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Attn: Katherine Dorofaeff
Kapiti Coast District Council
175 Rimu Road, Kapiti Coast

KCDC Consulting Services
IZ024600

Submission 86, Klimenko

Dear Katherine

The information in this letter responds to the Council's request for additional technical detail to respond to submission 86 to the Proposed District Plan, lodged by John and Peggy Klimenko. The submission seeks the removal of a ponding area notation at Ōtaki Beach. To respond to the submission, the Council commissioned a report from CH2M Beca Ltd ('Beca'). You have provided us with a copy of the report dated 13 April 2015, and titled KCDC Proposed District Plan - Stormwater Submission Review Number 86 - M Klimenko. The report supported the retention of the ponding notation at Ōtaki Beach, with specific consideration of 7 and 11 Health Camp Road. In compiling the report, Beca obtained information from Jacobs who undertake the flood modelling for the Council. The Klimenkos were provided with the Beca report and subsequently raised a number of issues with the Council about the report. You have asked Jacobs to assist with responding to ten issues raised by the Klimenkos.

Following on from our email correspondence and meeting regarding Submission 86, Klimenko, please see our response to the issues raised. The issues (as provided to Jacobs) are numbered and our responses are in bold. The page numbers and references included in the issues statements correspond to the Beca report.

1.) Definition of ponding - PDP definition not supported - gives no information about depth of water and duration. Alternative definition proposed as per industry standard among NZ Civil Professional Engineers - 'The excessive accumulation of water at low-lying areas that remains after 48 hours after the end of rainfall under conditions conducive to drying.'

I have looked for the above definition on line and with input from my colleagues and have been unable to find the proposed definition accredited to NZ Civil Professional Engineers.

The above proposed alternative definition appears in an online search of ponding a number of times but only appears in the form of a general definition search with no reference to a New Zealand institution or publication.

One of the links provided referenced the publication "The Stress Point, A publication of Engineering Design & Testing Corp.", Columbia, South Carolina and comes under the heading Roofing Definitions.

While this definition is very similar to that proposed it specifies "The excessive accumulation of water at low-lying areas on a roof that remains after 48 hours after the end of rainfall under conditions conducive to drying."

The definition is used in the context of roofing and is not referenced to a New Zealand institution or publication.

Ponding areas are defined as floodplain areas where lower-velocity flood waters pool in natural low-lying terrain. Ponding of flood waters occurs both during the flood event, and for a period after the peak of the flood has passed. The duration of ponding will vary from location to location due to the dynamic relationship between ponds, the stormwater network, stream and river corridors, overland flow paths and infiltration rates. The duration of flooding within ponding areas is expected to be longer than the duration of flooding identified for stream and river corridors and overland flow paths. The reason the duration of flooding within ponding areas is longer is because of the low lying nature of ponding areas which controls the rate flood waters can drain from the ponding areas.

Ponding is a direct risk because these areas are predicted to flood from rivers and streams as well as the piped stormwater network and overland flow paths, the flood levels predicted within ponds are not dependent on the failure of upstream flood protection.

2.) Soil classification / geomorphology - The soil classification used in the report is incorrect (CN of 65, Group B). P6 #10 & p7 Section 9.3 Beca report.

We believe a CN of 65 is appropriate for this area. Geology and Soils maps of the Otaki area classify this area as inactive dunes meaning they are relatively stable in structure and are neither actively growing nor eroding. Given the majority of the Otaki Beach area is developed the assumption that construction compaction has occurred is entirely appropriate. The slightly higher CN of 65 takes account of the areas proximity to the coast and likelihood of layers which may impede infiltration rates including peat layers.

3.) Water table level. There is no information about this. Klimenkos have offered to have a piezometer installed.

Piezometer installation to record groundwater levels will be of little use, unless we catch a rare flood event, as it will only record the effect of existing tidal levels on ground water levels. We are interested in the coincidence of extreme rainfall and high sea levels.

4.) Limitations of the modelling - Not suitable for use at this small scale

The model methodology has been peer reviewed and the model has been verified and is suitable for the purposes of flood hazard mapping. The detail and accuracy of the model is at a higher standard than most councils use for undertaking flood hazard mapping.

5.) Mean Sea Level rise - Level used is incorrect. P6 #11

For the mapping of the 100 year fluvial flood event including the predicted climate change impacts the 0.8m sea level rise was added to an estimation of the 20 year ARI sea level. The peak of the fluvial event was timed to coincide with the peak of the tide. In the model of the local flooding in and around Otaki the sea level peaks at 3.3m aMSL (Wellington 1953 Datum).

The estimation of the 20 year ARI sea level was based on the work by Peter Blackwood - Storm Surge Wave Run-up Design Levels for Foxton Beach - May 2007 where he estimated sea levels for the Kapiti Coast.

6.) Surface flooding - Reference to Paekakariki not relevant. P6, #12

As an example of ponding in low lying areas, the Beca report refers to ponding that occurred near the centre of Paekakariki for several days after the 2003 floods. It appears that the Klimenkos are questioning the relevance of a reference to Pakakariki.

Below is a summary of identified flood prone areas in Otaki, identified as ponding, accumulated from historical flooding accounts and records. These locations were used to verify the flood hazard model used by KCDC.

Cobb Place Soakpits, Greenwood Boulevard, Upstream of Railway Culvert, Upstream of SH1, Arthur and Dunstan Street, Alexander Place and Mill Road, Lupin Road, Aotaki Street, Kirk Street, Patterson Court, St Peter Chanel School Culvert, Tasman Road, Mangapouri / Waiwhetu Confluence, Upstream of Rangiuru Outlet

7.) Rainfall information - Incorrect / not relevant. P7, #9.2

Rainfall has been derived from the report titled Update of Kapiti Coast Hydrometric Analysis, Jacobs 2008. This update develops the isohyet maps from 22 gauging stations with a combined total of 549 years of data. The Otaki rain gauge has a long record and is suitable for estimating return periods of rainfall events.

8.) 'Initial losses of 3mm' - What does this mean. P6, #9

This refers to Initial Abstraction (Ia) which represents the amount of rainfall that is absorbed by a catchment before runoff begins to occur. Initial abstraction is

assumed to include interception, initial infiltration and surface storage. Work completed for a Master's Thesis (Watts L, 2002 Hydrologic Response and Runoff Model Parameters in New Zealand Coastal Zone. Unpublished Master's Thesis Victoria University of Wellington) suggested that for storms in the order of an annual flood, Ia values fluctuated between 0 and 4 mm based on the level of catchment urbanisation.

9.) Soakage tests - More relevant information specific to the local area needs to be used.

The document "Updated Isohyet Based Calculation of Design Peakflows, Jacobs 2004" sets out the methodology for determining catchment characteristics including the rainfall losses over the period of the storm based on catchment soil, and land-use characteristics assessment. This is an agreed methodology and is used by all consultants undertaking work for Kapiti Coast District Council.

Previous work completed in the Kapiti Coast District (Connell Wagner, 2001) has identified base CN values that encompass most of the soils typically found in the region; therefore losses associated with soil types are Kapiti specific and take into account the soakage rates of soils typically found in the region.

10.) LiDAR reliability - Query accuracy. Notes some hollows not identified as ponding areas. An example is Duncans Way - low lying but not shown as ponding.

Generally LiDAR will be flown with an accuracy of 1 sigma (68% of points fall within standard deviation of +/- 100mm). Vegetation can affect LiDAR accuracy. Looking at the area in question there is very little in the way of dense vegetation which would affect the accuracy of the LiDAR.

Yours sincerely

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