INTETICS SMART 3D CITY MODELS
ENHANCE URBAN PLANNING CAPABILITIES OF A MAJOR CITY

Objective

To create a new master plan and perform 3D city analysis for the City of Kharkov's Department of Architecture and Urban Planning that incorporates urban indicators and identifies 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 did not have time or 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 City of Kharkov turned to Intetics, which has many years of experience in geospatial data analysis, including analysis of urban environment and indicators, as well as an understanding of how urban planning principles relate to GIS. First, Intetics team processed 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, used for data processing and 2D master planning, and CityEngine, used for 3D master planning and 3D city analysis.


After preparation of the master plan *(left)*, Intetics GIS analysts computed the urban indicators *(right)*, such as safety, coverage areas, 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.
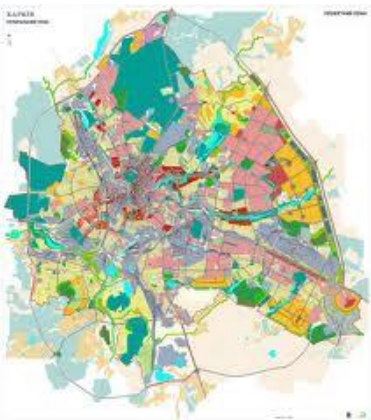
Zone type	Urban indicators		
	Value of standard, %	Value of zone, %	Zone status, Norm or Not Norm
Hard surface (Paved)	<25	5,7	Norm
Buildings	20-22	7,6	Not Norm (< of standard value)
Green area	>50	15,11	Norm

Then, Intetics began working in 3D. The team integrated all layers of the master plan from ArcGIS into CityEngine software to generate a 3D city smart model *(1)*. 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 *(2)*. Using the Computer Generated Architecture and Python programming, Intetics used urban planning standards to build realistic and scientifically correct 3D urban environment model *(3&4)*. After generating a highly detailed and high quality 3D city model, Intetics performed a series of 3D city analyses such as shadows, visual impact, building volumes, density and zoning regulations *(5)*. 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.
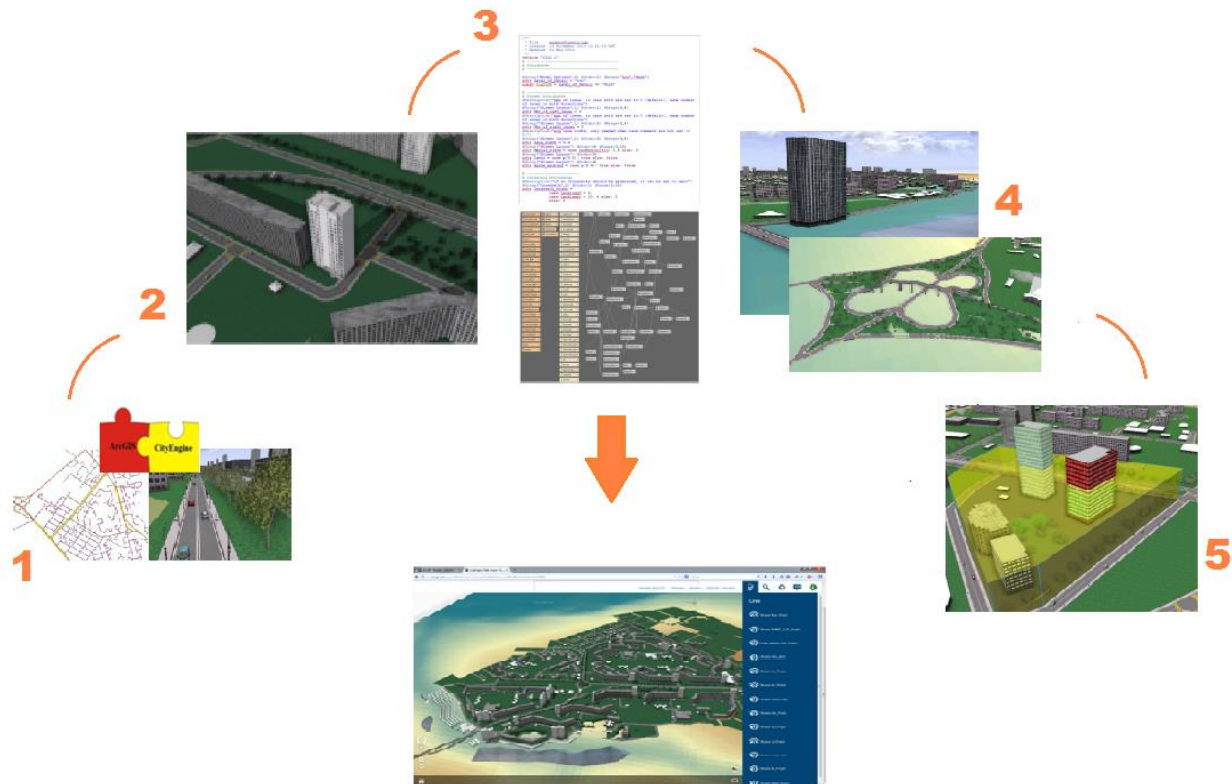
Results

Due to working with Intetics, the City of Kharkov received highly detailed maps and 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 phasing, 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 find the right solutions to improve the urban environment in the City of Kharkov.

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