



The site in its current state is majority grassed with dense vegetation to the north and a gully running from the north-east corner to the north-west corner of the site.

Based on geotechnical information from NSW eSPADe, the soil profile is believed to consist of silty sand.

3. PROPOSED DEVELOPMENT

The development of the site generally comprises of the following:

- 5 storey residential aged care facility (4 storey residential units & roof-top terrace and multi-use room)
- Ground level parking within RACF
- External on-grade visitor and staff parking
- Outdoor above-ground pool
- Lawn bowling green

The layout of the proposed development has been illustrated in the concept engineering plans appended to the rear of this report.

4. PROPOSED STORMWATER MANAGEMENT STRATEGY

4.1 GENERAL STRATEGY

The onsite stormwater management system has been designed to replicate the processes which would occur naturally on site. The proposed development will incorporate a number of devices and measures aimed at providing adequate and responsible management of stormwater runoff for minor and major storm events.

In line with Chapters D5 & D7 of Bega Vally Shire Council Development Design Specification, the stormwater management strategy has considered the following items which will be discussed in the following sections of this report:

- Water quality ;
- Stormwater detention;
- Local overland drainage.

4.2 WATER QUALITY

In order to minimise any adverse impacts upon the ecology of downstream watercourses, stormwater treatment devices have been incorporated into the design of the development. The adopted stormwater quality targets were as specified in Australian Runoff Quality (ARQ, 2006) and are summarised in Table 1:

Table 1 – Required Water Quality Reductions

Pollutant Criteria	Required Reduction Target (%)
Total Suspended Solids (TSS)	80
Total Phosphorous (TP)	45
Total Nitrogen (TN)	45
Gross Pollutants	90

The performance of the proposed stormwater management strategy was assessed against these targets using the conceptual design software MUSIC (Version 6). The MUSIC model was developed using parameters recommended in the document “NSW MUSIC Modelling Guidelines” (WBM, 2015).

The performance of the total catchment was modelled through the treatment train. A number of devices are to be implemented on site to achieve the water quality reduction targets, including a proprietary GPT device (Oceansave OS0606 or equivalent) and a biofiltration basin.

A schematic of the MUSIC model is provided in Figure 2.

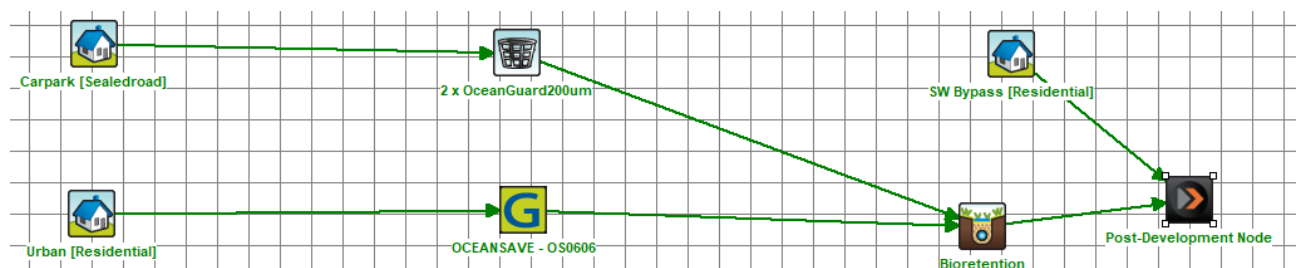


Figure 2 – MUSIC Model Schematic

The biofiltration basin has a plan area of 100 m², an extended detention depth of 200 mm, and a 400 mm filtration layer with a hydraulic conductivity of 200 mm/hr. The filter material is required to have a total nitrogen content of 80 mg/kg, more than 3% organic material and less than 50 mg/kg of

The effectiveness of the modelled treatment train by comparison of pollutant load reduction is outlined below in Table 3.

Pollutant Criteria	Reduction Target (%)	Sources (kg/yr)	Residual Load (kg/yr)	Achieved Reduction (%)
Total Suspended Solids (TSS)	80	1280	148	88.4
Total Phosphorous (TP)	45	2.05	0.532	74
Total Nitrogen (TN)	45	14.7	4.07	72.2
Gross Pollutants	90	203	21.5	90

Table 3 shows that the proposed stormwater quality management strategy will achieve the required load reduction targets. A copy of the MUSIC Link report has been appended to the rear of this report.

In accordance with Bega Valley Shire Council Design Specification Chapter D5, on-site detention will be required to be investigated to limit post development flows from the proposed development site to less than or equal to pre-development flows for all storm events up to and including the 100 year ARI storm event. Runoff from the proposed development was modelled using the runoff routing software DRAINS incorporating an on-site detention facility. This was compared to the pre-developed site in its existing state with an impervious percentage of 0%.

Impervious depression storage = 1 mm
Pervious depression storage = 5 mm
Time of concentration = 3 minutes
Soil type = 3

A screenshot of the DRAINS model for the 1% AEP storm event is displayed in Figure 3.



A comparison between the pre-development and post-development flows from the site for the critical storm duration for each of the design storm events, up to and including the 100 year ARI is presented in Table 4.

AEP	Pre-Developed Peak Flow (L/s)	Post-Developed Peak Flow (L/s)
1%	671	603
2%	551	447
5%	365	238
10%	272	167
20%	171	151

4.3 LOCAL OVERLAND DRAINAGE

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5. CONCLUSION

The proposed stormwater management design presented above has been prepared to comply with Bega Valley Shire Council's DCP and Development Design Specification as well as industry best practice. The design philosophy is based on the principle of at source treatment, to reduce conveyance infrastructure and manage water quantity and quality aspects.

At a concept level the system has been designed to cater for frequent and infrequent storm events.

Based on the above, our investigation and concept designs indicate the proposed development can adequately manage and address all items surrounding stormwater runoff. Should you have any queries, please feel free to contact the undersigned on (02) 4365 1668.

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REFERENCES:

BMT WBM Pty Ltd, Draft New South Wales MUSIC Modelling Guidelines, August 2010

Bega Valley Shire Council, Development Design Specification, January 2002

Bega Valley Development Control Plan 2013, January 2022

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APPENDIX A – SUPPLEMENTARY INFORMATION

- Concept Stormwater Management Plans