

**To: Alderhill Planning**

**RE: B.C. Flood Intentions Paper**

*Thank you for facilitating this event and performing this much needed task. There are many areas of success and many areas that have room for improvement when it comes to flood strategy. A “no stone left unturned” approach is going to be required to affect change for the good. Everyone in this sector and all areas of governance will need to be open for discussion. It will be important for all groups to read all responses with an open mind and with understanding that we all have opinions, and those opinions may differ. Difference of opinions means that there is an opportunity for learning, teaching and refinement. In a world that has a lack of generalists and has grown to blindly agree with focused academia, this opportunity has never been more crucial for a better future. It is important to observe that there are many different belief systems around the world, and we can learn something from each of them. Cognitive bias is a difficult hurdle to overcome, and time must be taken to search your belief system and own bias.*

We will separate our thoughts and comments into the 4 program areas. It is important to know that these are just thoughts and comments. There was not near enough time at the event for deep enough discussion and to have all questions answered or even properly discussed.

**Program area 1:**

**Action 1.1: "Work with other levels of government to advance flood maps to better inform flood construction levels and development decisions."**

- The Pemberton Valley has all populated areas flood mapped. This on its own still does not remove the possibility of poor FCL and development decisions.
  - FCL in the Pemberton Valley is determined by the geotechnical engineer that is retained by the home builder. This is an issue, as there is no local roadmap for the geotechnical engineer to use. They must sort through all the flood maps, if they know where to find them, and local knowledge is a must. This process needs to be tightened up and, in most cases, the consulting firm that made the flood maps would be the most knowledgeable in this regard.
  - Development decisions are often made by the local government. In the Pemberton Valley we have a robust "referral system". The PVDD is given the chance to review all development and comment as required. This process works well in Pemberton as the PVDD is not attached to local government. In areas where the diking authority is the local government, the knowledgeable staff of the diking authority could



be silenced by politics and thus lead to poor development decisions. In Pemberton, the diking authority should be the final say.

- The reason why there is a lack of flood maps is due to the cost. Many jurisdictions simply do not have the tax base to cover off such tasks as they are in "survival mode". If you only have enough money to do the bear minimum, then that is the logical choice. It has only been in the last few years that funding has been available to carry out these types of projects.

*A few thoughts on flood maps and use of computer models.*

- *Flood maps and models are a tool. They are not correct, and the only way to vet them is to have instruments in the river to monitor a real flood at various locations. Once the flood happens you then need to go back and calibrate the model. Pemberton has this system in place, but few other locations do. We will continue to build on this for the future.*
- *The margin of error and liability concerns means that most flood maps are likely overstating a flood.*
- *Computer modelling is flawed and, as previously mentioned, is just a tool. It is arrogant to assume that we as a people understand complex systems to the degree that we think we do. This means that there are variables and inputs in models that we simply do not understand. Fluid dynamics is an area of modelling with very wide error bars.*

#### **Action 1.2 "Conduct a province wide flood risk assessment."**

- This is a complex issue as we are sure that there are many areas like Pemberton which already have this completed. We will assume that this exercise is to create a risk matrix so that funding and projects can target the most at-risk area first. In principle we can agree that the most risk areas should be focused on. However, a province-wide risk assessment would take time. There are many jurisdictions which should not be made to wait for this to happen. I would also like to see who would perform this task as, in the absence of ground level people who work in the industry, this may not yield the best outcome. Consultants and engineering groups have different drivers than industry experts who work in the industry every day.
- It is important to have a well-thought-out funding and actions roadmap prior to committing funds to this, as if there is no way to action, then don't spend the money on the risk assessment.



**Action 1.3 "Strengthen dike regulatory programs."**

- This leads the reader to assume that there is an issue with the current program. We do not believe this to be true. More red tape may slow down the already slow process and lead to more costs for the end user. The reason why dikes are not up to standards in many locations is because the standards have changed, become so strict they are, in many cases, unattainable and there was a lack funding along the way to have the current dikes upgraded as the standards changed. If strengthening the program is constructive and will result with a streamlining of the process, then we are open to this idea when enough discussion can be undertaken.
- If the province feels that a strengthening of the program is required, then the first step should be an inward look at the program to find out why the program became weak.
- What is the desired outcome of the strengthening of the program? What issues will the program seek to overcome, and what mechanism will the program have to do so?
- There needs to be a group of people from the Dike Operator/Maintenance world as part of this process or its chances of success are minimal. The government cannot do this work in isolation as they lack a feedback loop and often get ideology and reality mixed. This is due to politics and is not a slight on any individual.
- In a time where there is constant government interference in the process, and the process is already extremely expensive, this needs to be well thought out. It may have unintended consequences and not solve the problem as intended. We can't add red tape for no improved outcome. FLNRORD is a good example of a trial and fail at this approach. The thought that combining the sectors would help was a good thought but did not work. Why did FLNRORD fail and have to be broken up?

*In many jurisdictions, like Pemberton, the PVDD was set up to fail. When the PVDD was formed the tax base could never have supported the amount of infrastructure that this area has. The province and the federal government did not take this into account when turning over the governance of the diking system. This coupled with a permitting process which is completely out of step with the real world means that a small tax base with a large amount of infrastructure is set up to fail.*

**Action 1.4 "Increase public and business awareness of flood risks"**

- This is another complex issue, but there are some paths forward. We think that the realtor and seller of a house that is in a flood plain must disclose the risk level or point the buyer to where the information is located.
- Another option that has been done in the Pemberton area is a visual flood level signage board. We give full credit for this idea to Lil'wat First Nation. They came up with this idea after the flood maps were combined in 2020. In



2021, they installed signage in several locations around Nation Lands. On the sign is the flood history, and there is a line on the sign structure showing the depths of a 200-year flood. This is a great idea that should be adopted in other areas. The PVDD is thinking about doing this however we are not the governing body and would have to get the Squamish Lillooet Regional District and Village of Pemberton on board with this plan.

- The PVDD has been reaching out to schools for an opportunity to present to high school kids. This may happen in 2023. We feel that any areas where children live in a flood plain that this is a must.
- There is an issue that we have noticed in Pemberton. It is that some people prefer to live with their head in the sand and not know what the risk is. We have a very hard time getting engagement and only get a handful of people coming out to our AGM. We did start a Facebook page, and this has helped, however engagement is only high during or after a weather event.

#### **Action item 1.5 "Support applied research and training."**

- The PVDD and other local groups do try to facilitate the research of our area. We have been somewhat successful in getting universities to use our area for research, but this is done on a volunteer basis and is difficult to facilitate at the local level. When this research is completed with a hypothesis applicable to other disciplines, it can aid the PVDD in justifying future funding applications.
- The research is not always useful as academia lacks real-world understanding and has transitioned to modelling and steady-state experimentation. This is a major issue in learning today as it gives young academics a false sense of thinking they understand a complex system. They only understand a system with fixed inputs that they control, in most cases. Work must be done to undo this trend and move back toward "first-principle" problem solving.
- Grant funding to support research may help this, but deliverables would have to be strongly enforced.

#### **Program area 2**

##### **Action 2.1 "Improve First Nations involvement in flood resilience decision making."**

- We were not sure where Pemberton was positioned in relation to other areas in this regard. After this meeting, we now think we are excelling in this effort. When the Pemberton Valley Emergency Management Committee was formed in 2016, this really closed the loop in our area. The PVEMC is comprised of Lil'wat Nation, the Squamish Lillooet Regional District, the Village of Pemberton, and the Pemberton Valley Diking District. We meet 10 times or so a year to review each other's projects and concerns. In most cases the First Nations Referral Process is started while the project is still in a conceptual phase, giving ample time for the right people to get the right information to make an informed decision.



- Decision-making in relation to flood risk is complex and requires technical and logistical expertise. Lilwat Nation has this expertise on staff and welcomes views from both internal experts and Lilwat community members, as well as external experts. There are smaller Nations in BC that lack the expertise and technical background that may make technical and logistical decision-making challenging in such a regulated sector as flood-risk reduction. However, we do support a two-eyed approach, seeing integration of western science and Indigenous ways of knowing to inform flood mitigation. Consideration to providing access to quality education and training on the most up-to-date practices in managing flood risk should be provided in addition to just integrating ideas.

**Action 2.2 "Review and modernize provincial legislation, regulations, and policies to address flood risk."**

- This could be a good idea or a very bad one, depending on the methods. To do this properly a group consisting of provincial government, local government and ground level dike operators must be assembled. This cannot be done by the province or consultants in isolation. The group would need to first look backward at past legislation and find out why there is a need to do this. We are not sure that there is a need as the legislation is strong; however, if I was a part of this group, I may learn new things and may change my mind. What went right in the past and what went wrong? What led to the breakdown of the system if there in fact was one. Understanding this path will be required to solve the problem.
- The barriers to projects must be modernized, streamlined, and some removed. The permitting system is broken and needs to be reimaged. The current system is very confrontational, and the process becomes an "us and them" in almost all occasions. Having people in the permitting agencies with real experience is a must. This is lacking right now.
- It is completely wrong to add legislation and regulations as if we are on a one-way street. Right now, the province lacks the employees to support the system in its current form. If you are going to add more layers, then other layers must be removed. It must get better, not worse. Current permit waiting times are unacceptable and permitting agencies lack the local knowledge and time to work with local governments to a level that is required. Permitting delays are already putting communities at risk, and making the system more complex is not the answer.
- We feel the province should take this opportunity to take a hard stand on the current function of DFO in BC. Without DFO on board and without proper staffing levels then most projects will suffer delay costs that are currently very high. DFO is one of the reasons we are in this current state due to their poor policy decisions on fishing over the last hundred-plus years. DFO unfairly saddles local government with the cleanup costs of their poor policies and looks at projects through a lens which is foggy. Desired end state should be the metric of a project and then the project should be completed to reduce harm as required. In most cases, the local QEP has a much better way of handling this, if they were left to do their job that they are professionally qualified to do.



Blanket legislation and decision-making of our current system leads to runaway costs, for the project that would never meet anyone's ROI calculation and often do not return a more fish-friendly project in the end.

*Just like OCP planning documents, the province or legislative body that puts out the guidance cannot consider all local situations. The less guidance the better as both provincial legislators and local policy makers often lack the ground level experience and political freedoms to complete such guidance documents with open mindedness.*

**Action 2.3 "Review and modernize provincial technical guidance."**

- This is another instance of good and bad idea. What are the current issues with the technical guidance? And by who's opinion is this measured? The seismic criteria are an example that can be used as a lesson learned. All dikes and flood infrastructure are designed by professional engineers who are signing off on the project. In most cases they have much more experience and technical expertise than policy makers. How will this be balanced? Too much technical guidance is a death blow to innovation. People are smart, and they should be allowed to innovate. While we agree that there is room for guidance improvements, this is a slippery slope. Think about SpaceX outperforming NASA in under 3 years. We need a SpaceX approach.
- The current guidance on seismic is an unbalanced or unnuanced approach. There are many areas where a "High Consequence Dike" cannot meet the criteria. This does not mean it should not be built if the risk level is so high that the project is being contemplated. This means that the regulations are not being applied properly. If the technical guidance is going to drive up costs of a project as they currently do, the funding streams must grow to suit that increase. A more pragmatic approach to this must be explored or many worthwhile projects will die unnecessarily.
- If there is a Federal/Provincial "flood insurance" program for high-risk areas, then this problem may take care of itself. The government will be a de facto underwriter. This may change the math and lead to progress as we do not think that this area has been well contemplated.

*It is often thought that you can fix a perceived problem by controlling it through "rules." The problem with this approach is that the rules cannot possibly consider the dynamics of nature or regional discrepancies. Sometimes getting out of the way and moving to a learning and support role leads to a better outcome. If you read about the issues revolving around*



*the rebuilding after the 2010 earthquake in Haiti, you will see that more "help" and money does not equal a positive outcome. We can learn from this.*

**Program Area 3: Enhancing flood preparedness, response, and recovery.**

**Action 3.1 "Enhanced flood forecasting capabilities and early warning systems."**

- Flood preparedness is the single most economical approach to preventing loss of life and property.
- We believe strongly in this approach and have taken it to heart in our area. The PVEMC group manages five hydrometric gauges and one WSC gauge in partnership. We are in the process of building a robust system to accommodate this data and use it for forecasting and emergency preparedness.
- The Ministry of Environment has large gaps in its data in the Pemberton area. We are currently lobbying them for help in filling these gaps which will add much needed resolution to our area. This is an area where most local governments lack the expertise and financial means to drastically improve things on their own.
- The provincial response during a flood is a well-performing sector. EMBC is meeting expectations at this task.

*This is an area that needs to be improved. The pace at which recovery can be done is cumbersome at best. If we look at the current situation in Lytton and how horribly wrong that has gone, as an example, we know that this is a difficult area to make changes. It is another example of legislators telling you how to do it, increasing the costs of doing it and not supporting you along the way. This is an oversimplification of the problem but gets the point across. We understand that build back better is an approach that makes sense; however, without the proper understanding and support to actually do it, you will only cause anger and lack of support in future recovery efforts.*

**Action 3.2 "Enhanced flood preparedness by developing and exercising flood emergency response plans at multiple scales."**

- This seems like a good idea and is being done at the local level in Pemberton. I think we need to do it more often.

**Action 3.3 "Enhanced emergency response activities."**



- I have not been through a flood yet as manager of the PVDD, so I will reserve comment on this as I need more information.

**Action 3.4 "Enhance pre-disaster recovery planning and post-disaster recovery, including build back better."**

- Recovery planning is a great idea.
- Post disaster and recovery, including build back better, is a big problem. As we said previously, the limitations from BC and the local building code, as well as the insurance issues that inhibit "build back better," need to be addressed and thoroughly reviewed.

**Program Area 4: Investing in flood resilience.**

**Action 4.1: "Enhance investments in flood avoidance."**

- This is another great idea to explore. I think that understanding how the mechanism would work would be key to commenting on this program better.
- I have reviewed the new EMA/EPA act that BC is considering, and it is severely flawed in its writing and nature. This act change should be pivotal in flood avoidance. Instead, it downloads unrealistic constraints on local governments that need discussion prior to adopting this legislation.
- Flood avoidance is very complex as we all know. But as stated previously, it takes way more money than we think government is willing to explore to affect change.

**Action 4.2: "Enhance investments in flood accommodation."**

- This is a topic we have been exploring in detail in Pemberton. We think that micro floodproofing of properties and structures is a must do so that we can accommodate flooding in large areas to reduce flooding in others. This is very difficult to enact given the current constraints of the funding and permitting system.
  - How do we pay for this?
  - How do we incentivise property owners?
  - How do we deal with the building code issues that stop this in its tracks?
  - How do you do this in agricultural areas when crop insurance is expensive and covers little no loss risk reduction?
  - How do you do this in areas that have septic fields?





- Flooding on your own terms is a very good idea. Let the water in, but on your terms in a low-velocity state and have a mechanism to dewater when the water goes down.

*This is an area that needs to be focused on as, in many areas, this is a necessary tool for making the future safer. There needs to be a trial area for a project like this. Pemberton would be a great test, as flooding vast areas of farmland would enable floods to happen in a slower and more controlled fashion. But we must have the means to accommodate people's homes, farm fields and farm equipment. We must remove all possible contaminants from the area, so we don't encounter the issues that Abbotsford is having with post-flood pollution. Finding one area and making this a reality to work through the issues that arise would be the best approach to moving into provincial scale projects.*

**Action 4.3: "Enhance investment in flood protection."**

- The current funding programs to affect change are severely lacking. The reality of the cost of projects is not echoed in the funding dollar amounts, cost sharing and land acquisition constraints. This needs to be addressed. If we look at the current DMAF funding, as an example, how can we think that a small investment of \$3.3 billion is even going to make a dent. The rebuilding of the diking system in the lower Fraser would be 5 times this amount.
- The other issue is the guidelines and constraints put on the design engineers as we have pointed out before. We are asking for a dike to be built to a safety factor that drives costs up to \$3-10 million per kilometer. This is insanity. It is like telling everyone they need to drive a Mercedes S Class regardless of their financial situation.
- The reality is that we need \$100 billion over the next 10 years. We are going to pay for it anyway in disaster response so spend it early.
- There should be a funding stream for pure engineering works so projects could be brought to an IFC (Issued for Construction) state prior to applying for construction funding. Then costs and risks will be better understood. This would lead to better utilization of the construction funding and lower the risk of cost overruns.
- Setting the provincial standard at 200 years plus an arbitrary climate factor is another area that needs addressing. Many areas simply cannot attain this level of protection but can more than adequately achieve a 100-year protection level. In many cases the 100-year project should still be built, provided that the failure mode is known and built in.



**Action 4.4: "Enhance investments in community-led retreat."**

- I find it interesting that the term "community-led" was chosen for this. This is an effort that needs to be facilitated by appropriate legislation. Pemberton is currently looking at how to do this. It is extremely expensive, so it cannot be done at the community level, and the process is so cumbersome when you look at buying people's property out or expropriation if they don't want to leave. Until the legislators put themselves in the people's shoes, that live in these properties, and make the process fair for the landowners financially, this will never work. We cannot kick people off their property and leave them in a less optimal financial situation than they have. Federal flood insurance may fix this issue during events.

*In many recent meetings with provincial officials, private engineering firms and geotechnical engineers, we have noticed a lack of general understanding of the constraints that local government and diking operators face. In a recent meeting, a government official that was recommending raising homes, had no knowledge of BC Building Code or local government building code and how that handcuffs this effort. We are not sure how that is possible, and it shows that the province cannot solve this problem without assembling a group of people from various disciplines to do so. I am sure that there are many people who work in all areas who would jump at this chance to help affect change.*

*The fix, as proposed, and this discussion paper does show the province has not investigated this issue with a large enough lens. The entire system needs to be reimagined, not repaired. The permitting system (tenure, water rights and others), DFO's involvement, the adjudication process of funding, the issues with using ROI as a metric, the lack of feedback loop to provincial officials, the lack of people with ground level real experience being involved and working full time in the process means that this will not work. We have a chance to save this. Having this completed by the end of 2023 is not the right timeline, and there is not enough labour power being thrown at this. It is being over complicated with ideology. Look at what is going on in health care. BC's Flood infrastructure has been in that state for years; its just not visible until a disaster.*





*In a thesis paper published in 2021 – Veronica Woodruff summed up our current governing structure like this:*

"As highlighted by the UN (2022), current governance models underestimate the complexity of modern interconnected systems, the cascading risks associated with multiple tipping points, and have difficulty embracing the transformation required to meet this new reality. Djalante et al., (2013) characterizes adaptive governance as “notions of governance that are more flexible and innovative and that encourage learning to better manage uncertainties and system complexities” (p. 2111). Implementing an adaptive governance model will require embracing some level of risk, while building in appropriate monitoring systems. The key is transforming strong situational understanding into action, and having the ability to adjust as necessary, without bureaucratic delays, based on observed repercussions of policy direction or mitigation tactics. Adaptive governance is an important strategy for ‘ruggedization’ because it allows communities to take action immediately to reduce their risks, adjusting as necessary, without having to wait for the perfect conditions before they can begin to build resilience. As one of the research participants noted, perfection cannot impede progress when trying to mitigate the rapidly increasing risk. There is no need to forego striving for the highest standards but there is a requirement to create viable pathways to attain these necessary aspirations for community safety.

The collaborative research project illustrates the value of collaborative effort and good communication, the strength of shared community experience and knowledge, the advantages of building on existing networks, and the benefits of and need for adaptive governance to support ruggedization in the face of our changing climate"

*We think that this is a very fair estimation of this current system.*

*We can fix this. Let’s assemble the right group of people to make this a reality.*



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