

**SUSTAINABILITY ASSESSMENT OF COMPACT-CITY
DEVELOPMENT USING GEODESIGN APPROACH**

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ABSTRACT

Improving and evaluation of development plans is an essential to ensure a better planning and design practice. Compact city development is an urban design and planning concept that is noted to be very useful to ensure sustainability and overcome environmental, economic and social problems caused by urban sprawl. However, the outcomes and impacts of compact city development are not clear if using the conventional spatial analysis methods for evaluation. This study intends to improve and advance the process and methodology of assessing compact city development taking benefit from the new emerging concept of GeoDesign. This study is carried out in the city center of Johor Bahru, the capital city of the State of Johor, Malaysia. As a result, the study highlights compact city 2D and 3D indicators and the importance of these indicators is ranked under each development scenario based on expert's opinions. The study develops a composite sustainability index map in three scenarios environmental protection, economic efficiency, and social equity. Then, the GeoDesign approach applied for evaluating the compact city development. Finally, the computed sustainability index map of Spatial Multi Criteria Analysis (SMCA) model was analyzed and combined with 3D GeoDesign visualization to examine the sustainability levels of future development of the study area. GeoDesign dealt with centrality, high density and proximity, intensification, mixed land uses and public transit systems. The study found that the future development of the study area is a polycentric urban structure, and the proposed light rail transit (LRT) stations of transit oriented development (TOD) concept are not located in the core of the proposed high density mixed land uses urban centers. Furthermore, the assessment of development sustainability by considering planning and design criteria through GeoDesign enhanced the results of simulated analysis and reduced the possibilities for disregarding any of the related measures of the involved sustainable development concept.

ABSTRAK

Meningkatkan dan penilaian rancangan pembangunan adalah penting bagi memastikan perancangan yang lebih baik dan amalan reka bentuk. Pembangunan bandar padat reka bentuk dan perancangan konsep bandar yang terkenal sangat berguna bagi memastikan kelestarian dan mengatasi masalah alam sekitar, ekonomi dan sosial yang disebabkan oleh terkapar bandar. Walau bagaimanapun, hasil dan impak pembangunan bandar padat tidak jelas jika menggunakan kaedah analisis spatial konvensional untuk penilaian. Kajian ini bertujuan untuk memperbaiki dan memajukan proses dan metodologi menilai bandar padat manfaat pengambilan pembangunan daripada konsep baru muncul baru GeoDesign. Kajian ini dijalankan di pusat bandar Johor Bahru, ibu kota Negeri Johor, Malaysia. Kajian mengetengahkan bandar padat petunjuk 2D dan 3D dan kepentingan indikator ini berada di kedudukan di bawah setiap senario pembangunan berdasarkan pendapat pakar itu. Kajian ini membangunkan kelestarian komposit indeks peta dalam tiga senario perlindungan alam sekitar, kecekapan ekonomi dan kesaksamaan sosial. Yang dikira indeks kemampuan peta Spatial Multi Kriteria Analisis (SMCA) model telah dianalisis dan digabungkan dengan 3D GeoDesign visualisasi untuk mengkaji tahap kemampuan pembangunan masa depan kawasan kajian. GeoDesign diuruskan keutamaan, ketumpatan yang tinggi dan jarak, intensifikasi, guna tanah bercampur dan sistem transit awam. Kajian mendapati bahawa pembangunan masa depan kawasan kajian adalah struktur bandar polycentric, dan yang dicadangkan (LRT) stesen konsep TOD tidak berada di dalam teras tanah bercampur berkepadatan tinggi yang dicadangkan menggunakan pusat-pusat bandar. Penilaian kemampuan pembangunan dengan mempertimbangkan perancangan dan reka bentuk melalui kriteria GeoDesign dipertingkatkan hasil analisis simulasi dan mengurangkan kemungkinan untuk mengabaikan mana-mana langkah-langkah yang berkaitan terlibat konsep pembangunan lestari.