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## COMPACT SINGLE-FAMILY HOUSING GENERATED BY PARAMETRIC DESIGN – SEARCH FOR OPTIMAL, SUSTAINABLE OR SMART DENSITIES

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### Abstract

Single-family housing – the form of residential buildings expected by the society is often inconsistent with the theoretical optimum form of housing that is recommended in urban theories and ideas. Research indicates that most Poles want single-family housing, while its density is low in comparison with multi-family housing which provides a more compact city. The paper identifies the thesis to what degree it is possible to develop a compact city with single-family housing. The authors verify how parametric design may be useful in urban design and spatial planning. The purpose of the article is to discuss the possibility to generate single-family housing estates' projects using the parametric tool of the Grasshopper program. The authors demonstrate how parameter tool-supported designing may be useful for better effectiveness of using space. The research used a script by Dawid Kaźny, developed for the purposes of his diploma thesis, in which he attempted parametric variants and optimization. The paper describes the issue of “density vs quality of life” in quantitative terms. Quantitative density variants can be used in analysis for future smart and intelligent cities' development.

Keywords: Parametric designing; Intense single-family housing; Numerical parameters of single-family housing; Smart cities; Compact city.