An understanding of the characteristics of flood propagation in streets and crossings can be important to mitigate the flood damage in urban areas. In this study, firstly, the characteristics of flood propagation within and around a crossings connected symmetrically with four straight streets are numerically analysed by using a two-dimensional well-balanced HLLC finite volume model. As results of numerical analyses, the numerical model employed in this study predicts relatively well the complex water surface in crossings to the conditions of inflows and street slopes. Moreover, the predicted temporal and spatial variations of water depths in a crossings and outflows at two downstream boundaries agree relatively well with laboratory measurements. Secondly, in order to predict and analyze the flood propagation through crossings and streets in real urban area, we applied to a dense residential area with relatively steep slope in Changwon city, Korea. As results of this application, it was shown that the numerical model used in this study can be able to assess the flood risk in an urban area.