The following Addendum (2) is issued in response to proponents' questions. Questions are listed in Black with answers highlighted in blue.

1. Can you please confirm that naturalized flows will be available at the start of the project, and also please provide the periods of records, time steps and locations for which naturalized flows have been developed?

We have naturalized flows for the period from 1996-2006, information about this study can be found on the OBWB website (https://www.obwb.ca/wsd/data/surface-water-hydrology). The study included all inflows to the basin. Modeled data sets will be made available to the successful proponent. An updated naturalized flows study is under way, but only for a subset of the streams. We encourage the proponents to use the original study as well as the new, updated models.

2. In Section 5.3 of the RFP (Work Steps), item III. Indicates development of a separate inflow model. Can you please provide more detail on the expectation for the inflow model, and would the separate inflow models be extracted from an existing model?

Due to the highly regulated nature of the main stem Okanagan Valley lakes, it is thought that the inflow into each lake is the best starting point to look at extreme water levels. The methodology of determining that extreme inflow is up the proponent but once determined, various scenarios for dam releases from each lake could be used iteratively to come up with extreme lake elevations. The decision making process for dam releases sometimes must factor in holding water in a lake so as to limit downstream impacts. Historic decisions and related rationale will be made available to the successful proponent in this regard. It should be made clear that (for example) a 1:200 year return period inflow may not translate into a 1:200 year lake level due to variability in the inflow forecasting that informs dam releases and drawdown planning. The Okanagan Lake flooding of 2017 is a good example of this.

3. For the inflow hydrology report, the RFP asks to include "hydrographs, timing of inflows, and corresponding lake levels". Won't the calculation lake levels require the modelling done in Phase 2?

It is correct that "lake levels" should not have been included in the phase 1 report deliverable. Flood levels on the lakes and river will only be determined once hydraulics are factored in.

4. For Task II, the RFP asks to obtain operation guidelines and rules, and historical data, including … climate models. Could you expand on this? Do you want the

proponent to understand the climate models used in the existing Okanagan hydrology/hydraulic models?

It's probably more precise to specify "data outputs and scenarios from climate models." There's been fairly detailed modeling already completed, that's available through the Water Supply and Demand Project. The reports on this are on the OBWB website, but the actual downscaled climate modeling data is held in the water demand model database. We did two separate scenarios studies: https://www.obwb.ca/wsd/climate-change-scenarios/supply-scenarios and https://www.obwb.ca/wsd/climate-change-scenarios/phase-3-scenarios

5. For development of inflow models (Task III), what extreme precipitation amounts should be included? (20, 100, 200, 500 year return periods and 2017 event?)

Our thinking has been that the volume and timing of lake inflows is more important than precipitation events although we are open to any thoughtful proposed methodology. Just using extreme precipitation may be of value for the sub basins but may not be as valuable for Okanagan Lake because of the size of that watershed. The standard for flood plain mapping has been 1:200 year water surface elevation return period. However, developing that number may be complicated due to the regulated nature of the main stem lakes. A bidder should provide a rationale to use a suitable number (or range) that makes sense. Annual levels on the Okanagan and Kalamalka lakes will be a function of how far the lakes are drawn down prior to freshet. Understand that (for example) a 1:200 year return period inflow may not translate into a 1:200 year lake level due to variability in the inflow forecasting that informs dam releases and drawdown planning. The Okanagan Lake flooding of 2017 is a good example of this.

6. Is there any bathymetry information available for the lakes?

Very limited bathymetry information is available for the lakes, in old non-digital forms. However, most of the "action" is in the surface layers of the lakes (active storage). Okanagan and Kal Lakes are very deep. There is new, digital bathymetry for Kal/Wood Lake.

7. What are the existing hydraulic models for the system? Will they be available for the successful bidder?

There are HEC-RAS files for the Okanagan River that can be made available by FLNRORD. Note that cross sections, roughness coefficients, etc. would require updating.

8. What is the approximate spacing of the surveyed cross sections on Okanagan River reaches?

Current cross sections spacing is variable. That information can be on the image documents section of the ECOCAT link at: http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=3159

9. Task VI) b): What is a freeboarding rating curve? Are you asking for the discharge versus upstream lake level or downstream lake level (whichever governs)?

Yes, it is a discharge versus upstream lake level curve when dam gates are fully open but not surcharged.

10. Does the LiDAR (2017 and 2018) and orthoimagery cover the entire study region?

There is LiDAR (217 and 2018) for the Okanagan Valley (however there is no current Similkameen River LIDAR available). Orthos are available for 2017, and for most of the project area in 2018. For more information see: https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/embc/dfa/okanagan-lidar-project-background.pdf

11. Deliverable 5c) Map areas of ponding caused by inadequate drainage: Does this require an analysis on groundwater connectivity to high Okanagan River flows? Or do you just want the 2017 LiDAR extents mapped?

It is likely that both the 2017 and 2018 LiDAR will show ponding. Low-lying areas are likely to have ponding based on the difference between the floodplain elevations in the valley near the channel and the height of water in the channel. Groundwater connectivity would be a valuable addition to the proposal if it is within the budget scope.

12. Deliverable 5f) Map potential wave heights along different portions of lakeshore/river banks: Do you want wave heights modelled, or just calculated to most vulnerable locations and added to the high water levels for mapping? Do you want wave modelling along the river (or just where the river banks will be affected by waves – river flow surge)?

We want wave heights modeled on the lakes to improve the estimates of freeboard required. The current freeboard of 0.60 m is less than the observed wave heights in many portions of the lake system. Waves are less of a concern on the river channel. Waves have a different effect on flooding than high lake levels (they have significant consequences on the shoreline, but not the persistent effects of lake flooding that potentially moves far on-shore).

13. Is it required wind modelling for the generation of wind waves? We assume that the wind fields along the lakes will be different from the measured locations (airports for example)

The successful proponent should ascertain what level of detail is required for wind-wave studies and provide a rationale for that decision. There may be some wind data available in different locations from yacht clubs etc.

14. Please confirm if there is wave data measured available for calibration.

FLNRORD has no current data. There may be some wave data available, but it will mainly have to be modeled based on the geography of the lake, prevailing wind direction, length of fetch, etc.

15. Per page 13 of the RFP (Scored Criteria) it appears that "Appendix D – Experience Form" is mistitled. We think it should be "Appendix E – Experience Form". Please confirm.

Yes, the experience form should be titled Appendix E.

16. Should the proponent develop a new hydrological model or is it possible to validate/calibrate an existing hydrological model for the desired accuracy of the results?

We are looking for a proposal that best serves the desired results. A proponent using professional judgement should provide a justification and rationale that their methodology best serves this purpose; be it using a new model or reworking an existing model.

17. The RFP references an analysis of the breaching of flood protection infrastructure but this does not include dykes and dams. Please define flood protection infrastructure.

Flood protection infrastructure are any of the different forms of lakeshore protection. In the Okanagan, dikes are along river and creek banks and dams and control structures are at the outlet of lakes and directly instream.

18. Are flood hazards maps for Lower Vernon Creek and Middle Vernon Creek within the scope of this RFP?

Middle and Lower Vernon Creek are not in scope.

19. Are channel surveys available for Lower Vernon Creek and Middle Vernon Creek?

Not that we are aware of although it is possible these may be sourced during a literature review. Middle and Lower Vernon Creek are not in scope.