List of suggested work to be done to review the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam

Prepared by Queensland Flood Commission staff, 17 May 2011

This is a list of potential investigations/work to be completed at different phases of the review of the Manual. Please provide reasons for your agreement or disagreement and in the case of agreement provide an opinion as to how the action should be completed.

The Commission welcomes comments on other work that you think should be completed at any stage of the process.

Interim review of the Manual (before 2011/2012 wet season)

A. Should this review of the Manual:

1. resolve the confusion over non-damaging flows, target flows and corresponding levels downstream with respect to flows at Moggill (taking into account impact of tides, influence of downstream tributaries, effect of maintaining discharges for long periods)?
2. involve operational/technical writers writing the content and organising the material in the Manual to properly reflect the strategies as applied by the flood engineers?
3. ensure the Manual is internally consistent?
4. involve lawyers to check wording of manual and potential effects on liability and immunity?

Longer term review of the Manual

B. Should this review of the Manual:

5. include a review of the design hydrology?
6. if so, should such a review of the design hydrology:
    a. use a stochastic, Monte Carlo or probabilistic approach rather than a deterministic approach?
    b. take account of observed variability in temporal and spatial patterns of rainfall?
    c. take account of observed variability in relative timings of inflows from the dam and downstream tributaries?
    d. account for how dam levels and discharges are influenced by downstream tributary flows?

7. test the usefulness of installing more ALERT gauges at high elevations in the catchment?
8. involve a bathymetric survey of all significant creeks and rivers upstream and downstream of the dam relevant to flood modelling?
9. update the hydrodynamic (hydraulic) model using up-to-date bathymetry and LIDAR (light detection and ranging optical remote sensing technology)?
10. assess the reliability of forecast rainfall?
11. run simulations to test the robustness of relying on forecast rain?
12. consider the ability to pre-release on the basis of forecasts?
13. consider potential triggers for such pre-releases?
14. consider the ability to incorporate information from weather radar?
15. involve obtaining information from the Bureau of Meteorology on its ability to provide ensemble forecasts (multiple predictions based on different initial conditions)?
16. consider the ability for the flood engineers to use such ensemble forecasts?
17. involve modelling to cover a range of potential Full Supply Levels with different operating strategies?
18. assess the performance of different operation strategies against property floor levels in all urban areas downstream and upstream of the dam and likely damages?
19. develop damage versus water level or flow relationships for different types of damage including monetary, life safety, social and environmental damage? If so, who should do this task?
20. develop a probability distribution for the time between flood peaks in the catchment using historical records?
21. resolve the confusion over non-damaging flows, target flows and corresponding levels downstream with respect to flows at Moggill (taking into account impact of tides, influence of downstream tributaries, effect of maintaining discharges for long periods)?
22. incorporate a hydraulic model in the Real Time Flood Model to increase confidence in downstream flood estimates?
23. consider the options to prioritise mitigation for smaller, more frequent floods or larger, rarer events?
24. consider the level of discretion to be given to flood engineers during flood operations?
25. consult with all stakeholders, including Seqwater, Brisbane City Council, Ipswich City Council, DERM, Somerset Regional Council and local residents to determine risks and benefits of different strategies?
26. having undertaken all of the above, perform modelling to assess possible changes to the existing strategies including trigger levels, target flows and steps between strategies?

27. if so, perform the modelling in the following order:
    a. perform initial simulations using a rainfall runoff routing model?
    b. assess the most promising options using the hydrodynamic model?
    c. have independent experts reviewing the modelling?
28. in particular, model the outcomes of:
    a. a stepped change from W3 to W4?
    b. moving to a higher rate of release earlier in W1?
    c. bypassing W1?
    d. altering maximum release rates under W3?
    e. situations in which initiating a fuse plug may be preferable?
    f. altering the FSL, either permanently or temporarily?
    g. for each potential FSL level, new operating strategies to release water as soon as the dam level rises above FSL?
29. having undertaken all of the above, develop potential new operating strategies without reference to the current strategies in the Manual?
30. finalise the wording and structure of the Manual by:
    a. engaging operational/technical writers to write the content and organise the material in the Manual to properly reflect the strategies decided upon in earlier investigations?
    b. ensuring Manual is internally consistent?
    c. engaging lawyers to check wording of manual and potential effects on liability and immunity?

Future reviews of the Manual

C. Should all future reviews of the Manual:

31. include a more detailed review of the manual than in the past?
32. engage a small independent expert panel to assess the operational strategies in the Manual that is nominated by various stakeholders such as Seqwater, Brisbane City Council, Ipswich City Council, DERM, Somerset Regional Council, which should:
    a. be comprised of flood hydrologists, but also include experts on rainfall forecasting and the operation of dams (electrical and mechanical operation of gates and flood operations)? If so, how many of each would be appropriate?
    b. determine whether changes in technology, methods or downstream risk profile warrant the updating of the hydrology, operation or forecasting?
33. involve a person entirely independent of the process of creation or review of the Manual giving it final approval.