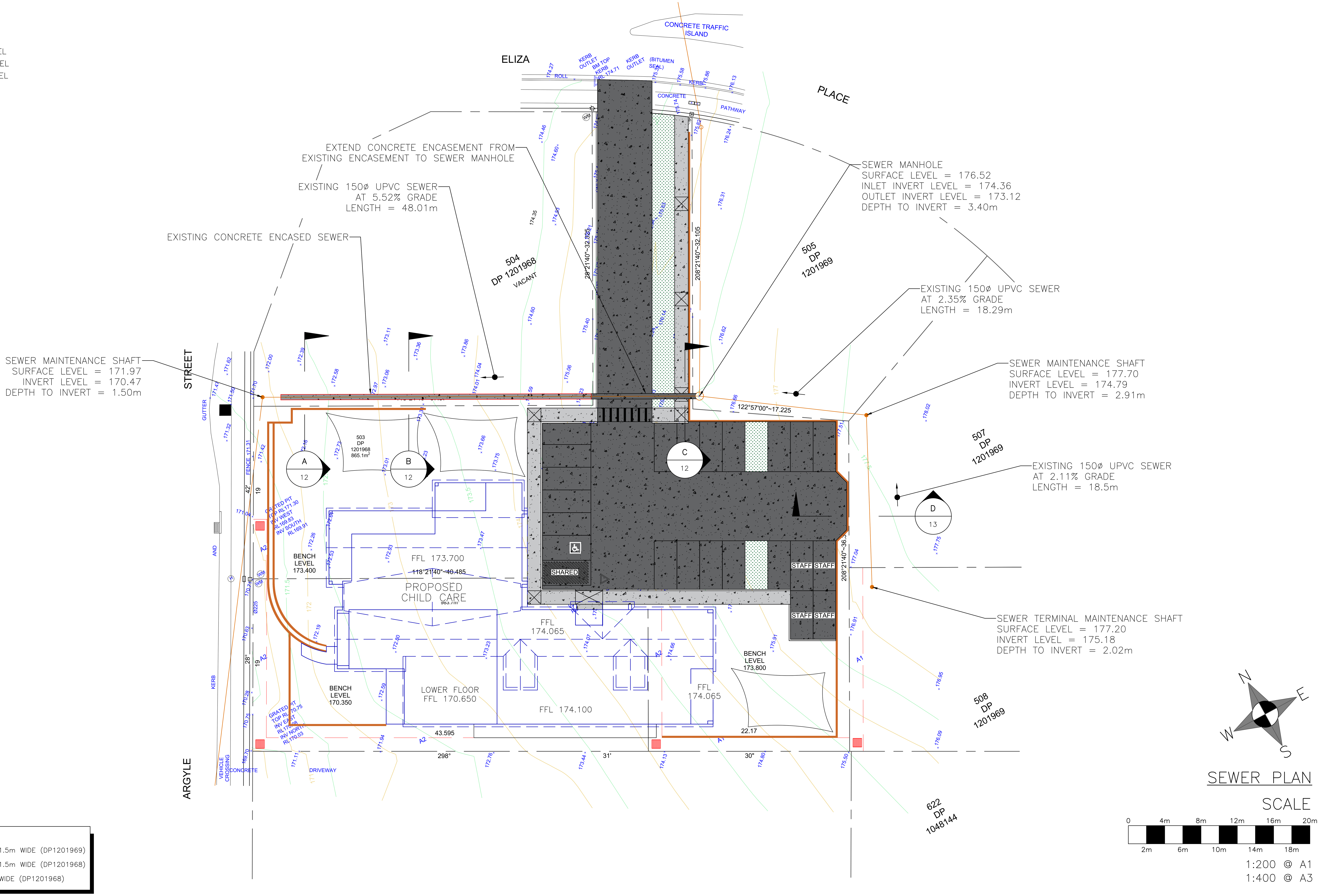
SJ = SAWN JOINT



EASEMENTS:

A1 – EASEMENT TO DRAIN WATER 1.5m WIDE (DP1201969)
A2 – EASEMENT TO DRAIN WATER 1.5m WIDE (DP1201968)
B – RIGHT OF CARRIAGE WAY 3m WIDE (DP1201968)

REV	AMENDMENTS	REV DATE	INITIALS
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B	DRIVEWAY LAYOUT AMENDED	25/05/22	SDL
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A1	SCALE: AS SHOWN ON SHEET	DATE: 28/09/2020	

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PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 13/17

DWG NO: 200774

DESIGNED: BW
DRAWN: BW
CHECKED: AJB

ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969)
4–8 ELIZA PLACE
PICTON NSW 2571

CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.

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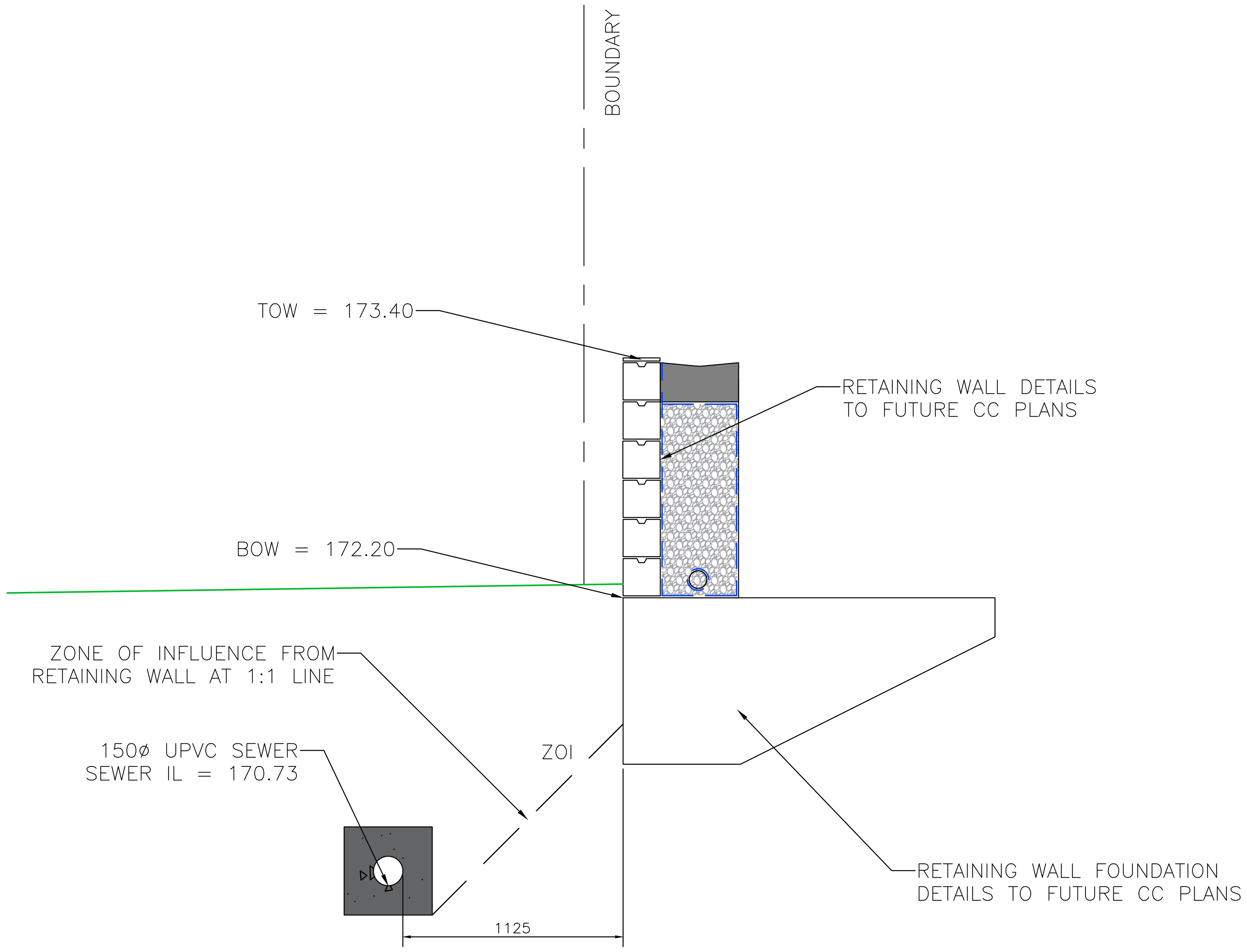
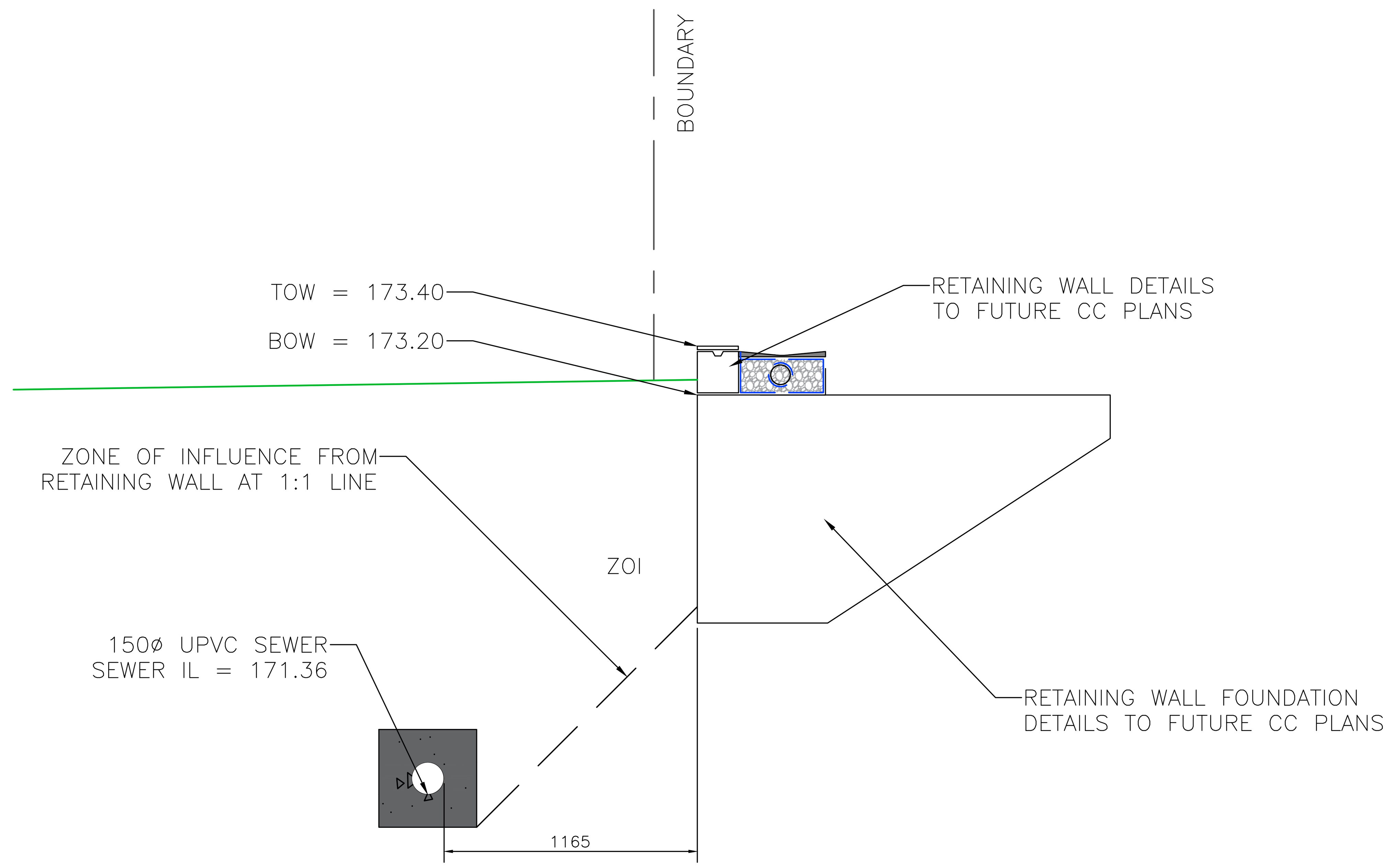
B.E.(MIEAust) CPEng

CLIENT: ENVIRONMENTAL PROPERTY SERVICES



SECTION A–A
SCALE – 1:20
A / 12



SECTION B–B
SCALE – 1:20
B / 12

REV	AMENDMENTS	REV DATE	INITIALS
–	–	–	–
–	–	–	–
B	DRIVEWAY LAYOUT AMENDED	25/05/22	SDL
A	CIVIL PLANS REVISED TO SUIT NEW ARCH PLANS	13/05/22	SDL
A1	SCALE: AS SHOWN ON SHEET	DATE: 28/09/2020	

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PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 14/17

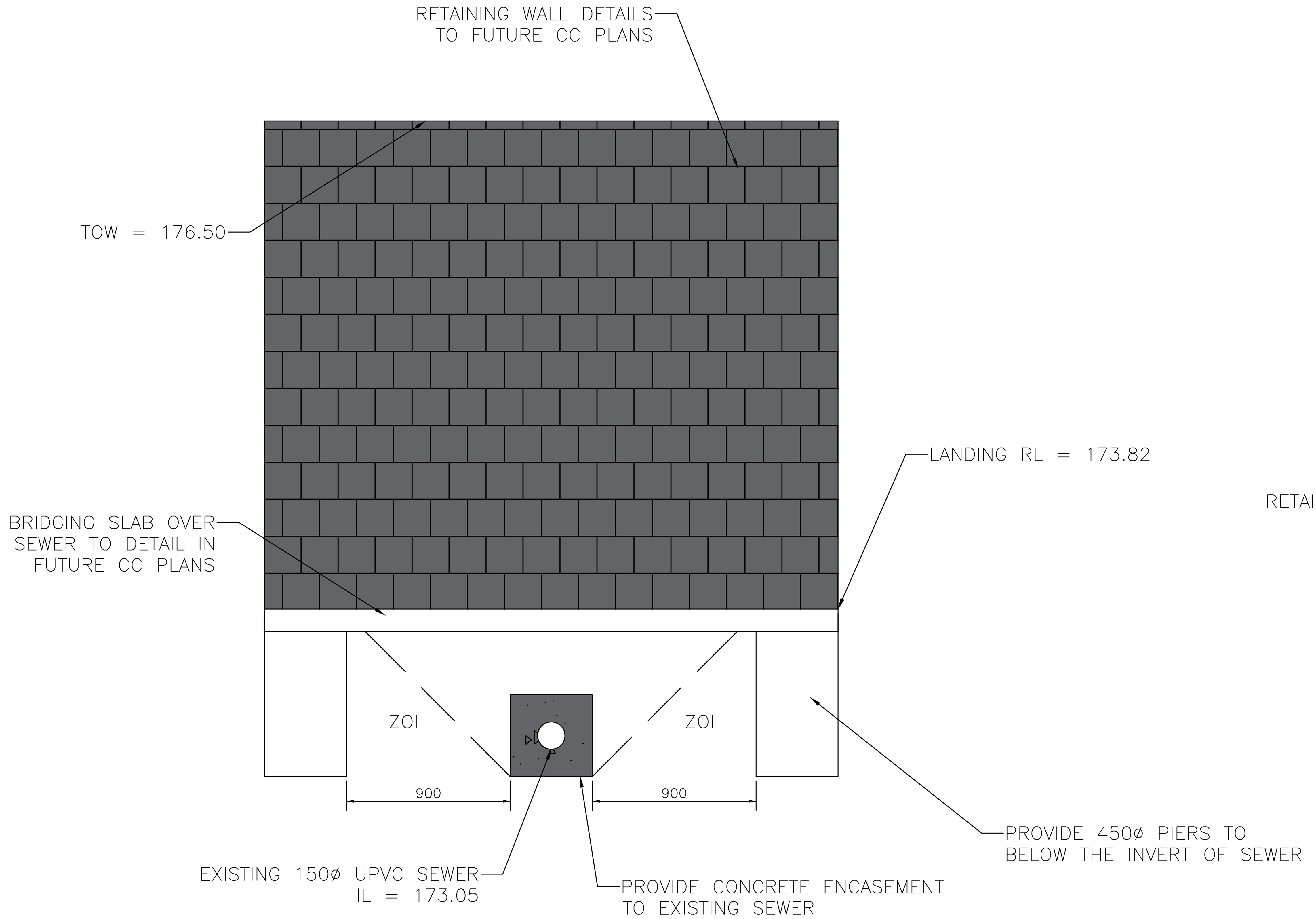
DWG NO: 200774

DESIGNED: BW
DRAWN: BW
CHECKED: AJB

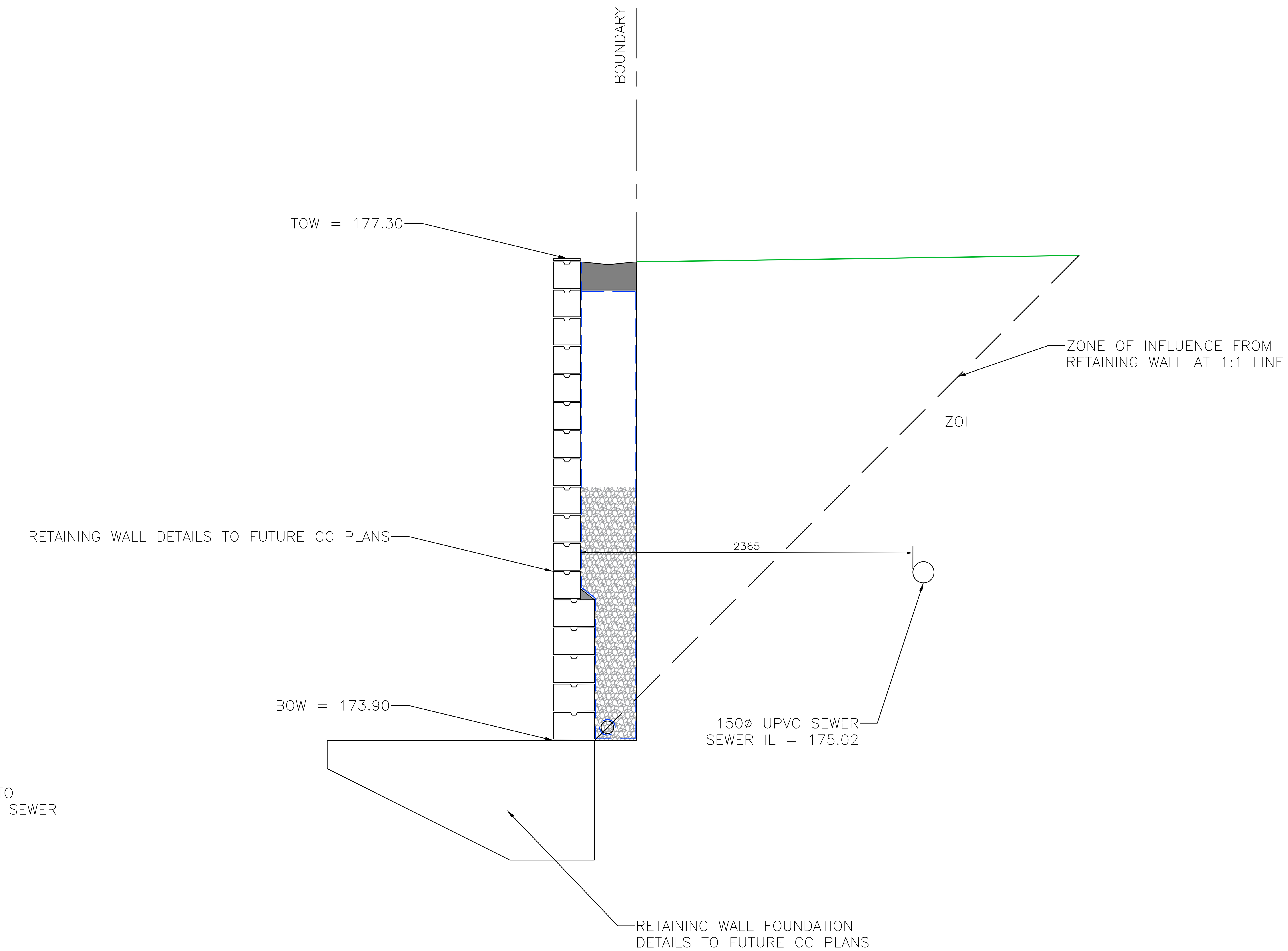
ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969)
4–8 ELIZA PLACE
PICTON NSW 2571

CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.
SIGNED & APPROVED: D.TURNER
B.E.(MIEAust) CPEng

CLIENT: ENVIRONMENTAL PROPERTY SERVICES



SECTION C–C C/13
SCALE – 1:20



SECTION D–D D/13
SCALE – 1:20

REV	AMENDMENTS	REV DATE	INITIALS
–	–	–	–
–	–	–	–
B	DRIVEWAY LAYOUT AMENDED	25/05/22	SDL
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PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE	SHEET: 15/17	DWG NO: 200774	DESIGNED: BW DRAWN: BW CHECKED: AJB
ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969) 4–8 ELIZA PLACE PICTON NSW 2571		CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS. SIGNED & APPROVED: D.TURNER B.E.(MIEAust) CPEng	
CLIENT: ENVIRONMENTAL PROPERTY SERVICES			

NOTE:
IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES PRIOR TO COMMENCEMENT OF WORKS

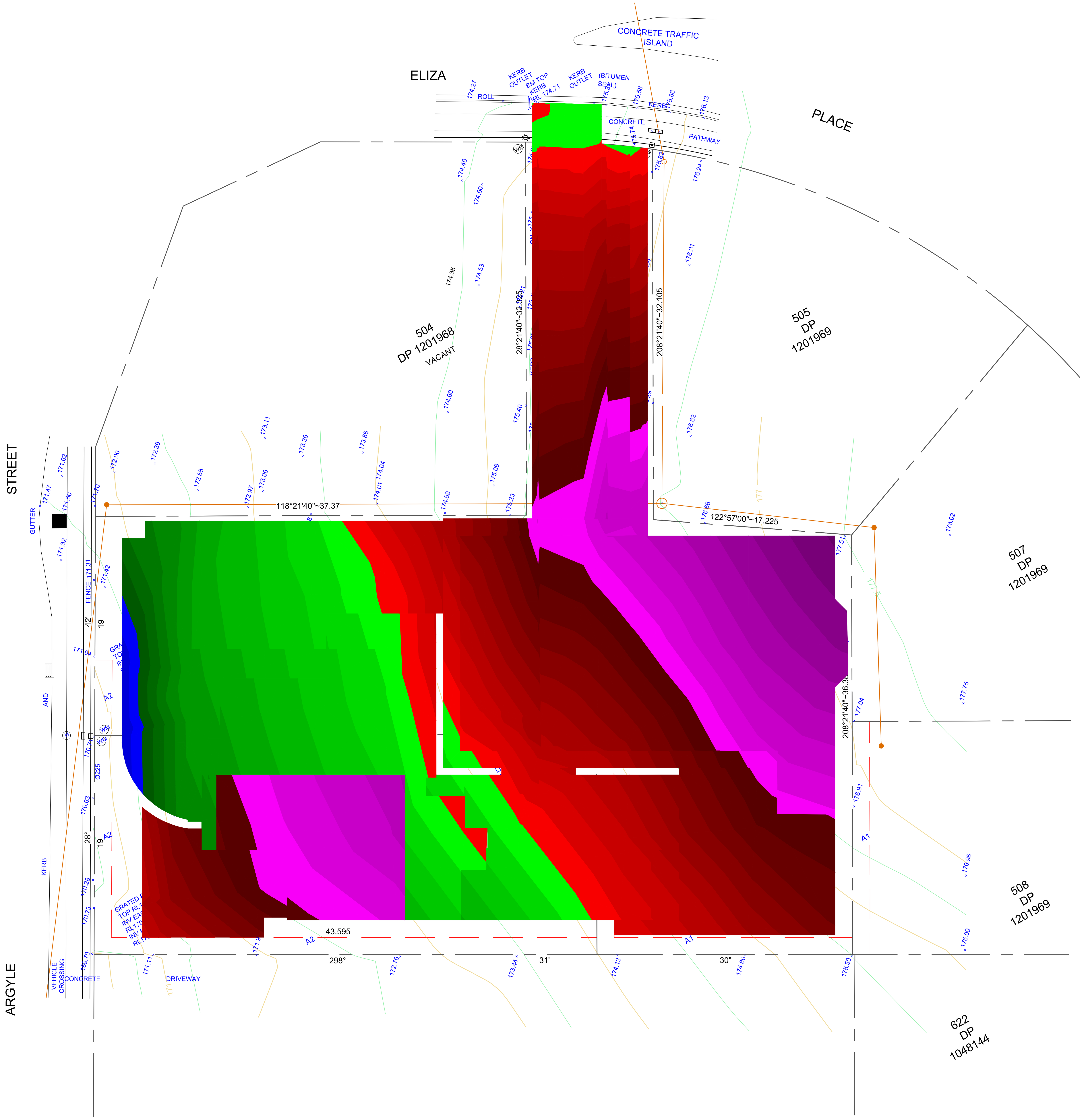
DIAL BEFORE YOU DIG www.1100.com.au

CUT/FILL	RANGE	COLOUR CODE	
CUT	3.8m – 4.0m	MAGENTA 088	
CUT	3.6m – 3.8m	MAGENTA 104	
CUT	3.4m – 3.6m	MAGENTA 120	
CUT	3.2m – 3.4m	MAGENTA 136	
CUT	3.0m – 3.2m	MAGENTA 152	
CUT	2.8m – 3.0m	MAGENTA 168	
CUT	2.6m – 2.8m	MAGENTA 184	
CUT	2.4m – 2.6m	MAGENTA 200	
CUT	2.2m – 2.4m	MAGENTA 216	
CUT	2.0m – 2.2m	MAGENTA 248	
CUT	2.0m – 1.8m	RED 088	
CUT	1.8m – 1.6m	RED 104	
CUT	1.6m – 1.4m	RED 120	
CUT	1.4m – 1.2m	RED 136	
CUT	1.2m – 1.0m	RED 152	
CUT	1.0m – 0.8m	RED 168	
CUT	0.8m – 0.6m	RED 184	
CUT	0.6m – 0.4m	RED 200	
CUT	0.4m – 0.2m	RED 216	
CUT	0.2m – 0.0m	RED 248	
FILL	0.0m – 0.2m	GREEN 248	
FILL	0.2m – 0.4m	GREEN 216	
FILL	0.4m – 0.6m	GREEN 200	
FILL	0.6m – 0.8m	GREEN 184	
FILL	0.8m – 1.0m	GREEN 168	
FILL	1.0m – 1.2m	GREEN 152	
FILL	1.2m – 1.4m	GREEN 136	
FILL	1.4m – 1.6m	GREEN 120	
FILL	1.6m – 1.8m	GREEN 104	
FILL	1.8m – 2.0m	GREEN 088	
FILL	2.0m – 2.2m	BLUE 248	
FILL	2.2m – 2.4m	BLUE 216	
FILL	2.4m – 2.6m	BLUE 200	
FILL	2.6m – 2.8m	BLUE 184	
FILL	2.8m – 3.0m	BLUE 168	
FILL	3.0m – 3.2m	BLUE 152	
FILL	3.2m – 3.4m	BLUE 136	
FILL	3.4m – 3.6m	BLUE 120	
FILL	3.6m – 3.8m	BLUE 104	
FILL	3.8m – 4.0m	BLUE 088	

TOTAL CUT TO DESIGN SURFACE = 2,700m^3

TOTAL FILL TO DESIGN SURFACE = 500m^3

NOTE: CUT AND FILL TO DESIGN SURFACE

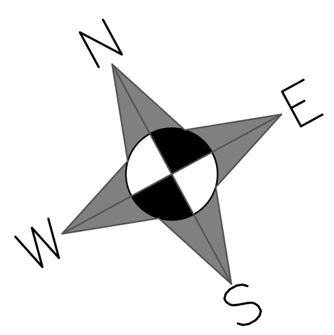


EASEMENTS:

A1 – EASEMENT TO DRAIN WATER 1.5m WIDE (DP1201969)

A2 – EASEMENT TO DRAIN WATER 1.5m WIDE (DP1201968)

B – RIGHT OF CARRIAGE WAY 3m WIDE (DP1201969)



CUT & FILL PLAN

SCALE

0 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m

1:200 @ A1

1:400 @ A3

REV	AMENDMENTS	REV DATE	INITIALS
–	–	–	–
–	–	–	–
B	DRIVEWAY LAYOUT AMENDED	25/05/22	SDL
A	CIVIL PLANS REVISED TO SUIT NEW ARCH PLANS	13/05/22	SDL

A1 SCALE: AS SHOWN ON SHEET

DATE: 28/09/2020

D & M CONSULTING
CIVIL & STRUCTURAL ENGINEERS

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CIVIL AND STRUCTURAL ENGINEERS
SHOP 1 & 2,
16 MITCHELL STREET, CAMDEN
PH (02) 4647 4014
EMAIL: engineer@dmceng.com.au

PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE

SHEET: 16/17

DWG NO: 200774

DESIGNED: BW
DRAWN: BW
CHECKED: AJB

ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969)
4–8 ELIZA PLACE
PICTON NSW 2571

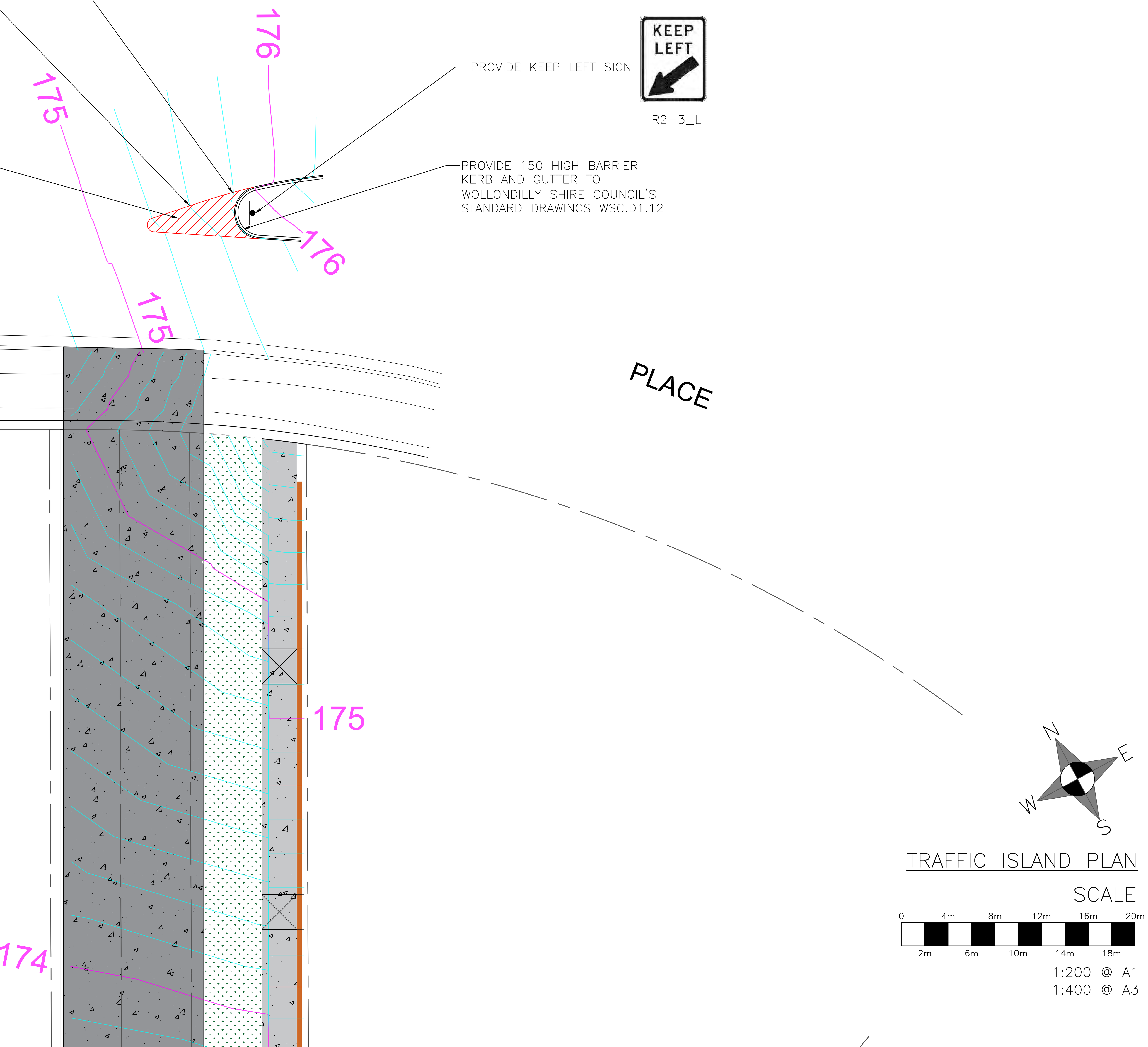
CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.

SIGNED & APPROVED: D.TURNER
B.E.(MIEAust) CPEng

CLIENT: ENVIRONMENTAL PROPERTY SERVICES

KEY:

CL = CONCRETE LEVEL
PL = PAVEMENT LEVEL
FFL = FININSHED FLOOR LEVEL
FGL = FINISHED GROUND LEVEL
EGL = EXISTING GROUND LEVEL
IL = INVERT LEVEL
TOK = TOP OF KERB
GL = GRATE LEVEL
I/O = INSPECTION OPENING
DP = DOWNPIPE
DP/S = DOWNPIPE SPREADER
RH = RAINHEAD
BG = BOX GUTTER
SMH = SEWER MANHOLE
OVF = OVERLAND FLOW PATH
DJ = DOWEL JOINT
SJ = SAWN JOINT

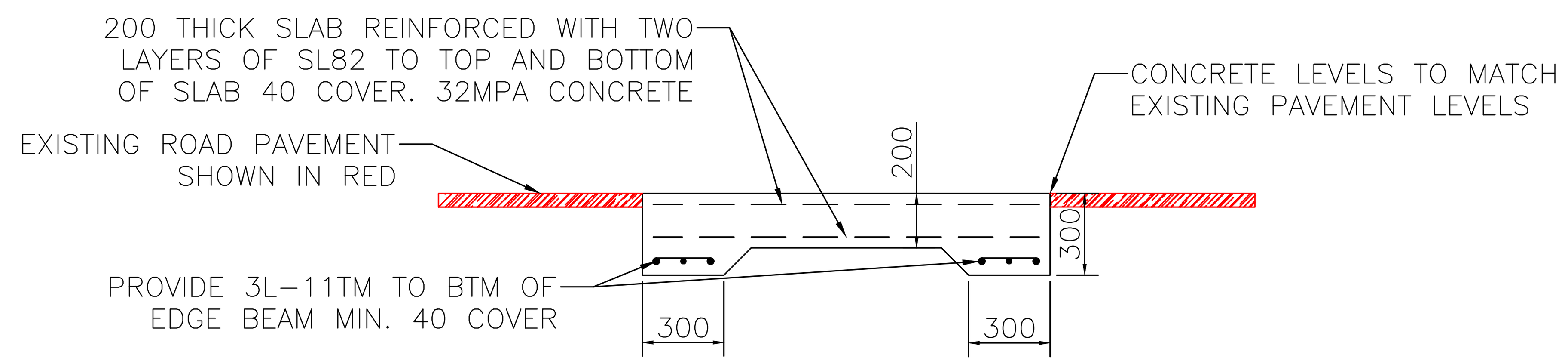


TRAFFIC ISLAND PLAN

SCALE

0 4m 8m 12m 16m 20m
2m 6m 10m 14m 18m

1:200 @ A1
1:400 @ A3



TRAFFIC ISLAND SLAB DETAIL

SCALE 1:20

REV	AMENDMENTS	REV DATE	INITIALS
–	–	–	–
–	–	–	–
B	DRIVEWAY LAYOUT AMENDED	25/05/22	SDL
A	CIVIL PLANS REVISED TO SUIT NEW ARCH PLANS	13/05/22	SDL
A1	SCALE: AS SHOWN ON SHEET	DATE: 28/09/2020	

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EMAIL: engineer@dmceng.com.au

PROJECT: CIVIL DESIGN FOR PROPOSED CHILDCARE CENTRE	SHEET: 17/17	DWG NO: 200774	DESIGNED: BW DRAWN: BW CHECKED: AJB
ADDRESS: LOTS 502–503 (DP1201968) & LOT 506 (DP1201969) 4–8 ELIZA PLACE PICTON NSW 2571		CERTIFIED DESIGNED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS. SIGNED & APPROVED: D.TURNER B.E.(MIEAust) CPEng	
CLIENT: ENVIRONMENTAL PROPERTY SERVICES			