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Stormwater Structural Civil
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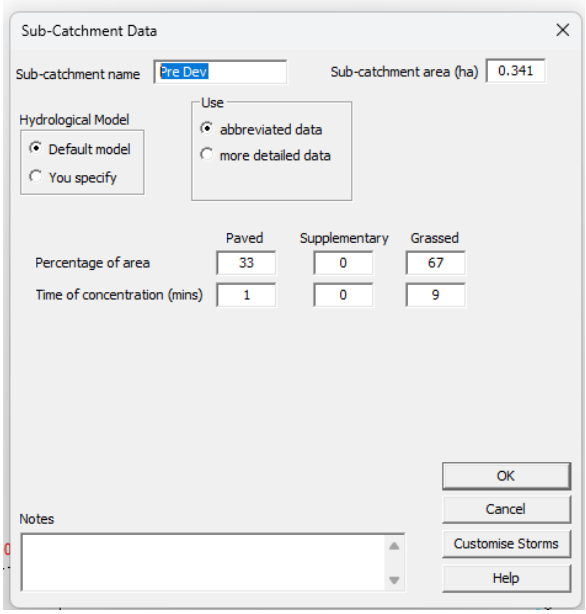
31st Oct 2024

337 LOWER PLATEAU RD BILGOLA PLATEAU
PROPOSED SUB DIVISON - DA 2024 / 0303
engineering referral response (dated 18 / 10 2024)
STORMWATER MANAGEMENT - Job No 211203

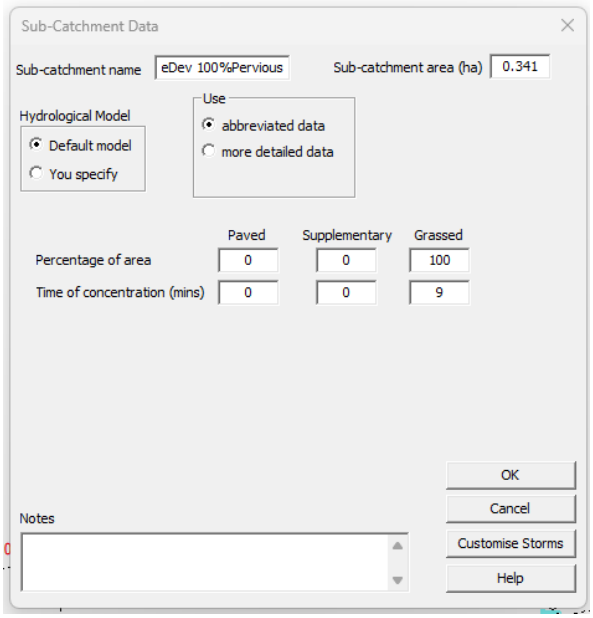
In reference to Northern Beaches Councils engineering referral response (dated 18 / 10 2024) Barrenjoey Consulting Engineers pty ltd have reviewed the submitted plans and DRAINS file and comment (in **bold**)

Officer comments
Updated Comments 18/10/24
The recently submitted DRAINS model and stormwater management plan has been reviewed and is not supported for the following reasons:
1) State of Nature predeveloped conditions have not been modeled in the determination of the the Right of way on site stormwater detention (OSD) and post development discharge requirements. The design is to be in accordance with Councils Water Management for Development Policy. **The DRAINS model (*OSD100 31 10 24*.drn) contains two analysis of the predevelopment conditions a) Pre Dev (with actual site % pervious area) and b) PreDev 100%Pervious (with site modelled as 100% pervious, ie state of nature), see attached screen shots.**

a) Pre Dev
(with actual site % pervious area)



a) PreDev 100%Pervious
(with 100% pervious area, ie state of nature)



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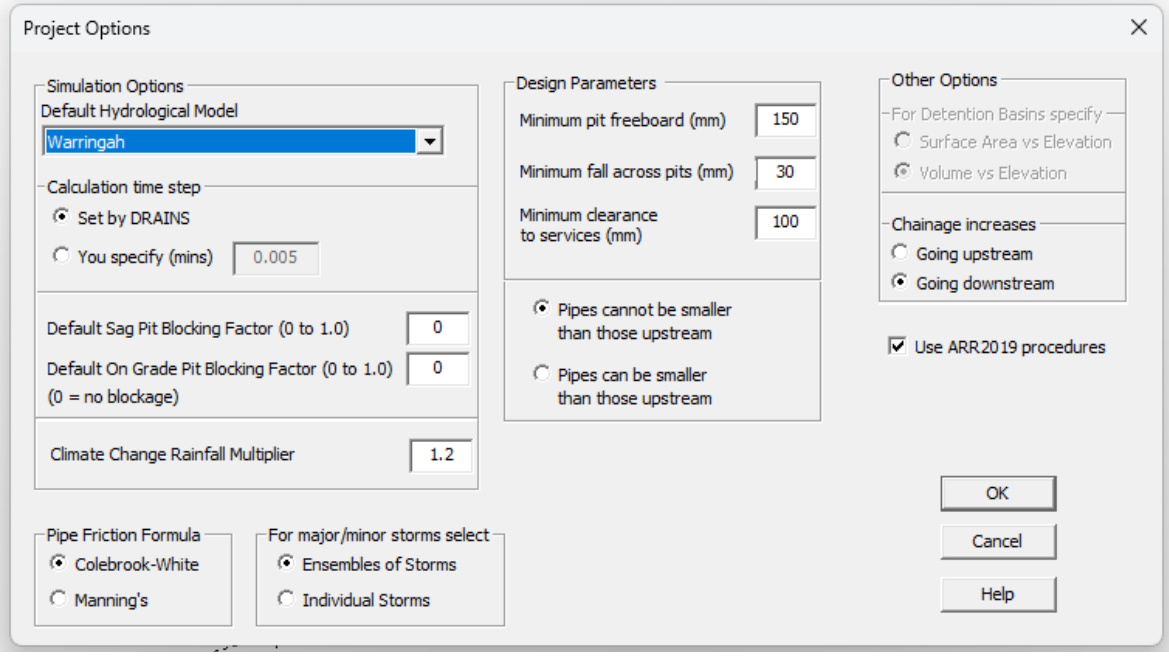
2) Accordingly the OSD required for the propopsed dwellings is to be designed based on State of Nature Pre Developmented conditions. An allowance is also to be made for supplementary impervious areas in the form of pathways and hard landscaping.
The OSD required for the proposed dwellings is not addressed in detail with this application DA 2024 / 0303 that being for the subdivision only. Any OSD requirement (inc allowance to be made for supplementary impervious areas in the form of pathways and hard landscaping) will be addressed in the future DA application/conditions for those dwellings. Noting conceptual OSD tanks of 18000l (collecting 400m2) have been included in the DRAINS modelling.

3) Additionally the DRAINS model is to include the provision of climate change in accoradance with ARR version 4.2.
The DRAINS model (*OSD100 31 10 24*.drn) now contains provision for climate change, and results amended in revised plans (SubDivision SWMP 31102024)



For the East Coast South cluster, from Table 1.6.3 of ARR 2019 (shown as below), we select **RCP 8.5 And 42 GCMs**, the more intense category. For the majority of global climate models (32 out of 42) the temperature estimates in 2090 fall into the 'much hotter' > 3˚C category. The 32 estimates have a median of 4.1˚C, so we might chose a temperature increase of 4˚C. From Equation 1.6.1 in ARR 2019, this corresponds to a rainfall increase of approximately 20%.

4)The summary information on the concept stormwater management plan does not align with DRAINS model.
Amended in revised plans (SubDivision SWMP 31102024) and now including provision for climate change.

STORMWATER FLOW SUMMARY
(*DRAINS* ANALYSIS)

Site area	- 3410m2	
Existing impervious area	- ~1125 m2 (0m2 modeled)	
Existing Site Discharge		
(100% Pervious ie state of nature)		(+Climate Change provison)
20% AEP Storm	- **70 l/s**	(92 l/s)
1% AEP Storm	- **157 l/s**	(201 l/s)
Detention Volume modeled	- Drive way 1x8000l / 1x5000l / 1x3000l - Each Residence 18000l (future DA requirement)	
Post Development Site Discharge		
		(+Climate Change provision)
20% AEP Storm	- 56 l/s (36 uncon, 20 via OSDs)	**70 l/s** (47 uncon, 23 via OSDs)
1% AEP Storm	- 109 l/s (80 uncon, 29 via OSDs)	**150 l/s** (103 uncon, 47 via OSDs)

NOTE -
Proposed development + climate change provision peak run off flowrate will be less than
current state of nature peak run off flowrate

The following information previously requested information has still not been provided regarding the flooding impacts on the proposed development.
As the property is impacted by overland flow Barrenjoey Consulting Engineers has summarised the flood information in terms of 1/100 AEP and FPL levels throughout the development site from Councils Avalon to Palm Beach FloodPlain Risk Management Study and Plan 2017 as prepared by Manly Hydraulics Lab. However no assessment has been made as requested in the previous development application in terms of whether the proposed dwellings have habitable floors w a minimum of 500mm freeboard to the 1/100 AEP overland flow path levels. Additionally an assessment is to be made on the proposed location of the internal access road and the existing overland flow paths that impact the site.

This issue has been addressed in the Flood Inundation and Risk Assessment Report Subdivision Addendum dated 17 07 2024 –

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SUMMARY

In respect to Councils comments - *whether the proposed dwellings have habitable floors with a minimum of 500mm freeboard to the 1/100 AEP overland flow path levels* -
As previously outlined within the *Flood Inundation & Risk Assessment Report Proposed Sub division 337 Lower Plateau Rd Bilgola Plateau* by Barrenjoey Consulting Engineers pty ltd dated March 2023 and Addendum dated 25. 03. 2024 all habitable floors will have a minimum of 500mm freeboard to the 1/100 AEP flood levels, and (based on the above analysis) with the implementation of the standard requirements of the National Construction Code / BCA and relevant Australian Standards will be protected from the overland flow path levels.

In respect to Councils comments - *an assessment is to be made on the proposed location of the internal access road and the existing overland flow paths that impact the site* -
As previously outlined within the *Flood Inundation & Risk Assessment Report Proposed sub division 337 Lower Plateau Rd Bilgola Plateau* by Barrenjoey Consulting Engineers pty ltd dated March 2023 and Addendum dated 25. 03. 2024. Based on the above analysis the proposed subdivision access driveway generally mimics the existing and in part is to be an 'elevated' structure with isolated column supports to the NGLs located as not to adversely affect any 'overland flow'.

The proposed subdivsion if carried out in accordance with recommendations within the *Flood Inundation & Risk Assessment Report* by Barrenjoey Consulting dated Mar 2023 and this Addendum will satisfy the intent of Northern Beaches Councils Water Management for Development Policy Section 10 Flood Risk Management and Pittwater 21 DCP Section B3.11 Flood Prone Land.

It is our opinion the proposed residential buildings (as detailed in the submitted architectural plans, subject to future DA submissions and review) will also accommodate the requirements of Northern Beaches Councils Water Management for Development Policy Section 10 Flood Risk Management and Pittwater 21 DCP Section B3.11 Flood Prone Land.

It is to be noted that, due to the many complex factors that can affect a site, the subjective nature of a risk analysis, and the imprecise nature of the science of flood analysis, the risk of persons being injured, to life and property cannot be completely removed. The recommendations within this Report do not remove the risk associated with the predicted flooding event, though lower those risks to an acceptable level reasonably anticipated by the community in everyday life.

Regards
BARRENJOEY CONSULTING ENGINEERS pty ltd

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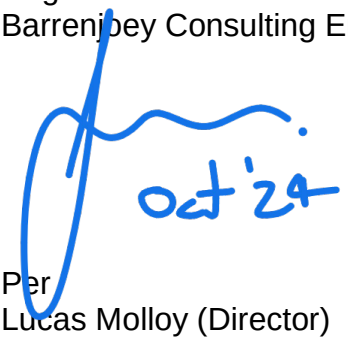
Should further information regarding this certificate be required please contact our office as outlined below.

Regards
Barrenjoey Consulting Engineers pty ltd



Per
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APEC / Engineer / IntPE(Aus)