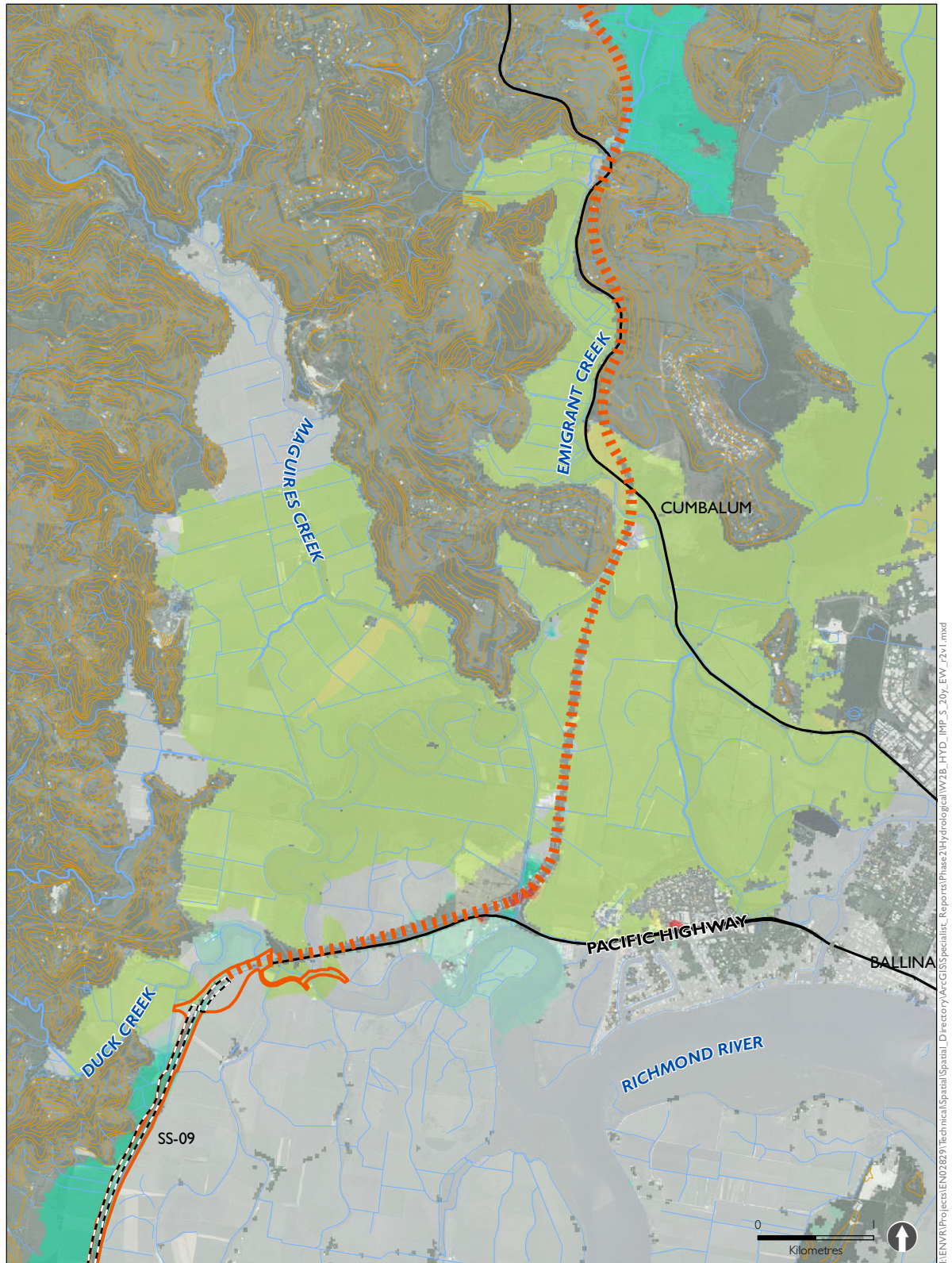





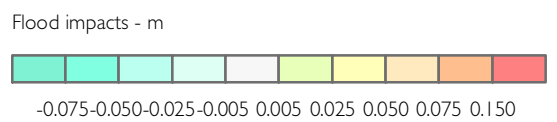


Upgrading the Pacific Highway - Woolgoolga to Ballina Upgrade

Figure 5-9 Soft soil site flood impacts 20 year ARI event: Lower Richmond River and Ballina



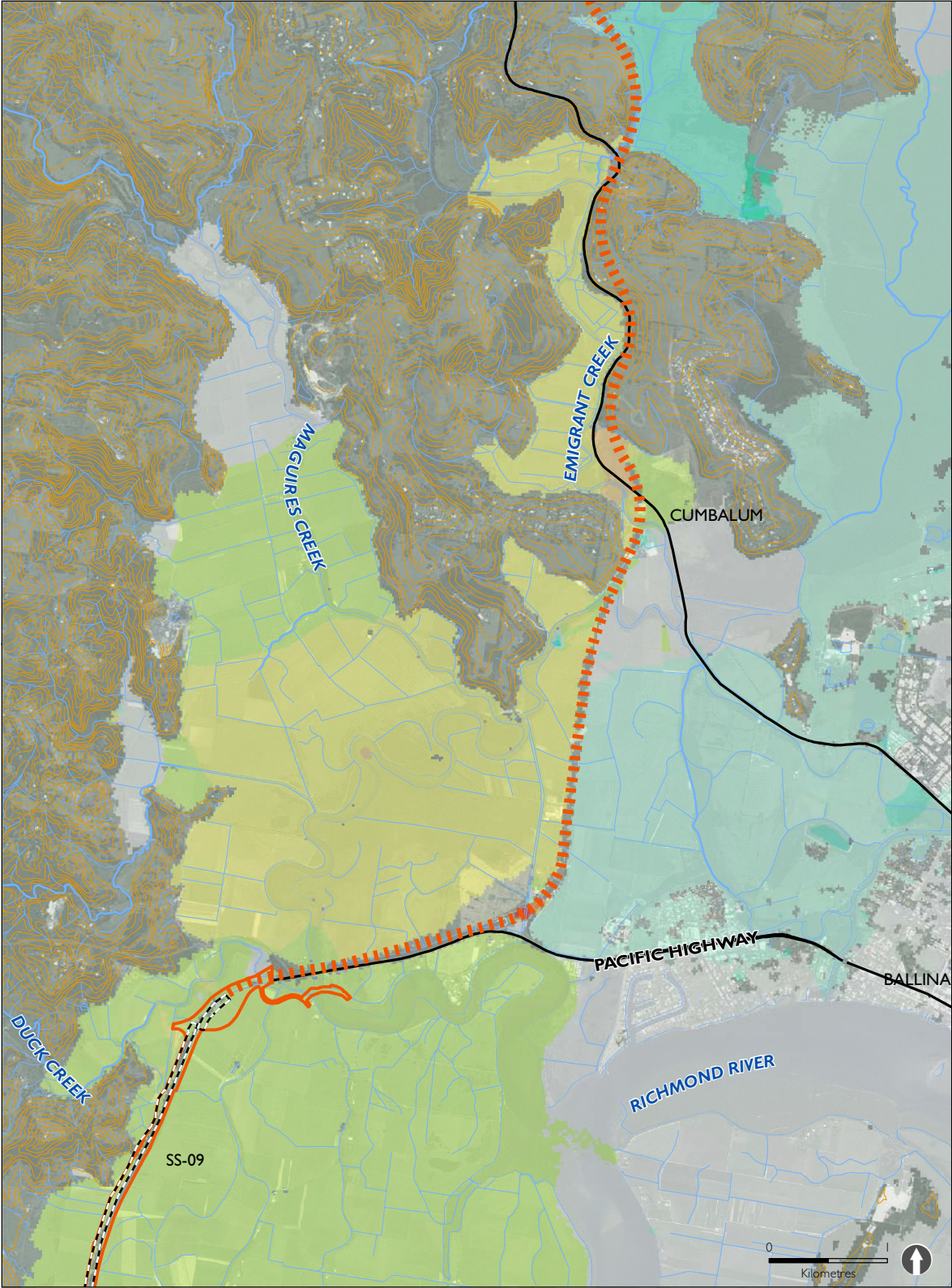
-  The project
-  Ballina Bypass upgrade
-  Existing Pacific Highway
-  10m ground level contours (indicative)
-  Soft soil site



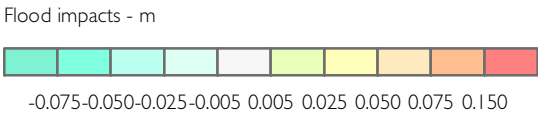


Upgrading the Pacific Highway - Woolgoolga to Ballina Upgrade

Figure 5-10 Soft soil site flood impacts 100 year ARI event: Lower Richmond River and Ballina



- The project
- Ballina Bypass upgrade
- Existing Pacific Highway
- 10m ground level contours (indicative)
- Soft soil site



## 5.4. Impacts of construction on cane lands

### 5.4.1. Impacts of soft soil sites on cane land flooding

The construction of the soft soil sites has the potential to obstruct floodplain flows and change flooding behaviour on the cane floodplains of the Clarence and Richmond rivers. The predicted impacts of these soft soil sites have been assessed and is discussed above. In summary, the flood modelling assessment indicates that the flood management objectives for cane areas (relating to changes to peak flood levels, depths, periods of inundation) would be met with the soft soil sites constructed.

### 5.4.2. Impacts of construction on cane drainage networks

The construction sites and haul roads may cross a number of cane drains. It is critical that the capacity of cane drains is not reduced as this could result in significant delays to the drainage of cane lands, which could result in extended inundation and potential loss of crop. The main area where this has been identified as a potential issue is within the Shark Creek basin.

The design would need to verify that the conveyance characteristics of the cane drains are maintained through the provision of waterway crossings under any construction sites and haul roads. Temporary drainage would be oversized in order to prevent blockages.

## 5.5. Flood impacts of temporary connections

### 5.5.1. General comments

RMS is proposing to stage the future delivery of the project based on the combined consideration of upgrade need and funding. Each delivery stage would involve upgrading a combination of one or more project sections, with some sections of highway being upgraded in advance of others.

The construction of earlier delivery stages may require the construction of a temporary connection to the existing Pacific Highway, where adjoining sections may not be upgraded yet. There would be potential for some of these temporary connections to result in additional impacts to flood behaviour. Hence, each potential temporary connection was assessed to determine this potential and any required temporary mitigation measures. These temporary connections would all be formed within the project boundary and would not require land outside of that boundary.

All but four of the temporary connections are out of the floodplains along the project. However, two of the temporary connections are discussed below.

### 5.5.2. Section 3 north temporary connection

This temporary connection would be located just north of Tyndale. An assessment of the location of the temporary connection identified that it would be just outside the 100 year ARI Clarence River flood extent. Hence, there is no potential for this temporary connection to change flood behaviour.

### **5.5.3. Section 9 north temporary connection**

This temporary connection would be located just south of the proposed crossing of the Richmond River. The connection road would be constructed at a relatively low level and would not result in any significant blockage of flow on the right bank. This bank only conveys a small percentage of the total flow in the river system in a 20 year ARI flood event (less than two per cent).

Furthermore, the project constructed to this stage would not include the new bridge across the Richmond River. The majority of the impacts associated with the completed project are attributable to this new bridge. Hence, the temporary connection would not result in any impacts higher than the completed project.

## **5.6. Influence of climate change on predicted impacts of construction**

Construction sites would operate for a limited period of time in the near future. It is unlikely that climate change would result in any considerable changes to sea levels or rainfall intensities during this period. For this reason there was not any assessment of the influence of climate change on predicted impacts of construction.

## **5.7. Cumulative assessment**

No cumulative impacts of construction exist as flooding impacts of the project occur on discrete sections of the highway with no regional or overarching impacts.