RC220060 – THE CLEARING STAGES 3-6

Response to Minute 5 regarding attenuation pond depth

by

Hayden Kent, Hurunui District Council Consents Engineer

Minute 3 extract -

> • *Mr Stevenson was to provide information regarding the frequency with which the attenuation ponds would have at least 1m of water.*

Mr Stevenson response

> *2. The expected frequency that water would pond to a depth of 1 m or more in the proposed attenuation basin to be formed in Dry Gully is annually.*

Minute 5 extract -

> *ii. We would like to understand whether Mr Kent had any comments, in particular regarding safety, on the table provided in Mr Stevenson's supplementary statement regarding the speed at which the basin may fill to a range of depths depending on the Average Recurrence Interval Event.*

Response –

I believe the table presented addresses an unasked question. The rate of filling in respect of egress time for pond occupants is not considered to be a significant safety hazard, particularly given the reduced likelihood of people being in the basin during inclement weather.

The safety issues I consider are as follows-

Firstly, this is a dry basin with little perceived risk in fine conditions, unlike a wet basin which has continual risks that are acknowledged and recognised as part of the environment.

A dry basin may have long periods of unimpeded access and public amenity whilst 'empty'. However, following rain events start to pose public risk from accidental or errant entry (e.g. a child playing/ retrieving a toy, or an adult retrieving a child or pet)

Providing for a maximum water depth of 1.0m means that at no time will the pond be greater than 1m depth, with the normal operating condition varying from 0 – 1.0m dependent on storm events. 1.0m being synonymous with the irregular "1 in 50 year" event, and lesser depths more frequently with storms of shorter Annual Recurrence Intervals.

Depths of up to 1.0m max are viewed to be identifiable and manageable for safe egress from ponded water, with the maximum depth of 1.0m being the greatest risk

Providing for a normal operating condition varying from 0 – 2.3m (as proposed) means that greater and less safe depths will occur at more regular intervals.

My own rudimentary analysis (based on assumptions around pond shape) suggest pond depths in the table below.

50 year max pond depth	10 year ARI pond depth (approx.)	2 year ARI pond depth (approx.)
1.0m	0.7m	0.45m
2.3m	1.61m	**1.04m**

My fundamental concern is the frequency of ponded water and its associated risk given the increased regularity of intense storms which is well documented.

H J Kent 19th July 2023