9 Surface water and flooding

Richmond Bridge and the Kurrajong Road approach from Richmond are currently subject to regular flooding. The Kurrajong Road approach from Richmond passes across a floodplain known as the Lowlands which carries flow that breaks out of the main Hawkesbury River channel during flood events.

Flood modelling for the proposed Options B, C and D was carried out to assess the impacts of flooding on these options. Options C and D required this modelling as the eastbound carriageway across the flood plain will be higher than the existing carriageway due to the provision of an increased flood immunity for these two options.

The purpose of the flood modelling was to assess the flooding impacts of Options C and D to ensure that impacts are within acceptable limits and to determine the minimum road levels, and drainage structures required to achieve the desired flood immunity.

The flood modelling criteria and design parameters are outlined in Table 24.

Table 24 - Flood modelling criteria

Flood modelling criteria	*Description*
Maximum allowable afflux for occupied properties	200 millimetres in the flood plain
Flood immunity of proposed upgrade alignment	Option A, B: Less than 1:5 year ARI (existing) Option C: 1:5 year ARI Option D: 1:20 year ARI
Flood level in relation to strategic design level of new bridge structures	Flood level below bridge soffit (Option C and D only)

An allowable increase in flood level of 200 millimetres for events up to the 100 year ARI was nominated by RMS as acceptable for the purposes of determining waterway opening sizes at a strategic concept design detail.

A RUBICON model of the Hawkesbury Nepean River indicated that the largest flood impacts would occur upstream of the Lowlands flow path as a result of the raised carriageway embankments associated with Options C and D which involve raising the road to achieve 1:5 and 1:20 year ARI flood immunity respectively. These impacts would be highest in events more frequent than the 1:20 year ARI. In the 1:100 year ARI event, flow would pass over the roadway.

The flood modelling results indicated that there are several flow paths (2-3) in the lowlands areas that will carry flows in a flood event and which will need suitable drainage structures (culverts or bridges) to allow flood waters to pass and to achieve the assumed acceptable afflux.

Flood marker at Richmond Bridge