

# MEMO

**TO:** David Usmar **DATE:** 18<sup>th</sup> November, 2022  
**FROM:** Sejal Sangwai **PROJECT NO.:** J000663  
**REVIEWE:** James Taylor  
**SUBJECT:** Initial Review of Stormwater Management for Private Plan Change 81

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## INTRODUCTION

Dargaville Racing Club Incorporated (DRC) have submitted a Private Plan Change 81 (PPC81) to support the development of the existing Dargaville Racing Club site in Dargaville. As noted in the Statutory Assessment Report submitted as a part of Dargaville Racecourse Private Plan Change Request, the Plan Change seeks to rezone the site from the current Rural Zone under the Operative Kaipara District Plan to a Development Area that provides for a mix of Residential, Neighbourhood Centre, Open Space and Light Industrial. The land use details supplied by Lands and Survey Limited as follows:

*Table 1 Anticipated land use and activities (supplied by Lands and Survey Limited)*

ZONE	AREA OF ZONE (ha)	NUMBER OF LOTS
Light Industrial – Small or Large/ Commercial	9.53	24
Residential – General or Lifestyle	23.67	435
Neighbourhood Centre	0.29	1
Open Space	4.16	n/a
Infrastructure	1.59	n/a
Road Reserve	6.19	n/a
<b>Total</b>	45.43	

## SCOPE OF REVIEW

Kaipara District Council (KDC) have engaged Awa Environmental Ltd (Awa), to undertake a preliminary review of the proposed stormwater management discussed in the Civil Engineering Assessment Report submitted as a part of PPC81 by Lands and Survey Engineering Ltd (L&S). The scope of work is to complete a preliminary review of the proposed stormwater management strategy to identify potential effects, how they are managed and to provide a list of recommended further information requests, if any, to KDC.

## DOCUMENTS REVIEWED

Table 2 Summary of Documents Reviewed

DOCUMENT NAME	AUTHOR	REVISION	DATE	FORMAT
Civil Engineering Assessment Report	L&S on behalf of DRC	Final – Issued for Plan Change Lodgement	9 February 2022	Report
Statutory Assessment Report	L&S on behalf of DRC	-	17 February 2022	Report (Used for Context)
Further Information Request	KDC	-	16 March 2022	Memorandum

## LIMITATIONS

The review memorandum has been prepared for Kaipara District Council only and should not be used or relied on by any other person or entity. We note that this review has been undertaken purely from a compliance with regulatory requirements and ‘assessment of effects’ perspective only.

## REVIEW OF PROPOSED STORMWATER MANAGEMENT

### STORMWATER DRAINAGE

The application states that the site conveys stormwater via overland flows and natural channels, discharging to the roadside table drain. Two overland flow paths are indicated within the site area – both generating from near the center of the northern site boundary with one traversing diagonally towards the eastern boundary whereas the other traversing along what appears to be the channel drain within the property before turning to flow along the southern site boundary. Both the overland flows combine and exit the site at the south-eastern corner and appear to travel along Awakino Road from where it is directed south-east to then discharge into the Wairoa River.

The stormwater management strategy is purportedly to maintain pre-development peak flows, post-development by way of hydraulic neutrality. We consider this approach to be reasonable where there are downstream capacity constraints or flood hazard, as is the case for this site.

This is proposed by the applicant to be achieved by directing flows from the site to three on-site detention devices (one for each respective sub-catchment) which provide approximately 11,884m<sup>3</sup> of storage volume thereby limiting the post-development flows to less than or equal to pre-development flows.

It is important to note however, that maintaining flows at pre-development rates does not equate to their being sufficient capacity to service the development. It is also noted that the proposed zoning will result in the level of service increasing from a 20% AEP design storm for primary drainage, to 5% AEP. We would consider it to be highly unlikely that downstream drainage has capacity for this event. The applicant’s assessment has shown that the downstream roadside table drain does not have sufficient capacity. We also note that the low-lying nature of the site may result in downstream capacity having a backwater effect on the development.

The rainfall data for runoff calculations was taken from NIWA HIRDS V4 Depth-Duration-Frequency Results. Historical data for pre-development and RCP8.5 Climate Change rainfall for post-development was utilized. This leads to very conservative allowance for the effects of climate change, with the applicant effectively offering to mitigate the effect of climate change on their site.

The applicants assessment for the change in land-use is based on worst case scenario for impermeable areas based on the conceptual model of the Outline Development Plan V4.0 as follows:-

- Light Industrial, Neighborhood Centre – 100% impervious surfaces
- Infrastructure – near 100% impervious surfaces
- Residential – 70% impervious surfaces
- Lifestyle Lot Residential – 40% impervious surfaces

This change in land use appears sufficiently conservative for the proposed zoning.

## FLOOD HAZARD

It is noted that according to the Northland Regional Council hazard layers, a small portion of the site depicted on the updated regionwide flood hazard maps appear to be susceptible to river flooding during all events ranging from the 10 year to 100 year ARI. However, we note that the naming of this flood layer as ‘river flooding’ may be misleading, as the NRC river models still include rainfall-runoff flooding which appears to be what is affecting this site.

Awa has also used the preliminary Dargaville Urban Stormwater Hydraulic Model, currently being built by Awa for KDC to check the potential flooding impacts on the site. The model currently only contains a 2D domain, with 1D pipe networks still to be added. It is noted that there are presently few/no pipe networks in this area, therefore the predicted flooding in this is unlikely to substantially change as the model is further developed.

The model shows that the existing site is subject to substantial ponding in the 100-year ARI event, as it is low-lying and is effectively bounded by Awakino Point Road. It will be necessary for any development to displace or drain this flooding in order to create safe building platforms, which could have an adverse impact on downstream flooding if not adequately mitigated.

The application provides no discussion as to how this low-lying ponding will be managed.

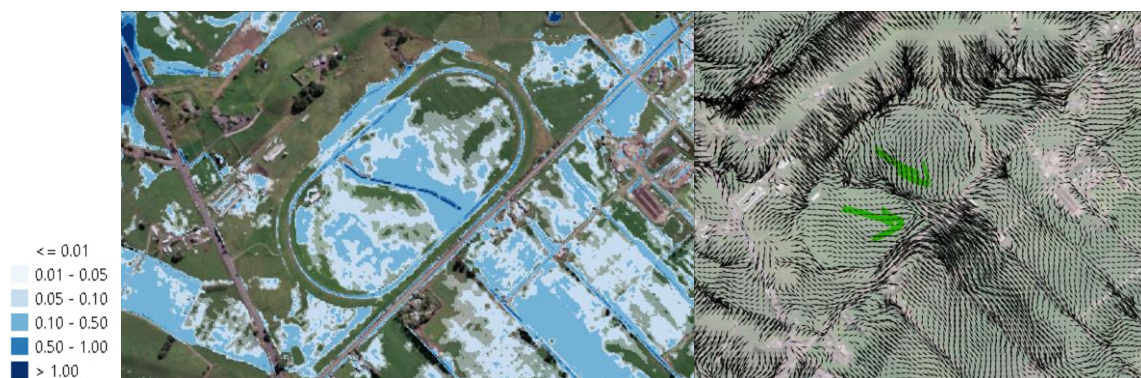


Figure 1: Extracts from Awa's Dargaville Urban Stormwater Model

## SUMMARY

In summary, whilst the applicant has shown that it may be possible to mitigate some of the adverse impacts of their development, there is missing information that will need to be provided to demonstrate that the development can be adequately serviced in terms of stormwater drainage and flood hazard. The following key findings are noted:

- Given the low-lying nature of the site, it is unclear how future stormwater networks and ponds will drain into the existing downstream drains without extensive fill earthworks.
- It is not clear whether the stormwater infrastructure in the area will have capacity to cater to the requirements of design periods for commercial land use i.e. 5% AEP. An upgrade of infrastructure may be required to provide a suitable level of service to the development.

- The assessment does not appear to have considered the upstream catchment draining into the site which could both be impacted by the proposed development, and could impact the development.
- Whilst the applicant has proposed stormwater attenuation devices to mitigate the effects of increased impervious area, they have not assessed what the potential impact the development will have on downstream flooding, in terms of the displaced ponding on the site.
- There are a large number of unknown culverts in place that the development will need to rely on in terms of stormwater servicing, for which no capacity assessment has been carried out. It is therefore currently unclear whether the site can be designed to meet the required level of service in terms of drainage and flood hazard.

It is noted that the permeability rate of the underlain soil is considered very low to negligible and that the site appears to be generally waterlogged. It is unclear how this matter will be managed, especially in the areas where detention ponds are proposed. The water table may impact on the ability of detention ponds to provide the necessary storage without substantial engineering/earthworks.

Should you have any queries relating to any of the above, please do not hesitate to contact us via details provided below.

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