



2.2. Hydraulic Model Setup

The TUFLOW hydraulic model has been used in this analysis with the ground grid provided by Hughes Truman. TUFLOW represents the ground surface as a 1m by 1m grid and the model extent is shown on Figure A.

Initially the model was established for existing conditions and the 100 year ARI flood levels obtained. Subsequently the ground grid was altered to reflect the proposed design and additional drainage works and the 100 year ARI event re-run.

2.3. Design Scenarios

A number of design scenarios were investigated and these focussed on two main floodplain management approaches. Firstly reducing the peak flow along Hirst and Bonar Streets by providing additional pits and pipes and secondly by moving the crest of the “hump” in Bonar Street further to the north.

2.3.1. Existing Pipes

There is an existing 1200mm pipe under Bonar Street and across the rear of 43 Bonar Street that connects to downstream. The modelling assumes that this pipe is at capacity ($3.6\text{m}^3/\text{s}$) and does not change for any of the design scenarios. Ultimately this pipe must be re directed directly under the proposed roundabout at the intersection of Hirst and Bonar Streets (not across 43 Bonar Street) and exit into the old “bowling club” as an open channel (approximately 4m wide by 2m deep). However for this interim design phase (i.e no construction of the new culvert through 13-15 Wollongong Road) the existing 1200mm pipe must remain as works cannot be undertaken within the bowling club to return runoff into this pipe and through 13-15 Wollongong Road. The flow for this pipe is not shown on any of the figures.

There are twin 750mm pipes in Hirst Street that join with the 1200mm pipe at the proposed roundabout. The modelling has assumed that any flow in these pipes will not exit into the 1200mm pipe as the 1200mm pipe is already “at capacity” with flows from upstream. Thus it is assumed that the twin 750mm pipes are effectively “blocked” and no runoff enters them for the

existing scenario. However for design these pipes can be used to feed into a new culvert under the roundabout to exit into the open channel within the bowling club.

2.3.2. Adopted Design

For the adopted design scenario it is assumed that the crest of the hump in Bonar Street is approximately 65m north of the proposed roundabout and sufficient drainage works are undertaken in Hirst Street to reduce the peak flow from $9.6\text{m}^3/\text{s}$ to $7.6\text{m}^3/\text{s}$. This $2\text{m}^3/\text{s}$ reduction in peak flow in Hirst Street can be achieved by linking the twin 750mm pipes in Hirst Street with a new pipe under the proposed roundabout. The design of the drainage works and the linking/or upgrading of the 750mm pipes in Hirst Street has been undertaken by Hughes Truman in a separate report.

The results of the adopted adoption are provided in Figures A (change in levels due to design) and absolute levels (m AHD) on Figure B.

Figure B indicates that within 43 Bonar Street there is no significant increase in flood levels within the 100 year ARI event (the results indicate an increase within two pixels but this can be ignored).

Within Hirst and Bonar Streets there is an increase in flood levels due to the road regrading. This has occurred as a result of ensuring the proposed road cross fall is in accordance with current Australian standards for road design. Comment on this aspect is provided by Hughes Truman.