

June 14, 2019

Jean Woeller,
Chair, Bowness Responsible Flood Mitigation Society (BRFM)
jwoeller@shaw.ca

Re: Requests to Committee on May 15, 2019

Dear Ms. Woeller,

This document provides responses to the Bowness Responsible Flood Mitigation Society's letter to The City's Standing Policy Committee on Utilities and Corporate Services Chair, dated May 21, 2019. The City values your community's input and appreciates your organization's thoughtful inquiry. All responses are organized as presented in the original letter, with responses below in *italics*.

The City would also like to note that it is participating in the Bowness Flood Barrier community working group on flood mitigation. The City will be addressing any subsequent inquiries through this process to ensure consistent information and understanding is provided to all participant groups. The City kindly requests that any subsequent comprehensive inquiries be directed through your representatives on the community working group.

The City will continue to make every effort to continue to communicate directly and answer inquiries with citizens via the multiple avenues set up under the Bowness Barrier Project for communication, including:

- Direct emails
- 311 inquiries
- Project e-newsletters
- The project website and FAQs, and
- Engagement opportunities (one-on-one property owner visits, community meetings, working group meetings, pop-up booths at community events)

Again, The City appreciates your community's input and thanks you for communicating your concerns.

Sincerely,



Denise Nogueira

For reference, the figure below demonstrates the stages of design and where we are in the process for the Bowness Barrier project. The City is committed to additional engagement with community members and homeowners as it moves forward, at which time more detailed discussions regarding groundwater, environmental concerns, and social concerns can be addressed.

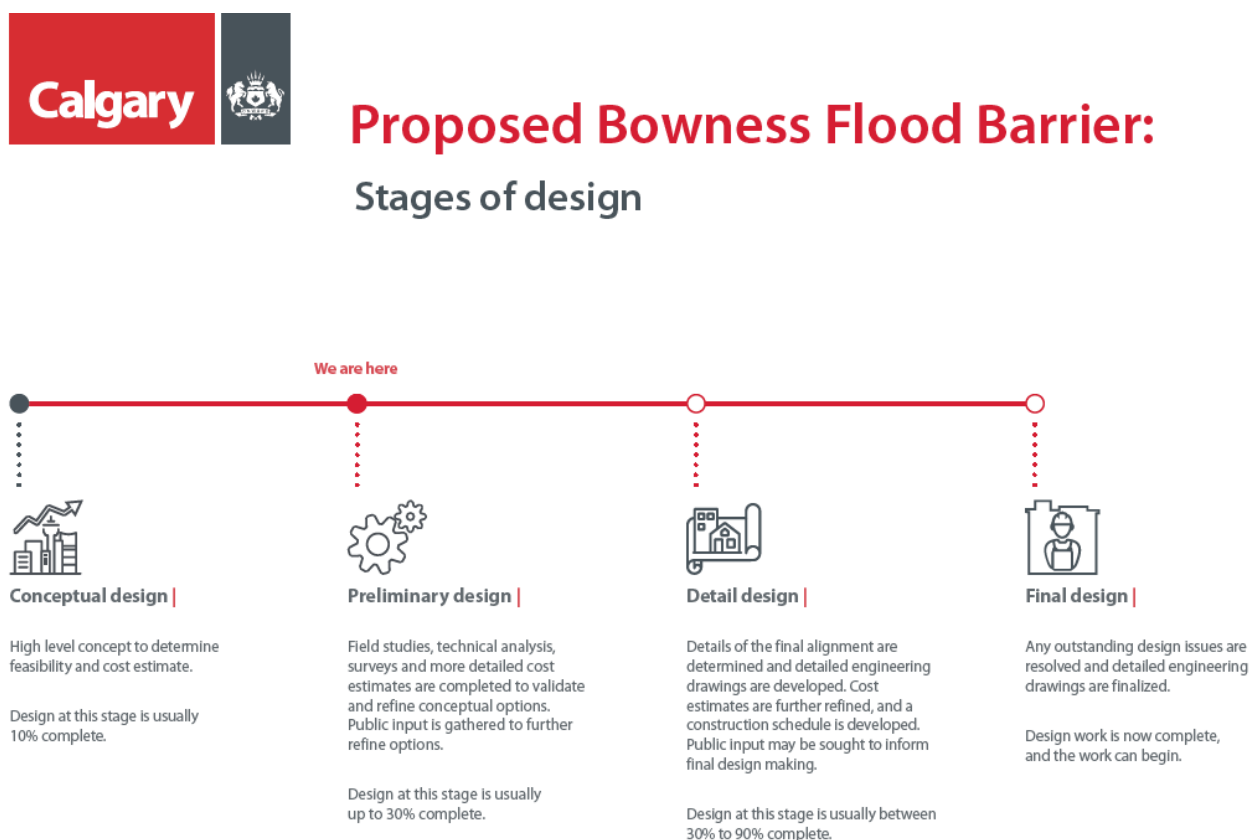


Figure 1 – Stages of Design

Consultation / Engagement

The City of Calgary has made two decisions on the Bowness barrier:

- to complete a conceptual design of the barrier to be built on private property, and
- to move forward with a subsequent preliminary design

1. Given the Committee is now aware of how much consultation was performed with directly affected residents before decisions were made and its own documentation demonstrates direct engagement did not occur until well past the decision date, does this Committee believe the City fulfilled their own policy on consultation for this project, and specifically for the two decisions already made?

Engagement completed in 2015 and 2016 by The City was used to inform a comprehensive Flood Mitigation Measures Assessment (FMMA). This assessment resulted in the development of The City's Flood Resilience Plan, which recommends a conceptual approach to mitigate flooding to at least a 2013-level for all of Calgary

(UCS2017-0266, March 22, 2017). As part of this work, engagement workshops were held throughout Calgary, including one in Bowness. These workshops were advertised publicly and citizens were free to attend any of the 11 scheduled sessions, regardless of where they lived.

In addition to the public sessions, citizens from communities from across Calgary were invited to apply to participate on The City's Community Advisory Group during engagement on the Flood Mitigation Measures Assessment. This group provided input in determining the best approach to flood mitigation throughout Calgary and included two residents from the community of Bowness.

While a barrier in Bowness was recommended as part of the overall plan in 2016, this does not mean that The City has decided to move ahead with constructing a project in this community without conducting engagement. The City's 2016 annual update report to The City's Standing Policy Committee on Utilities and Corporate Services (UCS2017-0266, March 22, 2017), identified that extensive community engagement must be included as part of any community flood mitigation plan.

The City started engaging with the community of Bowness regarding the barrier in August 2018 and began one-on-one meetings with riverfront owners in October 2018. The City is in the process of preliminary design and is conducting studies and gathering citizen input to inform the preliminary design work. No decision regarding either the design or construction of a barrier has been made. The City is committed to further engagement with the community as it moves forward.

- 2. We request the City change their consultation policy to explicitly require consulting of property owners for projects to be built on private lands, with clear questions on if projects should go forward, and results separated by those not actually affected, prior to decisions being made.**

The policy serves as a guiding document which on how engagement should occur. The City's Engage Policy does not prescribe requirements or specific engagement tactics to specific types of projects. Part of the process, which takes place with each engagement project undertaken by The City, includes a determination of which methods would be most appropriate for a given project.

No decision regarding either the design or construction of a barrier has been made. The City will undertake further engagement with the community as the project moves forward.

As noted in item 1, The City has been conducting one-on-one meetings with riverfront property owners in Bowness since October 2018. 100 out of 133 riverfront owners have met with the project team. Results from these meetings were recorded and will be provided to individual property owners starting in late June 2019. Owners who have not yet met with The City can still meet with the project team and ask questions regarding the progress or voice any concerns they have. The City will also be working with the Bowness Flood Barrier Project working group on community flood mitigation to discuss any questions or concerns regarding the project, and will share results from ongoing

technical analysis and studies with the group. This feedback will inform any potential preliminary design options presented to the community.

Following engagement and determination of necessary approvals, The City will negotiate appropriate consent and access arrangements with property owners if access to private lands are necessary. This is a distinct and separate process from engagement.

- 3. Given that consent is a key component of funding and the Water Act, consent is highly likely to affect schedule to implement as well as cost. Our request is to direct Water Services to conduct a proper survey of the property owners to determine if they will consent to a barrier being constructed. And the results of this survey be given to Council. And then Council to consider if there should be any more costs borne by this project.**

The City is currently gathering property owner input and conducting technical analysis and studies such as groundwater surveys to get an understanding of potential flood mitigation options for the community. Until this work is completed, there is no design to give consent to. The studies and property owner feedback will inform any potential design options presented to the community. No decision regarding either the design or construction of a barrier has been made. The City expects further engagement with the community as it moves forward.

As indicated in item 2, following engagement and determination of necessary approvals, The City will negotiate appropriate consent and access arrangements with property owners if access to private lands are necessary. This is a distinct and separate process from engagement.

- 4. The current individual property consultation form does not include a request to the homeowner to state a position on the barrier or even ask the property owner if they are all right with it. However, we understand the City is internally compiling this information, inferring it from discussions with residents. We request the City be transparent and cease inferring support or non-support and instead ask the explicit question in writing.**

No inferences are being made by City staff about homeowner positions regarding a potential barrier. The City of Calgary is collecting information from one-on-one meetings with homeowners solely to understand their concerns regarding potential flood mitigation in Bowness.

Homeowner feedback is being collected to inform the studies being undertaken so that community concerns can be addressed to the best extent possible in any potential preliminary design options. These options will be presented to the community and property owners through the Bowness Flood Barrier Project working group on community flood mitigation, and further engagement with the community and property owners is expected.

- 5. We request the City review their groundwater, environmental and social costs studies & quantification, and perform them with the residents. And then allow the**

residents to review to ensure they are of the same weighting as those given to Elbow Park residents on the Elbow River.

The technical, environmental, and social costs in the FMMA and Barrier Conceptual Design studies were used to develop The City's Flood Resilience Plan. These were high level assessments completed on a city-wide basis to decide which flood mitigation concepts warranted further study, and did not account for project-specific details.

As indicated in item 1, The City started engaging with the community of Bowness regarding the proposed barrier in this community in August 2018 and began one-on-one meetings with riverfront owners in October 2018. The City is only currently in preliminary design and is conducting studies and gathering citizen input to inform the preliminary design work. No decision regarding either the design or construction of a barrier has been made. The City is committed to further engagement with the community as it moves forward, at which time more detailed discussions regarding groundwater, environmental concerns, and social concerns can be addressed.

Equality and Fairness

Given, the expert management panel on flood mitigation states “The Panel does not recommend – building permanent or temporary flood barriers directly along the shore of the Elbow River residential areas because of the challenges with private property.”

6. Why does the City believe the challenges are less in Bowness?

The City's FMMA, conducted in accordance with the Expert Management Panel's report recommendations (UCS2017-0266, March 22, 2017), did not recommend barriers on the Elbow River because the Assessment considered the construction of the Springbank Reservoir (SR1) by the Province and upgrades at The City's Glenmore Dam as part of its analysis. A 2013-level of flood mitigation on the Elbow River can be achieved by construction of SR1 and the infrastructure upgrades underway at the Glenmore Dam. Consequently, additional barriers are not required on the Elbow River to achieve this level of flood protection.

The FMMA and the Provincial study done in collaboration with the Bow River Working Group concluded that, even with one new upstream reservoir, a 2013-flood level protection cannot be achieved in Bowness due to the low elevation of the community, and a barrier was proposed for study by The City to address the community's residual risk and reduce the risk of damages from smaller, more frequently occurring floods. This was determined by evaluation of the conceptual upstream storage scenarios in the Province's Bow River Water Management Project Final Report.

In a situation where upstream mitigation could not be built on the Elbow River, barriers would still not be recommended due to the excessive barrier length and height that would be required to protect Elbow communities to a 2013 flood level. The same conclusion was reached in the FMMA if upstream mitigation could not be built on the Bow River, and barriers would also not be recommended due to similar challenges.

7. Despite this recommendation, why did the City approve the Flood Mitigation Measures Assessment (FMMA) without even consulting Bowness private property owners?

As noted in item 1, engagement completed in 2015 and 2016 by The City was used to inform a comprehensive Flood Mitigation Measures Assessment (FMMA). This assessment resulted in the development of The City's Flood Resilience Plan, which recommends a conceptual approach to mitigate flooding to at least a 2013-level for all of Calgary. As part of this work, engagement workshops were held throughout Calgary, including one in Bowness. These workshops were advertised publicly and citizens were free to attend any of the 11 scheduled sessions, regardless of where they lived.

In addition to the public sessions, citizens from communities from across Calgary were invited to apply to participate on The City's Community Advisory Group during engagement on the Flood Mitigation Measures Assessment and included two residents from the community of Bowness. This group provided input into what was presented as part of the broader engagement on the project, which helped determine what the best approach to flood mitigation throughout Calgary.

8. Bowness has the same challenges with private property and groundwater. Why does the FMMA recommend upstream mitigation for the Elbow River, and local barriers for the Bow River?

The City's FMMA, conducted in accordance with the Expert Management Panel's report recommendations (UCS2017-0266, March 22, 2017), recommends upstream mitigation for both the Elbow and Bow Rivers.

The FMMA did not recommend barriers on the Elbow River because the Assessment considered the construction of the Springbank Reservoir (SR1) by the Province and upgrades at The City's Glenmore Dam as part of its analysis. A 2013-level of flood mitigation on the Elbow River can be achieved by construction of SR1 and the infrastructure upgrades underway at the Glenmore Dam. Consequently, complementary barriers are not required on the Elbow River to achieve this level of flood protection.

As noted in item 6, The FMMA and the Provincial study done in collaboration with the Bow River Working Group concluded that, even with one new upstream reservoir working in combination with the existing Ghost Reservoir flood operations agreement, a 2013-flood level protection cannot be achieved in Bowness due to the low elevation of the community, and a complementary barrier was proposed by The City to address the community's residual risk and reduce the risk of damages from smaller, more frequently occurring floods. This was determined by evaluation of the conceptual upstream storage scenarios in the Province's Bow River Water Management Project Final Report.

In a situation where upstream mitigation could not be built on the Elbow River, barriers would still not be recommended due to the excessive barrier length and height that would be required to protect Elbow communities to a 2013 flood level. The same conclusion was reached in the FMMA if upstream mitigation could not be built on the Bow River, and barriers would also not be recommended due to similar challenges.

9. Why does the City believe Elbow River, Sunnyside and the Hippos at the zoon [sic] should receive better groundwater protection than Bowness Residents?

The City's goal, as outlined in the Flood Resilience Plan, is to provide at least 2013-flood level protection for all communities in Calgary.

Locations requiring local or community mitigation come with their own unique set of circumstances that need to be considered. A large portion of the Calgary Zoo is located on St. George's Island. From the 2013 flood, we learned that evacuation options are very limited and it is technically challenging to evacuate zoo animals safely. The mitigation for the zoo was designed for these specific circumstances. Studies are ongoing in the community of Sunnyside regarding community mitigation, similar to what is occurring in Bowness, and no specific recommendations have been concluded.

Analysis and studies for each specific project and community will help identify the requirements and design considerations unique to that location. The groundwater surveys being conducted along Bow Crescent will help The City understand the groundwater concerns raised by residents. The results will also inform preliminary design options that will be proposed to the community for feedback and further engagement.

This is the reason for starting the projects with engagement and site-specific technical studies, as has been underway in Bowness since 2018. The City is conducting groundwater surveys along Bow Crescent to better understand the groundwater concerns raised by residents. Once complete, the results will inform subsequent barrier designs proposed by The City to the community.

As a participant in the Bowness Flood Barrier Project working group on community flood mitigation, The City will be addressing all subsequent inquiries related to groundwater through this process to ensure consistent information and understanding is provided to all participant groups.

10. We request Bowness be afforded the same protection against groundwater as Elbow River Communities in a 1:200 year event (since SR-1 requires no barriers and SR-1 will prevent a 1:200 year flood).

As noted in item 9, The City is conducting groundwater surveys along Bow Crescent to better understand the groundwater concerns raised by residents. Once complete, the results will inform subsequent barrier designs proposed by The City to the community.

The City is actively engaged with the Province through its Bow River Working Group regarding an upstream reservoir on the Bow River and potential groundwater benefits for downstream communities. Upstream mitigation is influenced by the limits of geography, technical feasibility, environmental impacts, and cost.

The City is participating in the Bowness Flood Barrier Project working group on community flood mitigation. Through this process, The City will be addressing all subsequent inquiries to ensure consistent information and understanding is provided to all participant groups.

11. As a primary stakeholder living on the Bow River, we request the same thorough upstream mitigation to 800 m³/sec to prevent groundwater flooding.

As noted in item 10, The City is actively engaged with the Province through its Bow River Working Group regarding an upstream reservoir on the Bow River and potential groundwater benefits for downstream communities. Upstream mitigation is influenced by the limits of geography, technical feasibility, environmental impacts, and cost.

The City has been working closely with the Province to advocate for construction of an upstream reservoir on the Bow River as soon as possible. The Province is currently studying the feasibility of various reservoir locations and sizes and it is expected the Province will recommend sites for further study by the end of 2019. The City is a key stakeholder in this process and we update and adapt our information and understanding as details emerge from the Province.

The City encourages the community of Bowness to advocate for upstream mitigation with the Province.

Groundwater and Barrier Effectiveness

In Dr. Tad Dabrowski's presentation he stated that the proposed scope of work is missing important components and this information was shared with the Bowness Barrier team in January 2019. BRFM has requested a meeting to discuss the planned groundwater study and is still waiting for a response to our meeting request. For your convenience, we have enclosed the document that describes Dr. Dabrowski's review of the proposed scope of work.

12. We request that BRFM's groundwater expert meet with the City of Calgary's groundwater expert for a collaborative discussion of the study.

The City's consultant, Kohn Crippen Berger, is currently conducting groundwater surveys at riverfront properties as part of the studies it is undertaking for the project. The terms of reference for this work has been shared with BRFM.

As this work has not been completed, it is too early to discuss any results at this time. All of The City's consultants are required to adhere to professional industry standards and to work in the best interest of the public. Community feedback is typically provided and considered through The City's engagement process. All content from BRFM related to the ongoing groundwater study has been received by The City and forwarded to Kohn Crippen Berger for their consideration.

As noted in item 9, The City is participating in the Bowness Flood Barrier Project working group on community flood mitigation. Through this process, The City will be addressing all subsequent inquiries to ensure consistent information and understanding is provided to all participant groups. Through this process The City intends to address any groundwater concerns that arise as a result of the study, and is open to a peer review of the results. This will inform subsequent barrier designs proposed by The City to the community.

13. If the current groundwater study being conducted in Bowness confirms BRFM Society assertions about the magnitude of the groundwater flooding problem, will the City commit to either solving it or focussing with residents and the Province exclusively on the provision of upstream mitigation, affording us the same consideration as Elbow residents as recommended by the FMMA?

As noted in item 12, The City is currently conducting groundwater surveys at riverfront properties as part of the studies it is undertaking for the project. This study will inform design options and the feasibility of groundwater mitigation in Bowness. Once results are available, they will be presented to the community.

As noted in item 9, The City is participating in the Bowness Flood Barrier Project working group on community flood mitigation. Through this process, The City will be addressing all subsequent inquiries to ensure consistent information and understanding is provided to all participant groups. Through this process, The City intends to address any groundwater concerns that arise as a result of the study. This will inform subsequent barrier designs proposed by The City to the community.

As noted in item 10, The City is actively engaged with the Province through its Bow River Working Group regarding an upstream reservoir on the Bow River, which will provide groundwater benefits to all communities downstream of the reservoir. Upstream mitigation is influenced by the limits of geography, technical feasibility and cost.

The City has been working closely with the Province to advocate for construction of an upstream reservoir on the Bow River as soon as possible. The Province is currently studying the feasibility of various reservoir locations and sizes and it is expected the Province will recommend sites for further study by the end of 2019. The City is a key stakeholder in this process and we update and adapt our information and understanding as details emerge from the Province.

14. If the berm is breached (design is only 1:20 year naturalized flow rate), the result will be immediate high rate and volume flow into the adjacent properties, with high destructive potential. Will this not leave the City liable for future class action suits such as are currently being undertaken in Quebec?

While barriers can be overtopped, they are designed specifically to withstand larger flows without failing (breaching) and not make existing conditions any worse than before they were constructed. The City does not guarantee that areas protected by flood barriers will not flood under any circumstance.

Flood barriers are designed by Professional Engineers to industry standards and constructed according to strict specifications, and are inspected regularly. For safety, areas protected by flood barriers may still be required to evacuate during a flood in case the barrier is overtopped or in the highly unlikely event that it does fail (breach). Residents should prepare their families and properties for potential flooding and evacuation, even if they live behind a flood barrier. It is also critical that citizens take flood warnings seriously, be prepared, and follow instructions when an evacuation order is called.

The City is unable to comment or speculate on the lawsuits that are being conducted in Quebec and any possible implications, given that they have not concluded and the unique situations of each municipality in Quebec.

Tree Census and Environment

- 15. We request members of committee come to Bowness and walk the proposed barrier alignment to see for yourself what is at stake (more than 5100 trees and shrubs likely to be removed, lost wildlife habitat, increased flow rates creating erosion, etc.).**

The City acknowledges that some environmental impacts will occur as a result of a potential barrier. Our goal is to minimize any potential environmental impacts to the greatest extent possible, in alignment with The City's Riparian Strategy (2013). To achieve this, over the next year we will be taking an inventory of all the trees that fall within the proposed alignment of the flood barrier and exploring alignment options to avoid trees having to remove trees where possible. Species, age and health of the trees and determining which trees would impact the construction of the barrier will be assessed.

In addition, we are working directly with residents to identify trees that have a special significance to property owners on potential avoidance or mitigation measures, and will make every effort to avoid cutting these trees. As part of our restoration of the natural environment we will also work with homeowners to replace as many trees as possible on the site.

- 16. We request The City complete the Biophysical Impact Assessment (BIA) before the preliminary design alignment is completed so that areas on environmental or archaeological significance can be protected.**

The City will not complete a preliminary design or propose a preliminary alignment until all ongoing and relevant studies are completed, including the BIA currently underway and groundwater surveys. Both studies will inform potential design options and alignments that would be presented to the community.

- 17. We request the City give BRFM the opportunity to review and provide input to the design of any BIA studies.**

The City will be participating in the Bowness Flood Barrier Project working group on community flood mitigation. The City will be addressing any subsequent inquiries, including inquiries related to the BIA study, through this process to ensure consistent information and understanding is provided to all participant groups.

All information provided by BRFM to date has been provided to Klohn Crippen Berger for their consideration. All of The City's consultants are required to adhere to professional industry standards and to work in the best interest of the public. Community feedback is typically provided and considered through The City's engagement process.

- 18. We request the City allow BRFM to have input to the BIA report before it is submitted to the Province who will decide on the requirement for an Environmental Impact Assessment.**

The City intends to review results of the BIA through the Bowness Flood Barrier Project working group on community flood mitigation. All information provided by BRFM to date has been provided to the consultant (Klohn Crippen Berger) for their consideration.

Upstream Mitigation Solutions

- 19. We request the City partner with BRFM to advocate for an upstream solution that**
- a. provides the required protection that limits flow rates in Calgary to 800 m³/sec**
 - b. provides flood and drought protection**
 - c. is part of a routinely operated system, not only once every 20 years**
 - d. provides for economic growth through value adding infrastructure.**

As noted in item 11, The City has been working closely with the Province to advocate for construction of an upstream reservoir on the Bow River as soon as possible. The City is actively engaged with the Province through its Bow River Working Group regarding an upstream reservoir on the Bow River.

The Province is currently studying the feasibility of various reservoir locations and sizes and it is expected the Province will recommend sites for further study by the end of 2019. The City is a key stakeholder in this process and we update and adapt our information and understanding as details emerge from the Province.

The City is supportive of BRFM's advocacy efforts regarding upstream mitigation on the Bow River and encourages the community to continue advocating for this work. Ensuring the Province is aware the urgency on this issue from multiple stakeholders is critical to ensuring progress on this issue.

- 20. After Preliminary Engineering, we request the suspension of the Bowness barrier project (and all flood mitigation projects on the Bow River) until the upstream mitigation solution is identified, approved and the operating protocol has been confirmed; this will determine what residual mitigation is required in Calgary.**

Based on the current progress of the SR1 project and historic timelines associated with infrastructure projects of a similar scale, it is statistically likely that another large-scale flood will occur on the Bow River before upstream mitigation can be constructed. If construction of a barrier is delayed, the community will experience overland impacts in flows as small as 850 m³/s and more than 350 properties in Bowness will be at risk of flooding at 1200 m³/s. Construction of barriers on the Bow River is a risk-reduction measure that will benefit the community prior to and after completion of a reservoir.

As noted in items 6 and 8, the FMMA and the Provincial study done in collaboration with the Bow River Working Group concluded that, even with one new upstream reservoir, a 2013-flood level protection cannot be achieved in Bowness due to the low elevation of the community, and a complementary barrier was proposed by The City to address the

community's residual risk. This was determined by the conceptual upstream storage scenarios in the Province's Bow River Water Management Project Final Report.

The City is continually refining its understanding of flood risk and mitigation options, provincial context and regulatory environment, and will continue to integrate this understanding into the resilience plan and project designs on an ongoing basis.

21. We request the City understand the influence of groundwater in Bowness before determining the barrier design.

The City is conducting groundwater surveys along Bow Crescent to better understand the groundwater concerns raised by residents. Once complete, the results will inform subsequent barrier designs proposed by The City for the community.

The City is participating in the Bowness Flood Barrier Project working group on community flood mitigation. Through this process, The City will be addressing all subsequent inquiries to ensure consistent information and understanding is provided to all participant groups.

Information Accuracy and Clarity

The Deputy Minister of Alberta Environment & Parks have the position that “it is premature to include this option [Bowness flood barrier] in the current multi level approach”. The FMMA also states “if a new Bow Reservoir is not built, fortification of the Bow River by barriers is not desirable, as it would require higher barriers with large footprints along the length of the Bow River within Calgary, resulting in impacts to the community”.

22. We request the committee direct Water Services to wait until such time as the reservoir is committed to, prior to designing a barrier

Based on the current the progress of the SR1 project and historic timelines associated with infrastructure projects of a similar scale, it is statistically likely that another large-scale flood will occur on the Bow River before upstream mitigation can be constructed. If construction of a barrier is delayed, the community will experience overland impacts in flows as small as 850 m³/s and more than 350 properties in Bowness will be at risk of flooding at 1200 m³/s. Construction of barriers on the Bow River is a risk-reduction measure that will benefit the community prior to and after completion of a reservoir.

As noted in items 6 and 8, The FMMA and the Provincial study done in collaboration with the Bow River Working Group concluded that, even with one new upstream reservoir, a 2013-flood level protection cannot be achieved in Bowness due to the low elevation of the community and a complementary barrier was proposed by The City to address the community's residual risk and reduce the risk of damages from smaller, more frequently occurring floods. This was determined by the conceptual upstream storage scenarios in the Province's Bow River Water Management Project Final Report.

The Alberta Community Resiliency Program (ACRP) has a requirement that “The applicant must also own or obtain legal consent to access the lands upon which the

project is constructed.” The City indicates, “The Bowness barrier is considered an eligible project under ACRP, but funding has not yet been approved.”

- 23. We request the committee direct Water Services to not state the project is eligible for funding as the requirement for consent is not yet met and the Deputy Minister’s letter position is still valid. A more accurate statement would be, “it may be eligible for funding in the future.”**

The City was informed by the Province that the projects as submitted to the Province in 2017 are conceptually eligible, but funding would be subject to further discussion regarding final design and alignment with the Alberta Community Resilience Program’s flood risk reduction goals. The City continues to communicate with the Province on these projects.

Given the wording as indicated by Deputy Minister Blackwood and that funding has not yet been confirmed, The City is amenable to modifying this wording in future messaging.

- 24. We request the City directly answer questions from residents. For example, if asked “how great is our risk to flood again” the response should be “With the current TransAlta agreement in place, the risk is 5%”, not the answer that was actually received in the “what we heard report”: “It’s true that Calgary has had several decades without a flood event, however, with a changing and warming climate, extreme rainfall and floods are expected to happen more frequently.”**

In response to the above question about flood risk, in addition to several direct emails, the following information has been posted to the project website since early 2019:

“Without any flood mitigation in place, there is a 12 per cent chance in any given year that Bowness will experience overland flooding. Mitigation infrastructure like reservoirs and barriers help reduce flood risk. When you factor in the TransAlta agreement for the Ghost Reservoir that was put in place in 2016, the annual flood risk in Bowness reduces from 12 per cent to five per cent.”

- 25. We request the committee direct the City to recalculate the Benefit Cost Ratios (BCRs) with the addition of excluded costs.**

As noted in The City’s response to the BRFM’s inquiries dated November 26, 2018, the benefits, costs and benefit-cost ratio will be recalculated as project-specific information, including a proposed alignment and design, is obtained through this phase of study. Previous benefits and costs were calculated at a conceptual, city-wide level for the purpose of creating a flood resilience plan for all of Calgary and identifying required projects to meet flood resilience objectives.

Estimates will be continually refined throughout the design process as additional information is gathered, as is standard practice, and will be shared with the community.

- 26. We request the committee direct the City to recalculate all BCRs using Land Compensation Board (LCB) order 457 (Inglewood barrier case) as the compensation standard. When we took the most conservative reading of the LCB**

order and ran it for Bowness, we arrived at \$20M. This is 60% more than what the City has budgeted (\$13M).

The City is not considering expropriation for the Bowness project. The Land Compensation Board (LCB) is an independent body that ruled on a matter of expropriation in the community of Inglewood on a separate project.

As noted in The City's response to the BRFM's inquiries dated November 26, 2018, The City deals with compensation on a case by case basis. Until it is determined how much land will be required for easement, The City does not know how much compensation will be offered.

- 27. We request the City rerun the BCR with the actual main floor flood elevations for the affected properties instead of using assumptions that artificially inflate main flood damages.**

Previous benefits and costs were calculated at a conceptual, city-wide level for the purpose of creating a city-wide flood resilience plan and identifying required projects to meet flood resilience objectives. Every reasonable effort was made in the conceptual study to use as accurate data as possible.

As noted in item 25, the benefits, costs and benefit-cost ratio will be recalculated as project-specific information, including a proposed alignment and design, is obtained through this phase of study. Previous benefits and costs were calculated at a conceptual, city-wide level for the purpose of creating a flood resilience plan for all of Calgary and identifying required projects to meet flood resilience objectives.

Estimates will be continually refined throughout the design process as additional information is gathered, as is standard practice, and will be shared with the community.

- 28. We request the City rerun the BCR based on historical design variance based on the Inglewood experience (20% more barrier than straight line to accommodate property owners choice of path and mix of berm vs. wall).**

As noted in items 25 and 27, the benefits, costs and benefit-cost ratio will be recalculated as project-specific information, including a proposed alignment and design, is obtained through this phase of study. Previous benefits and costs were calculated at a conceptual, city-wide level for the purpose of creating a flood resilience plan for all of Calgary and identifying required projects to meet flood resilience objectives.

Estimates will be continually refined throughout the design process as additional information is gathered, as is standard practice, and will be shared with the community.

- 29. We would like the City to explain why the City chose not to include historically known costs, not base estimates on previous designs, and not base land costs on the most relevant LCB ruling.**

As noted in The City's response to the BRFM's inquiries dated November 26, 2018, the conceptual report incorporated assessed value, historical and experienced based land values, with healthy contingencies. This formula and its level of accuracy was considered appropriate for a conceptual stage assessment.

As noted in items 25, 27 and 28, the benefits, costs and benefit-cost ratio will be recalculated as project-specific information, including a proposed alignment and design, is obtained through this phase of study. Previous benefits and costs were calculated at a conceptual, city-wide level for the purpose of creating a city-wide flood resilience plan and identifying required projects to meet flood resilience objectives

Estimates will be continually refined throughout the design process as additional information is gathered, as is standard practice.

As noted in item 26, The City is not considering expropriation for the Bowness project. The Land Compensation Board (LCB) is an independent body that ruled on a matter of expropriation in the community of Inglewood on a separate project.

30. The City just recently rezoned portions of Bowness, which were either flooded in 2013 or are in the flood mapping zone to a higher density. All flood reports state a desire to reduce flood damage. Why would the City then change the zoning to increase the density, resulting in increased damages? Or at a minimum, why wouldn't the City ensure there is no development below the 1:100 year level?

In all development applications, The City seeks to balance many priorities and risks, including: flood resilience and risk, urban sprawl, environmental footprint, natural ecosystems, emergency response, economics, demographics, accessibility and mobility, and more.

Current regulations prohibit new development in the floodway, and require new development and re-development within the flood fringe to be flood-proofed according to Land Use Bylaw IP2007, Part 3 Division 3.

Updated regulations to enhance flood resilience are being considered as part of larger ongoing work around the Municipal Development Plan update, flood resilience, riparian strategy and climate change. New regulations must go through a period of public engagement before approval by Council.

31. We request the Committee direct the Planning department to not allow non-waterproof basements for new developments in the flood zone.

Current regulations prohibit new development in the floodway, and require new development and re-development within the flood fringe to be flood-proofed according to Land Use Bylaw IP2007, Part 3 Division 3.

Updated regulations are being considered as part of larger ongoing work around the Municipal Development Plan, flood resilience, riparian strategy and climate change. New regulations must go through a period of public engagement before approval by Council.

32. We request the Committee advise Council to not allow zoning changes to higher densities in the flood zone, or if they do, to not allow non-waterproof developments below the 1:100 year level.

As noted in item 30, in all development applications The City seeks to balance many priorities and risks, including: flood resilience and risk, urban sprawl, environmental footprint, natural ecosystems, emergency response, economics, demographics, accessibility and mobility, and more.

Current regulations prohibit new development in the floodway, and require new development and re-development within the flood fringe to be flood-proofed according to Land Use Bylaw IP2007, Part 3 Division 3. Updated regulations are being considered as part of larger ongoing work around the Municipal Development Plan, flood resilience, riparian strategy and climate change. New regulations must go through a period of public engagement before approval by Council.