

# A method suggestion to protect Historic City Silhouette

## Three dimensional digital terrain model

Sazuman SAZAK, Trakya University, Turkey<sup>1</sup>

**Keywords:** urban, silhouette, identity, 3D digital terrain model

## Introduction

Within the scope of the study, the urban silhouette model is created by using three dimensional digital terrain model for the protection of Selimiye Mosque's rapidly disappearing silhouette which is one of the essential elements of the urban identity of Edirne chosen as an example and is on the Unesco World Heritage list (Sazak 2001). This model, at the same time, contributes to creating the legal basis for restricting the rights of construction intended

## Methods

The perception of urban space is formed parallel to biological features in great degree. The sense of sight and the angle of sight in terms of biological feature differentiate depending on the distance. For the perception of urban silhouette, heights of the points of view, directions of view, distances and the perspectives of active elements are determiner. Depending on the distance, another factor for the formation of spatial perception is "scale". Human scale is accepted as 30m; urban scale is accepted as 150m; monumental scale is accepted 1300m. The angle perceived by man is 33° horizontally, and is vertically 33° including 6-7° under the line of horizon and 26-27° over the line of horizon (Aru,1980).

In this study, the relationship of the dominating point of the city and city entrance gates that is formed in historical process has become the directing factor for determining the line of silhouette. In this context, there are seven entrance gates in total inside the city including the four of them on Meric River (four of them provide the connection of outside the city) and these also describe silhouette line (corridors) inside the city.

In this direction, the limitation of height needs to be placed on the areas that take place in certain silhouette corridors and the silhouette of Selimiye Mosque, which is one of the main elements of Edirne urban identity, needs not to be damaged. On the other hand, multi-layered cultural structure, other symbolic elements need not be curtailed in the silhouette (Onal, 2012).

Within the scope of this study, the corridor where the effect of Selimiye Mosque on the urban silhouette is most under the threat, and which is over (E-5) Istanbul-Edirne road in east direction, in the direction of arrival to Edirne and begins from the point of where Selimiye is seen, is chosen. The furthest distance of this viewpoint to the monument is 10276m. (Having its place on the urban silhouette from this far distance, Selimiye Mosque also reveals its difference with this feature of it's.)

The five viewpoints of intersection chosen are listed, on the corridor, and the corridors from these points to the structure of monument are formed. According to these corridors, elevations of land are determined and the land profiles that will enable the assessment of height according to the structure of monument are prepared. For the right results of this kind of studies, land topographies needs to be analysed well.

---

<sup>1</sup> Sazuman SAZAK, Trakya University, Edirne, Turkey, [sadumans@hotmail.com](mailto:sadumans@hotmail.com)

In this study, Computer-Aided Design (CAD) software is used. By the aid of this software, corresponding elevations of every 20m of the land points, that is made with Total Station in the direction of the profiles and whose three-dimensional coordinates are known, is determined with the method of interpolation. In design software, the definition of sight line between viewpoints and Selimiye Mosque on the map is made and the profiles are prepared with the aid of width sections which have 20 m intervals.

**Examples of application**

Within the scope of the research, an example of application is done for an area which is included by three different corridors. Land elevations that were measured with each 20 meters intervals beginning from the starting point as the criteria of assessment in the example of application are given with table for each profile. In this research, a case study is done for a structure that is included by three of the view corridors being formed according to 5 viewpoints on Istanbul – Edirne (E-5) State Road (Fig. 1).

In the first stage, maximum height of the structure in 3 different directions (right- left and middle axis) in the land profile made for each corridor is determined, and the minimum value among these is accepted. In the second stage, the minimum value is determined by comparing the structure height values in these three corridors. (Table 1)

VC	Distance to the beginning	Maximum level of eaves		
		Right axis	Middle axis	Left axis
V1	2650 m	11.48 m	12.21 m	11.55 m
V2	1360 m	15.56 m	15.09 m	16.50 m
V3	1138 m	18.93 m	18.88 m	16.55 m
Minimum threshold value for V1				11.48 m
Minimum threshold value for V2				15.09 m
Minimum threshold value for V3				16.55 m
Maximum level of eaves that will be reached by the result of assessment				11.48 m

Table 1. The determination of the maximum level of eaves in the sample area

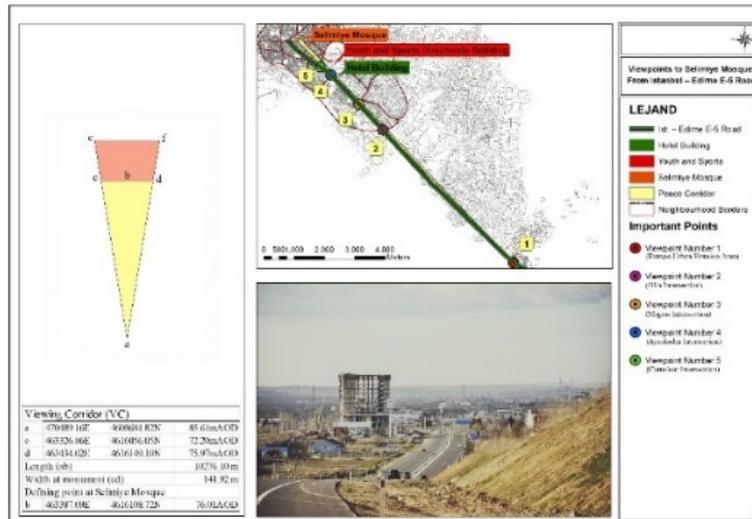


Fig.1. Viewpoints of the Silhouette of Edirne Selimiye Mosque over Istanbul-Edirne E-5 Road and Corridors

## Conclusion

The suggestion of method that is about the protection of urban silhouette within the scope of the study is assessed with the case of Edirne Selimiye Mosque. For the protection of the effect of Selimiye Mosque on the urban silhouette of Edirne within the scope of the model;

Three dimensional digital analysis model is used in the study. 5 viewpoint (in the intersections) on Istanbul-Edirne State Road ( E-5) is determined. For the monument structure to look perfect from these viewpoints, land profiles that enable height assessment according to the monument structure in the view corridors being formed with 5 viewpoints are created.

In the use of these profiles, the processes of the assessment of silhouette need to be done according to the order below because of the changing feature of the land topography.

- Determining by which corridor the area where the building will be placed is included.
- Creating profiles that give the height of the structure in each 20 meters, the points which topography changes.
- Determining the maximum level of eaves in 3 different directions (right-left and middle axis) for the buildings that will be built in the areas included by these corridors, and accepting the minimum value among these.
- By making an analysis between the maximum levels of eaves that belongs to the suitable profile determined for the regions included by more than one corridor.

The order of construction that will be formed with the right of construction that will be given according to this process will enable the silhouette of Selimiye Mosque, which is on e-5 corridor, the main triangulation of Edirne urban identity, to be seen perfect from all viewpoints.

On the other hand, the elements that damage and hinder the silhouette within the corridors (illumination elements, boards and signs) need also be assessed separately.

## References

Aru, K., A., *Urban Design and Urban Renovation Lecture Notes*, ITU.  
 Onal, F, (2012). *Report of The The Assessment of Edirne Historical City*.  
 Sazak, Ş, (2011). *The Report of Protecting Edirne Urban Silhouette*.