URBAN GROWTH PATTERNS AND ENVIRONMENTAL PERFORMANCE: A COMPARISON OF LATE 20TH CENTURY AMERICAN SUBURBAN PATTERNS TO THOSE OF LATE 19TH CENTURY CENTRAL EUROPEAN URBAN FABRIC

James Dougherty, AICP, CNU-A, ASAI
Principal / Director of Design
Dover, Kohl & Partners town planning
1571 Sunset Drive, Coral Gables, FL 33143. USA
jdougherty@doverkohl.com

ABSTRACT

This paper is a typological analysis comparing late 20th Century American suburban growth patterns to the growth patterns of late 19th Century Central European urban fabric, with accompanying analysis of each pattern regarding key environmental performance factors.

As towns and cities grow, the growth pattern chosen for new urban development has a profound impact on environmental footprint. The global proliferation of late 20th Century American suburban growth patterns has been implicated in disproportionately high levels of environmental degradation and an exaggerated effect upon issues affected by global energy consumption rates, such as climate change.

The compact and highly walkable growth patterns of late 19th Century Central European urban fabric, built just prior to the proliferation of the automobile, may provide a useful model for emulation in order to improve the environmental performance of future urban developments.

This paper's comparative typological analysis provides information to help better inform the choice of patterns for new growth. For the comparative analysis, the paper utilizes key evaluation criteria as outlined in the U.S. Green Building Council's rating system: "LEED v4 for NEIGHBORHOOD DEVELOPMENT" (Updated July 2, 2018). The analysis criteria include items such as: thoroughfare connectivity, land use distribution, open space distribution and parking footprint.

It is hoped that this paper will provide practitioners with information to help in choosing growth patterns for new development, informing them of potential beneficial implications regarding key environmental performance factors of selecting characteristics of the growth patterns of late 19th Century Central European urban fabric for use today.

Keywords: Urban, Suburban, Growth Pattern, Environmental Performance, LEED ND

INTRODUCTION

As towns and cities grow, the pattern chosen for new urban development has a profound impact on environmental footprint. The global proliferation of late 20th Century American suburban growth patterns has been implicated in disproportionately high levels of environmental degradation and an exaggerated effect upon issues affected by global energy consumption rates, such as climate change. In contrast, the compact and highly walkable growth patterns of late 19th Century Central European urban fabric, built just prior to the proliferation of the automobile, may provide a useful model for emulation to improve the environmental performance of future urban developments. The following is a typological analysis comparing late 20th Century American suburban growth patterns to the growth patterns of late 19th Century Central European urban fabric, with accompanying analysis of each pattern regarding key environmental performance factors. The examples being studied are chosen for their clear representation of their respective settlement patterns and their similar range of building heights.

Tysons, Virginia, USA was planned and built in the late 20th Century and is an archetypal example of American auto-oriented suburban development. It exhibits the physical separation of land uses, sparsely-connected street network and automobile-dominant transportation bias typical of development regulated by suburban Euclidean Zoning.

Szeged, Hungary was rebuilt almost completely in the decade following a devastating flood in 1879 as a modern city of its time. It is therefore an unusually pure example of late 19th Century Central European pre-automobile urban development principles. It exhibits a fine-grained network of interconnected streets and compact blocks which are occupied by attached, street-oriented courtyard buildings containing a diverse mix of land uses.

Tysons, Virginia, USA **Szeged, Hungary**

Figure 1: Orthographic views of the urban fabrics of Tysons, USA and Szeged, Hungary. (Photos: Google 2019).

The sample size used is a one square kilometer segment from each location. This is large enough to reduce the effect of any anomalies the examples may contain and is similar in dimension to the 5-minute Pedestrian Shed often used by planners to define the size of a typical walkable neighbourhood.

The comparative characteristics chosen for this analysis were selected from the LEED-ND rating system, which was developed by the U.S. Green Building Council (USGBC). According to the USGBC, the LEED for Neighborhood Development (LEED-ND) rating system was developed "to inspire and help create better, more sustainable, well-connected neighborhoods and looks beyond the scale of buildings to consider the environmental implications of the design of entire communities".

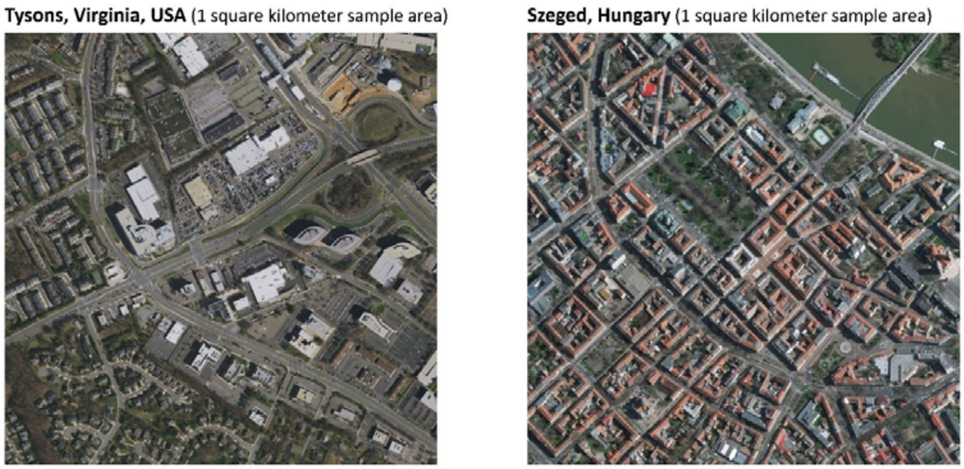

Figure 2: Aerial views of the urban fabrics of Tysons, USA and Szeged, Hungary. (Photos: Google 2019).

Connectivity and Intersection Density

The first aspect analysed for comparison is street connectivity. Connectivity within the street network is critical to facilitating distribution of trips, shortening travel distances, and promoting a diversity of travel modes. A reduction in connectivity, particularly when combined with a physical separation of land uses, is a primary cause of the disproportionate levels of vehicular congestion typical of suburban automobile-oriented development patterns.

LEED-ND encourages development with a high degree of street connectivity. Connectivity is measured by calculating intersection density. Tysons has a very poor rate of intersection density of only 31 intersections per square kilometer. Szeged achieves a rate over three times as high, with 98 intersections per square kilometer.

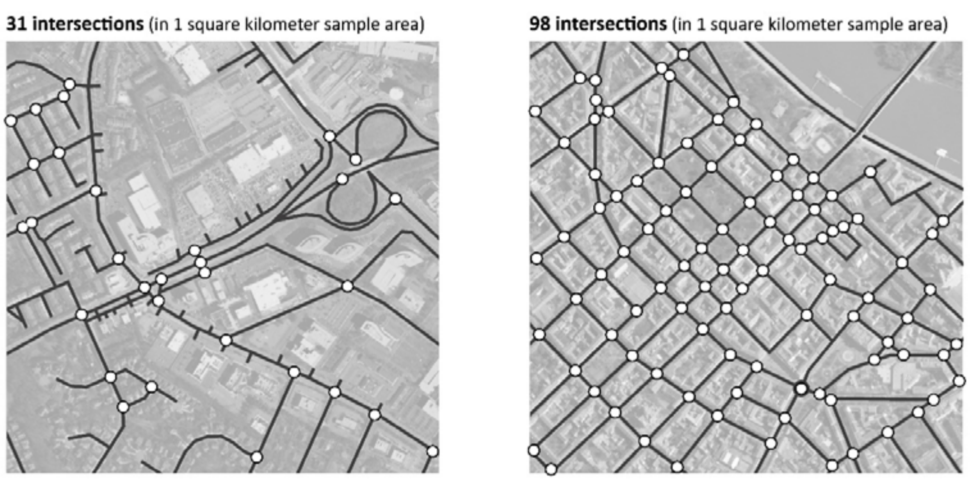

Figure 3: Connectivity and intersection density of Tysons, USA and Szeged, Hungary. (Dougherty 2019).

Building Footprints

According to LEED-ND, absorbing development pressure within a compact physical settlement pattern helps to “conserve land and protect farmland and wildlife habitat by encouraging development in areas with existing infrastructure”. It also helps “to promote livability, walkability, and transportation efficiency, and reduce vehicle distance travelled”. Finally, it helps “to improve public health by encouraging daily physical activity”. LEED-ND rewards projects that achieve higher residential densities and higher non-residential Floor Area Ratios (FAR).

Equivalent residential densities and FARs can be achieved with shorter buildings if the percentage of site occupied by building footprints is increased. Tysons utilizes 14.5% of site area for building footprints while Szeged achieves a much higher utilization of site area for building footprint of 35.1%. Tysons would therefore need buildings more than twice the height of those in Szeged to achieve the same residential densities and non-residential FARs. This additional height would have a significant impact on community character.

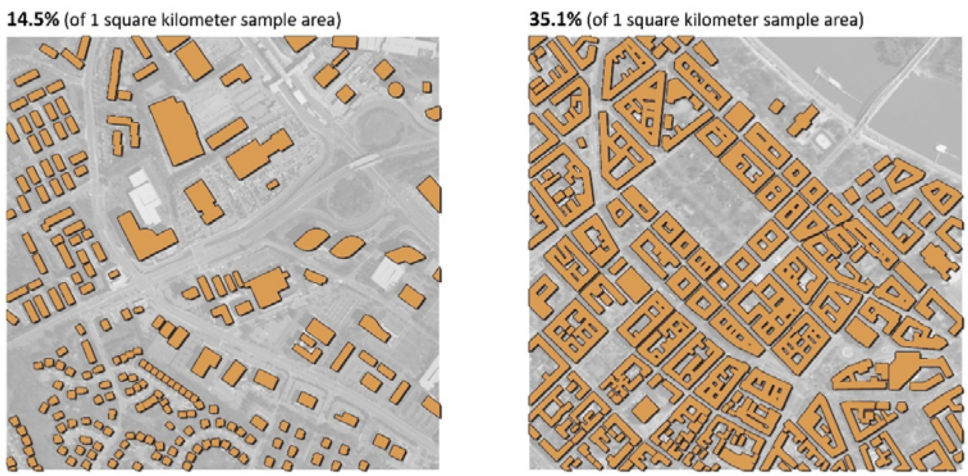

Figure 4: Building footprints of Tysons, USA and Szeged, Hungary. (Dougherty 2019).

Private Outdoor Open Space

The availability of private outdoor open space is important to preserving livability of the built environment for occupants. Tysons achieves a higher percentage of private outdoor open space within the 1 square kilometer sample area 21.6% to Szeged’s 14.4%. It should be noted however, that Tyson’s private open space is allocated almost entirely to single family and townhouse fabric areas, and the more commercial areas of the site are almost completely lacking in private outdoor open space. By contrast, Szeged’s private outdoor open space is distributed throughout the built fabric, primarily in the form of courtyards. While physically smaller, Szeged’s private outdoor open spaces are more readily accessible to a larger proportion of occupants.

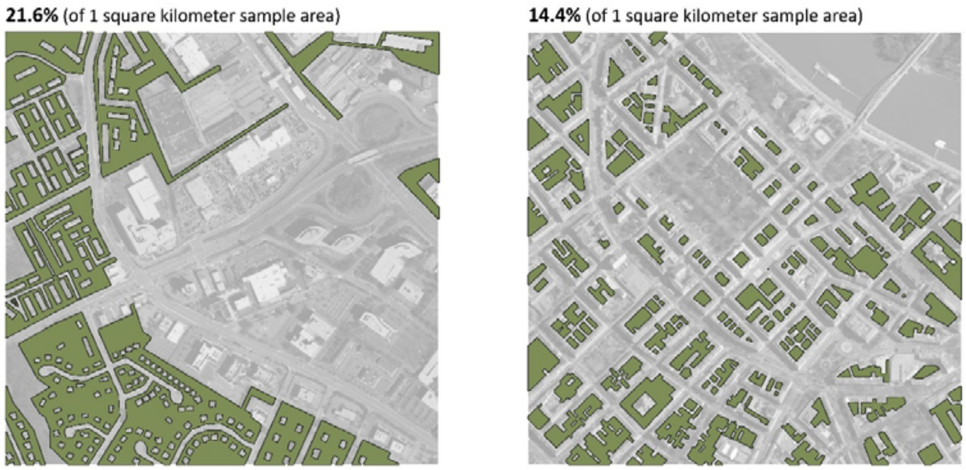

Figure 5: Private outdoor open space of Tysons, USA and Szeged, Hungary. (Dougherty 2019).

PUBLIC OUTDOOR OPEN SPACE

LEED-ND encourages the provision of public outdoor space “close to work and home that enhances community participation and improves public health”. Tysons is almost completely devoid of meaningful public gathering spaces, and the meagre 2.2% of land area devoted to public space consists primarily of conserved remnants of natural areas. Szeged boasts a far greater quantity of public outdoor open space at 17.6% which is divided relatively evenly between preserved natural areas and open spaces designed for community gathering and recreation. Szeged’s public spaces are additionally distributed quite well throughout the built fabric for ease of accessibility.

Figure 6: Public outdoor open space of Tysons, USA and Szeged, Hungary. (Dougherty 2019).

PARKING

LEED-ND promotes a reduced parking footprint to “minimize the environmental harms associated with parking facilities, including automobile dependence, land consumption, and rainwater runoff”. Land area devoted to parking is one of the starkest differences between the settlement patterns of Tysons and Szeged. Tysons has 40.9% of its land area devoted to parking, while Szeged devotes a mere 3.3%. Furthermore, Tyson’s expansive surface parking fields tend to be visually dominant elements of the built environment, while Szeged’s minimal parking supply is usually tucked discreetly into building courtyard spaces where it is screened from view from streets and public spaces. The sheer percentage of land area devoted to parking in Tysons displaces other beneficial uses and renders the environment difficult to inhabit for those not in an automobile.

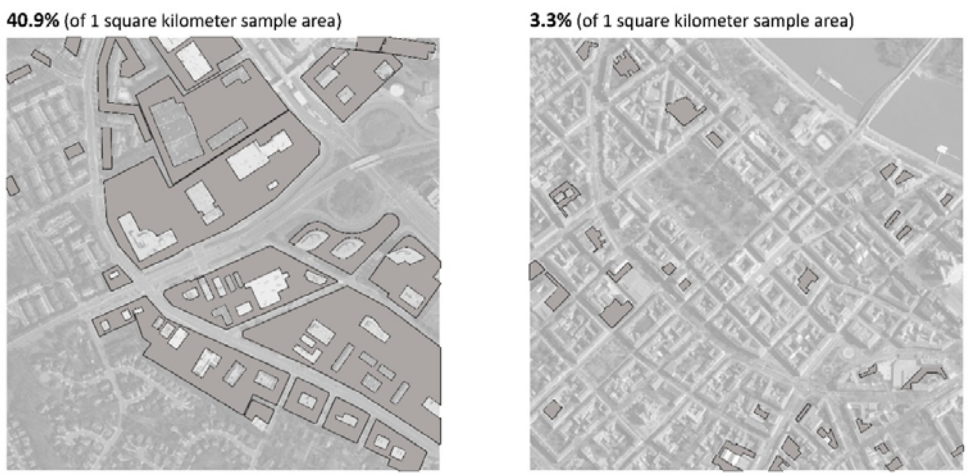

Figure 7: Parking configurations of Tysons, USA and Szeged, Hungary. (Dougherty 2019).

THOROUGHFARES AND SPATIAL REMNANTS

Tysons, with its relatively poor level of street connectivity, has a lower percentage of land area devoted to thoroughfares than Szeged. Additionally, a great deal of the land devoted to thoroughfares in Tysons is configured into space-consumptive arterials and a highway interchange that create a barrier to walkability rending the settlement into separate, disconnected portions. By contrast, Szeged’s high degree of street connectivity helps distribute trips across the transportation network, thereby allowing all thoroughfares to be narrower and more easily crossable.

20.8% (of 1 square kilometer sample area)

29.6% (of 1 square kilometer sample area)

Figure 8: Thoroughfares and spatial remnants of Tysons, USA and Szeged, Hungary. (Dougherty 2019).

Ground level views serve to illustrate that the intimate size of Szeged's thoroughfares is far more conducive to the creation of a positive human environment than Tysons' wide, vehicular-dominated thoroughfares.

Tysons, Virginia, USA

Szeged, Hungary

Figure 9: Ground views of primary thoroughfares of Tysons, USA and Szeged, Hungary. (Photos: Google 2019).

Conclusion

Tysons, Virginia and Szeged, Hungary are excellent examples of their respective settlement patterns. Tysons is a clear representation of late 20th Century American automobile-oriented suburban growth patterns, and Szeged is a marvellous example of late 19th Century Central European urban fabric. Their physical characteristics have a profound effect upon their environmental performance.

It is hoped that this side-by-side comparison and quantitative analysis of these two examples will provide practitioners with information to help in choosing growth patterns for new development; informing them of potential beneficial implications regarding key environmental performance factors of selecting characteristics of the growth patterns of late 19th Century Central European urban fabric for use today.

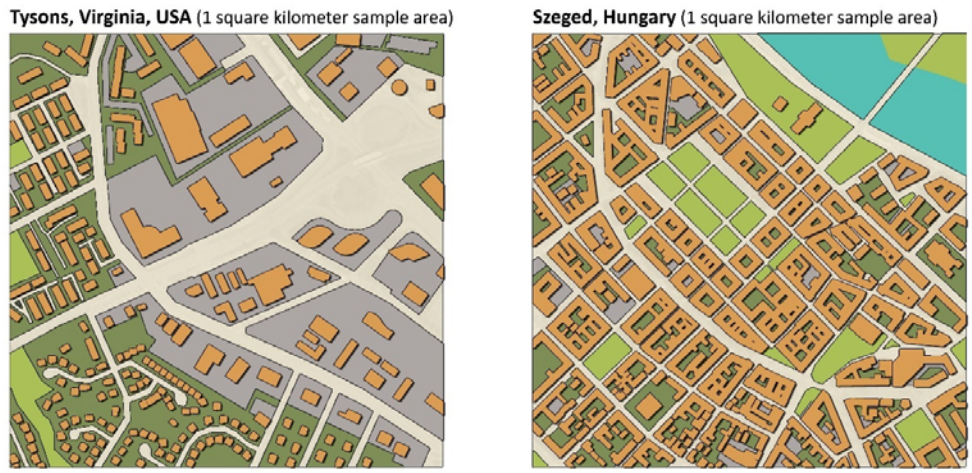

Figure 10: Cumulative comparative analysis maps of Tysons, USA and Szeged, Hungary. (Dougherty 2019).

REFERENCES

- U.S. Green Building Council. July 2, 2018. *LEED v.4 for NEIGHBORHOOD DEVELOPMENT*. USGBC.