Document 8 – Digital Twin

New Zoning By-law: Geospatial Analytics, Technology, and Solutions

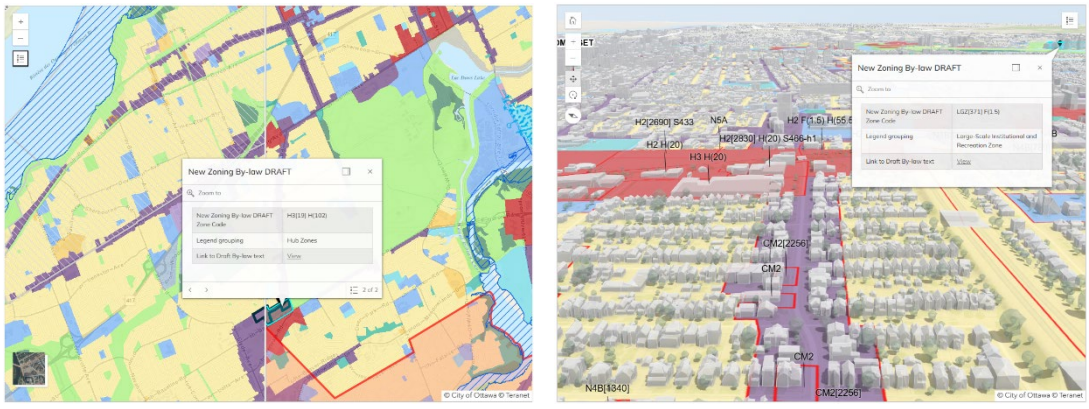
The Digital Twin and Reality Capture Program

The Geospatial Analytics, Technology and Solutions (GATS) team continues to improve the Digital Twin with enhancements to the datasets that support City Planning and developing tools that enable users to harness its abilities to greater extents. In the last year, the program deployed four oblique aerial cameras that produced higher resolution imagery, increased the frequency of aerial photography and LiDAR data acquisition and published the first iteration of the Digital Twin's public toolsets.

Two new interactive maps were introduced to support the new comprehensive Zoning By-law. The **Draft 1 Interactive Map** on Ottawa.ca helps residents understand current and proposed zoning regulations by providing a visual representation of the 289-page draft by-law. It features a sliding interface for side-by-side comparisons, interchangeable basemaps, additional reference layers like ward boundaries and floodplain data, and pop-up windows with detailed zoning information. This map is continuously updated to reflect new legislation and adjustments, aiding public consultation.

The **3D Interactive Map**, part of the City's Digital Twin Project, offers a three-dimensional visualization of zoning regulations, allowing users to view from a pedestrian's perspective or a bird's eye view. It includes interchangeable map layers and pop-up information windows alongside zoning layers, enhancing user engagement and understanding by immersing viewers in a realistic environment. Both maps are crucial tools for visualizing proposed changes and facilitating informed public feedback.

Visit www.ottawa.ca to view the New Zoning By-law - Draft 1 Interactive Map and the 3D Interactive Map.



Left/Right - Image of the Draft 1 Interactive Map / Image of the 3D Interactive Map

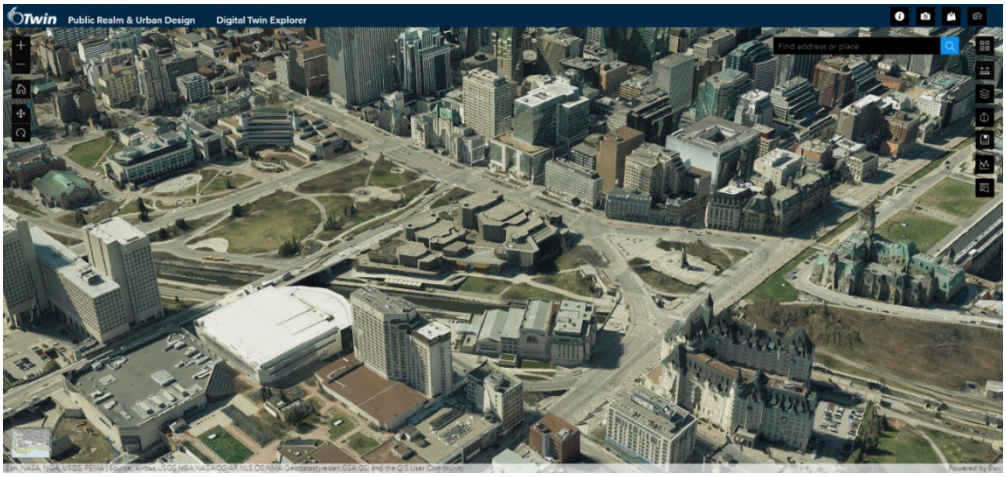
The **new Zoning By-law story map**, created using ArcGIS Story Maps, visually demonstrated how Neighbourhood designations in the new Official Plan apply to current Residential zoning. GATS used advanced mapping techniques, deploying terrestrial scanners to selected residential blocks and City Engine to develop overlaid 3D models of homes within their permitted building envelopes. As a result,

the story map demonstrated the implications of the new Neighbourhood Zones with photorealistic, 3D models and demonstrated a novel mapping technique available with the City's new Digital Twin and Reality Capture Program.

[Visit the Story of the New Zoning Bylaw here.]

Figure - Comparison of existing and proposed zoning provisions for various N zones being shown by red and orange blocks.

In the coming year, the **OTwin Viewer** is scheduled to launch for City staff. The viewer is a web application designed to provide staff with a comprehensive and interactive understanding of the City of Ottawa. It offers an immersive 3D experience with advanced tools tailored for urban planning and development. These tools include scenario modeling, development sightline analysis, sun/shadow analysis, and the ability to import and edit building information models. Currently, the OTwin Viewer is in a ready-to-publish state within a sandbox environment. The application will be launched once the necessary updates to corporate IT infrastructures are completed.



Additional developments to the Digital Twin have been initiated. The Reality Capture Program will introduce a new car-mounted camera system to capture 360-degree streetscape photographs, creating a City-owned catalogue of oriented imagery. This will enhance the OTwin Viewer by providing up-to-date, georeferenced images that planners can use alongside zoning layers and the digital twin. Additionally, GATS is developing an AI chatbot to assist planners with the new Comprehensive Zoning By-law, offering natural language responses and up-to-date information on zoning regulations. Both projects aim to improve accessibility and efficiency in city planning.

The Ottawa Digital Twin (OTWIN) Density Calculation Tool

GATS staff propose further advances on the Ottawa digital twin (OTwin) through 2025 with an automated building footprint and density calculation tool.

The purpose of the proposed tool is to improve the quality and coordination of data sources used to support planning decisions and develop a predictive model to allow staff, residents and Council to visualize the effect various funding and policy decisions could have on density and development trends, through three dimensional visualizations of possible development outcomes. This work is proposed in two phases, starting with development of an internal tool followed by a public-facing user interface.

The tool will leverage City data resources, including the existing digital twin, consolidating them into one tool to support data-driven planning. Using information on key development factors like available infrastructure, transit or services, it will support predictions for where development pressures and demand will come over time. By being able to rapidly render Zoning By-law provisions in three dimensions, the calculation tool will allow for testing of zoning provisions in the new Zoning By-law, and modelling of development footprints and building volumes using design catalogues of pre-approved buildings like those developed by the Canadian Mortgage and Housing Corporation. The proposed public-facing user interface will support public engagement by illustrating possible outcomes in an accessible way. Finally, the tool will also enable live incorporation of development activity information and trends, supporting monitoring of progress on delivering Official Plan, Municipal Housing Pledge and Housing Accelerator Fund housing targets.