

3D City Models Enhance Urban Planning Capabilities Of Kharkhiv

Objective

To create a new master plan and perform 3D city analysis for the City of Kharkiv's Department of Architecture and Urban Planning, include urban indicators and identify problematic areas for urban planning.

Challenge

The second-largest city in Ukraine wanted to create highly detailed 3D urban maps based on existing GIS and CAD data. They wanted to quickly and efficiently update their existing master plan of the city, analyze the urban environment, and identify urban planning challenges. The City administration did not have the resources to conduct the analysis and detailed research required, which had to incorporate numerous town planning conditions, requirements, standards, and urban indicator calculations. They needed a reliable partner to create an accurate master plan and perform analysis of the urban environment.



Solution

The development of the 3D model for the City of Kharkiv’s Department of Architecture and Urban Planning was performed as per detailed roadmap created by the GIS team.

6 major milestones:

★ 01

Master plan drafting

The first step in the process was processing a highly detailed geospatial data (Vector and Raster layers) to draft the master plan. They used the newest, most effective geo technologies, such as ESRI’s ArcGIS were used for data processing and 2D master planning. CityEngine was used for 3D master planning and 3D city analysis.

★ 02

Indicators computing

The second step after preparation of the master plan, GIS analysts computed the urban indicators by the GIS analysts such as safety, coverage areas, the density of area usage per person, rate of population increase and other parameters, which are needed for analysis of urban environment and assessment of potential problems.

★ 03

Layers integration

As the third step, the 3Dteam integrated all layers of the master plan from ArcGIS into CityEngine software to generate a 3D city, smart model. To better visualize the database of real-world building data with more 3D detail, they added highly detailed façade description data to CityEngine building parameters and generated rich and visually pleasing procedural 3D buildings.



Zone Type	Urban Indicators		
	Value of standard, %	Value of zone, %	Zone status, Norm or Not Norm
Hard surface (Paved)	<25	5,7	Norm
Buildings	20-22	7,6	Not Norm (< of standard value)
Green area	>50	15,11	Norm

★ 04

3D model building

Using the Computer Generated Architecture and Python programming, Intetics used urban planning standards to build realistic and scientifically correct 3D urban environment model.

★ 05

3D city analysis

When a highly detailed and high-quality 3D city model was generated, the team performed a series of 3D city analyses such as shadows, visual impact, building volumes, density, and zoning regulations.

★ 06

Masterplan publication.

Finally, the master plan, 3D scene, and the analysis reports were published on the municipal Web server to be used by the city planners in the Department of Architecture and Urban Planning.

Client's reference



The Intetics team professionally and effectively created an excellent 3D model that serves as an indispensable tool for use in our urban planning tasks

Benefits and Results

- ★ The City of Kharkiv received highly detailed maps and a high-quality master plan to help city planners solve urban planning challenges.
- ★ Their users gained an opportunity to use highly detailed 3D smart city models capable of showing plan phasings, such as building demolition and construction, roadway realignments, and landscape growth.
- ★ They also received scientifically accurate urban indicators and analysis reports that allow urban and city planners to find the right solutions to improve the urban environment in the City of Kharkiv.