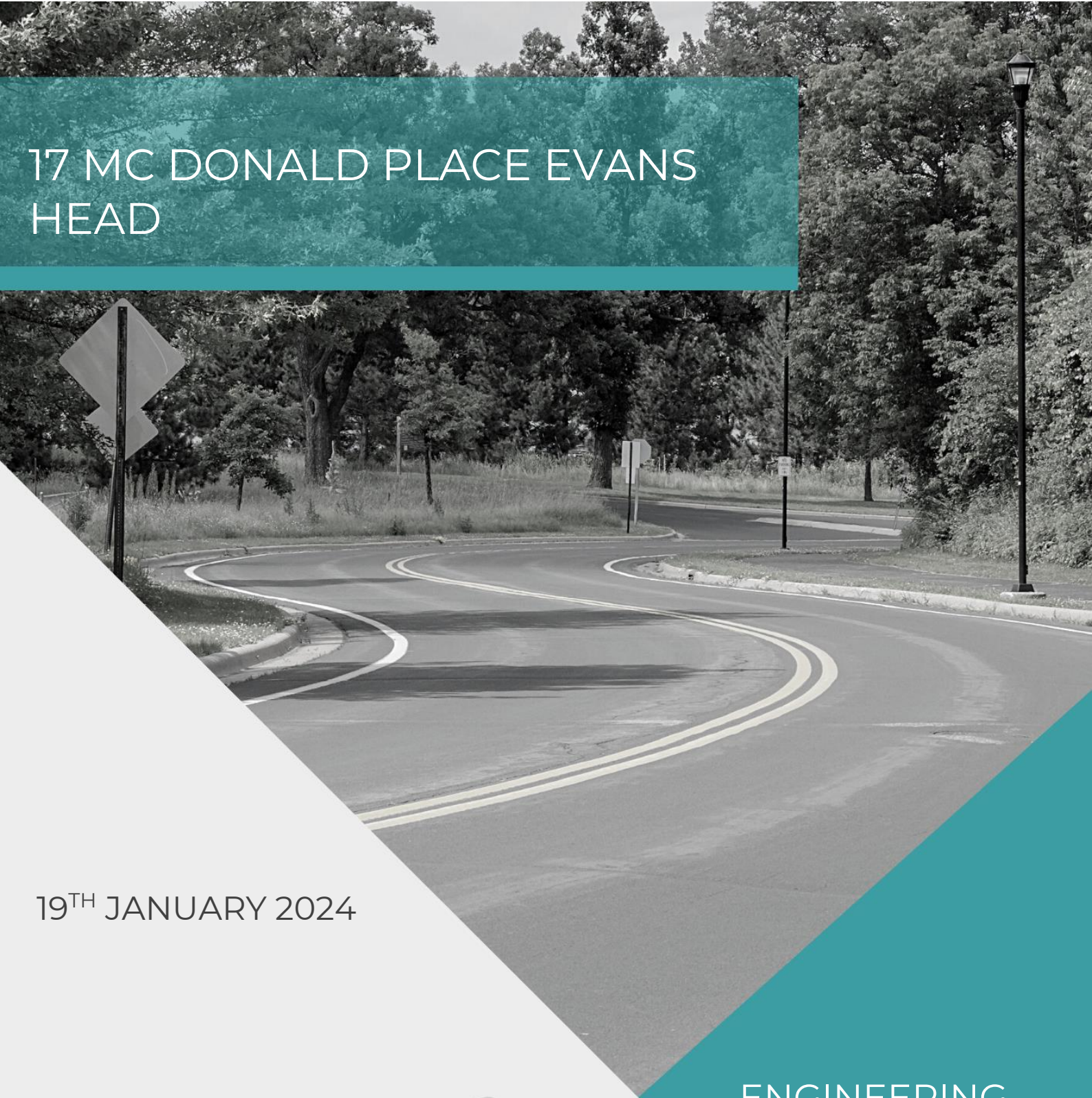
17 MC DONALD PLACE EVANS HEAD



19TH JANUARY 2024

ENGINEERING SERVICES REPORT

INGEN CONSULTING

ENGINEERED WITH PURPOSE

DOCUMENT CONTROL

Revision number	Description	Prepared	Reviewed	Issued	Issue date
A	Draft for client review	AK	MK	MK	
B	Development Application	AK	MK	MK	14/11/2023
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1. INTRODUCTION

Ingen Consulting P/L has been engaged by 17 The Evans Trust Pty Ltd to prepare an Engineering Services Report for a proposed mixed-use development at 17 McDonald Place Evans Head, NSW; Lot 7 DP14089.

1.1. Scope

This Engineering service report has been compiled to detail the individual engineering aspects of the proposed development and their compliances with the relevant standards. This report should be read in conjunction with other documentation lodged with the Development Application and in particular the DA engineering drawings, Traffic Impact Assessment and Noise Impact Assessment prepared by this office.

This report will address the following:

- Earthworks
- Roadworks
- Stormwater Management plan including:
    - Lawful point of discharge
    - Stormwater treatment
    - On-site detention
- Water demand and reticulation
- Sewer demand and reticulation
- Electrical and communication supply.

1.2. Site description

The subject site is located at Lot 7 DP14089, whose address is 17 McDonald Place in Evans Head, NSW 2473, having an area of 822.02m^2 (courtesy of RVC GIS Map).

The subject site is located in Evans Head, on the intersection of McDonald Place and Elm Street. Land uses to the west and south are low- and medium-density residential, to the east is the RSL club and the Gunthorpe Reserve to the north currently contains the 'Evans Head Village', which is temporary flood victim accommodation. Further north is the Evans Head town centre and commercial zone. Figure 1 shows an aerial image of the site and its surrounds. Existing Council assets are shown in Figure 2**Error! Reference source not found.**. Existing site levels vary between RL 4.76 and RL 5.11m AHD and it drains towards the east.

Figure 1 | Lot 7 DP14089 Location (proposed development site), *Source of the map: Richmond Valley Council 2023*

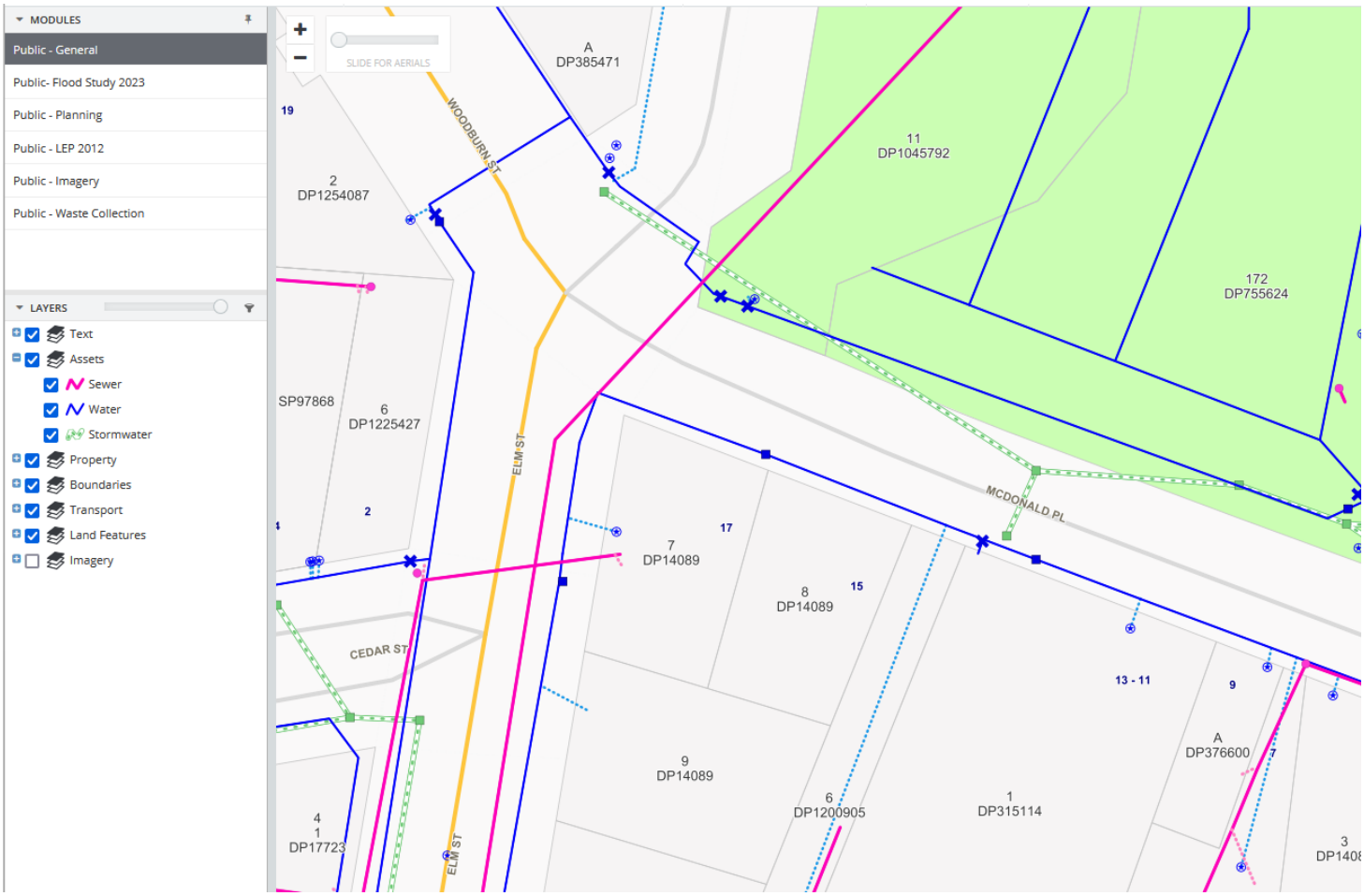

Figure 2 | Existing Council assets, *Source: Richmond Valley Council Intramaps.*

1.3. Proposed development

The intended project involves the removal of the existing house structure and the construction of a 3-storey mixed use development which includes:

- Ground Floor: car parking and café
- First Floor: five residential apartments and two communal gardens
- Second Floor: five residential apartments with communal open space and roof garden
- Roof top: communal area and mechanical services

The residential apartments will be for long-term residential use only and not for holiday letting.

The proposed operating time of the café is 6am – 10pm daily.

A ground level view of the proposed building is shown in Figure 3. Floor plans are provided in Figure 4, Figure 5 and Figure 6.

Figure 3 | Groundlevel view from the northwest, *Source: Barker Architects*

Figure 4 | Proposed layout, Ground floor, *Source: Barker Architects.*

Figure 5 | Proposed layout, First floor, Source: Barker Architects

Figure 6 | Proposed layout, Second floor, *Source: Barker Architects.*

2. FLOODING AND EARTHWORKS

2.1. Earthworks and Geotechnical

Richmond Valley Council DCP Chapter A-9 provides requirements for earthworks associated with shop top housing developments. The proposal involves no significant earthworks other than levelling and regrading to achieve a ground floor level of approximately RL5.00 and thus complies with the DCP requirements.

2.2. Acid Sulphate soil

Richmond Valley Council DCP provides a checklist to follow and work around to ensure effective management of areas that may be affected by Acid Sulphate soils.

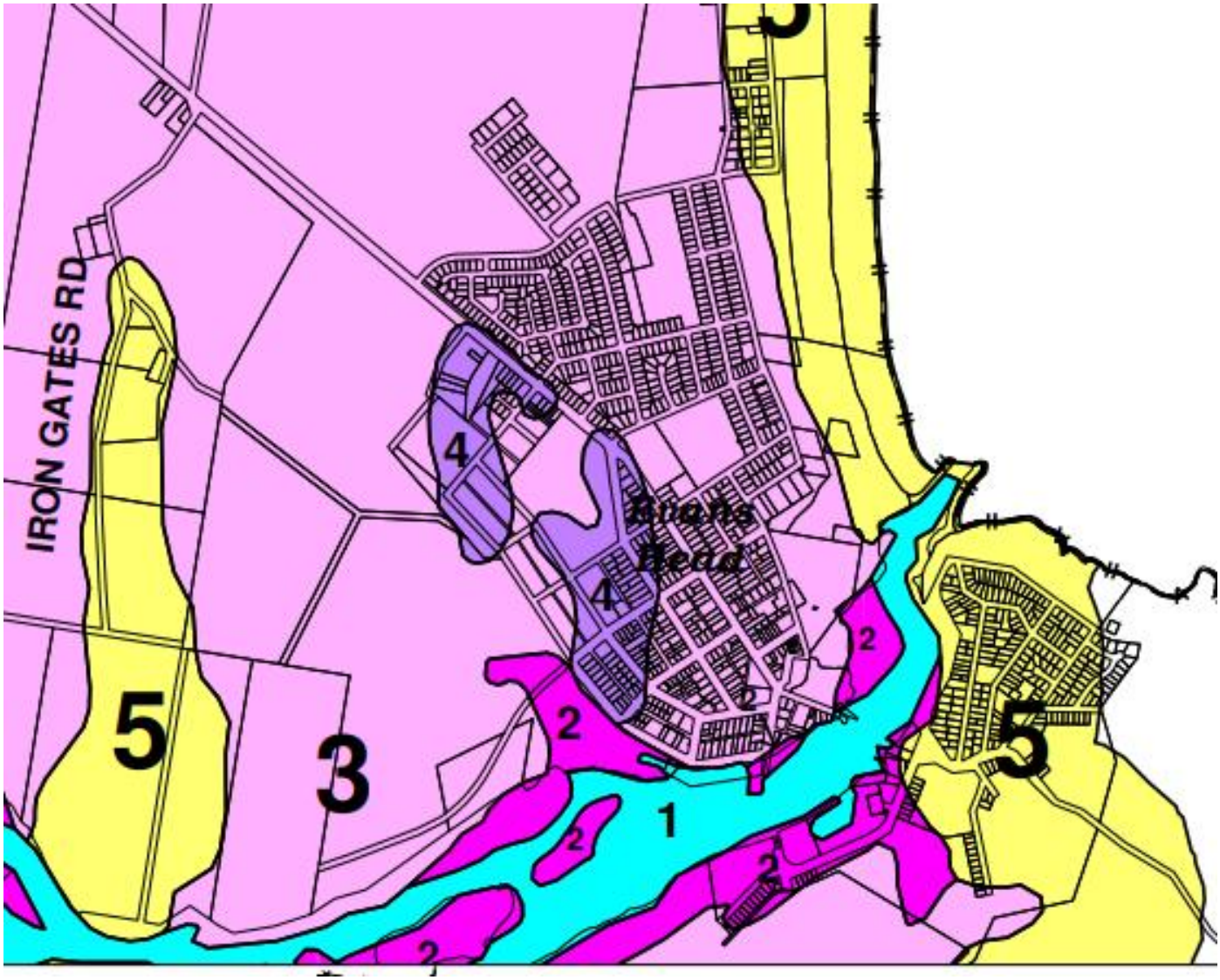

Figure 7 | Acid Sulphate Soils Planning Map, *Source Richmond River Local Environmental Plan 1992 (Amendment no. 22)*

As per the Richmond River Local Environmental Plan 1992 (Amendment 22), the proposed site is categorized as "Class 3." This classification encompasses two specific types of works: (Figure 7)

- Excavations or activities that extend more than 1 meter below the natural ground surface.
- Activities that have the potential to lower the water table beyond the 1-meter mark below the natural surface.

In simpler terms, any construction or actions falling within these categories are subject to the regulations and provisions outlined in the planning instrument and require obtaining development consent from the Council.

Richmond Valley Council DCP Chapter H-3.4 states Exceptions to requiring development consent: -

(3) Minor works

- Consent is not required to carry out works involving the disturbance of less than 1 tonne of soil (acid sulphate soil), or where the works are not likely to lower the water table.

If any excavations such as footing construction exceeds a depth of 1 metre, then an acid sulfate management plan should be prepared for these works.

2.3. Preliminary Flood Assessment

Richmond Valley Council DCP 2021 Chapter H-1.1 Flood Planning states that:

The general objectives of this chapter are to:

- Align flood planning with the NSW Government's Floodplain Policy.
- Explain the relevance of the adopted Flood Planning Level.
- Call up Flood Planning Development Controls from Council's Floodplain Risk Management Plans, which adopt a flood planning approach taking into account social and environmental considerations alongside economic benefits to reach the most objective balance.
- Explain the adopted floodplain risk hazard categories and encourage suitable development compatible with flood hazard.
- Make allowances for alterations to existing development, or on compassionate grounds such as when a building has been lost to fire or storm.

2.4. Flood Characteristics

As Council's 2023 flood modelling shows, the subject site is flood free for flood events up to and including the '1 in 500 year' event, see Figure 8 below. During a 'Probable Maximum Flood' (PMF) event the site can be subject to flooding in excess of 2 metres in depth (see Figure 9)

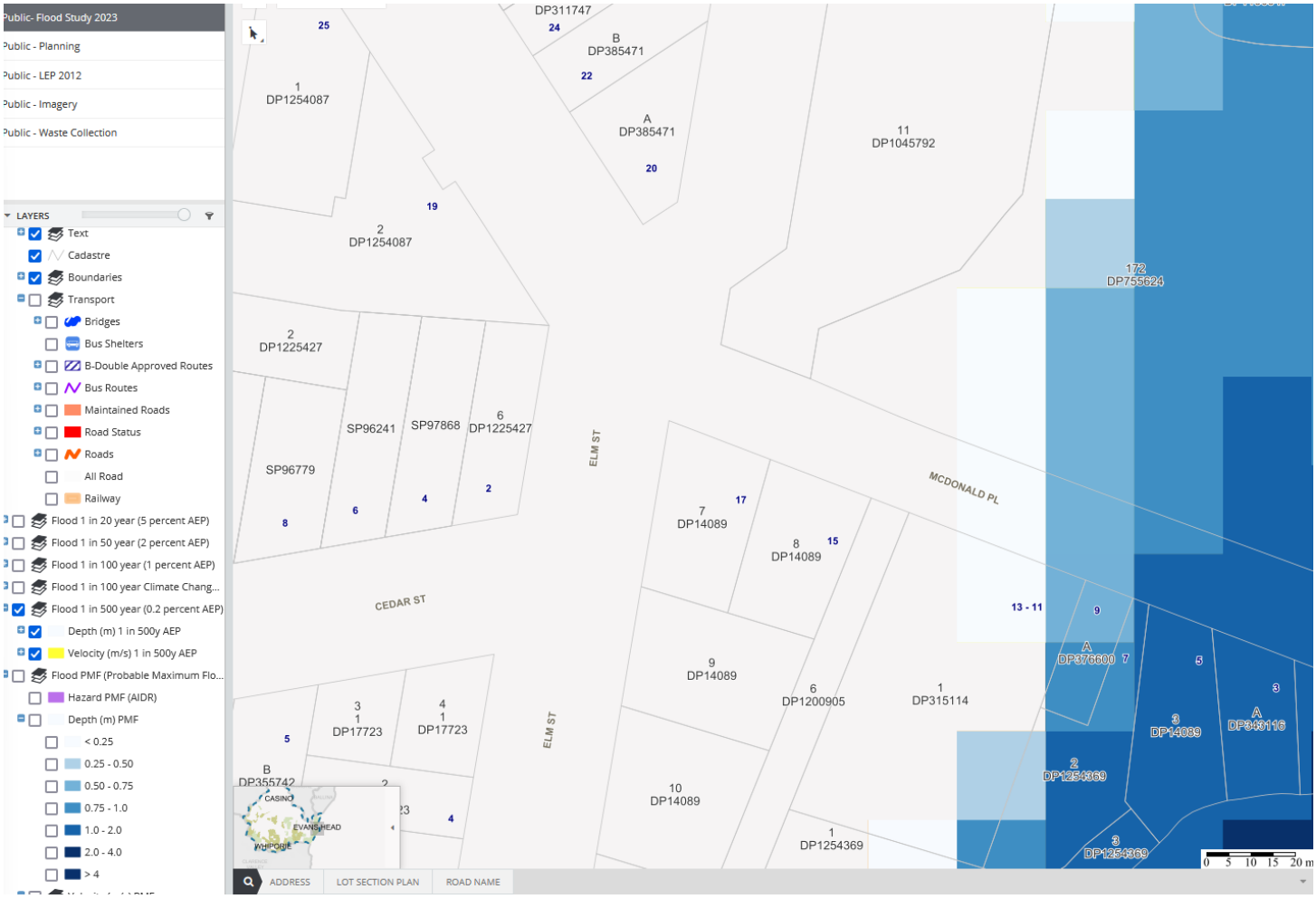

Figure 8 | 1:500yr ARI flood depths, *Source: Richmond Valley Council Intramaps*

Figure 9 | PMF inundation, *Source: Richmond Valley Council Intramaps*

2.5. Flood Planning Level

Richmond Valley Council have provided us with a Flood Information Enquiry. It should be noted that the results are based on 1999, 2010 and 2014 modelling and has not been updated using the results of the 2023 flood model.

The Flood Planning Level for this area is 3.4m AHD. Given the ground floor levels are around RL5m, significantly above the Flood Planning Level based on the older modelling, and given that the 2023 modelling shows the site to be flood free for events up to and including the 1 in 500yr event, we can conclude that the floor levels proposed in the architectural plans are adequate, above the Flood Planning Leve, and no further assessment on flooding needs to be undertaken.

3. TRAFFIC

Our office has provided a traffic impact assessment for the proposed development. The conclusions and recommendations from that report are as follows:

- All entry to be off Elm Street
- All exit to be onto McDonald Place
- The exit driveway to have a 6m wide garage door, but with bollards and linemarking forcing vehicles to exit whilst driving in the centre of this driveway, thus maximising sight lines to pedestrians on the McDonald Place footpath.
- Additional signage to be installed at the car park exit to make both pedestrians and exiting vehicles aware of each other
- On-street car parking proposed in Elm Street, using 45° parking
- It is proposed to linemark a loading bay in Elm Street
- It is recommended that the shortfall in off-street parking be addressed either by the additional car parking capacity created in the street using the angled car parking, or by ways of a Voluntary Planning Agreement

4. STORMWATER MANAGEMENT PLAN

Stormwater management on this site will need to demonstrate compliance with Chapter 1-9.4 of the Richmond Valley Council Developmental Control Plan.

4.1. Lawful point of discharge

A detailed survey of the site and its surrounding areas have been carried out by Newton Denny Chapelle.

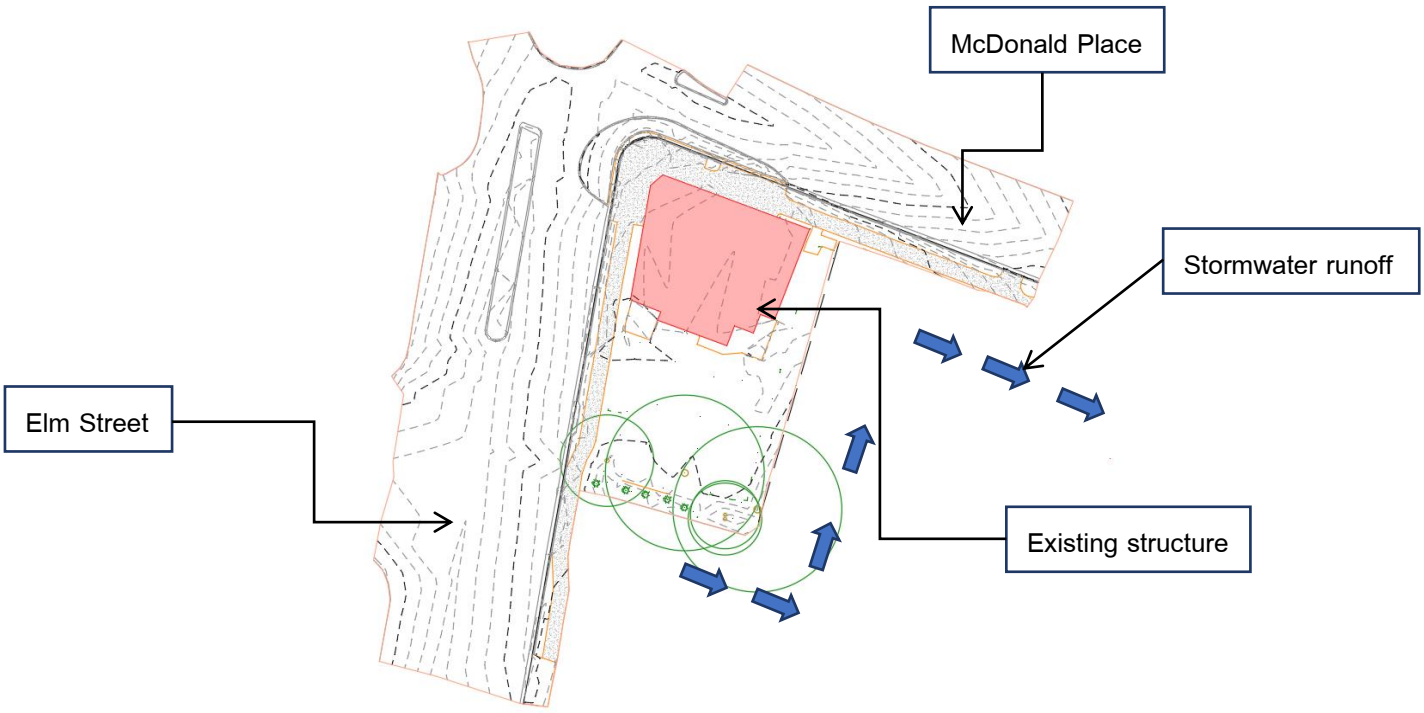

Figure 10 | Lot 7 DP14089 Location (proposed development site), *Source: Newton Denny Chapelle.*

In the absence of underground stormwater drainage, the available lawful point of discharge for this site is the kerb and gutter in Elm Street and McDonald Place. During our site inspection we found 4 existing kerb adaptors in the kerb along the site frontage, which can be reused for stormwater discharge.

Because no underground stormwater infrastructure exists along the site frontage, it is recommended that any stormwater detention and treatment is carried out above ground, so that gravity flow towards the kerbs can be achieved.

4.2. Catchments

The existing and proposed catchments have been determined using the survey plans provided by Newton Denny Chapelle Surveyors and Barker Architects respectively.

Figure 11 | Existing Catchment areas, *Source: Newton Denny Chapelle Surveyors.*

Table 1 | Existing catchment

ID	Area, sqm	Description	% of the total area	Type
A	315.159	Shed roof	38.3%	Impermeable
B	507.631	Landscape grassed	61.7%	Permeable
Total	**822.79**		**100.0 %**	

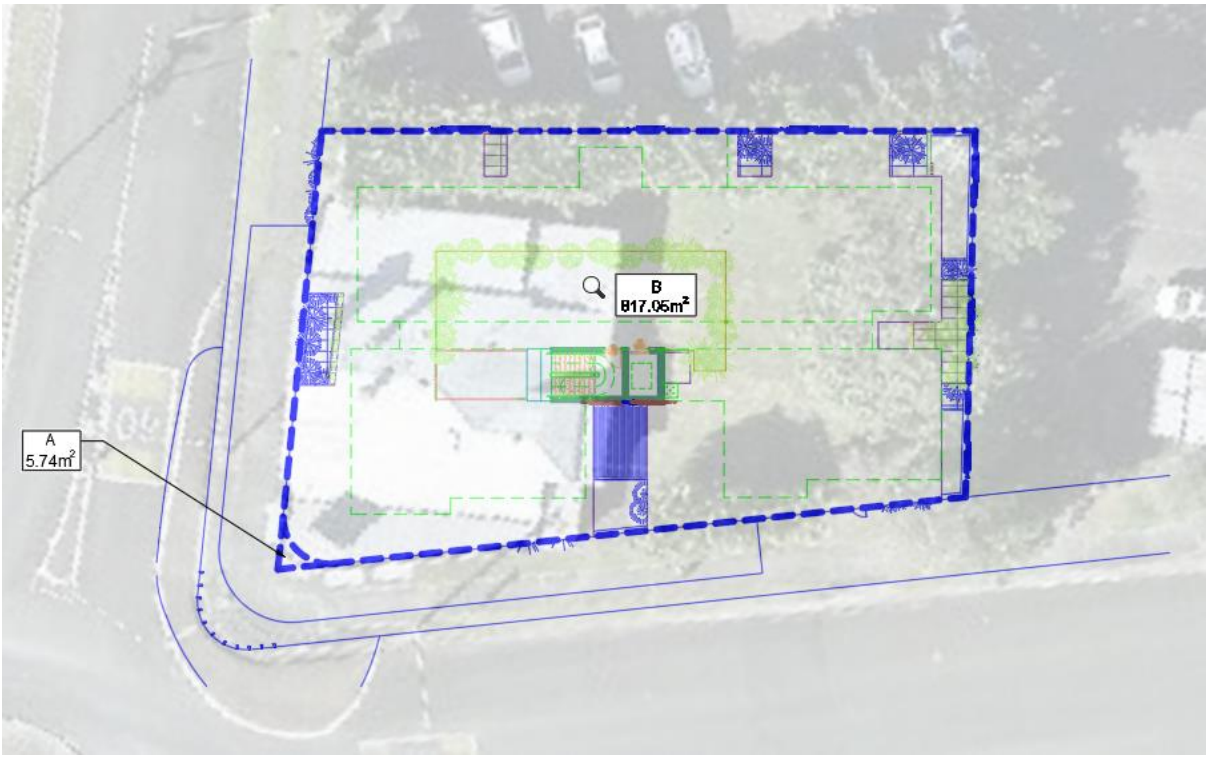

Figure 12 | Proposed site roofing area, *Source: Barkers Architects*

Table 2 | Proposed catchment

ID	Area, sqm	Description	% of the total area	Type
A	5.74	Existing footpath	0.69%	Impermeable
B	817.05	Shed roof	99.31%	Impermeable
Total	**822.79**		**100.0 %**	

4.3. Water Quality Controls

Richmond Valley Council's water quality control targets are provided in Figure 13.

Contaminant	Target
Coarse Sediment (0.1 to 0.5 mm)	80% mean annual reduction from baseline
Fine particles (<0.1 mm)	50% mean annual reduction from baseline.
Total Phosphorus	45 % mean annual reduction from baseline
Total Nitrogen	45% mean annual reduction from baseline
Litter	70 % mean annual reduction from baseline
Hydrocarbons, motor fuels, oils and greases	90% mean annual reduction from baseline

Figure 13 | Stormwater Quality Targets, *Source: Richmond Valley Council DCP*

All stormwater runoff will be from roofs only. There is no runoff from the off-street parking area as it is undercover and car washing is not permitted in the car park.

4.4. Stormwater Quality Results

We have prepared a concept treatment train design using MUSIC (see Figure 14). Several options are possible, but the preferred treatment train for this development includes a rainwater tank with 7kL. Using an assumed 1kL per day reuse volume and inclusion of a SPEL Stormsack in the tank, Council's WSUD targets can be met.

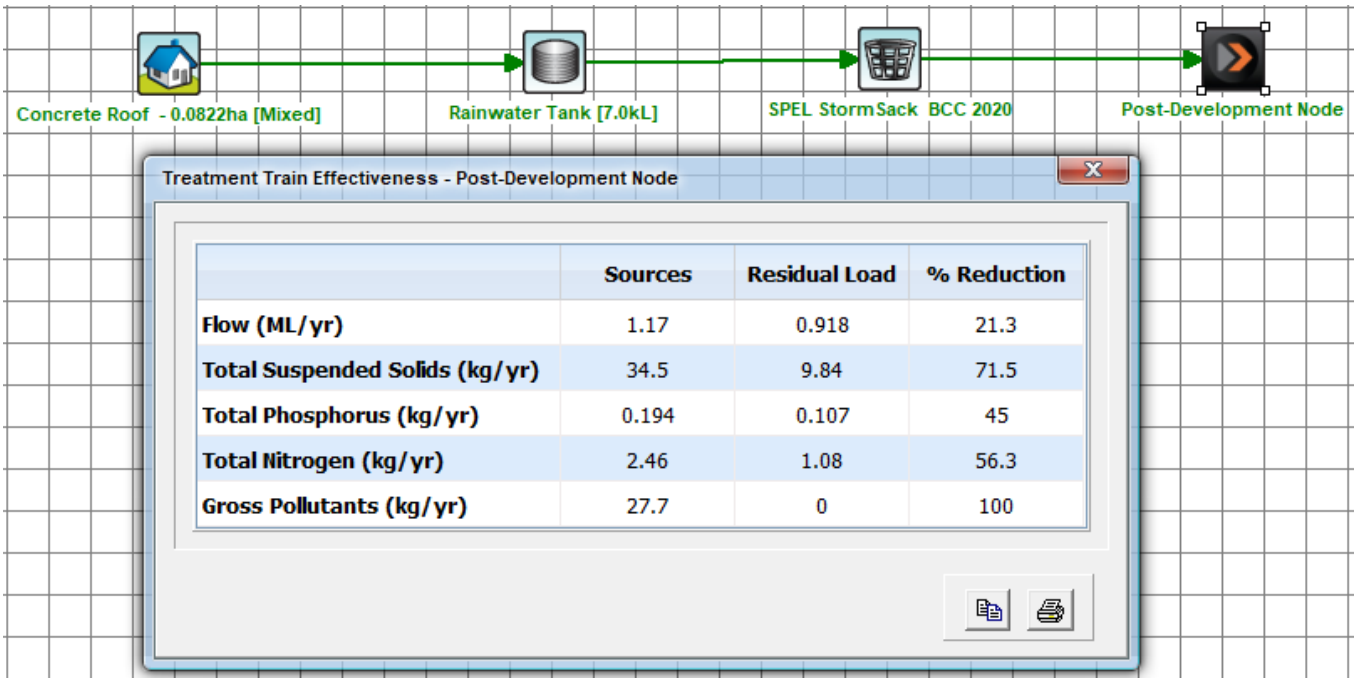

Figure 14 | Treatment train design, *Source: MUSIC*

The results are summarised in Table 3..

Table 3 | Post-development stormwater quality treatment train effectiveness

Pollutant Parameter	Sources	Residual Load (kg/yr)	% Reduction	Required Reduction	Compliant
Total Suspended Solids (Sediment) (kg/yr)	34.8	9.79	71.5	50%	✓
Total Phosphorus (kg/yr)	0.194	0.106	45.0	45%	✓
Total Nitrogen (kg/yr)	2.43	1.05	56.3	45%	✓
Gross Pollutants (kg/yr)	27.7	0	100	70	✓
Obs: There will be no hydrocarbon runoff as there is not road pavement combined with surface runoff					

4.5. On-site detention

Reasons why OSD is required for this project: -

- The planned construction will fully cover the site's footprint, leaving no room for permeable surfaces, and as a result, infiltration cannot be utilized as a means of stormwater discharge for the site.
- Stormwater detention is proposed to limit post development peak runoff to McDonald Place to match predevelopment volume.
- According to Richmond Valley DCP table I.9.3 Stormwater targets, flowrates at any point are not to increase during storms for the 2- and 5-year ARI events

The first step in determining the need for OSD is to calculate the runoff peaks from each individual catchment pre- and post-development and the impact OSD would have on the timing of runoff peaks. The catchment plan for this site is provided in Figure 11 and Figure 12, the catchment areas are summarised in Table 1 and Table 2 respectively.

Table 4 | Peak run off comparison

Storm event (ARR 2016 definitions)	Pre-development combined peak site runoff flow rate (m^3/s)	Post-combined peak site runoff flow rate (m^3/s) (unmitigated)	Post-combined peak site runoff flow rate (m^3/s) (mitigated)
0.5EY ('2-year ARI")	0.015	0.027	0.014

0.2EY (‘5-year ARI”)	0.022	0.034	0.016

This will be achieved by using on-site detention tanks collecting the roof water from the proposed dwellings, and gradually releasing the collected stormwater through orifice pipe.

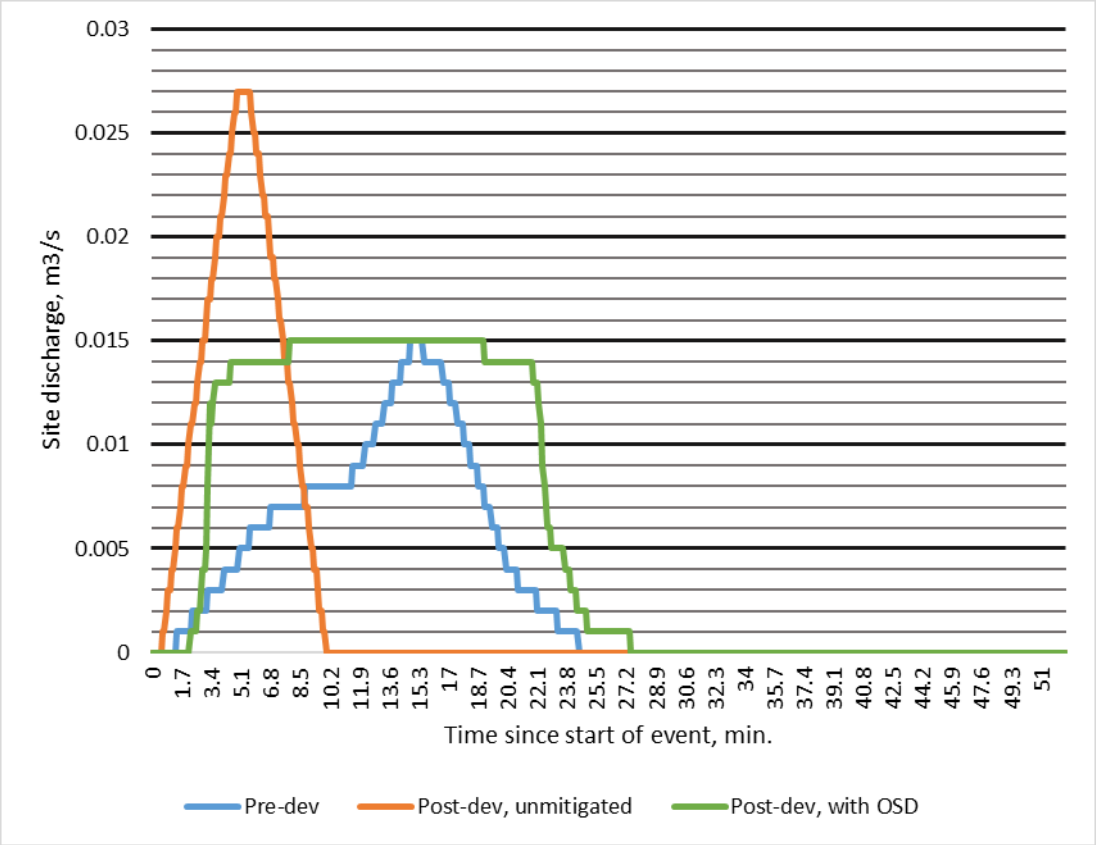

Figure 15 | Minor storm (0.5EY) discharge hydrograph

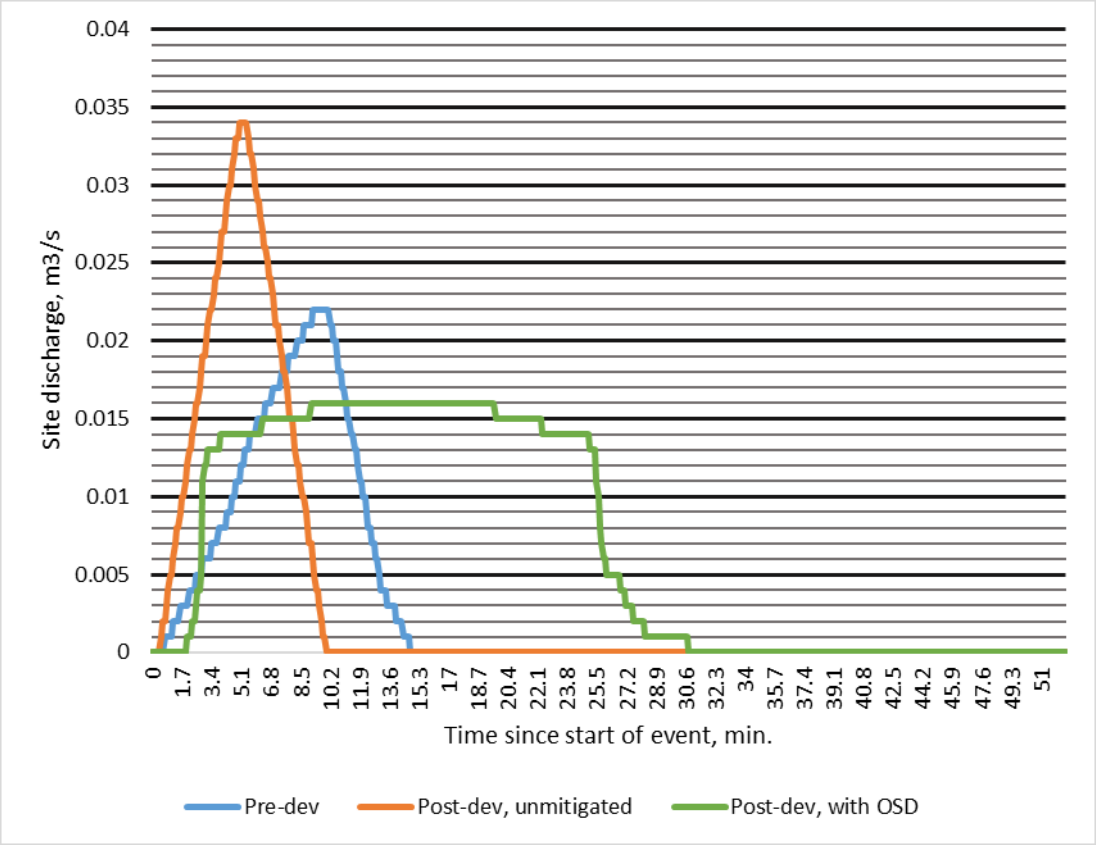

Figure 16 | Major storm (0.2EY) site discharge hydrograph

We carried out hydrology and detention calculations in DRAINS, resulting in the following rainwater tank volumes.

Table 5 | OSD details

ID	Description	Volume(L)	Outlet configuration (mm)	Catchment
OSD A	17kL custom designed and built rainwater tank, including Stormsack, capturing all roofwater Height = 2.2m, Length = 3.7m, Width = 2.3m.	17,000	1 x Ø150mm low level orifice pipe with an invert of 1.175m above tank invert. 1 x Ø100mm high level overflow pipe with an invert at 2.0m above the tank invert.	Roof catchment 822.09 m^2

This rainwater tank is modelled to support up to 5% AEP storm event. The DRAINS modelling results for the entire site are depicted in Table 4 for the 2 and 5-year ARI events. The durations of these

storm events are 5min to 3 hours. These results demonstrate that the stormwater detention targets as outlined in the Richmond Valley DCP table I.9.3 will be met since the post development peak runoff volume is equal to or less than the pre-development peak runoff volume.

This tank contains 7kL of reuse capacity in the bottom below the low level orifice pipe, and 10kL of on-site detention storage above the low level orifice pipe.

5. UTILITIES

5.1. Water supply demand and reticulation

Council's ET calculations as provided in the 25/10/2022 pre-lodgement meeting minutes are copied below.

Table 6 | ET calculations

No. of Bedrooms per apartment	No. of apartments	ET per unit	Total ET
1	4	0.4	1.6
2	4	0.6	2.4
3	2	0.8	1.6
Total	**10**	**1.8**	**5.6**

There is an existing water meter along the Elm Street frontage. This water meter and associated property connection with the main will be upgraded to a 50mm connection.

Council carried out a pressure and flow test at a McDonald Place hydrant on the 22nd of June 2022. The results are provided below. Given the Elm Street water connection is on the same main as the McDonald Place hydrant (see Figure 18), it is reasonable to assume that the pressure and flow characteristics at the current connection point are very similar to those printed below.

We understand from the hydraulic engineer that a booster assembly is not required for this proposal.

Project ID	Flood Relief Housing	Flow Rate (L/s)	Pressure (kPa)
Test Details	Two Hydrant Test		
	8.00am	0	400
Location	Evans Head	5	300
Street Address	McDonald Place	10	200
Requested By	David Peatfield	15	70
Tested by	Isaac Anderson	17	0
Date	22/06/2022		
Maximum Flow Rate	17.00 Litres Per Second		

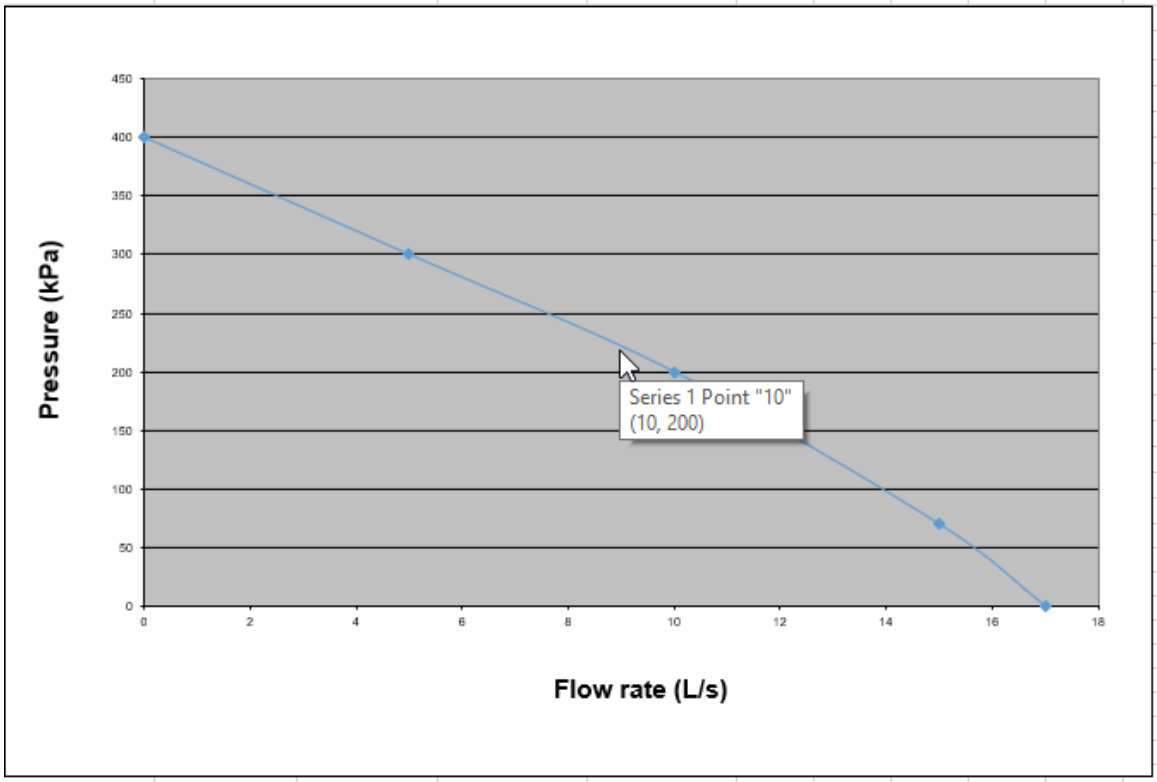

Figure 17 | McDonald Place pressure and flow test

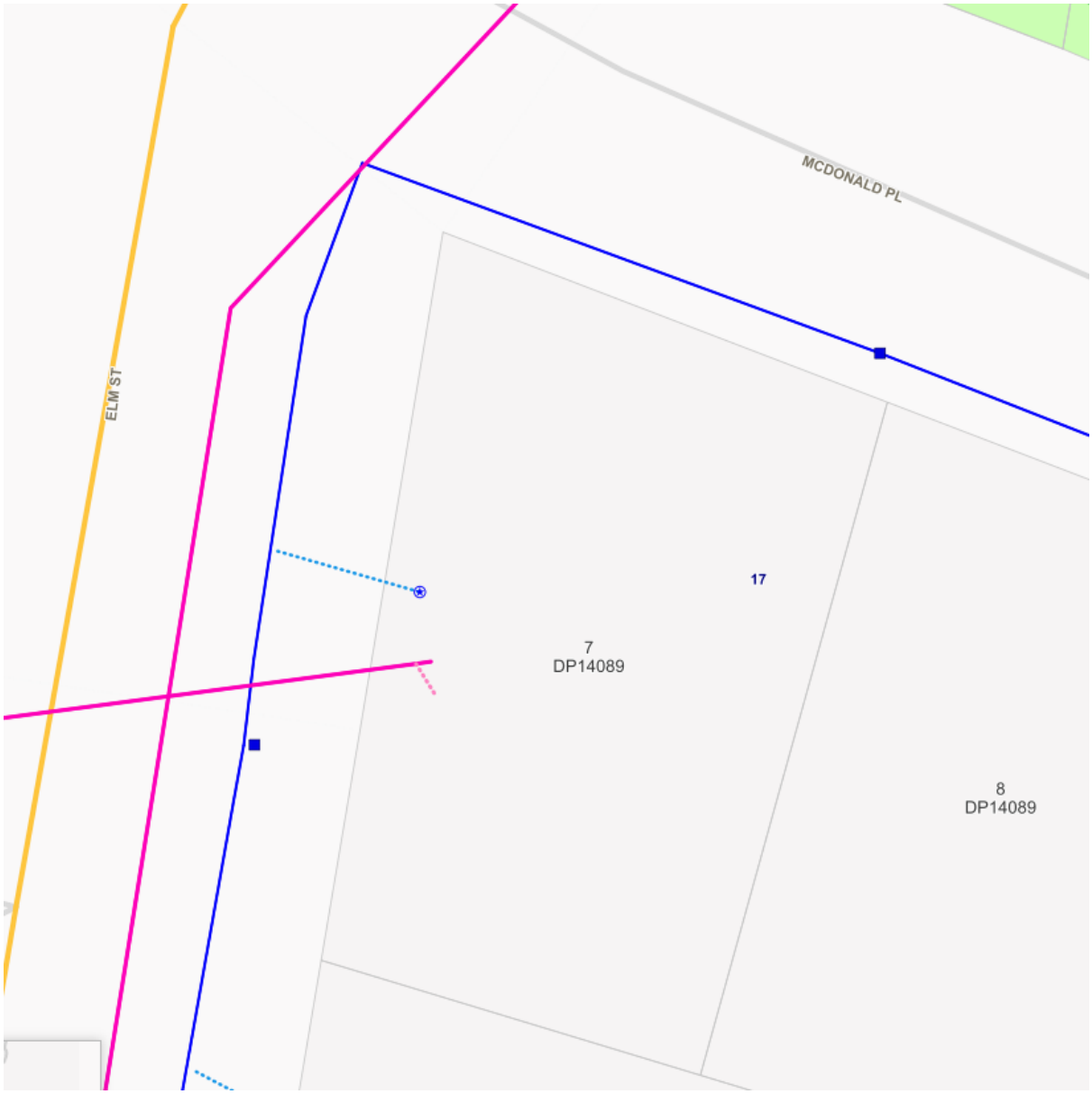

Figure 18 | Water infrastructure at site frontage, *Source: Richmond Valley Council Intramaps*

5.2. Sewer demand and reticulation

Council's ET calculations as provided in the 25/10/2022 pre-lodgement meeting minutes are copied below.

Table 7 | ET calculations

No. of Bedrooms per apartment	No. of apartments	ET per unit	Total ET
1	4	0.4	1.6
2	4	0.6	2.4
3	2	0.8	1.6

Total	**10**	**1.8**	**5.6**

The existing sewer connection is on Elm Street. There is an existing grease trap and private connection to the sewer main, as picked up on the survey (Figure 19) and observed on site (Figure 20). It is proposed to retain the same sewer connection location. If during detailed design stage any changes are required, then these will be applied for through a S68 application process.

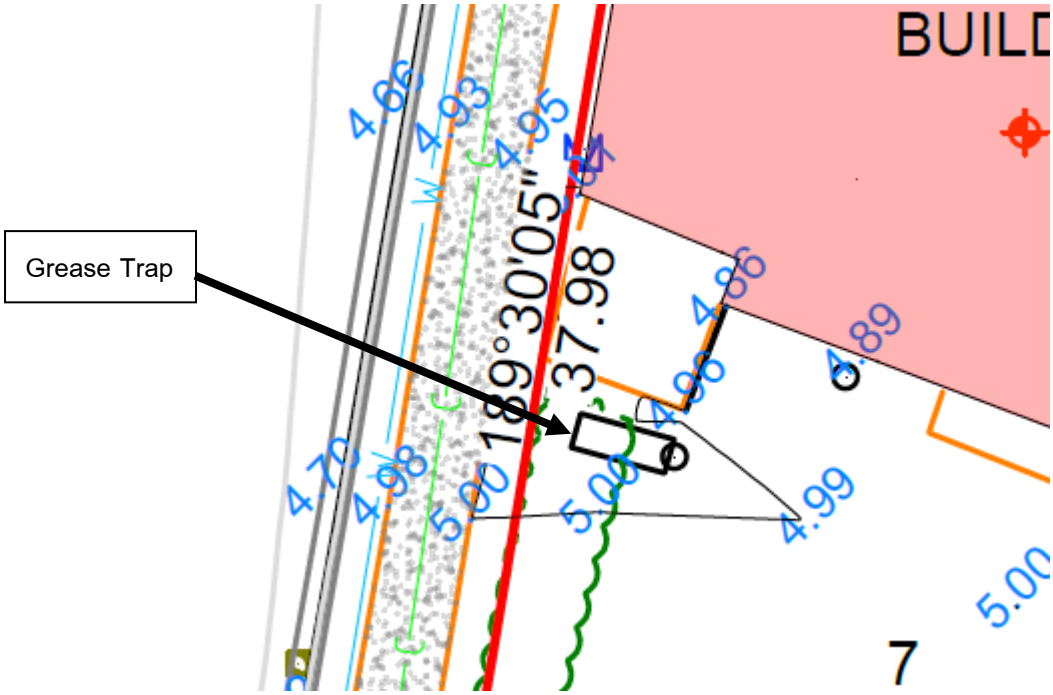

Figure 19 | **Grease trap location**

Figure 20 | Grease trap

5.3. Electrical Supply

Existing electricity supply is through an above ground cable from the opposite side of McDonald Place, as shown in Figure 21 below. The electrical design will be determined once an Essential Energy application has been submitted, which would happen after approval of the Development Application. There are two options for supply. Option one is to trench an underground cable across McDonald Place from the power pole opposite the site, to feed to a pillar box adjacent the northeastern corner of the site. This would then provide underground supply of electricity. Option 2 is an overhead supply wire, similar to what is there currently.

Figure 21 | Existing electricity supply

5.4. Communications supply

As per the DBYD (see Figure 22), there is already existing NBN network connection to the site. We assume this will be adjusted to suit, and a Notice of Arrangement would likely be required as part of a set of consent conditions accompanying a Development Application approval.

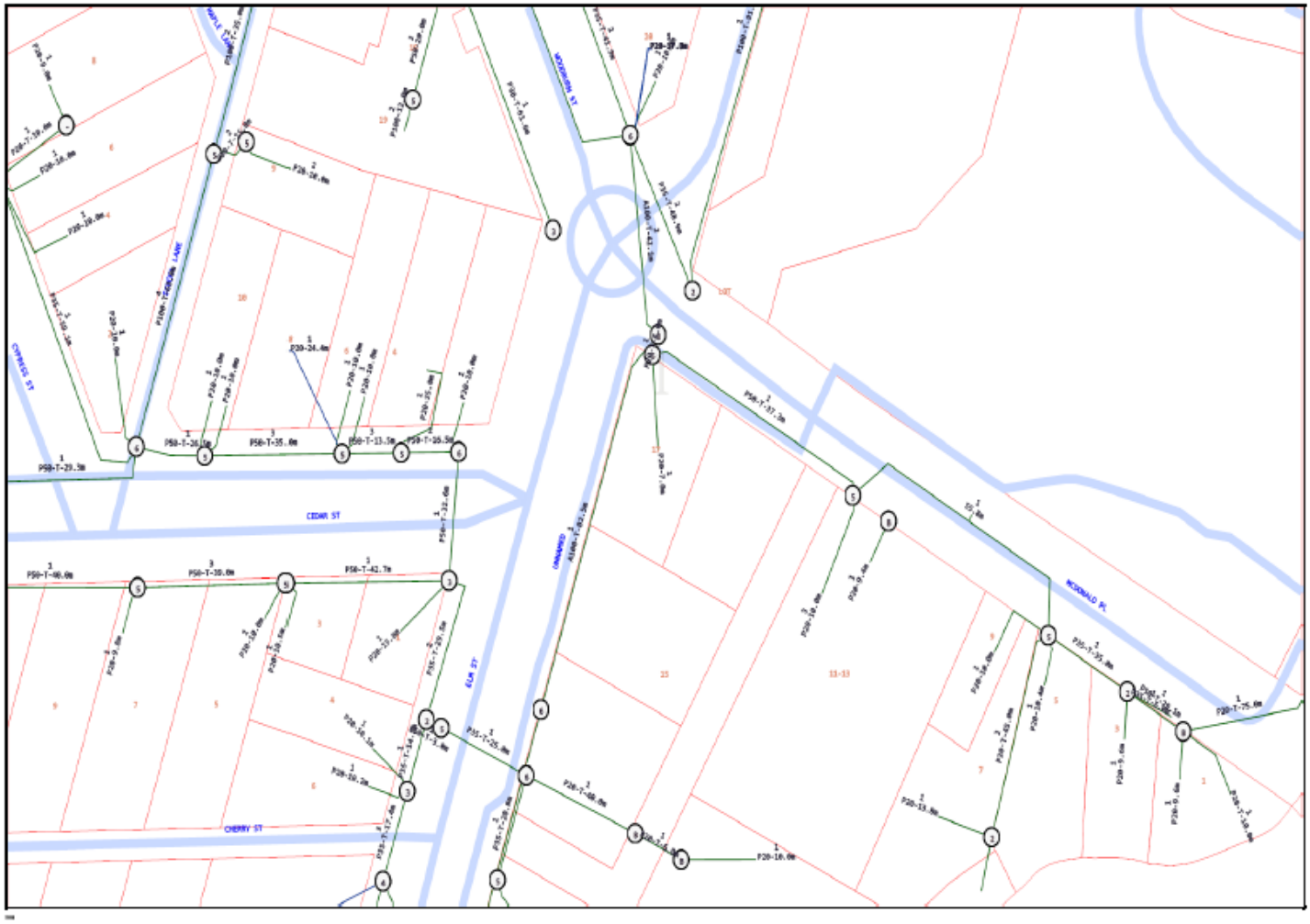

Figure 22 | Telstra NBN communication line, *Source: NBN DBYD.*

6. CONCLUSIONS AND RECOMMENDATIONS

All engineering aspects, including site constraints, geotechnical requirements, traffic impacts, stormwater drainage, water supply, and sewer demand have been considered in this report.

The Engineering Services Report demonstrates that the proposed mixed-use development Lot 7 DP14089, known as 17 McDonald Place, would include:

Traffic:

- safe and efficient vehicular access is provided to all lots.
- There is sufficient space for future 45 degree on-street parking.
- Pedestrian safety can be achieved with appropriate signage.
- Enough sign distance is available for the proposed vehicle access.
- Due to its existing conditions, the road network surrounding the subject site can handle a significant volume of traffic.
- For more information on roadworks please refer to Traffic Impact Assessment.

Earthworks:

- Since there will be no excavation of earth more than 1 metre of depth, there is no possibility of exposing any Acid sulphate soils.

Stormwater management:

- Lawful point of discharge: we propose to use the exiting kerb adaptors for discharge to the kerb.
- Runoff water quality: 7kL of reuse volume, assumed 1kL/day reuse rate
- 10kL or on-site detention
- Minimum combined tank volume: 17kL, custom built to suit the space available.

Utilities:

- Water demand: 5.6 ET
- Sewer demand: 5.6 ET
- Electrical supply: available on site: either continue use of overhead cable, or trench a new underground cable under the road
- Communications infrastructure: existing NBN connection available

On the basis of this assessment we recommend this development for approval from an engineering services perspective.

REFERENCES

Development Control Plan, Richmond Valley Council, Casino NSW, 2021

Development Servicing Plan Sewerage Services, Richmond Valley Council, Casino NSW, February 2013