The automated extraction of high resolution 3D building models from imagery and laser scanner data requires strong models for all features which are observable at a large scale. In this paper we give a semantic model of stairs. They play a prominent role in the transition from buildings to the surrounding terrain or infrastructure. We name the transition area between terrain and building collar, and the focus is on stairs in building collars. Simple and complex stairways are represented by UML class diagrams along with constraints reflecting semantic and functional aspects in OCL. A systematic derivation of an attribute grammar consisting of production and semantic rules from UML/OCL is presented. Finally, we show how hypotheses with comprehensive predictions may be derived from observations using mixed integer/real programming driven by grammar rules.