

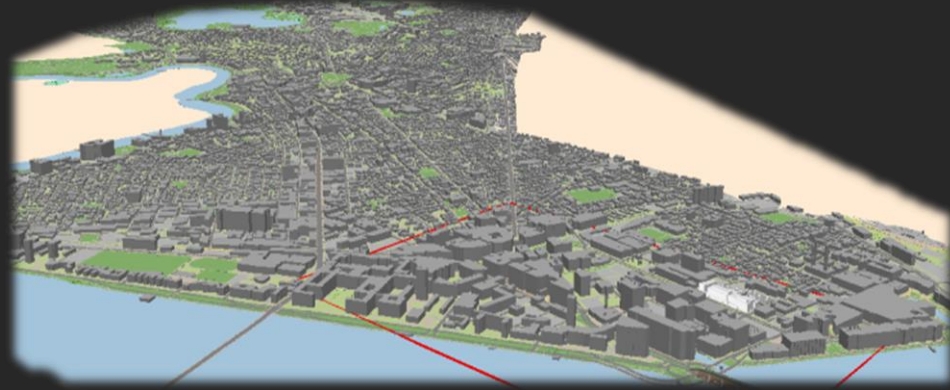
Cambridge City-Wide 3D Model

Bridging Urban Design and 3D GIS Infrastructure

Jeff Amero, GIS Manager, City of Cambridge, MA

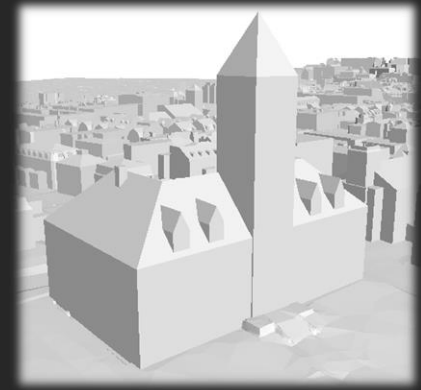
Paul Cote, pbcGIS: cultivating spatial intelligence™

Overview



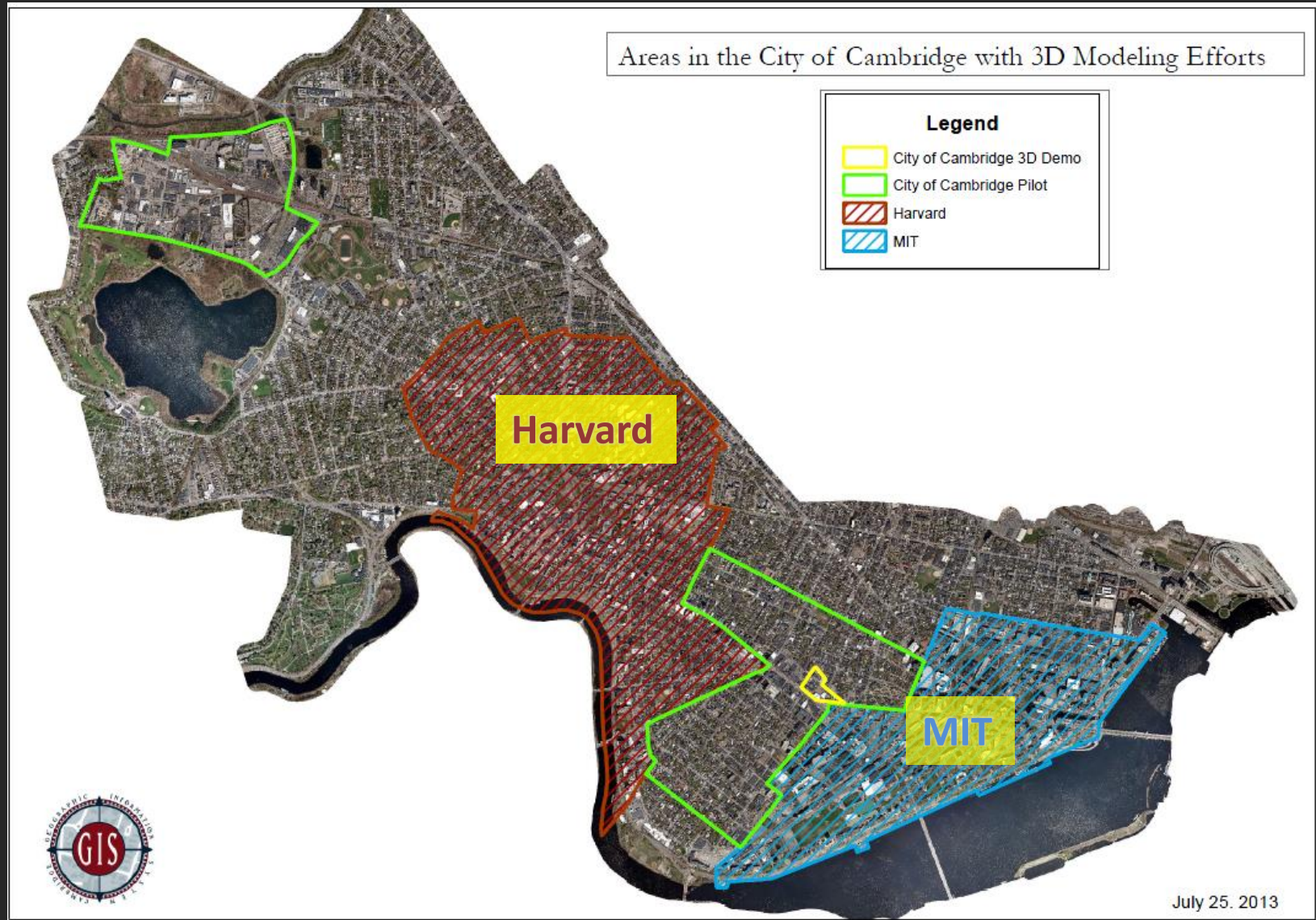
- Beginnings of a 3D program in Cambridge
- Model development and plans for maintenance
- Workflow for 3D data exchange
- The road ahead and lessons learned

A Model is Born



- For first time Community Development Dept. (CDD) showed interest in 3D model
- Similar efforts in Harvard and MIT
 - Harvard Planning and Project Management Office
 - MIT Department of Facilities
- Unified use of CityEngine software and file formats
- Vendor (CyberCity) who had data shared throughout the neighboring organizations

Pilot Project and Universities

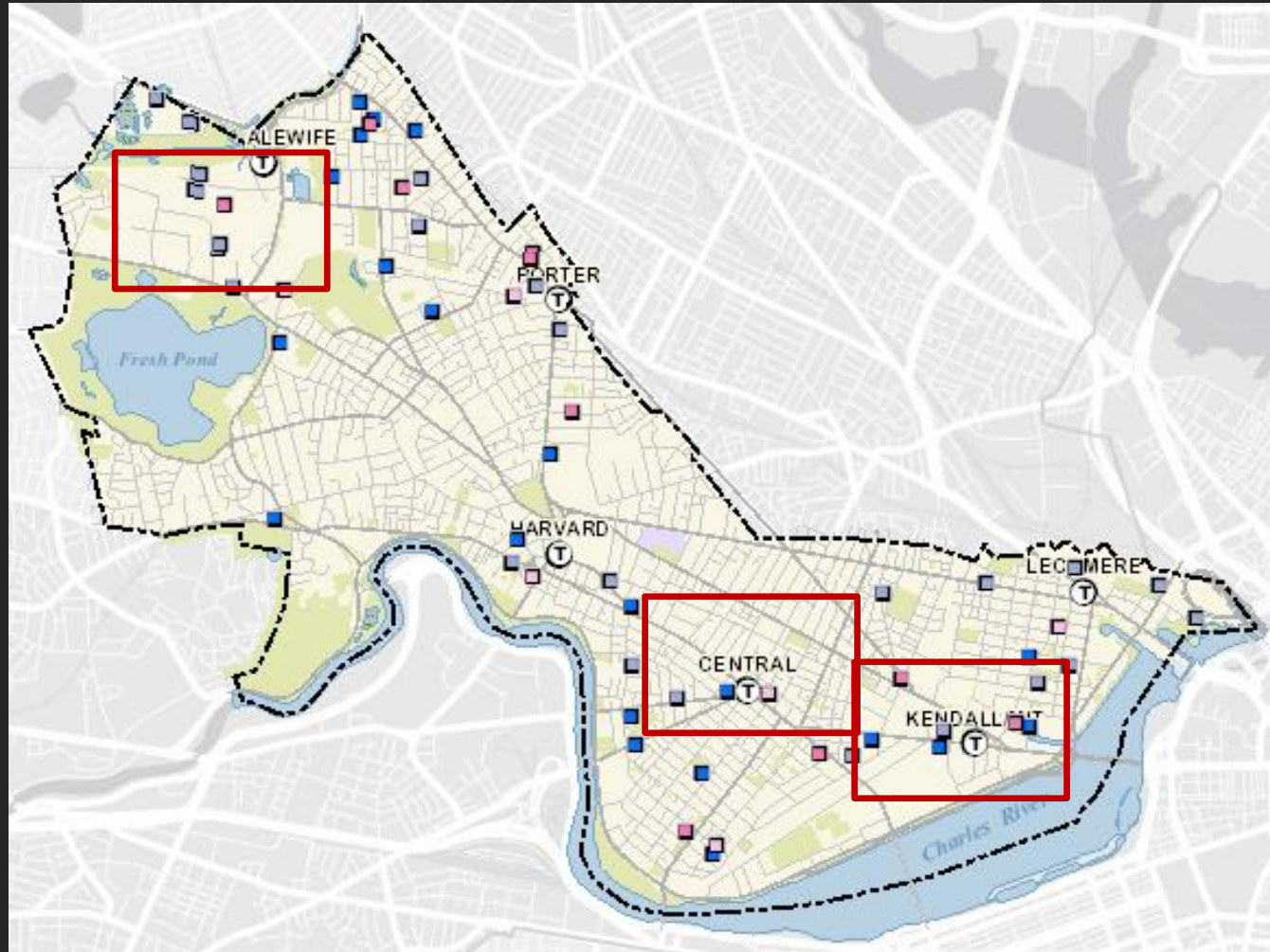


Early Efforts - 2013



- Education from ESRI and CyberCity
- Collaboration with universities
- GIS funds a pilot area
- Paul Cote available as a consultant for 3D

Projects Under Review and Neighborhood Planning Studies



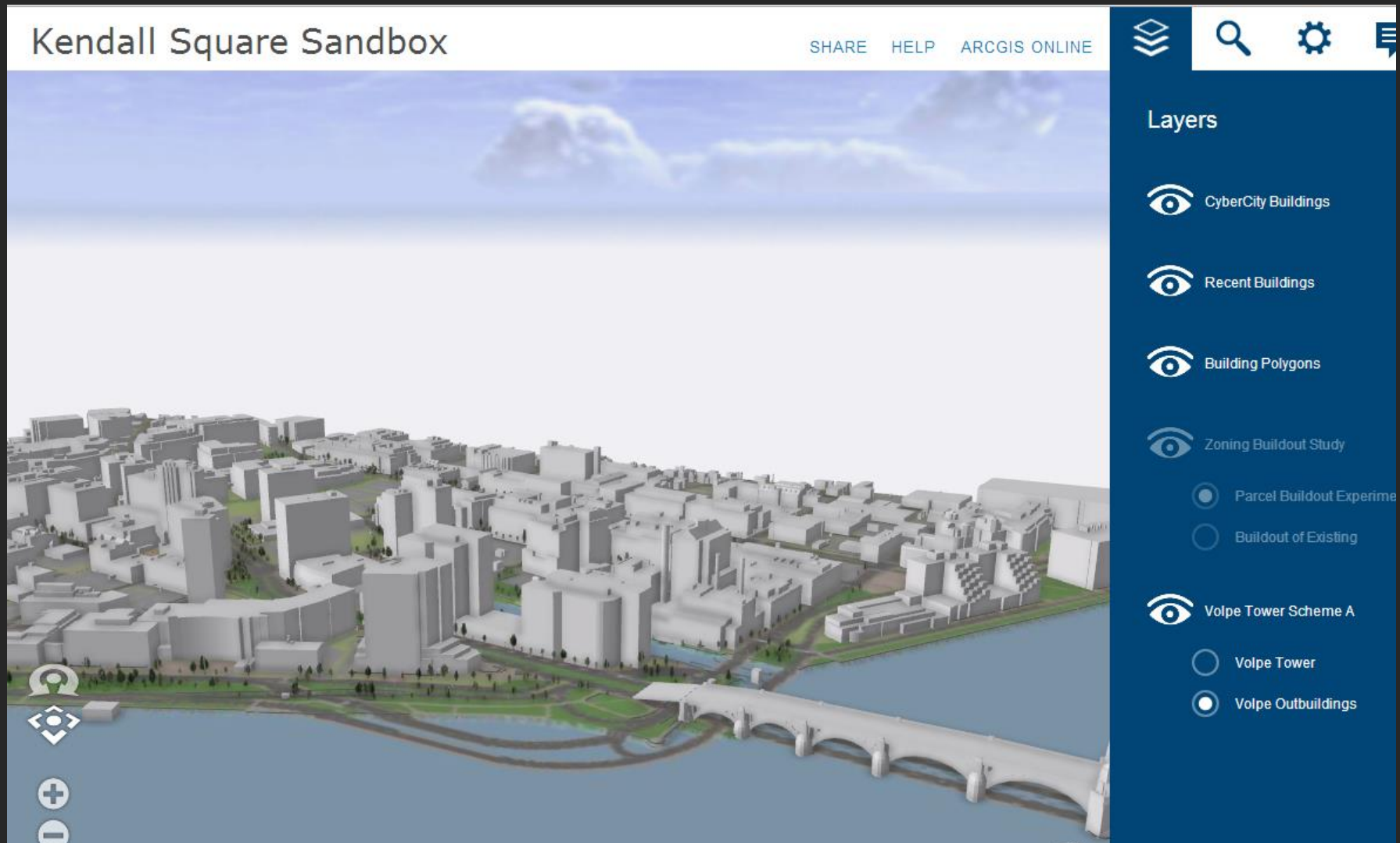
Sustainable Plan for the Model

- GIS will oversee creation, maintenance, and digital storage of model
- CDD will use model for visualization, planning, and in workflow
- GIS will direct and assist with ongoing maintenance of model
- GIS and CDD would work together on developing an exchange with developers and attempt a digital submission requirement

Kendall Square Pilot



Visualizing the Development Pipeline

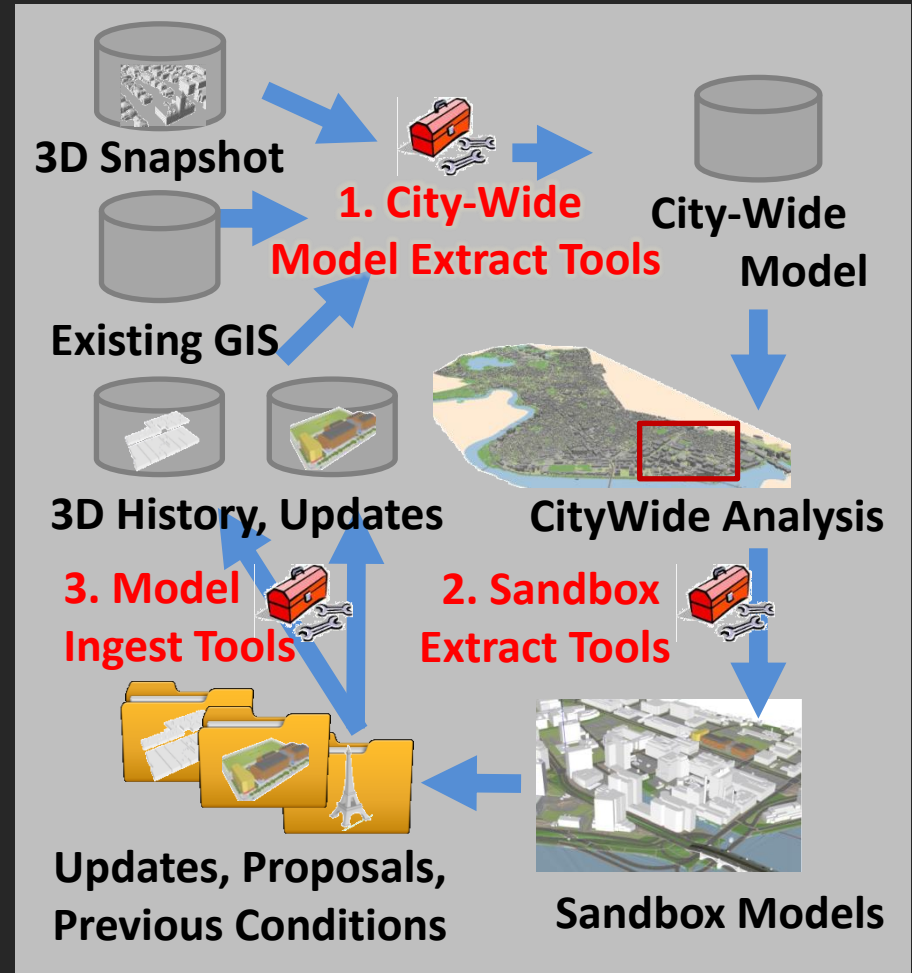


Visit www.pbcGIS.com/citymodeling to view interactive webscene.

Model Management Architecture

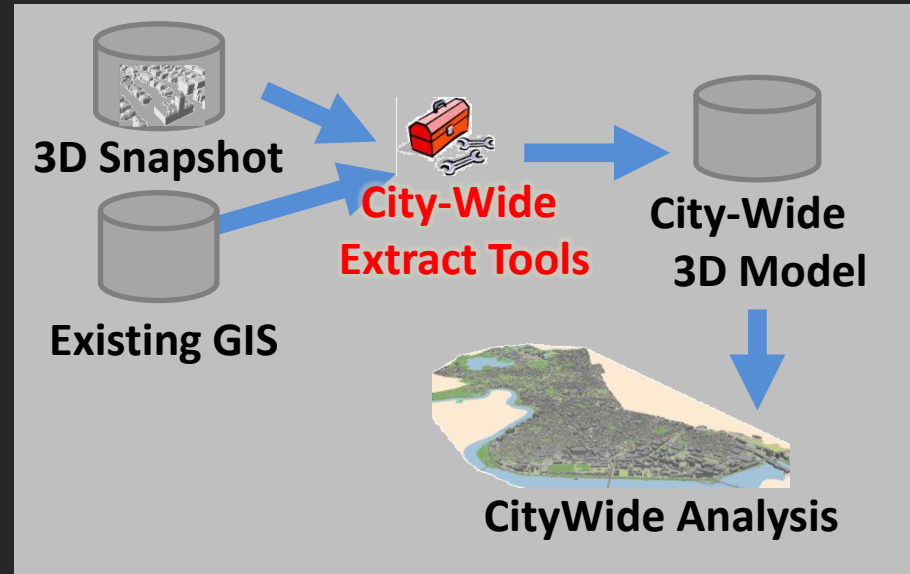
Using and improving the city-wide model makes use of three collections of geoprocessing tools.

These tool sets are discussed in the next several slides.



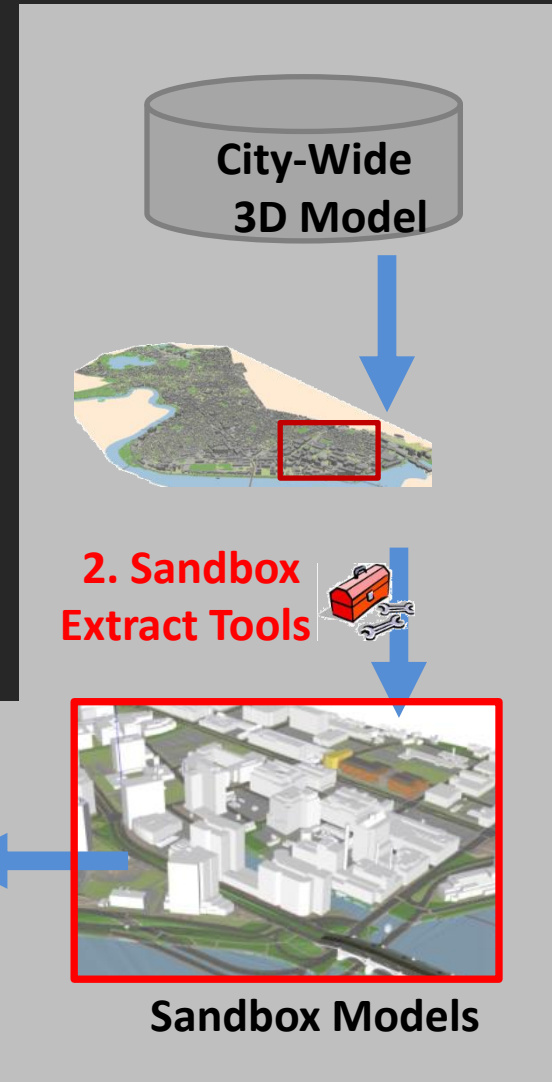
Extract and Transform a City-Wide 3D Model from Existing Data

1. Consolidate and transform existing planimetric data to assemble terrain model.
2. 25 layers merged for groundplan.
3. Vector layers optimized for 3D & CityEngine CGA Rules.
4. Merge in 3D data from CyberCity3D



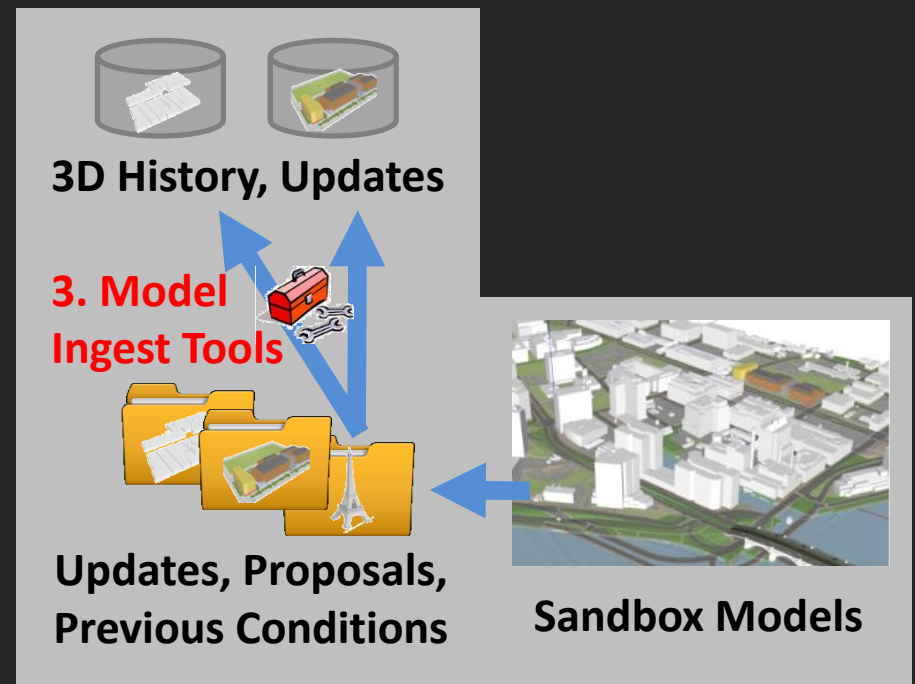
Extract Sandbox Models

1. Study models are clipped out and exported to CityEngine.
2. Exports can be made to other design tools from CityEngine through COLLADA.
3. Sandbox models are used to develop design schemes and model improvements.
4. Level of detail optimized for webscenes



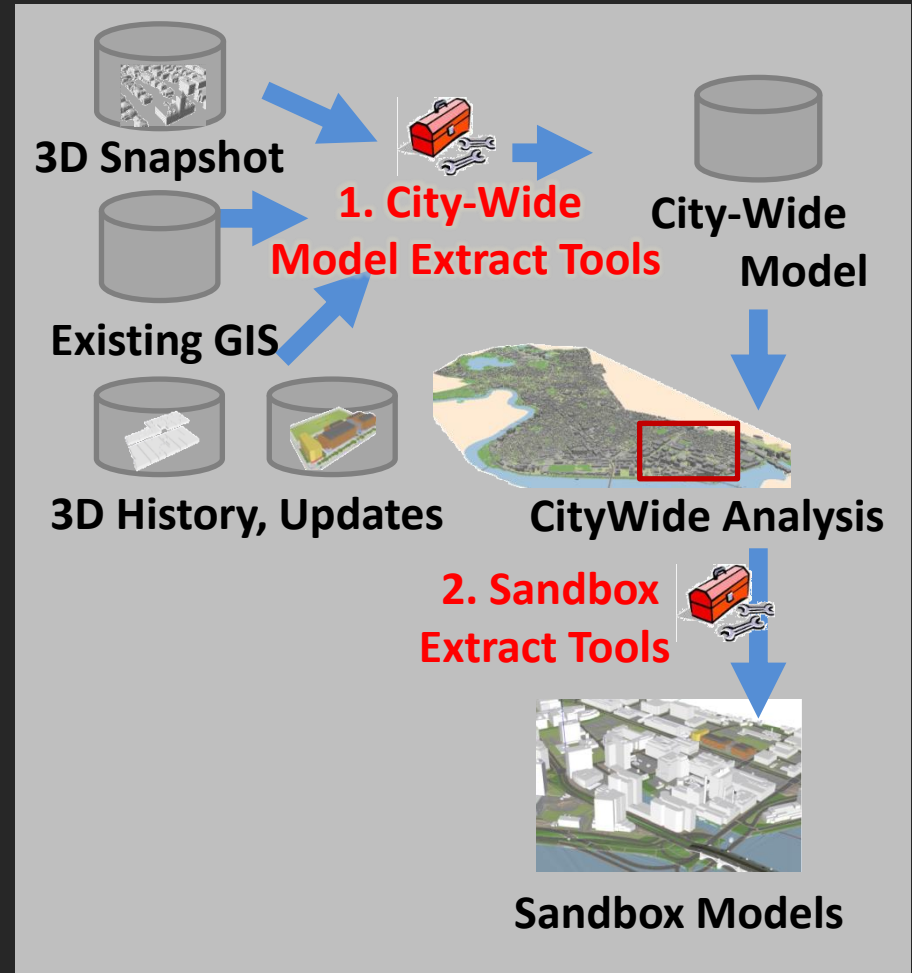
Incorporate Updates and History to City-Wide Model

1. New models come into the system as collections of working models, source documents and interchange files – e.g. KMZ and COLLADA files
2. Models are imported to geodatabase feature classes using ArcScene or CityEngine
3. Special attributes allow the model to revisit historical conditions or alternate future schemes

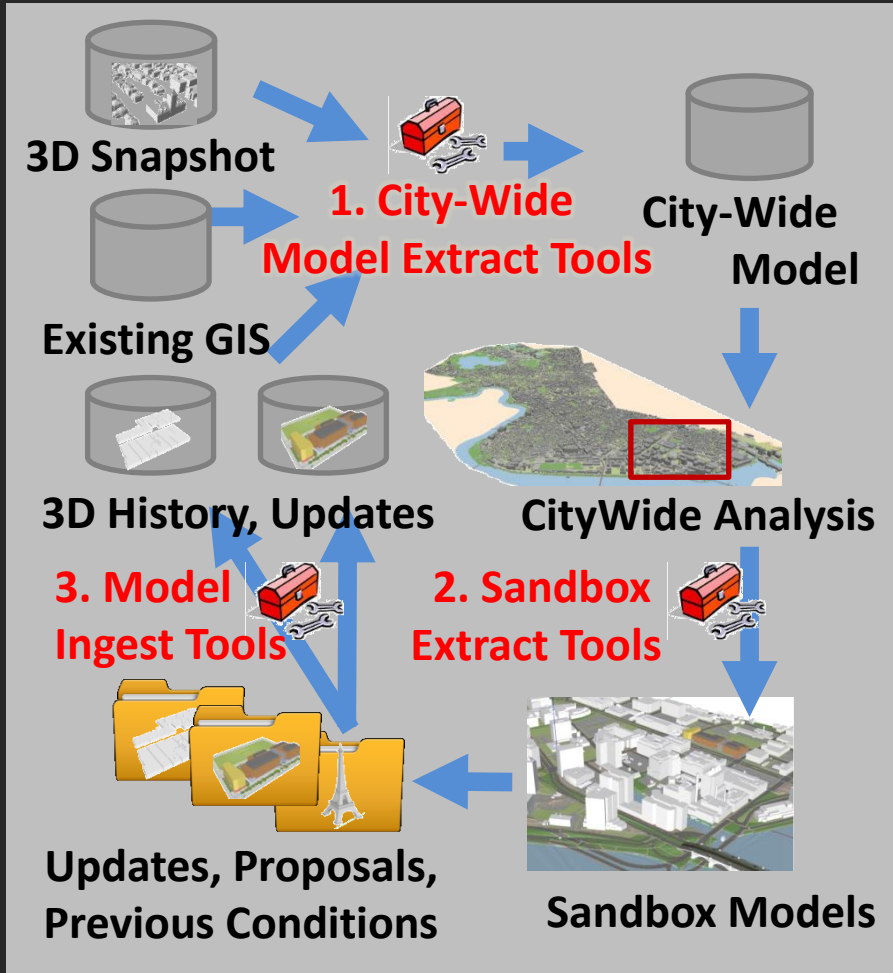


Model Management Architecture

After updates are ingested, they are automatically part of subsequent model visualizations and sandbox extractions.



Collaborations:



Cambridge GIS

Community
Development

Designers, Developers
Public

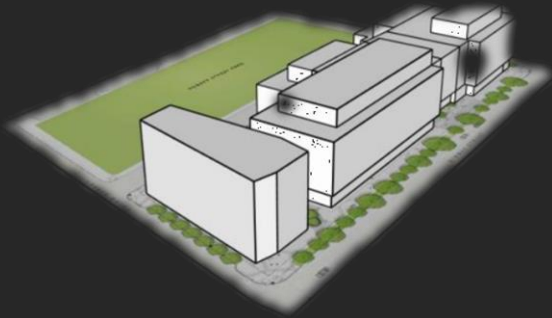


Collaboration with Developers

- We hope the model will provide a means for developers and city staff city to share understand the relationships among unbuilt projects.
- This will require developers to share 3D models of their design proposals.
- Submission of simple 3D models may become a requirement in the design review process.

Model Submission Guidelines

Context Model Provided as Sketchup, COLLADA and KMZ



Submit simple building shells and site plan as COLLADA or KMZ.

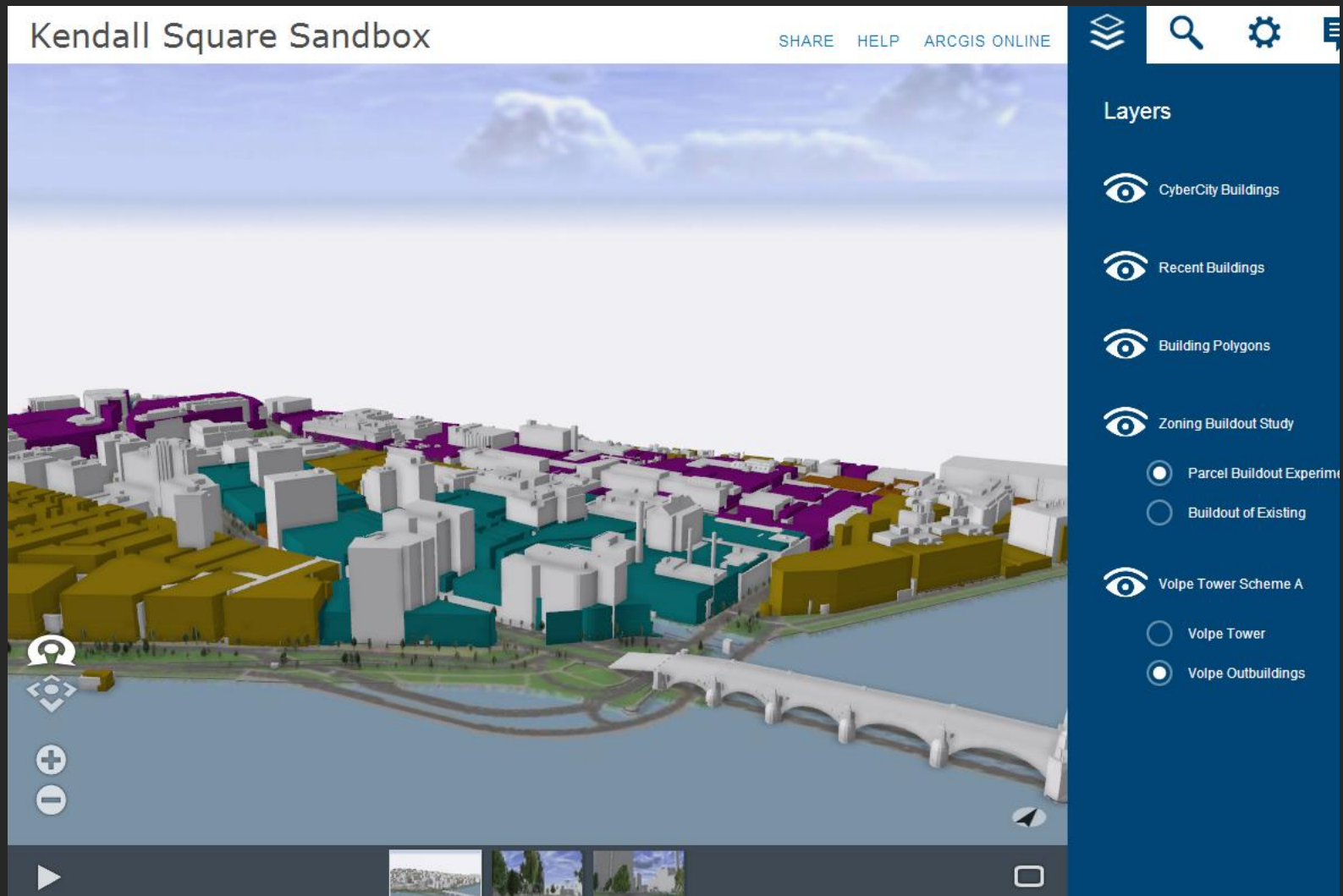


Conventions for thematic textures are under consideration.



Visit www.pbcGIS.com/k23d to see our submission guidelines.

Web Scene Zoning and Shadow Studies



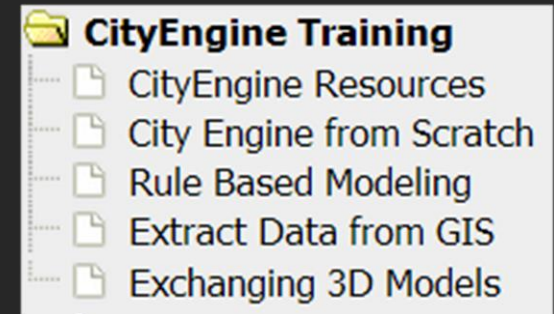
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Data Deliverable + Documentation

- City-Wide 3D Model
- Geoprocessing Tools
- Demo Data (Examples)
- User Manual
- Data Dictionary
- Buyers Guide for 3D Data



Training



- CityEngine is primary software.
 - ArcScene, SketchUp, & Collada for exchange
- Collaborative effort between Harvard, MIT, and City for training.
 - Training hosted at MIT Dept. of Facilities by pbcGIS.
- Met with CDD top staff to gauge commitment and vision.

Next Steps

- Citywide model derived from 2014 flyover stereo pairs
- Improve planimetric groundplan coverage
- Better organization of the elements within the model
- Add refinements to model in Kendall study area
- Practice & refine visualization and update workflows
- Extend data model & collaboration to Boston, MIT and Harvard.

Contact Information

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