Abstract

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Transportation is one of the major contributors of Greenhouse Gas (GHG) emissions all over the world. In Canada, transportation was the second largest source of GHG emissions in 2014, accounting for 23% of the total emissions nationwide (Environment Canada, 2016). At the provincial level, 38.4% of British Columbia’s GHG emissions came from the transportation sector (BC Ministry of Environment, 2016). Such high levels of GHG emissions can be attributed to the large expansion of the urban road network and automobile dependency in North America. It is very important to shift the paradigm and start planning our communities in a way that hinder automobile dependency and encourage people to use more sustainable modes of transportation. The fused grid model consists of several 16-hectare modules (ideally four) that provide vehicular accessibility for local traffic only and keep non-local traffic on the periphery of the modules while maintaining full pedestrian/cyclists accessibility via central green spaces and off-road pathways as shown in Figure 1. Perimeter roads in the fused grid model facilitate through traffic as per the following spacing: 1) collectors at 400 metres 2) minor arterials at 800 metres and 3) arterials at 1,600 metres. The classification, spacing, and alignments of the perimeter roads can be designed according to the existing ground conditions and planned land use activities. The model also provides convenient local services and amenities within a five-minute walking distance by classifying blocks located between the perimeter one-way couplet roads as mixed land use zones. All intersections in the neighbourhood are controlled by roundabouts three-way intersections to reduce the severity of collisions. Several studies have been found in the literature that address the benefits of the fused grid model in various aspects including: safety (Sun and Lovegrove, 2013), traffic performance (IBI Group, 2007), walkability (Frank and Hawkins, 2007), and transportation modal share (Masoud et al. 2017). While previous research like Frank and Hawkins (2007) and Masoud et al. (2017) has concluded that applying fused grid principles will result in more walking and less driving, which obviously would result in reducing GHG emissions, none of the previous research quantified by how much would GHG be reduced and thus quantifying its social benefits.