

**Appendix 3 – Evidence of Derek Todd on Coastal Hazards**

**BEFORE THE**

**TIMARU DISTRICT COUNCIL HEARING COMMITTEE**

**IN THE MATTER**

of the Resource Management Act 1991

**AND**

**IN THE MATTER**

of the Proposed Timaru District Plan – Coastal Environment Chapter – Coastal Hazards

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**STATEMENT OF EVIDENCE BY DEREK JOHN TODD**

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## **Introduction**

- 1 My name is Derek Todd. I hold qualifications of M.Sc (Hons) in Geography from the University of Canterbury (1983). My post-graduate studies specialised in Coastal Geomorphology.
- 2 I am currently the Principal Coastal and Hazards Scientist at Jacobs New Zealand, located in the Christchurch office. I have held this position for 9 years. I have 42 years' professional experience in monitoring and investigating coastal processes and hazards, assessing the potential future changes in coastline and river mouth stability, and advising on coastal management, protection and adaptation.
- 3 I understand the Timaru District coast very well, having worked on coastal hazard and management projects along this coast since 1983. Most recently, in 2020, I was the technical lead for assessment of coastal erosion with sea level rise over the next 100 years for the shoreline of Timaru District.
- 4 I have been asked by the Timaru District Council to provide evidence on submissions on the Coastal Environment Chapter of the Proposed Timaru District Plan in relation to coastal natural hazards.

- 5 I confirm I have read the Code of Conduct for expert witnesses contained in the Environment Court New Zealand Practice Note 2023 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

## Response to Submissions

- 6 The following responses relate to submissions made on the Natural hazard provisions of the Canterbury Environment chapter of the Proposed Timaru District Plan (PTDP). These submissions relate to the definition of ‘high hazard’; policies regarding coastal hazard areas and hard engineering hazard mitigation works; rules on regionally significant infrastructure and natural hazard mitigation works; Port-specific natural hazards provisions, and amendments to the *Coastal Erosion Overlay* at Caroline Bay and South Beach. I will also response to a Submission on the appropriateness of using RCP8.5M sea level rise scenario as outlined in the Strategic Directions section of the PTDP.

### Definition of High Hazards in the Coastal Environment

- 7 Submission 183.109 by the Canterbury Regional Council (Environment Canterbury) submitted that the definition of ‘high hazard’ in the Canterbury Regional Policy Statement (CRPS) Policy 11.3.1 is not reflected in the Coastal Environment chapter of the Proposed Timaru District Plan (PTDP). The submission sought that the Canterbury Environment chapter be amended to recognise that there are areas subject to coastal erosion and coastal inundation that meet the criteria of ‘high hazard’ defined by CRPS Policy 11.3.1.
- 8 I consider that this submission is due to the confusion of the status the *Sea Water Inundation* and the *Coastal Erosion Overlays* as additional *High Hazard Areas* to those defined in the Natural Hazards Chapter of the PTDP, which does not include coastal natural hazards. The definitions of the *Sea Water Inundation* and the *Coastal Erosion Overlays* are not given in the PTDP and are not referred to in anywhere in the PTDP text as being ‘high hazard areas’. However, the legend description of the overlays on the planning maps indicates that there are ‘high hazard’ areas.
- Part of confusion is addressed by the proposed changes by Mr. Willis to the definition of *high hazard* areas in the Natural Hazards Chapter to be consistent with definition in the CRPS so that it includes land subject to coastal erosion over a 100-year period, and to clarify that land subject to flooding covers all sources of flooding including coastal.
- 9 This confusion could be further addressed by including a definition of the *Sea Water Inundation* and the *Coastal Erosion Overlays* in the Coastal Environment Chapter of the PTDP.

- 10 However, I note that the current *Sea Water Inundation Overlay* presented in the PTDP planning maps is for the 1% AEP flood extent with projected sea level rise (SLR) over 100 years under an RCP 8.5 climate change scenario, so does not match the *High flood Hazard Area* definition of 1 m depth in a 0.2% AEP flood. It is most likely that the extent of the current *sea water inundation overlay* will be more extensive than the area covered by the proposed *high flood hazard* definition and will therefore require to be re-mapped. An appropriate alternative approach, that I understand Mr. Willis is proposing is to amend the Coastal Environment Hazard Rules to mirror the Natural Hazard Rules for coastal areas, where the *Flood Risk Certificate* identifies that coastal flooding meets the *High Hazard Area* Criteria.
- 11 I acknowledge that the current *Coastal Erosion Overlay* does represent the CRPS High Erosion Hazard area, being the extent of 50% probability of erosion with 1.2 m SLR over 100 years under an RCP 8.5 climate change scenario.
- 12 However, I have concerns whether this approach is appropriate and reasonable for defining “high hazard” as it takes no account of the timeframe before the land is projected to be exposed to erosion hazards or the likelihood (defined as a probability) of it being exposed within that timeframe. Therefore, under the current blanket *High Erosion Hazard* approach, land that is not expected to be exposed to erosion until close to 100-years’ time, and then only under high climate change scenarios, hence have a high degree of uncertainty whether will be exposed or not within this this timeframe, is considered to be “high hazard”. Under this blanket approach to hazard zoning there is no ability to apply a risk-based planning approach under which areas and activities located closer to the current shoreline where we are more certain that they will be exposed to coastal erosion within an appropriate planning timeframe would be defined as ‘*High Hazard*’ and can be managed differently from areas of further away where we are less certain they will be at risk and it will be longer before these risks materialise.
- 13 Although I recognise that it would be contrary to the definition of *coastal erosion high hazard* in the CRPS, I would recommend that consideration be given to defining two hazard zones within the current *Coastal Erosion Overlay* based on time to exposure and probability of exposure, with the more seaward zone being a redefined ‘*high hazard area*’ in which district plan provisions are more restricted, and the more landward zone being a ‘*medium or low hazard area*’ in which planning provisions are more permissive. A similar approach was applied to defining Qualifying Matters for Coastal Erosion in recent Christchurch City Urban Intensification Plan Change.
- 14 This approach would require the remapping of current *Coastal Erosion Overlay* into two zones to reflect the level of certainty of exposure to coastal erosion and the level of risk within the required 100 year timeframe, with the High Hazard Zone being the area closer to the current shoreline where we are reasonably confidence that erosion will most likely occur in the medium term (e.g. 50 years), and a more landward Medium Hazard Zone where we are less

confidence that erosion will occur over longer periods (e.g. up to 100 years)The jurisdiction for locating the actual boundary between these two zones can be negotiated with Environment Canterbury, but by avoiding naming a prescribed level of sea level rise within a specified time frame allow this position to be adjusted as estimates of sea level rise are updated in the future.

- 15 An alternative approach to re defining the current *High Erosion Hazard Area* would be to include as an assessment matter under appropriate rules for activities in the *Coastal Erosion Overlay* whether the activity is located landward or seaward of the above position. I understand that Mr. Willis has proposed this approach for amendments to Rules CE-R4, C-R& and CE-R8. I can support this approach but would still recommend it is shown on the planning maps, so applicants have certainty of the when the assessment matter applies.
- 16 I would note that the location of the above position in relation to the MWS or current landward boundary of the *Coastal Erosion Overlay* will vary along the coast, being dependant on the susceptibility of the location to future erosion processes.

### **Policy on Coastal Hazards Areas**

- 17 Submissions 107.8 by Lineage Logistics NZ Limited and 140.15 by Southern Proteins Limited both oppose the use of the term “avoid” in Policy CE-P12.2, which states “*Within existing urban areas, avoid increasing the risk of social, economic, or environmental harm from coastal natural hazards”*. Both submissions contends that the requirement to “avoid” sets a very high threshold for compliance, with and Submission 140.15 suggesting that under this policy no new buildings could be built in the *Sea water Inundation Area*, and Submission 107.8 suggesting that “avoid” is inconsistent with RMA S6(h), which refers to “*management of significant risks*”. Both submissions sought that Policy CE-P12.2 be rewritten removing reference to “*avoiding increasing risk*”. However, as pointed out by Mr. Willis, the wording of CE\_P12.2 is an exact copy of NZCPS Policy 25, which states that “*In areas potentially affected by coastal hazards over at least the next 100 years: a. avoid increasing the risk of social, environmental and economic harm from coastal hazards*”. I agree with Mr. Willis, that since the District Plan must give effect to the NZCPS, the policy position given in CE-12.2 is correct, therefore the submissions should be rejected.

### **Policy on Hard Engineering Coastal Hazard Mitigation Works**

- 18 Submission 172.88 by Silver Fern Farms on the wording on Policy CE-P14 contends that the inclusion of the words “only allow” in relation to hard engineering natural hazard mitigation will act as a de facto prohibition of any such works in the coastal environment, and that is undesirable as there may be circumstances where the replacement of natural hazard defences by hard engineering. The submitter sought to amend the policy to ensure it does not

inappropriately foreclose on the ability to use engineering measures to mitigate coastal hazards.

- 19 In my opinion, the inclusion of the wording “only allow” in this policy does foreclose the ability to use hard engineering natural hazard mitigation measures where they are the most appropriate to do so, with sub-clauses setting out appropriate circumstances when hard engineering would be justified. I also consider that Policy CE-P14 links back to Objective NH-O3 - Natural Hazard Mitigation Works, which sets a preference for natural features and buffers. However, adding the words “where practicable” to NH-O3 would strengthen the consistency with CE-P14. In my opinion, it would also be beneficial if Objective NH-O3 was also applied to natural hazard mitigation works in the coastal environment.
- 20 A second part of submission 172.88 was that there was duplication of sub clause (4) and (5) of Policy CE-P14, which should be removed. I agree with this part of the submission and suggest that sub clause 4 can be removed as its intent is included under “adverse effects” in sub-clause 5.
- 21 Another submission on Policy CE-P14 by Alliance Group Ltd (submission 173.88) sought an amendment of sub clause 2 of the Policy to allow an increase in natural hazards on adjacent properties as long as they can be appropriately avoided or mitigated.
- 22 I don’t support this proposed amendment, as it allows by policy the transfer of risk to adjacent properties, which may not be supported by the adjacent property owner although they may be avoided or mitigated. I consider that any non-compliance to the current policy wording would be picked up under Rule CE-R12, Matters of Discretion #3 (the extent to which the works will transfer natural hazard risk to other sites and the implications of this). In my view this is the more appropriate place to consider the transfer of risk rather than under policy. However, I note that this matter of discretion is not included in Rule CE-R9 for non-compliance of Permitted maintenance, replacement or upgrading of existing hazard work mitigation works. For consistency of provisions, I believe this matter of discretion should be added to this rule.
- 23 A future submission on Policy CE-P14 Clause 3 by Tosh Prodanov (submission 117.3) considers hard engineering must be done decades in advance of the risk is ‘*immediate*’ hence south that this word is removed from this clause. I agree with the view that there is a need to plan and implement hard engineering in advance of hazard occurring or the risk becoming intolerable, as is implied by the use of ‘*immediate*’. However, in my view an indefinite timeframe, as proposed by this submission, is not appropriate as gives not certainty on the timeframe that risk to life or property is to be considered and would be inconsistent with the reasonable consideration of the other clauses of this policy. I support Mr. Willis proposed amended wording to clause 3, to read “*where managed retreat has not been adopted and there is a demonstrated and clear risk to life or property from the natural hazard*”. Compliance with

this clause clearly places the onus on the applicant for any hard engineering works to demonstrate a clear risk with an associated degree of certainty, within a reasonable timeframe to allow for the planning and implementation of the works.

### **Rules relating to Regionally Significant Infrastructure**

- 24 ECan submissions 183.26 and 183.27 relate to the proposed rules on Regionally Significant Infrastructure (RSI). Under these rules, maintenance and upgrades to RSI (CE-R7) and new RSI (CE-R8) are permitted activities in the *Coastal Erosion and Sea Water Inundation Overlays (new)* as long as they have a footprint less than 200 m<sup>2</sup> and meet some floor level criteria. One of ECan's concerns is that there are no criteria addressing risk from coastal erosion, which is identified in the CRPS as a *high hazard*, and this should be addressed with relevant assessment matters. The submissions seek to address these concerns by amending CE-R7 & CE-R8 to be consistent with the approach for RSI activities in the Natural Hazards Chapter, under which Permitted Activity status does not apply to *high hazard areas* within which the activity status shifts to Restricted Discretionary with multiple matters of discretion around operational or functional need to be located in the high hazard area and the hazard effects of such a location and any hazard mitigation measures.
- 25 I support with Mr. Willis's proposed amendments to Rules CE-R7 & CE-R8 to address these concerns, including the proposed addition of a new clause in CE-R8 for New RSI in the *Coastal Erosion Overlay*, under which these activities will become a Restricted Discretionary Activity. I also agree with the matters of discretion under this rule, all being relevant matters for activities involving the placement of new RSI structures and building in a *Coastal Erosion Hazard Area*. This includes taking a risk-based approach to the location of the structure or building by taking into account whether it is located within or outside of the area defined by 95% probability of erosion under a 0.6 m SLR by 2070 as discussed above.
- 26 I also support Mr. Willis's proposed amendments to Rule CE-R4 (Buildings, structures and extensions excluding RSI) within the Coastal Erosion Overlay to make them consistent with the rules for RSI.

### **Rules on Natural Hazard Mitigation**

- 27 Rule CE-R12 states that any *New Natural Hazard Mitigation Works (excluding those only involving planting vegetation)* are Restricted Discretionary Activities for works undertaken on behalf of the council, crown, regional council or PrimePort (in the Port zone). Any other new natural hazard mitigation works undertaken by other parties would be a Non-complying Activity. Submission 172.92 by Silver Fern Farms Limited considered that this non-complying consent pathway for private works was inappropriate and inconsistent, and sought that the activity status when compliance was achieved (e.g. when not undertaken on behalf of the council, crown, regional council or PrimePort) be changed to being a Discretionary Activity.

- 28 I agree that this rule is inconsistently restrictive on private natural hazard mitigation works, meaning that these works would always default to Non-Complying Activity status. However, I understand the rationale for this in areas covered by Coastal High Natural Character Overlays, where any mitigation works are likely to compromise natural character values. In my view a better approach would be to retain the current proposed status just for Coastal High Natural Character Area Overlays and change the Activity status for when RDIS-1 and RDIS-2 not achieved to Discretionary Activity in the Coastal Erosion and Seawater Inundation Overlay areas (except where also in High Natural Character overlay area) as proposed by the Submitter. This means that private natural hazard mitigation works are still subjected to a more wide-ranging assessment of effects that similar council, crown, regional council or PrimePort works, which is appropriate as it is assumed that private works are less likely to consider a full range of effects if Restricted Discretionary Activity applies, but still offers a less restrictive consent path than non-complying status.

#### **Port Specific Natural Hazard Provisions**

- 29 PrimePort Limited made several submissions regarding port-specific natural coastal hazards provisions within the Port Zone. I understand that the basis of these submissions was that due to the port needing to be located in a coastal environment and therefore be exposed to natural coastal hazards, there is a need provide separate provisions specific natural coastal hazard provisions within the Port Zone. I have reviewed the relevant PORTZ-specific provisions drafted by the planners and support these provisions as being appropriate and reasonable within the port zone.

#### **Amendments to the *Coastal Erosion Overlay* at Caroline Bay and South Beach**

- 30 Since Caroline Bay and South Beach are both accreting, *the Coastal Erosion Overlay* is absent in these locations. I support the ECan submission (183.133) that this overlay needs to include potential storm/short-term erosion at these locations to show that this hazard is present. I agree with the proposed amended overlay positions put forward by ECan.

#### **Appropriateness of Applying RCP8.5 SLR scenario in Strategic Directions**

- 31 Lineage Logistics in submission 107.6 contend that the Council's approach of applying a SLR of 1.2 m on the basis of the NZ RCP8.5M climate change scenario is not appropriate and does not reflect the recommendations of the IPCC sixth Assessment report. The submission seeks that areas subject to coastal hazards should be identified on the basis of NZ RCP4.5 M projections rather than NZ RCP8.5M projections.
- 32 The NZCPS deliberately does not state which SLR scenario should be used in the identification of coastal hazards, as it recognises that the projections will change with time as more information is gained about climate change and



SLR. However, NZCPS Policy 24 does state that the identification of coastal hazard risk must be over at least a 100-year period “*taking into account national guidance and the best available information on the likely effects of climate change on the region or district*”. The most recent guidance is MfE (2024) “*Coastal hazards and climate change guidance*”, which does apply the IPCC sixth Assessment (2021) medium confidence scenarios, upscaled for NZ wide specific conditions and local Vertical Land Movements (VLM). In both the IPCC sixth Assessment and the MfE (2024) guidance, the scenarios are expressed as SSP (shared Socio-economic pathways) rather than RCP (Representative Concentration Pathways) but are similar.

- 33 The IPCC sixth Assessment does not assign probabilities to the different climate change scenarios and does not recommend scenario should be applied.
- 34 The MfE (2024) guidelines does provide interim magnitudes of SLR (e.g. excluding VLM) that are recommended to be applied for plan making and land use decisions for coastal areas where a dynamic adaptive pathway planning (DAPP) approach has not been implemented, which is the case for Timaru District. These recommendations are as follows (from Table 8 of MfE (2024)):

| Planning category  | Recommended interim precautionary RSLR allowances  |
|--|--|
| <b>A. Coastal subdivision, greenfield developments and major new infrastructure</b>  | Using a <b>timeframe</b> out to <b>2130</b> ( <sup>3</sup> 100 years), apply the <i>medium confidence SSP5-8.5 H+</i> based RSLR projection* that includes the relevant VLM rate for the local and/or regional area.<br>(Note: approximately 1.6 metre rise in MSL, before including VLM.) |
| <b>B. Changes in land use and redevelopment (intensification and upzoning)</b>   | Using a <b>timeframe</b> out to <b>2130</b> ( <sup>3</sup> 100 years), apply the <i>medium confidence SSP5-8.5 H+</i> based RSLR projection* that includes the relevant VLM rate for the local and/or regional area.<br>(Note: approximately 1.6 metre rise in MSL, before including VLM.) |
| <b>C. Land-use planning controls for existing coastal uses and assets (building additions)</b>   | Using a <b>timeframe</b> out to <b>2130</b> ( <sup>3</sup> 100 years), apply the <i>medium confidence SSP5-8.5 M</i> based RSLR projection that includes the relevant VLM rate for the local and/or regional area.<br>(Note: approximately 1.2 metre rise in MSL, before including VLM.)   |
| <b>D. Non-habitable, short-lived assets with a functional need to be at the coast, which are either low consequences or readily adaptable (including services)</b> | Using a <b>timeframe</b> out to <b>2075</b> ( <sup>3</sup> 50 years), apply the <i>medium confidence SSP5-8.5 M</i> based RSLR projection that includes the relevant VLM rate for the local and/or regional area.<br>(Note: approximately 0.5 metre rise in MSL, before including VLM.)    |

- 35 Clearly from this Table, the Strategic Direction SD-O4ii of applying a 1.2 m SLR over 100 years is appropriate, as it is consistent with the relevant national guidance for land use planning controls for existing coastal uses and assets, and therefore also consistent with NZCPS Policy 24. There is no justification in the national guidance for dropping the SLR scenario to SSP2-4.5 as sought by the Lineage Logistics submission.

D. Todd.

20 March 2025