The City of Vancouver, Autodesk, and Pitney Bowes Software: A Match Made in Business and Software

Dan Campbell
Graphics Planner

Class Summary

This class provides an overview of how a range of products from Autodesk and Pitney Bowes are being used together at the City of Vancouver. It will outline the history of how the workflows between products from two different vendors evolved, focusing on how to take advantage of existing 2D GIS data and to work through the plan, design, build, and manage lifecycle of infrastructure, and to visualize that same data in 3D. Three case studies demonstrating a range of workflows will be presented:

1. Election districtation
2. Building footprints
3. Population projections
4. Line of sight analysis

Learning Objectives

At the end of this class, you will be able to:

- List the potential benefits of the Autodesk and Pitney-Bowes strategic partnership
- Explain how interoperability can improve workflows from GIS to Building Information Modeling (BIM)
- List ways to take advantage of existing GIS data in a 3D environment
- Outline the steps that are required to manage the lifecycle of infrastructure

City of Vancouver

Things Cities Do

- Zoning, subdivision, development review & processing, public consultation, infrastructure management, infrastructure design, beat analysis, paper map production, web mapping, public art database, social housing inventory, orthophotos, LiDAR, shadow analysis, energy analysis, 3D city modelling, massing development, view analysis, urban forest management, sea level rise analysis, earthquake mitigation, crime mapping, way finding, facilities management, election boundary redistricting, homeless inventory, bike routes and sharing, asset management, performance facilities management, parks inventory, emergency management, event management, animations, capacity analysis, population projections…and a whole lot of other stuff

Forces

- BIM
- Open data
- 3D hunger
- Visualization of complex data
- Public’s demand for more participation
- Higher cartographic standards
- Web access and interaction with City data
- Blurring of roles

Key Business Drivers

- Major City Initiatives
  - Greenest City 2020
  - Replacement of permit system
  - Move to shared services model
  - Earthquake preparedness
- Substantial budget pressures
- Increased need for more collaboration and public participation (at a lower-cost)

CITY OF VANCOUVER | GREENEST CITY 2020

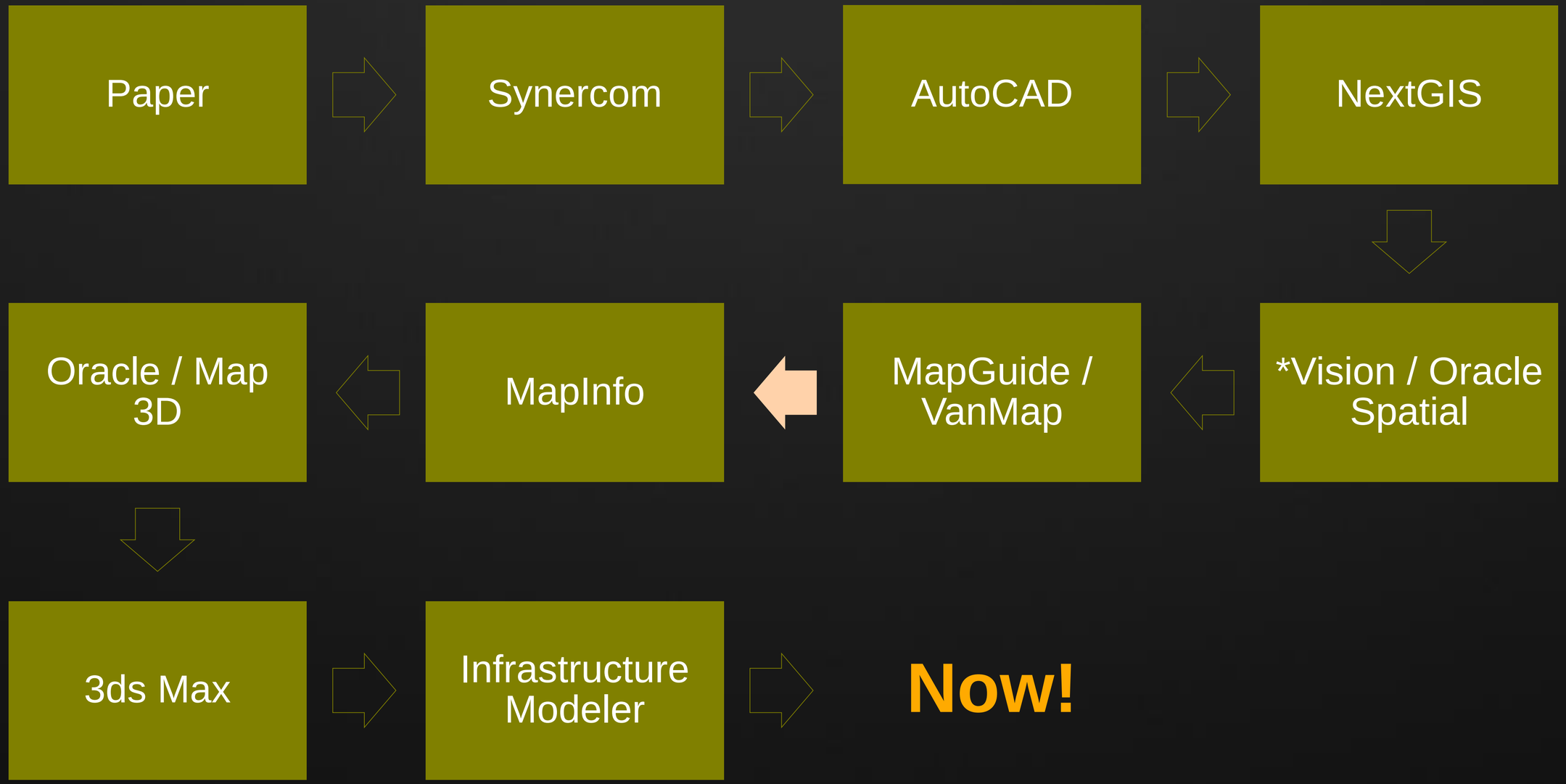
How We're Responding

Pitney Bowes & Autodesk

- History & context
- Role
- Four case studies
  - Election redistricting
  - Building footprints
  - Population projections
  - Line of sight analysis

How We Got There – Some History

Key Events – 1980 to…



The Ideal

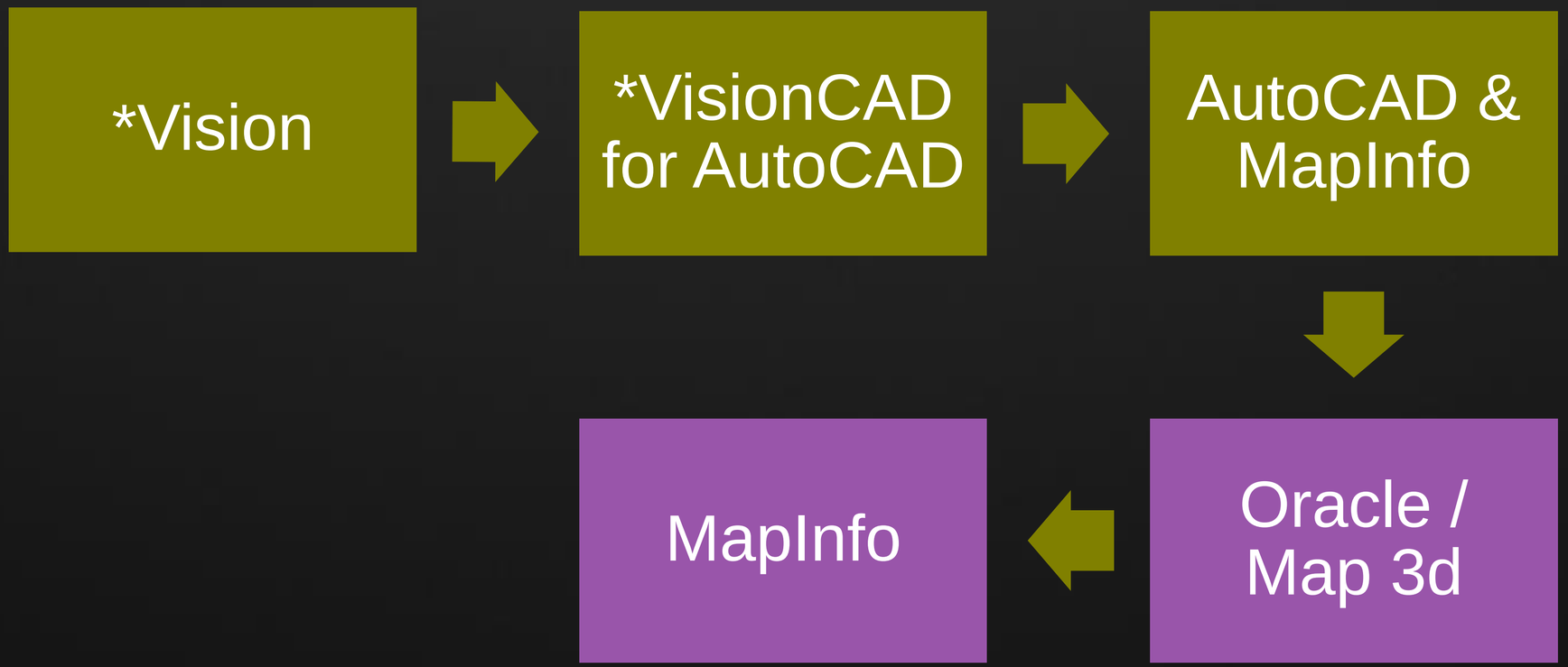
The Reality

The Solution?

Our Strategic Solution

- The next slide outlines what our strategic solution for integrating Autodesk and Pitney Bowes software was.

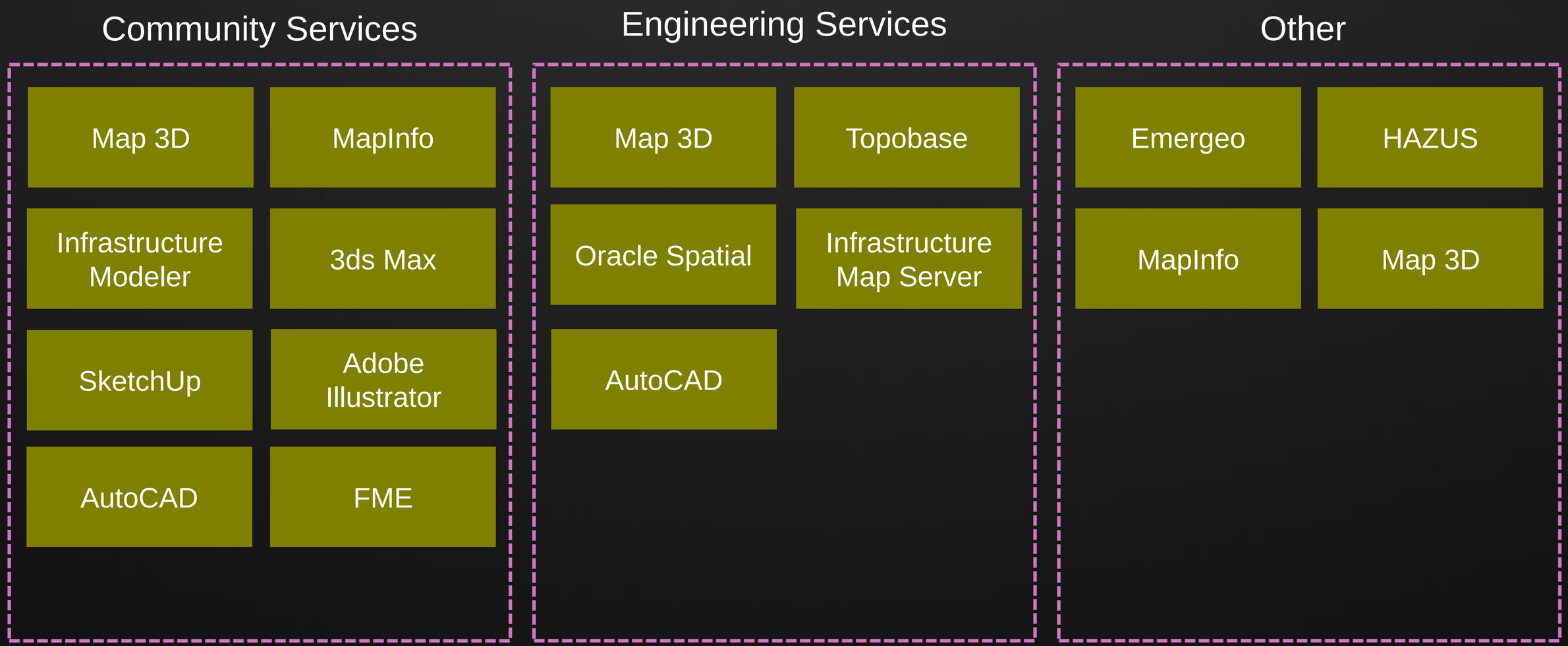
The Early Days of Integration



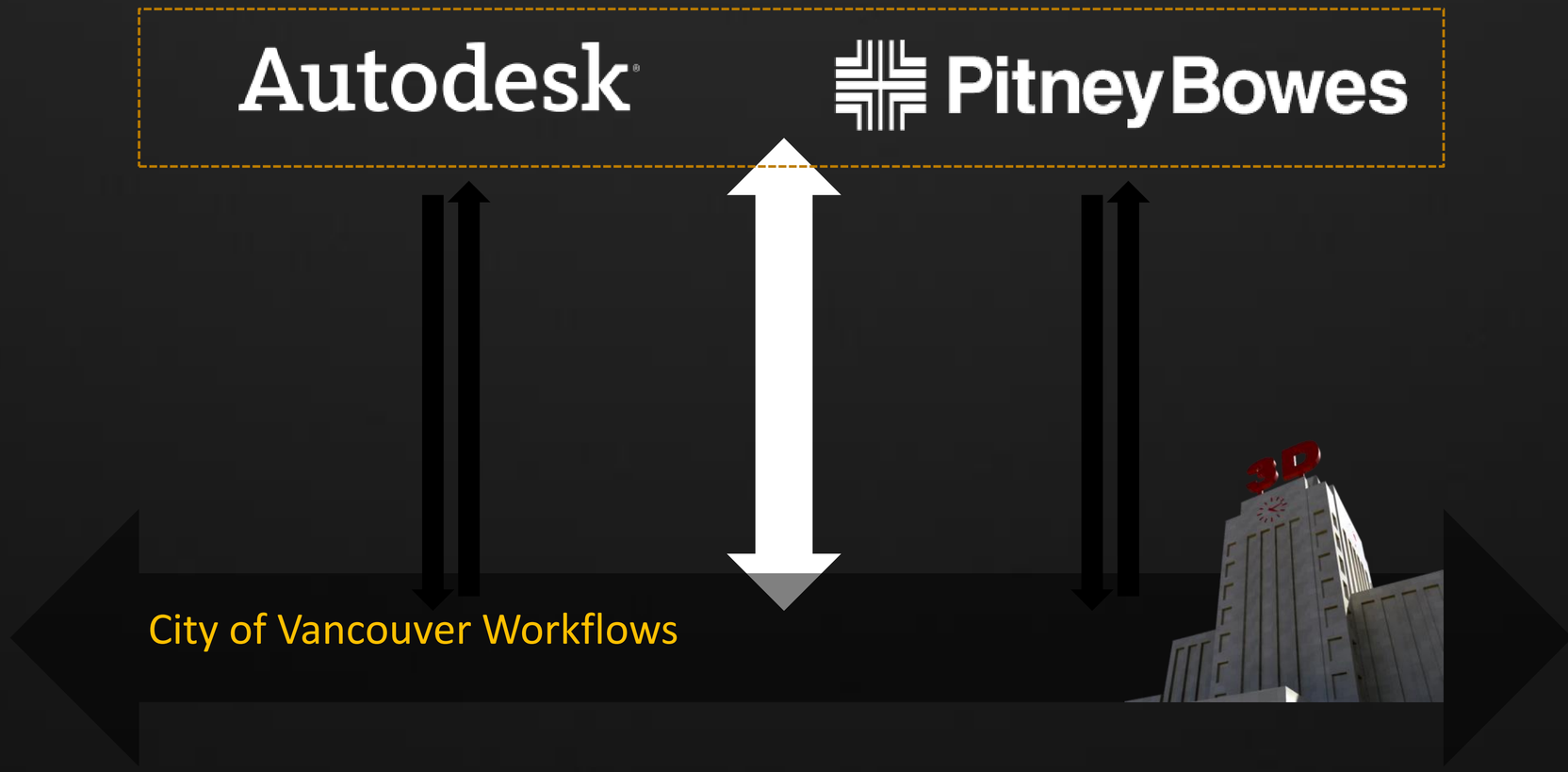
Gated Communities?

Software Silos?

What's In the Silos



Our Focus



City's GIS-*ish* Environment

Wasteful Data

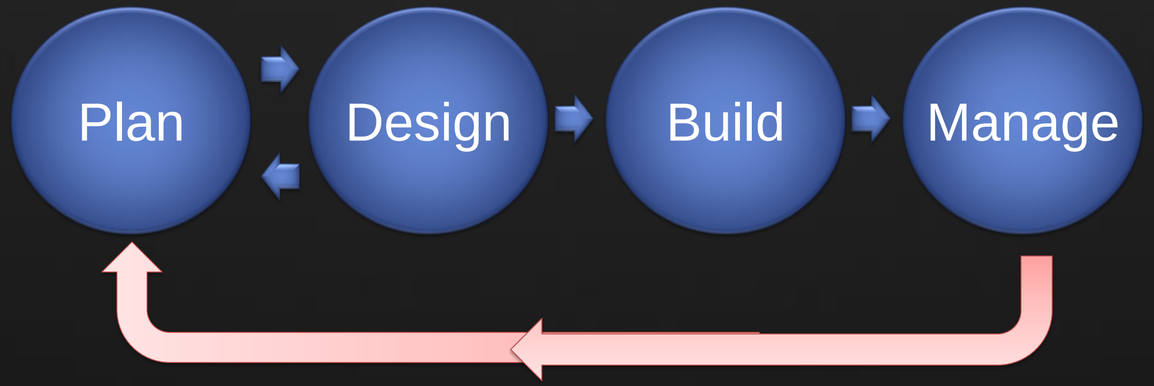
The Many Lives of a Single Piece of Data

The Many Lives of a Single Piece of Data 2

The Formalization of the Relationship

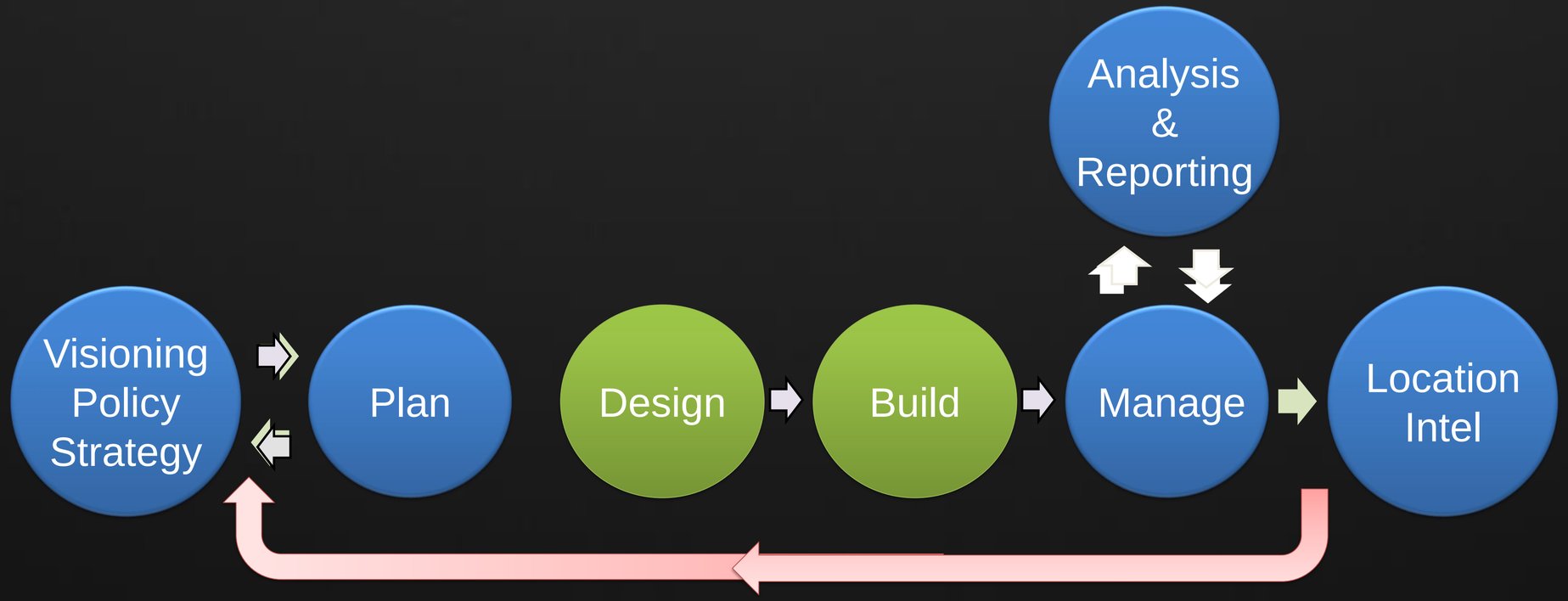
Autodesk

- BIM for infrastructure solutions



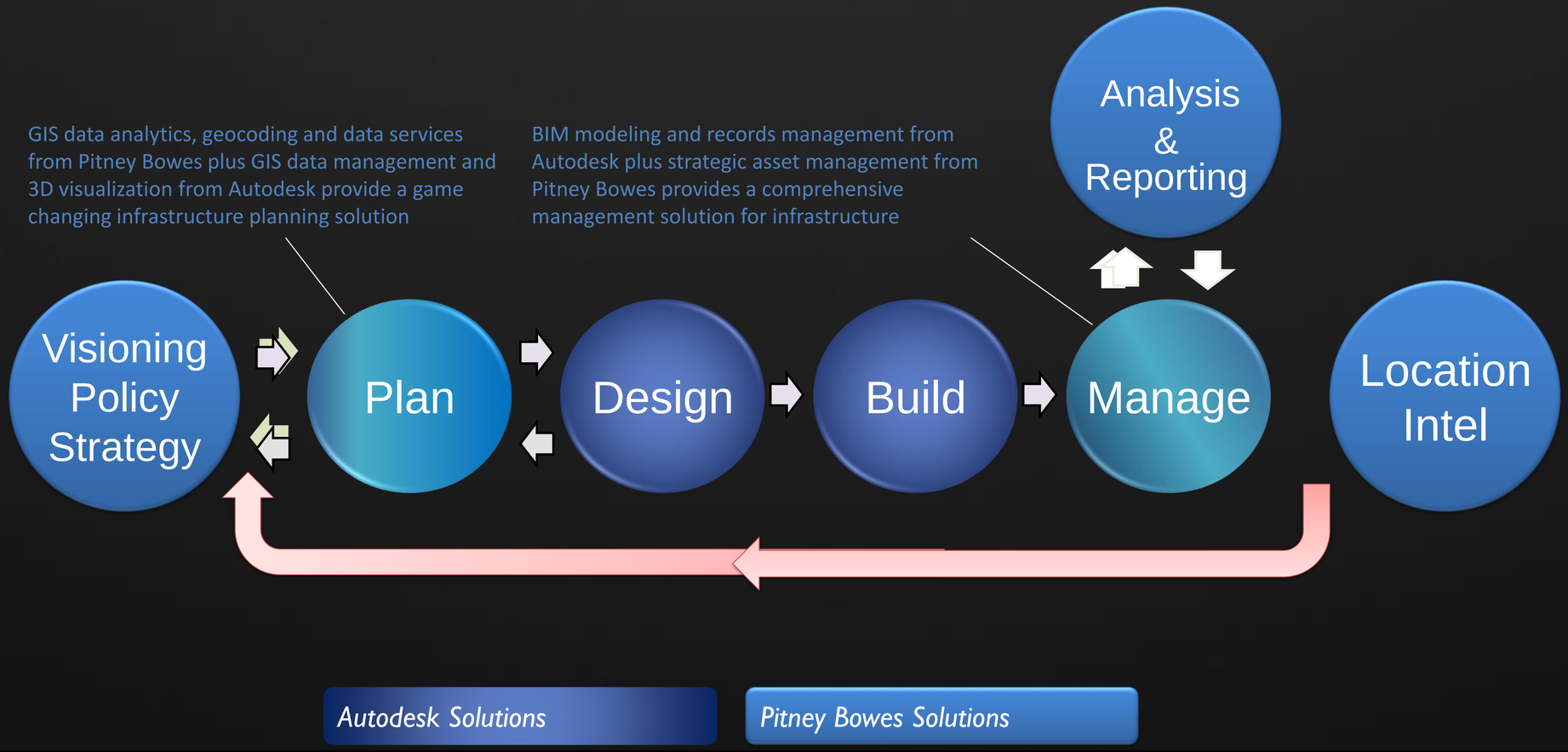
Pitney Bowes Business Insight

- Location intelligence and analytics solutions



Autodesk/Pitney Bowes Alliance

- Comprehensive end-to-end infrastructure solution



Our Own Strategic Initiative

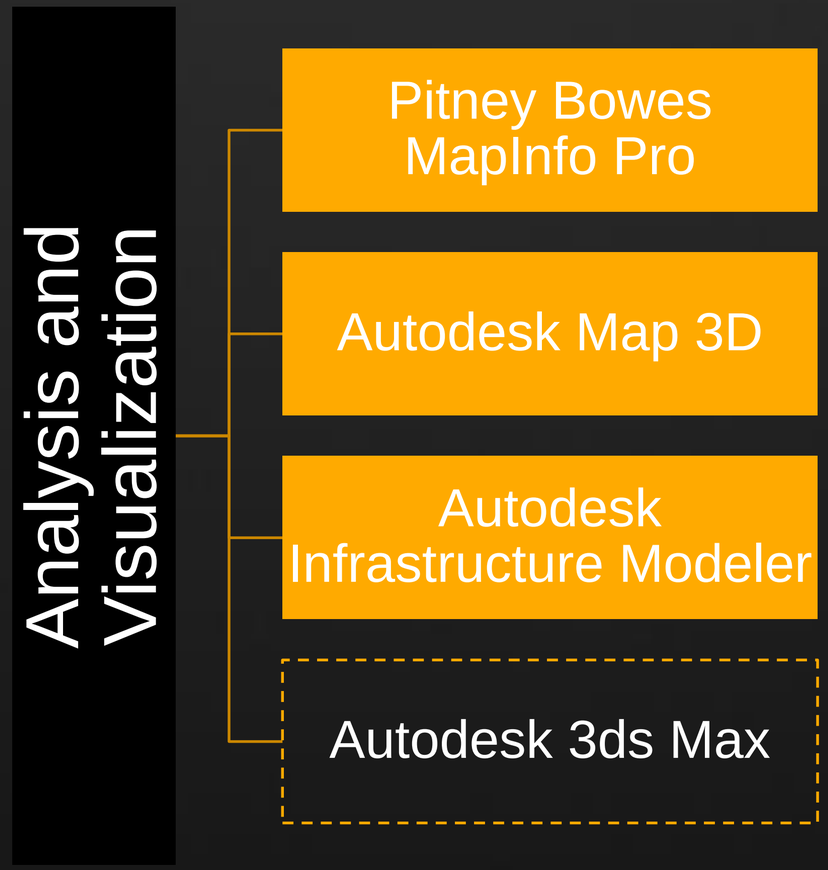
GIS Shared Services GIS

Engineering GIS

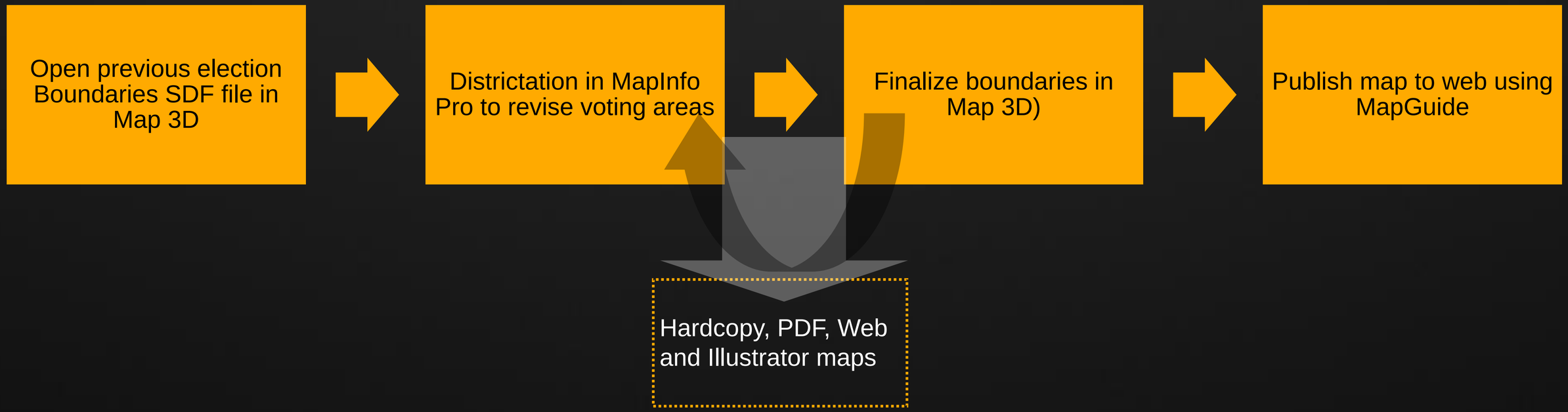
CSG GIS

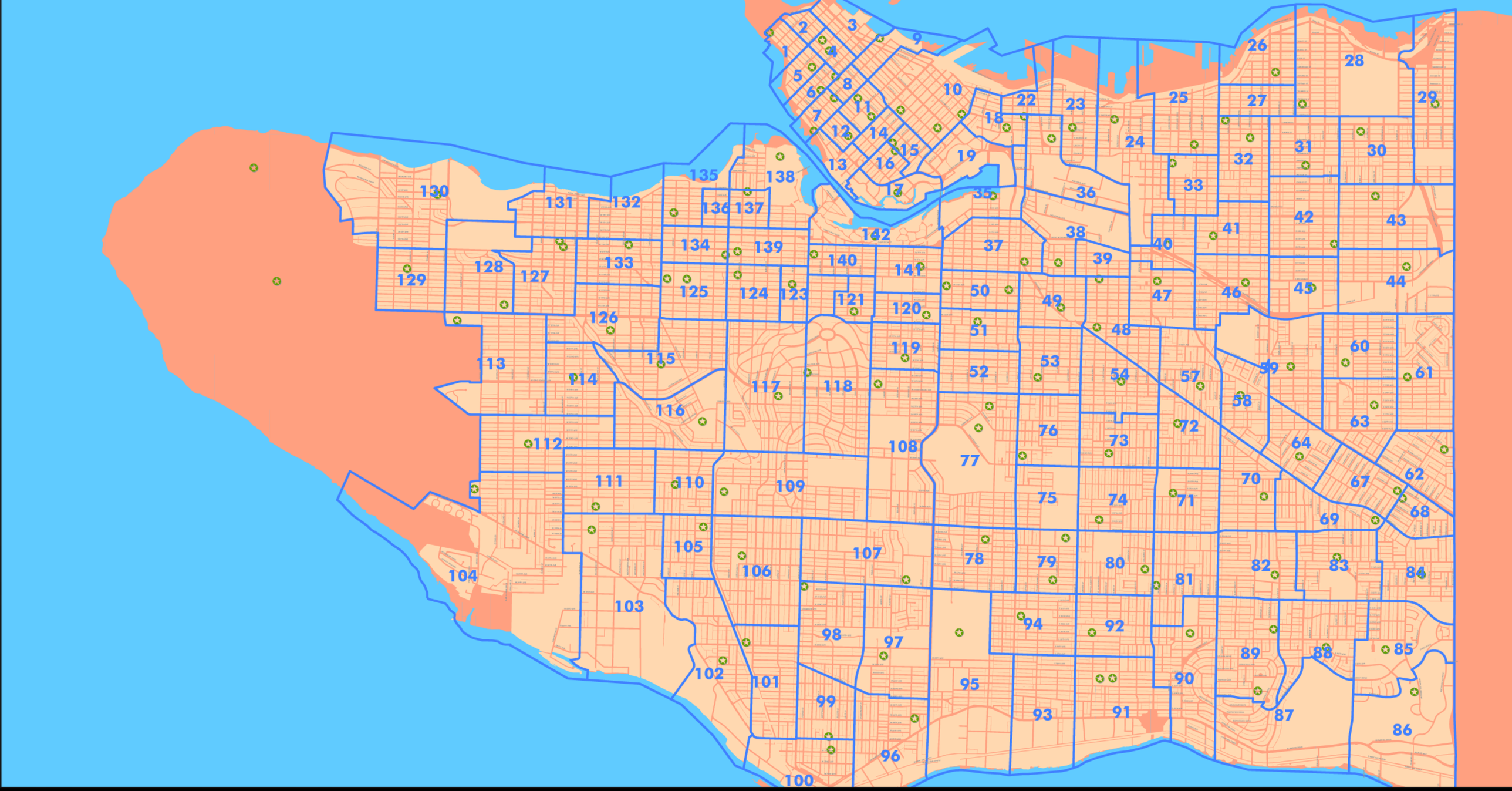
IT GIS

A First World Problem

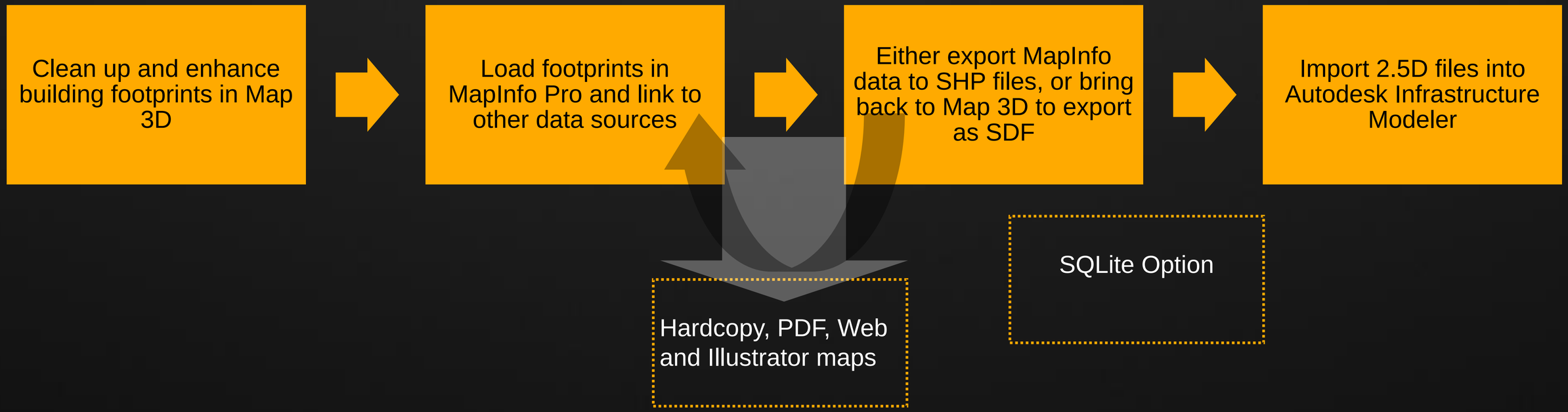


Election Boundary Districtation





Building Footprints



2D to 3D Workflow

How Big Is A City?

Strategy?

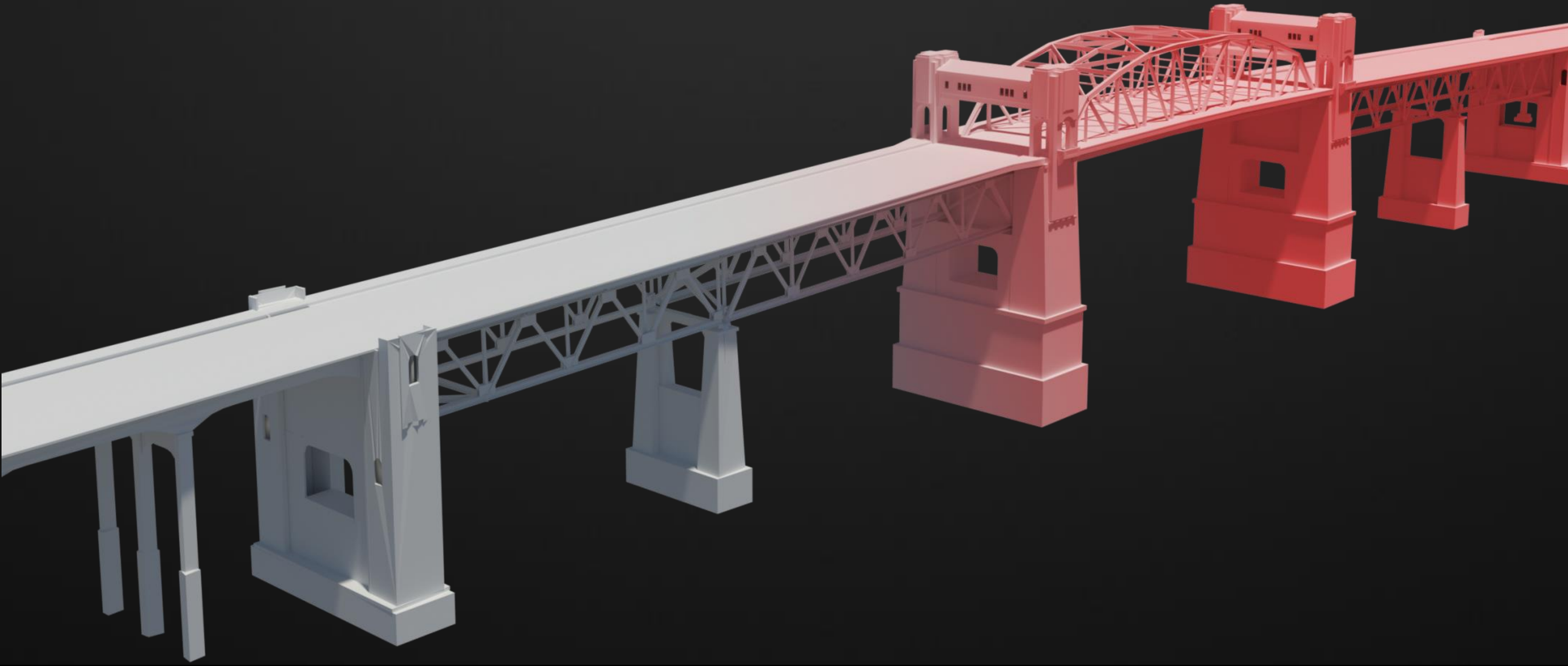
- We weren’t trying to introduce integrated GIS / 3D workflows using competitor’s products.
- We were just trying to find an easy way to get a 3D model

3D = (4D + 5D($)) *or* 2.5D

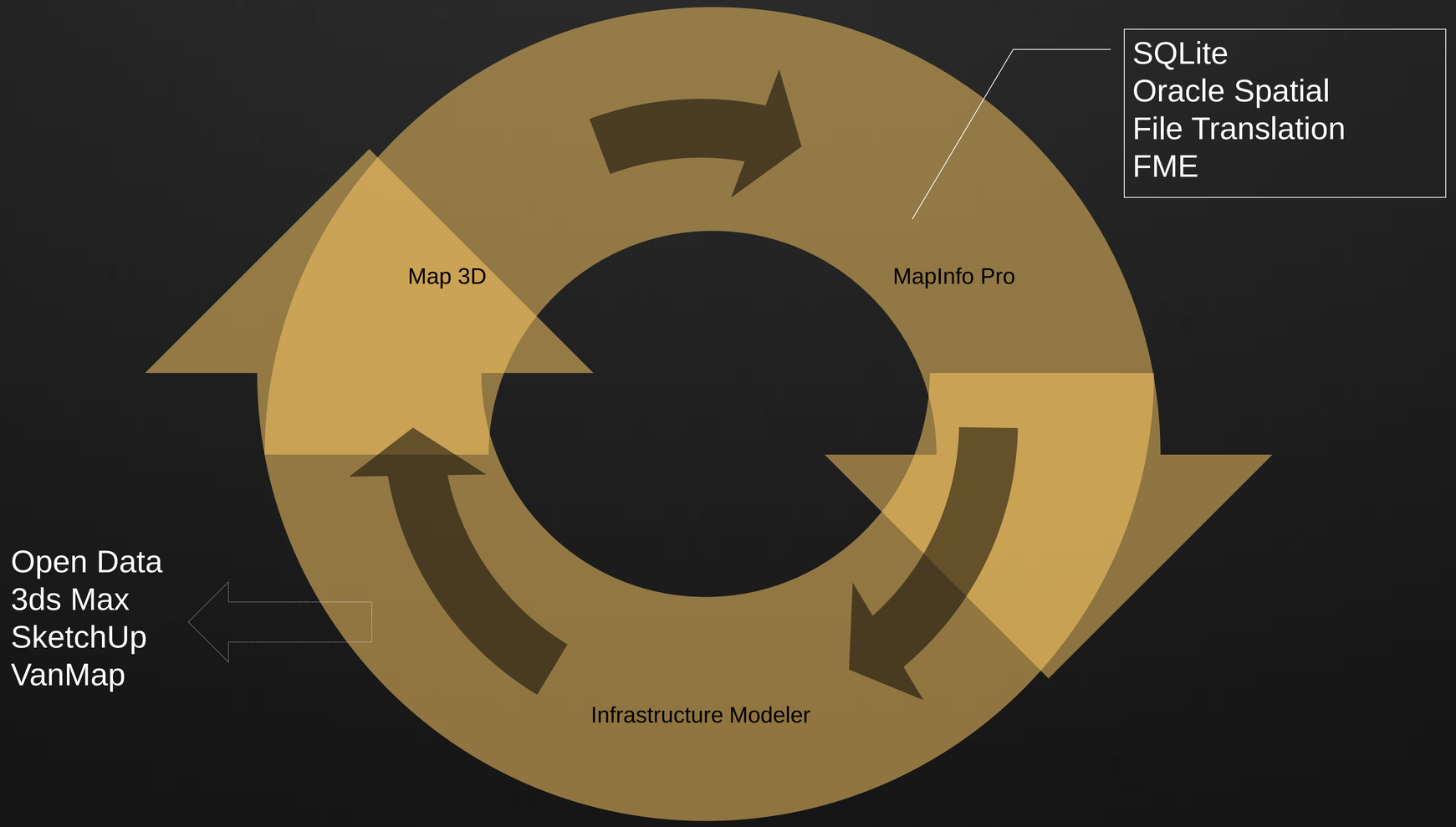
6 Million Dollar Man?

2,500,000.00

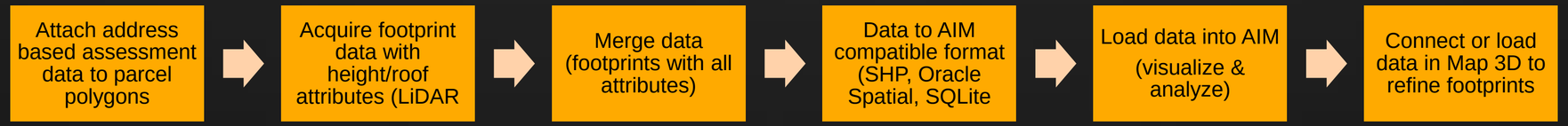
Sustainability



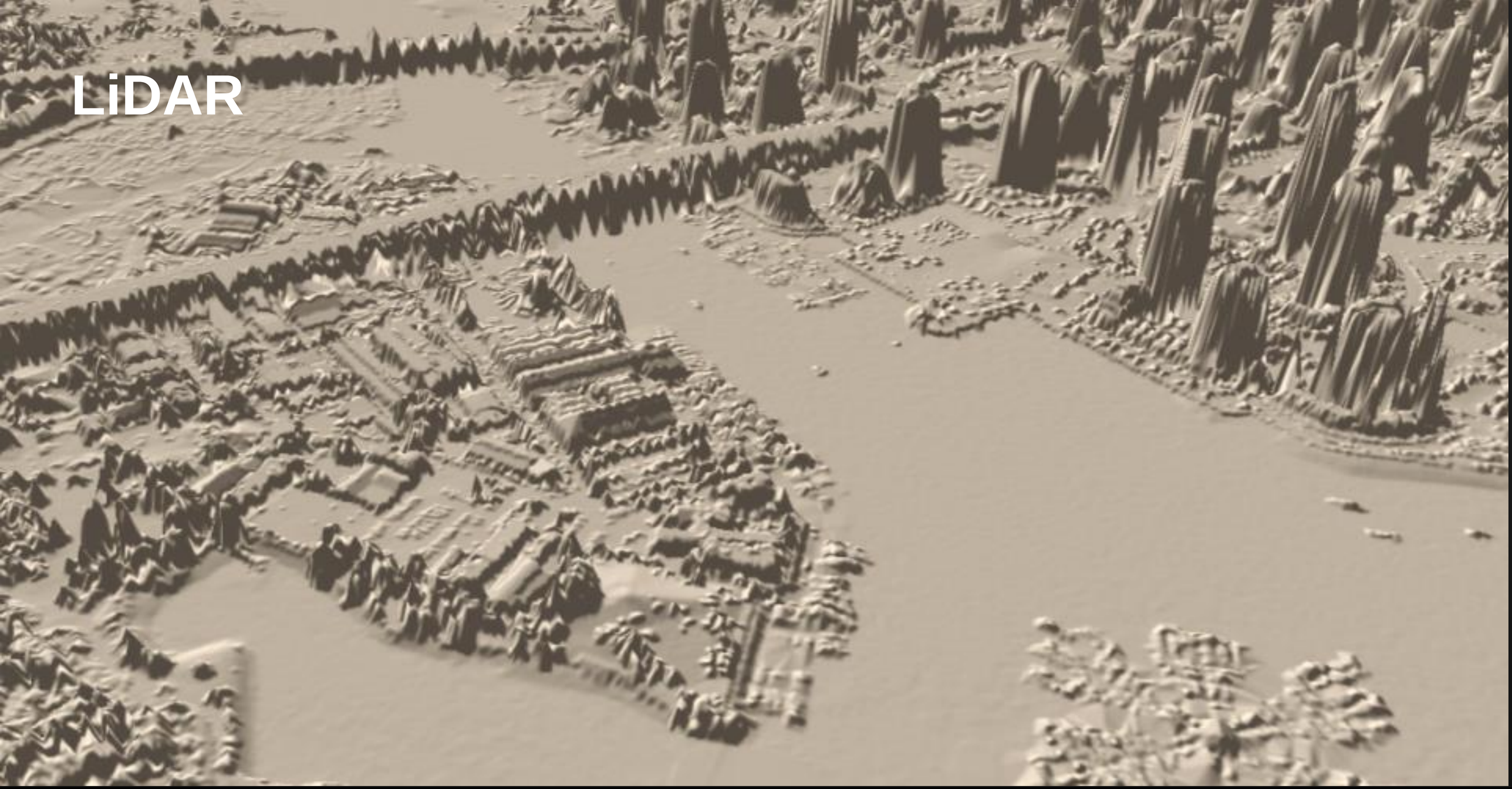
Building Footprints 2D > 3D

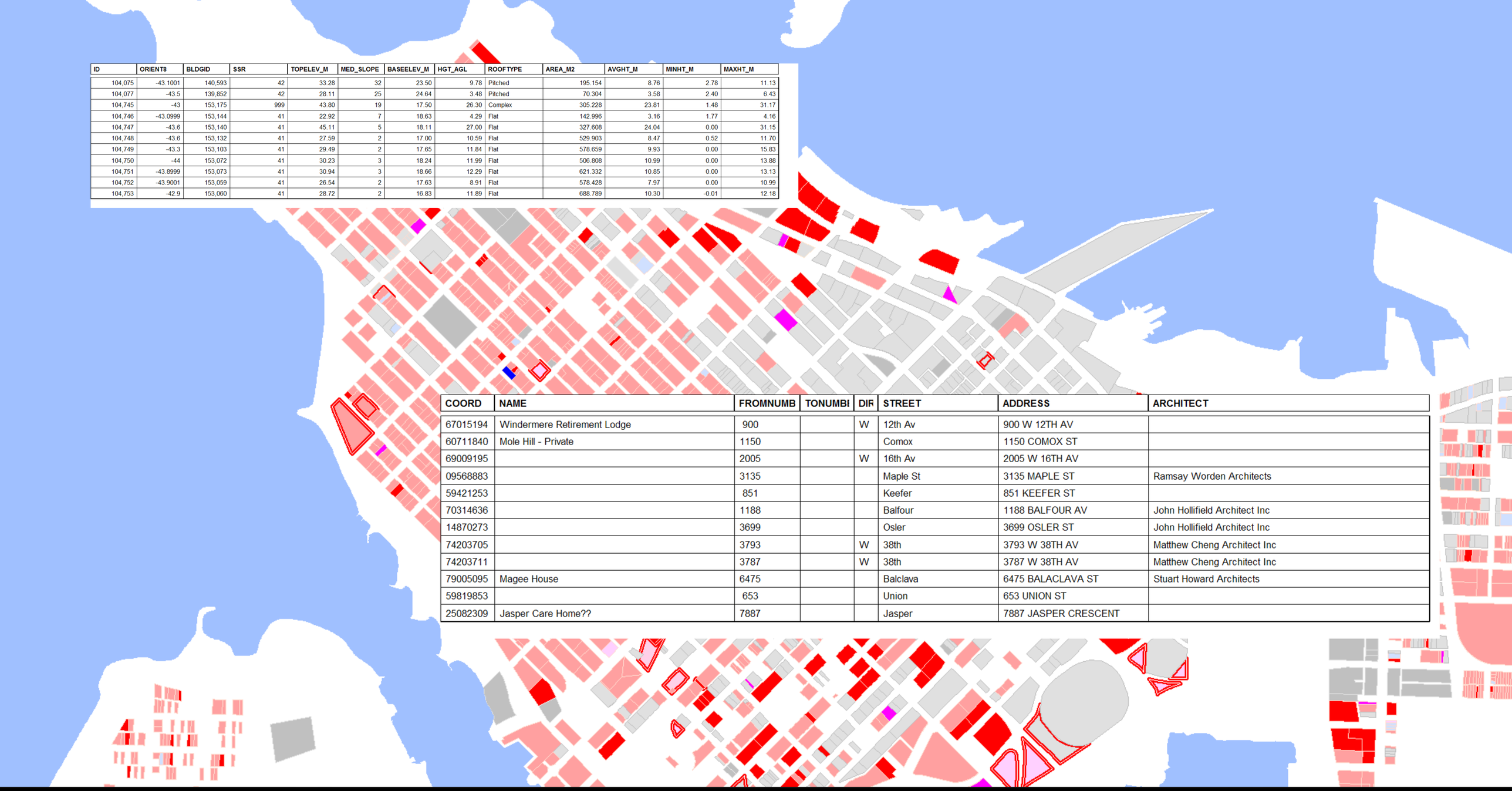


Detailed Steps for 2D to 3D



LiDAR

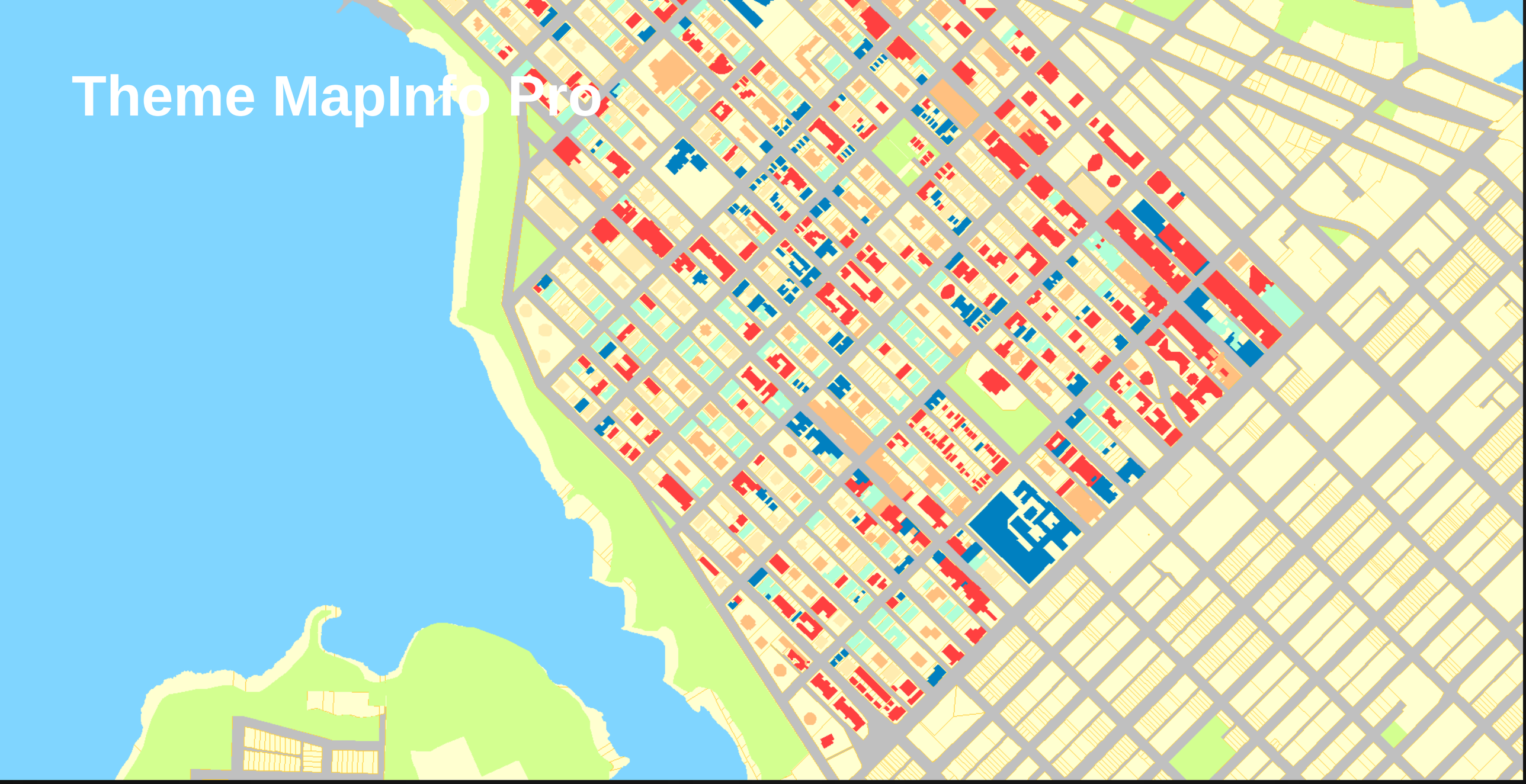




ID	ORIENT8	BLDGID	SSR	TOPELEV_M	MED_SLOPE	BASEELEV_M	HGT_AGL	ROOFTYPE	AREA_M2	AVGHT_M	MINHT_M	MAXHT_M
104,075	-43.1001	140,593	42	33.28	32	23.50	9.78	Pitched	195.154	8.76	2.78	11.13
104,077	-43.5	139,852	42	28.11	25	24.64	3.48	Pitched	70.304	3.58	2.40	6.43
104,745	-43	153,175	999	43.80	19	17.50	26.30	Complex	305.228	23.81	1.48	31.17
104,746	-43.0999	153,144	41	22.92	7	18.63	4.29	Flat	142.996	3.16	1.77	4.16
104,747	-43.6	153,140	41	45.11	5	18.11	27.00	Flat	327.608	24.04	0.00	31.15
104,748	-43.6	153,132	41	27.59	2	17.00	10.59	Flat	529.903	8.47	0.52	11.70
104,749	-43.3	153,103	41	29.49	2	17.65	11.84	Flat	578.659	9.93	0.00	15.83
104,750	-44	153,072	41	30.23	3	18.24	11.99	Flat	506.808	10.99	0.00	13.88
104,751	-43.8999	153,073	41	30.94	3	18.66	12.29	Flat	621.332	10.85	0.00	13.13
104,752	-43.9001	153,059	41	26.54	2	17.63	8.91	Flat	578.428	7.97	0.00	10.99
104,753	-42.9	153,060	41	28.72	2	16.83	11.89	Flat	688.789	10.30	-0.01	12.18

COORD	NAME	FROMNUMB	TONUMBI	DIR	STREET	ADDRESS	ARCHITECT
67015194	Windermere Retirement Lodge	900		W	12th Av	900 W 12TH AV	
60711840	Mole Hill - Private	1150			Comox	1150 COMOX ST	
69009195		2005		W	16th Av	2005 W 16TH AV	
09568883		3135			Maple St	3135 MAPLE ST	Ramsay Worden Architects
59421253		851			Keefer	851 KEEFER ST	
70314636		1188			Balfour	1188 BALFOUR AV	John Hollifield Architect Inc
14870273		3699			Osler	3699 OSLER ST	John Hollifield Architect Inc
74203705		3793		W	38th	3793 W 38TH AV	Matthew Cheng Architect Inc
74203711		3787		W	38th	3787 W 38TH AV	Matthew Cheng Architect Inc
79005095	Magee House	6475			Balclava	6475 BALACLAVA ST	Stuart Howard Architects
59819853		653			Union	653 UNION ST	
25082309	Jasper Care Home??	7887			Jasper	7887 JASPER CRESCENT	

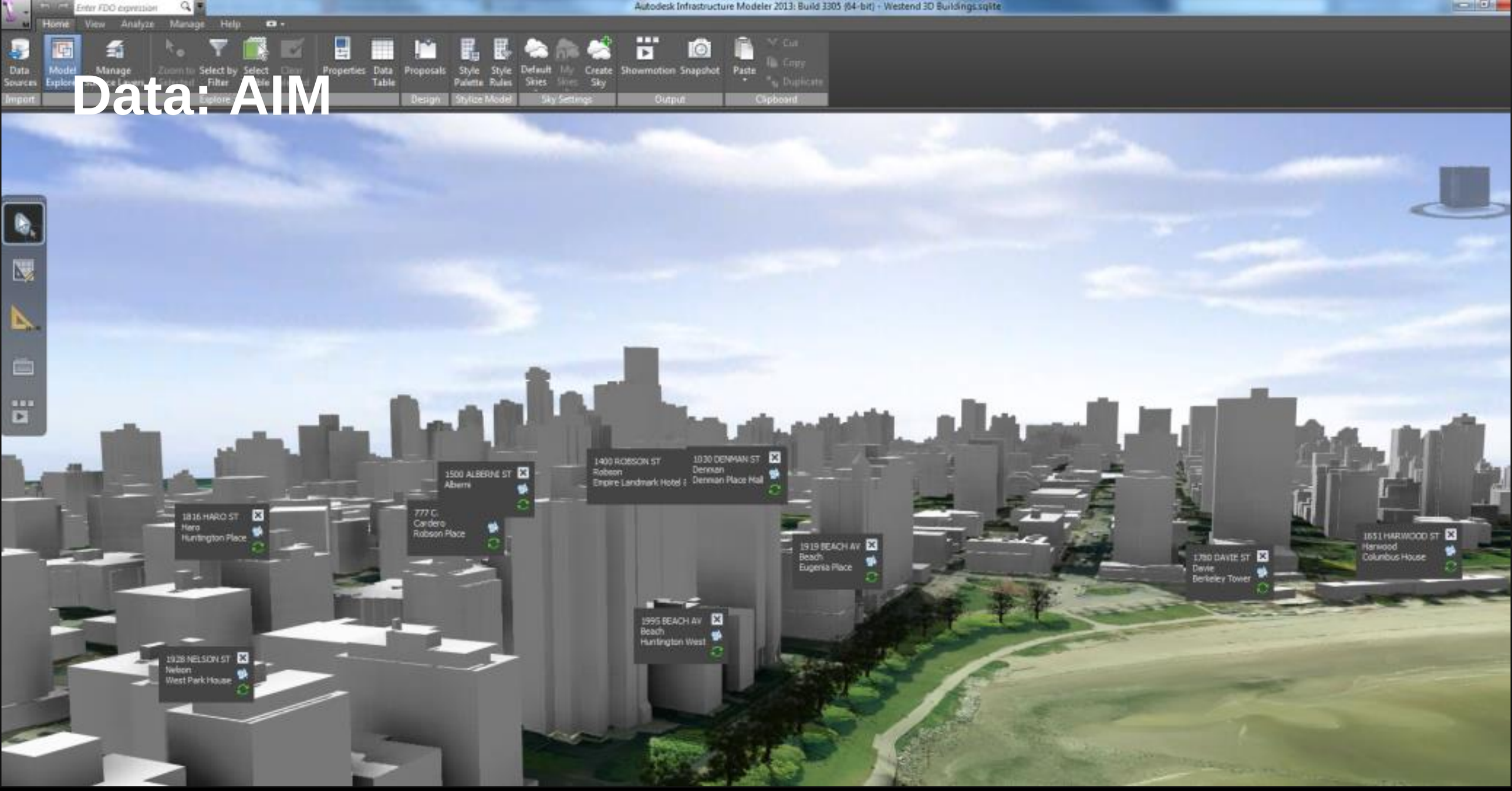
Theme MapInfo Pro



Theme: Infrastructure Modeler

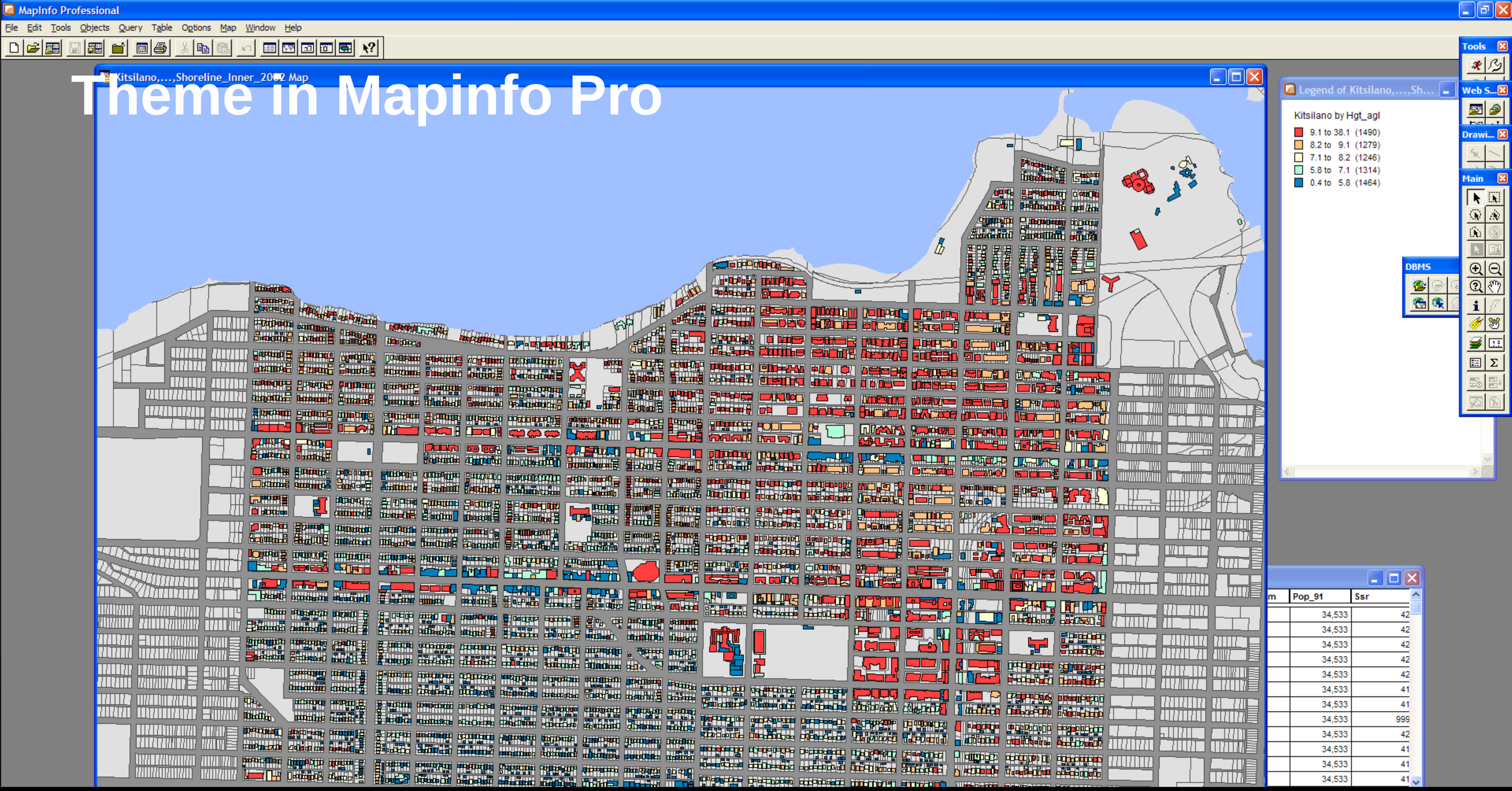
Data: Infrastructure Modeler

Data: AIM



Visualization: AIM

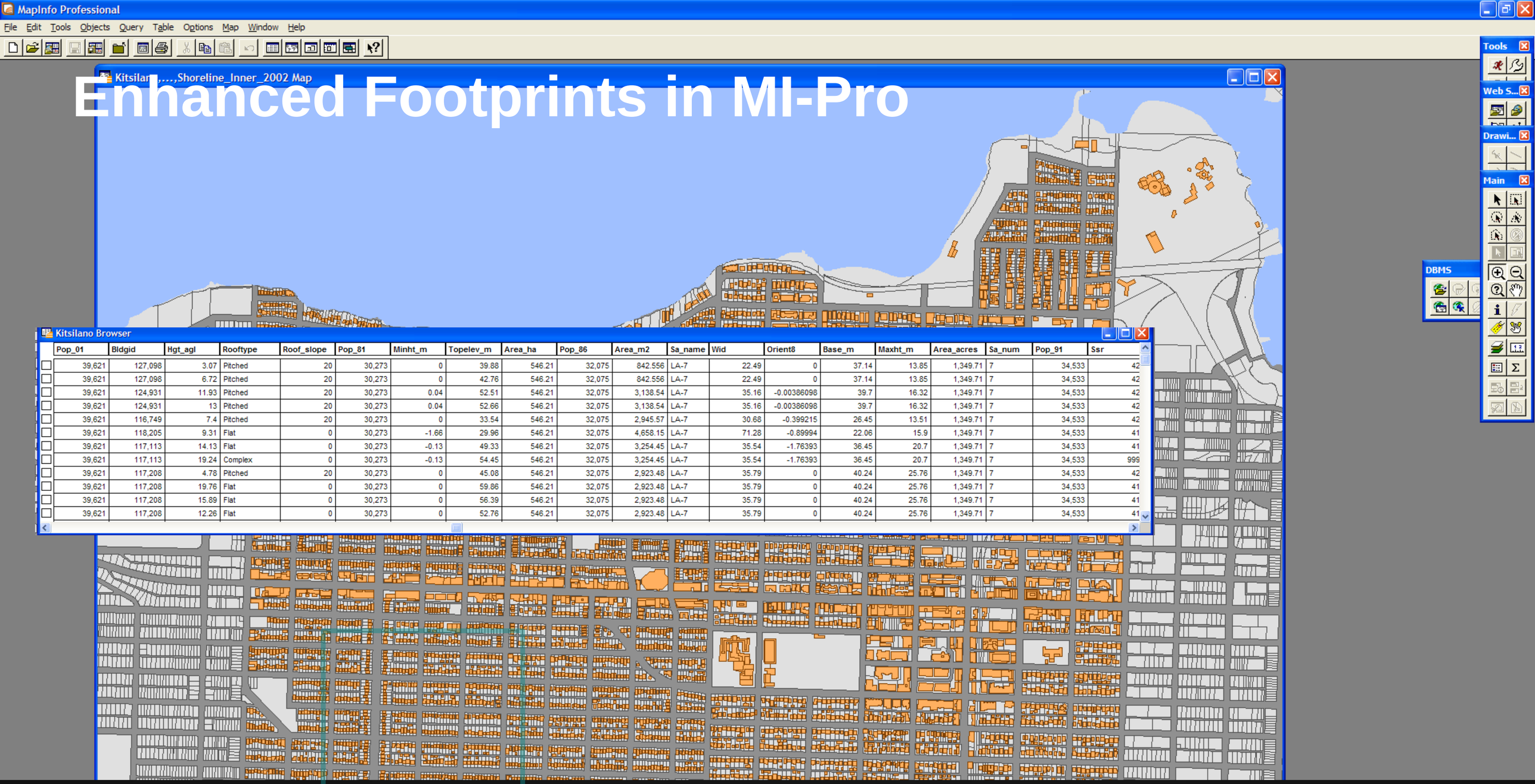
Theme in Mapinfo Pro



Theme in AIM

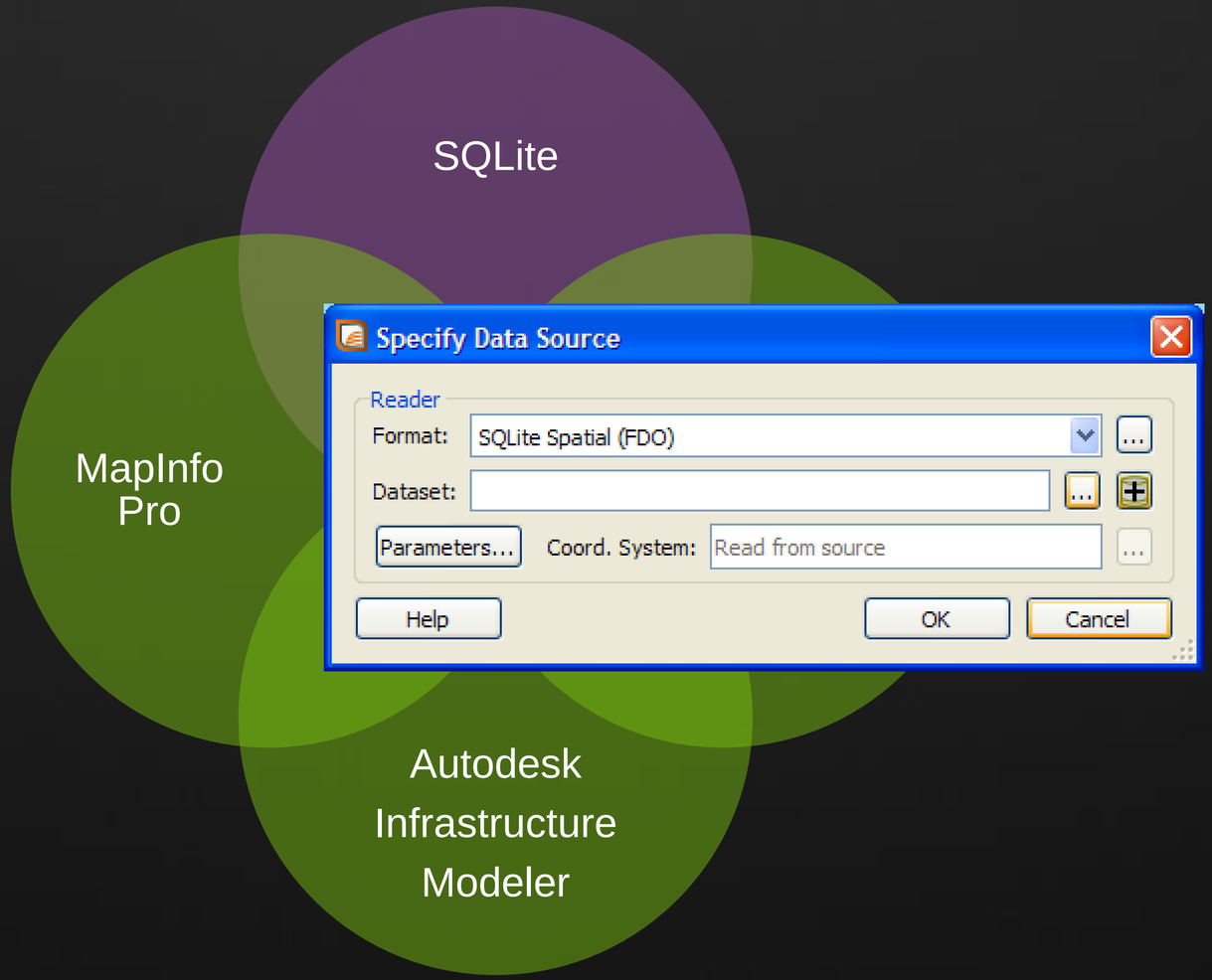
Footprints in Map 3D

Enhanced Footprints in MI-Pro

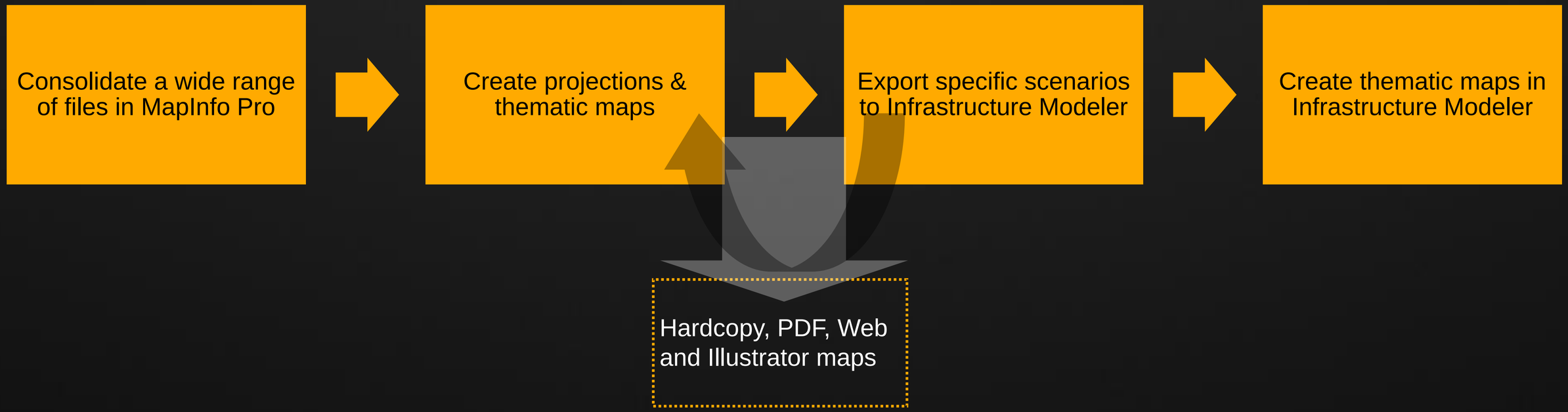


Pop_01	Bldgid	Hgt_agl	Rooftype	Roof_slope	Pop_81	Minht_m	Topelev_m	Area_ha	Pop_86	Area_m2	Sa_name	Wid	Orient8	Base_m	Maxht_m	Area_acres	Sa_num	Pop_91	Ssr
39,621	127,098	3.07	Pitched	20	30,273	0	39.88	546.21	32,075	842.556	LA-7	22.49	0	37.14	13.85	1,349.71	7	34,533	42
39,621	127,098	6.72	Pitched	20	30,273	0	42.76	546.21	32,075	842.556	LA-7	22.49	0	37.14	13.85	1,349.71	7	34,533	42
39,621	124,931	11.93	Pitched	20	30,273	0.04	52.51	546.21	32,075	3,138.54	LA-7	35.16	-0.00386098	39.7	16.32	1,349.71	7	34,533	42
39,621	124,931	13	Pitched	20	30,273	0.04	52.66	546.21	32,075	3,138.54	LA-7	35.16	-0.00386098	39.7	16.32	1,349.71	7	34,533	42
39,621	116,749	7.4	Pitched	20	30,273	0	33.54	546.21	32,075	2,945.57	LA-7	30.68	-0.399215	26.45	13.51	1,349.71	7	34,533	42
39,621	118,205	9.31	Flat	0	30,273	-1.66	29.96	546.21	32,075	4,658.15	LA-7	71.28	-0.89994	22.06	15.9	1,349.71	7	34,533	41
39,621	117,113	14.13	Flat	0	30,273	-0.13	49.33	546.21	32,075	3,254.45	LA-7	35.54	-1.76393	36.45	20.7	1,349.71	7	34,533	41
39,621	117,113	19.24	Complex	0	30,273	-0.13	54.45	546.21	32,075	3,254.45	LA-7	35.54	-1.76393	36.45	20.7	1,349.71	7	34,533	999
39,621	117,208	4.78	Pitched	20	30,273	0	45.08	546.21	32,075	2,923.48	LA-7	35.79	0	40.24	25.76	1,349.71	7	34,533	42
39,621	117,208	19.76	Flat	0	30,273	0	59.86	546.21	32,075	2,923.48	LA-7	35.79	0	40.24	25.76	1,349.71	7	34,533	41
39,621	117,208	15.89	Flat	0	30,273	0	56.39	546.21	32,075	2,923.48	LA-7	35.79	0	40.24	25.76	1,349.71	7	34,533	41
39,621	117,208	12.26	Flat	0	30,273	0	52.76	546.21	32,075	2,923.48	LA-7	35.79	0	40.24	25.76	1,349.71	7	34,533	41

The Enabling Role of SQLite



Population Projections



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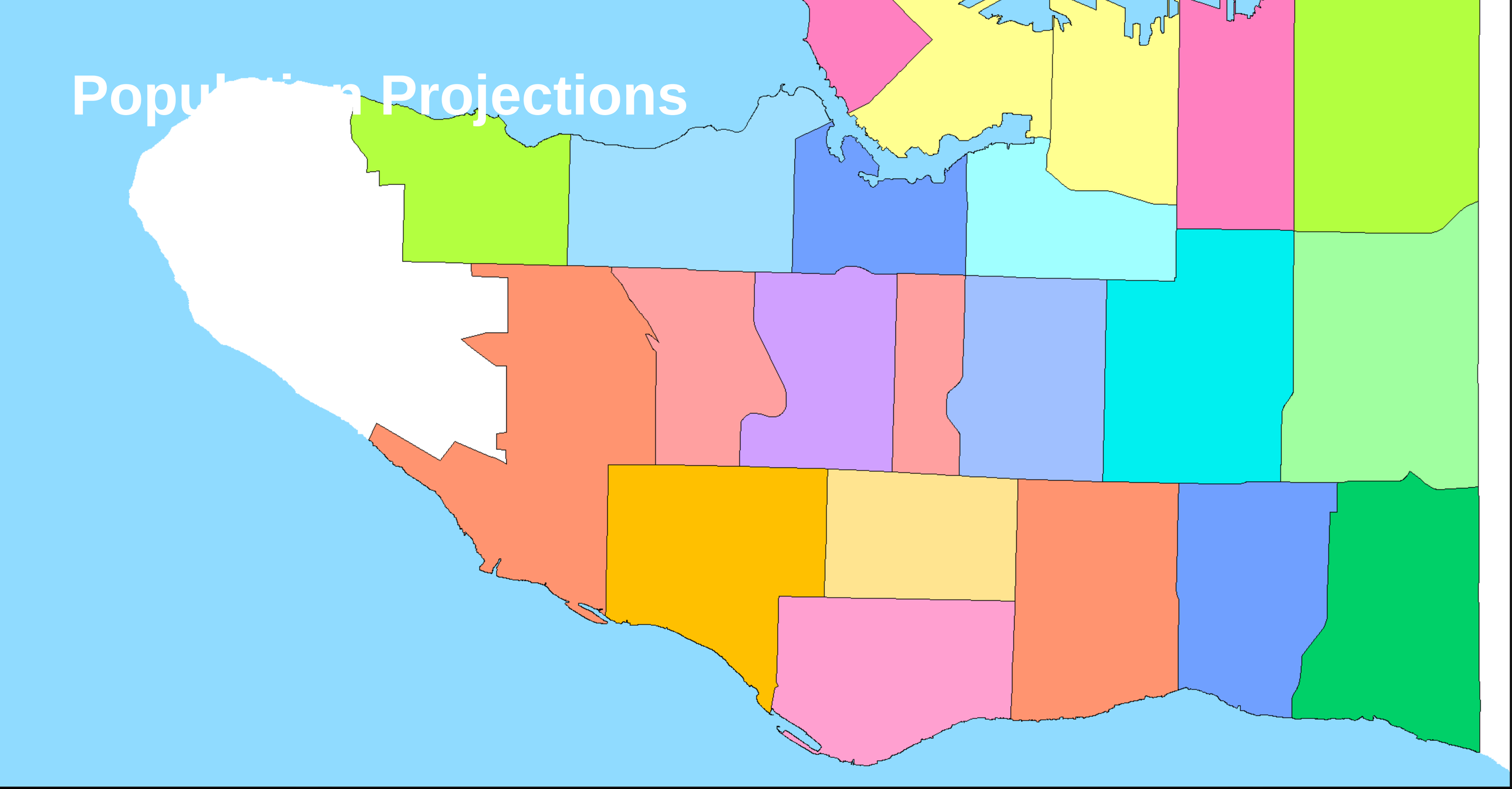
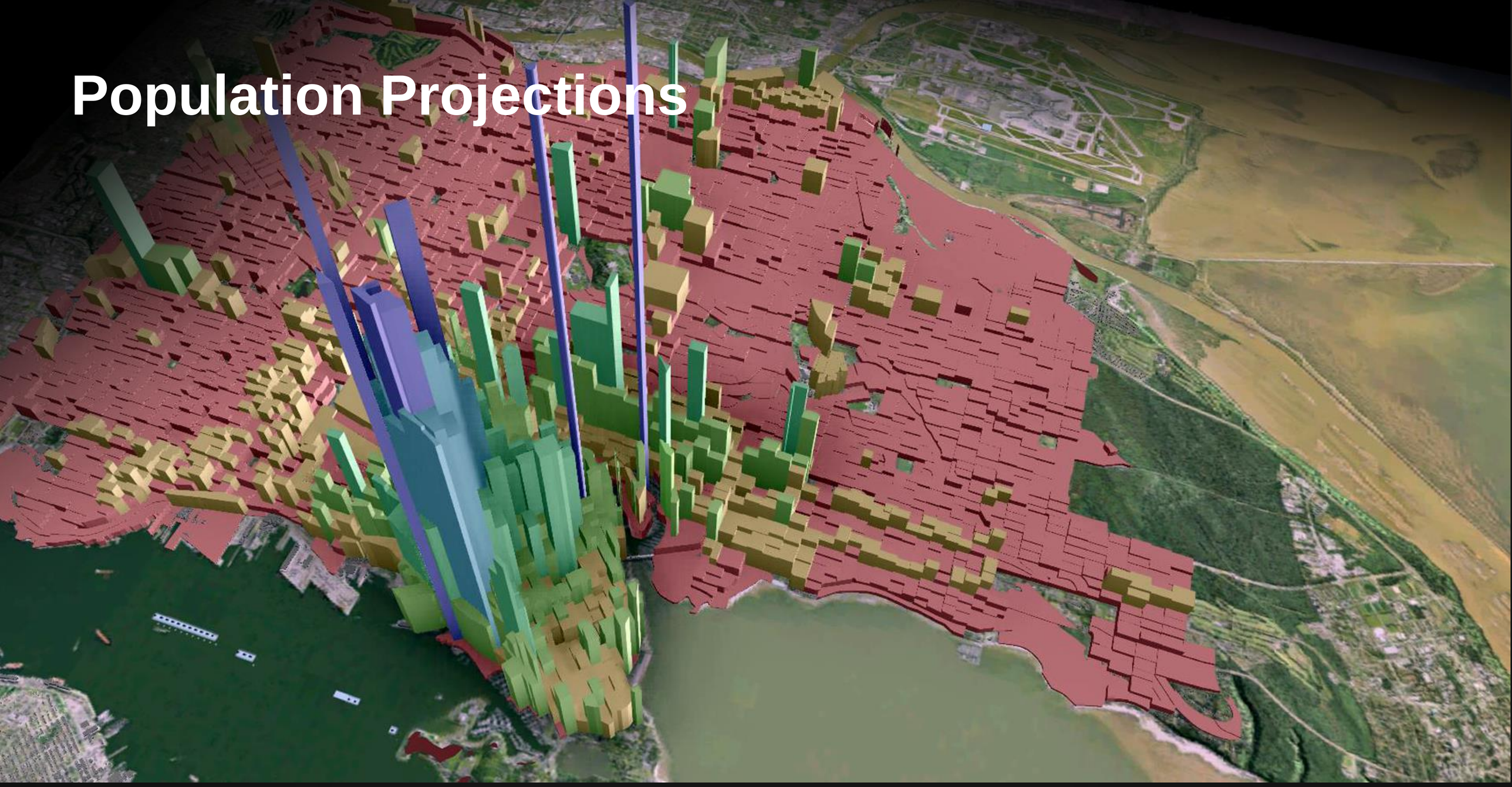
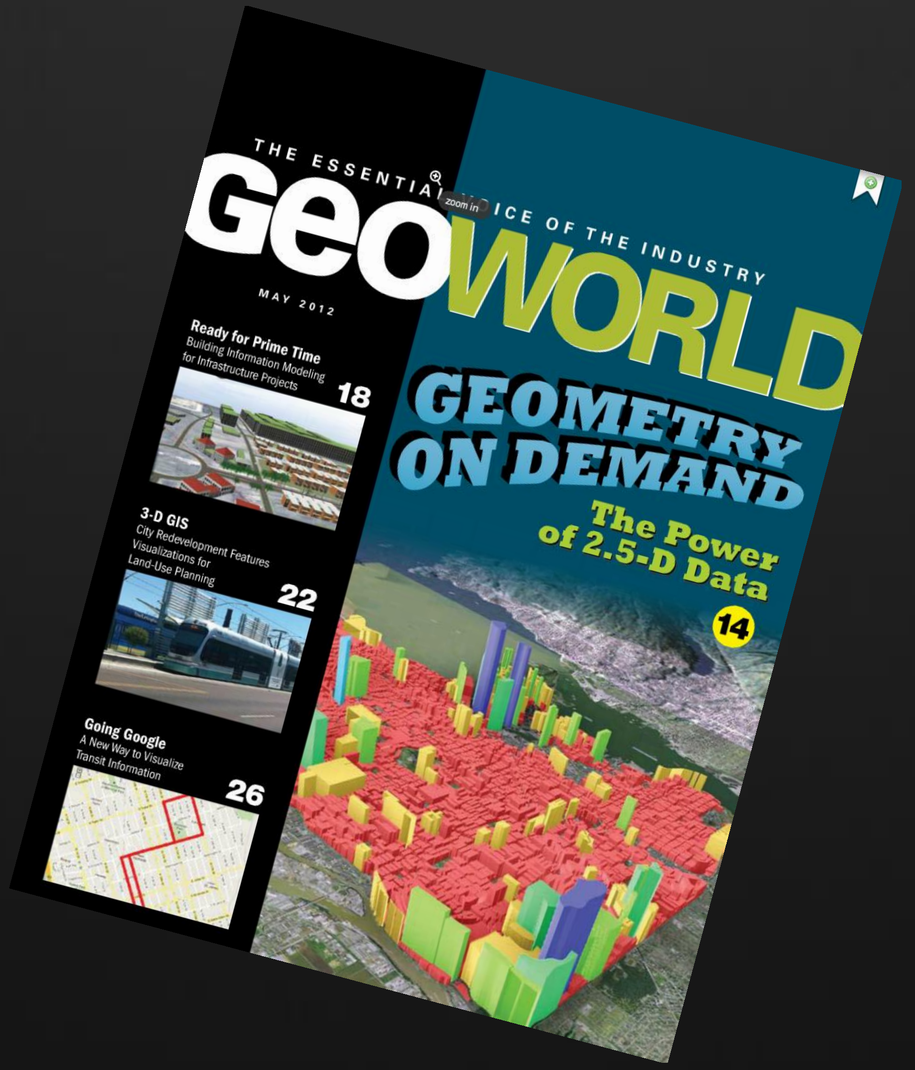


Population Projections

Population Projections



Population Projections



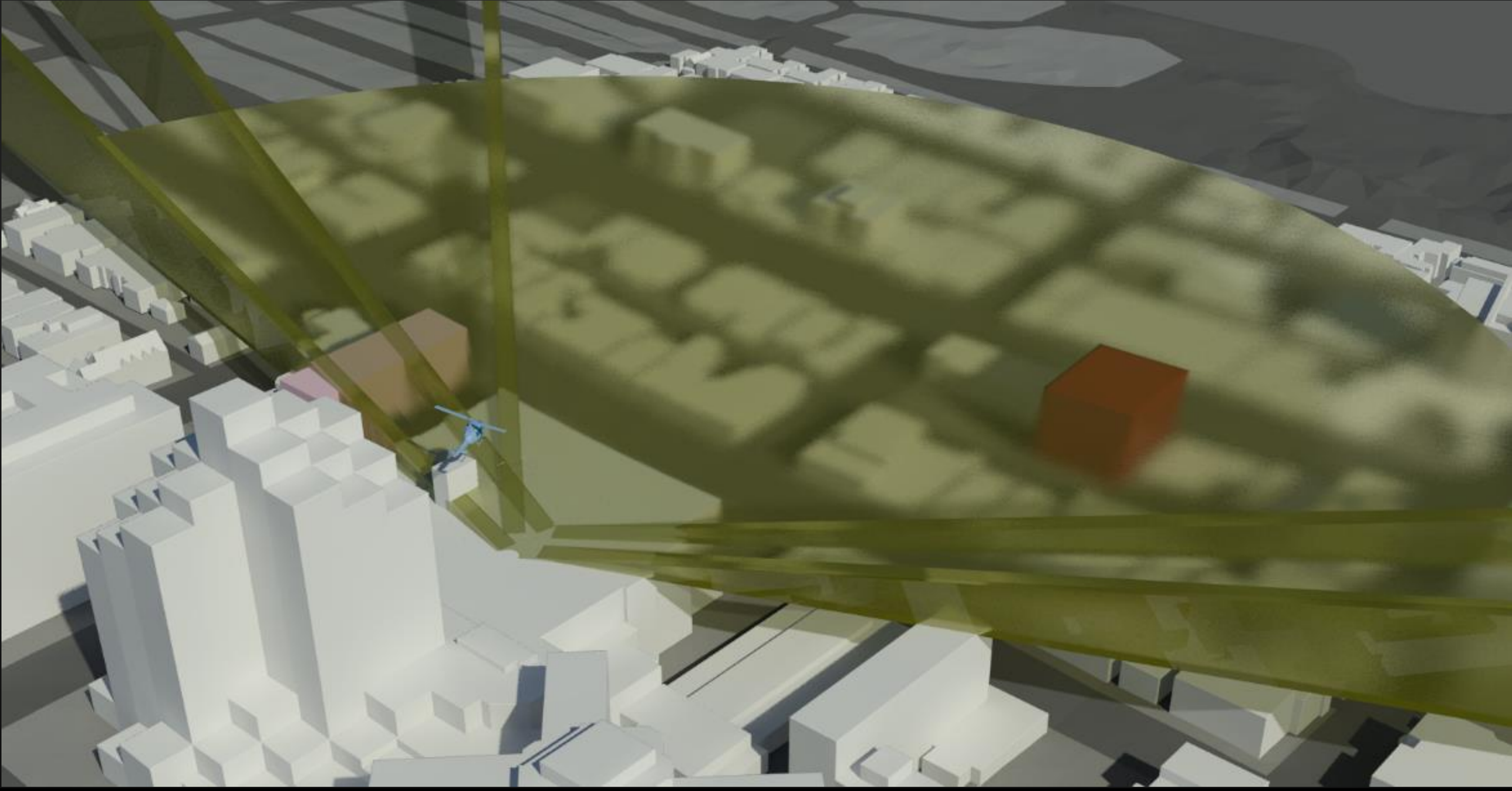
Line of Sight

Footprints in AIM are used to conduct line of sight analysis

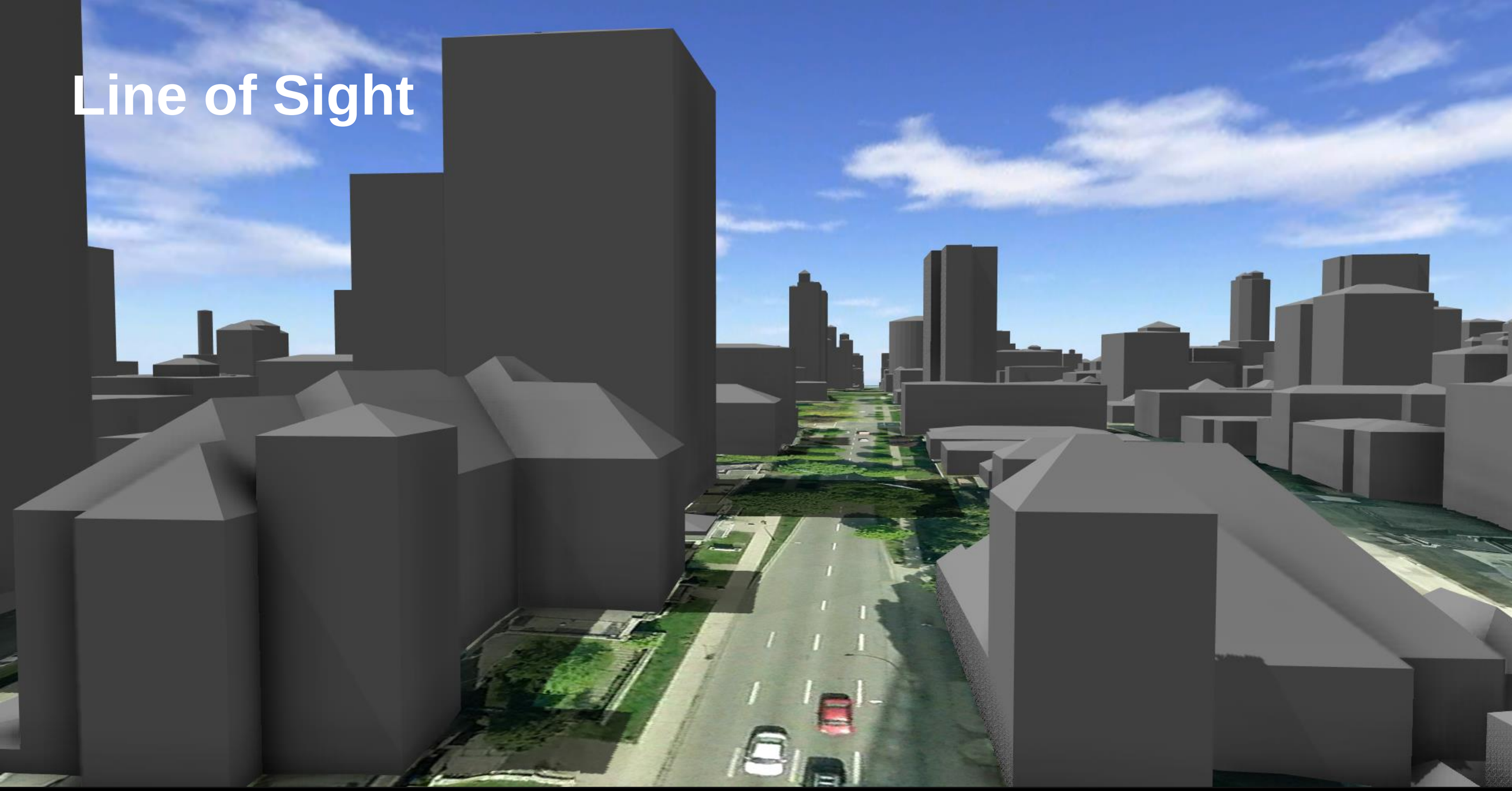
Visible buildings are saved as new data set that is exported to MapInfo Pro

In MapInfo Pro a buffer analysis is run to select buildings within a specific radius of central visible building

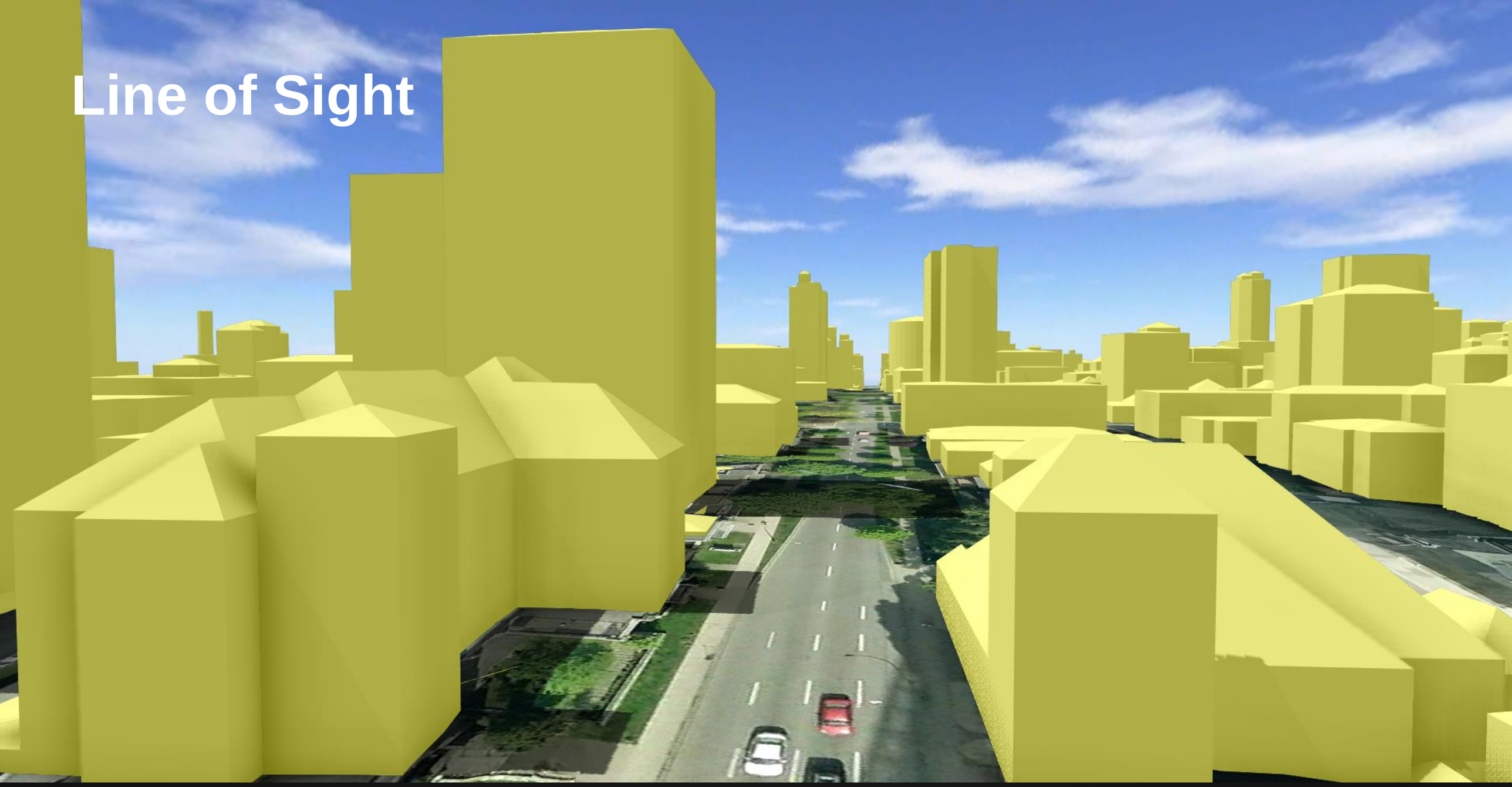
Export the buffer object back into AIM to visualize its impact on building height

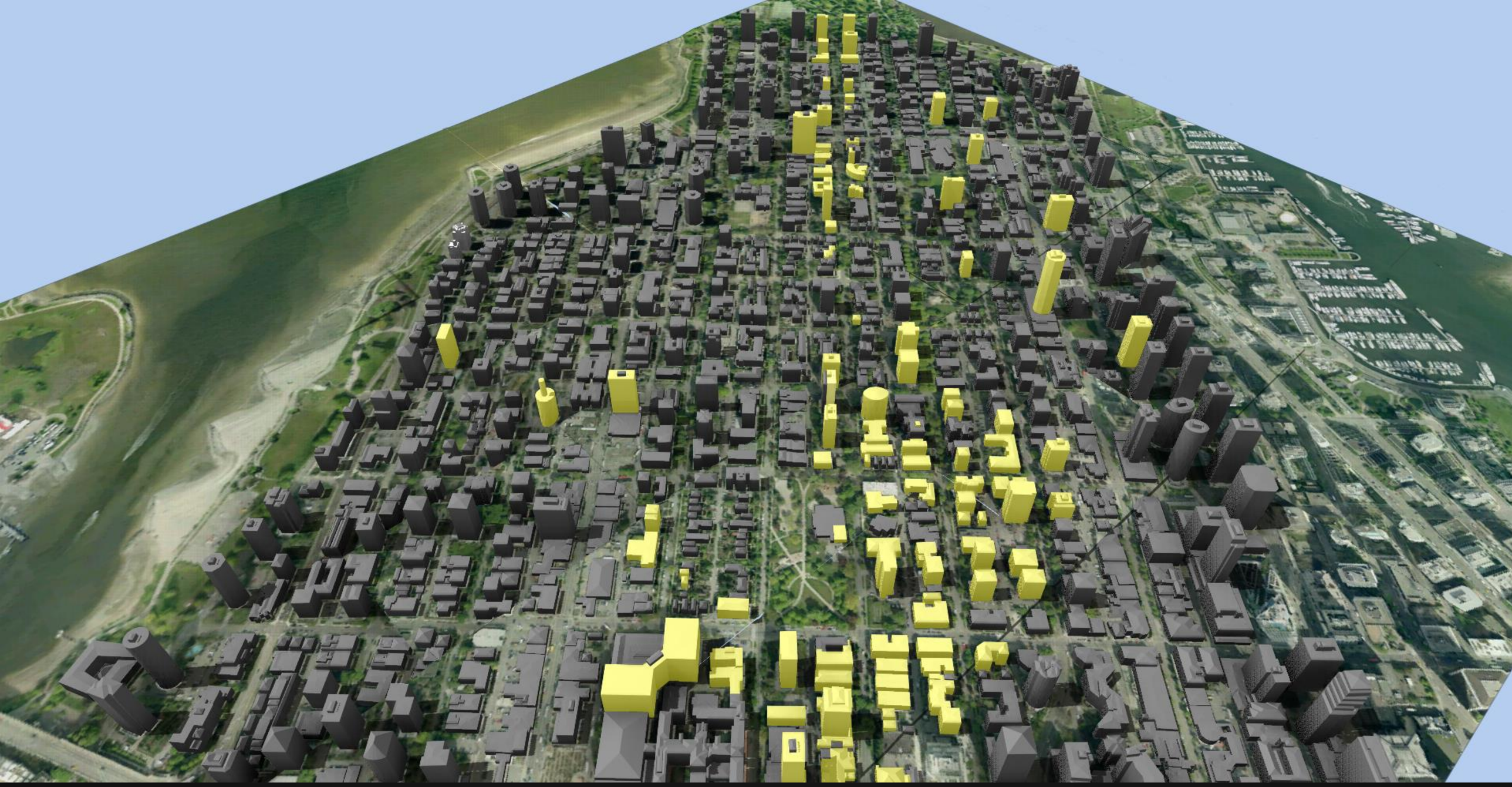


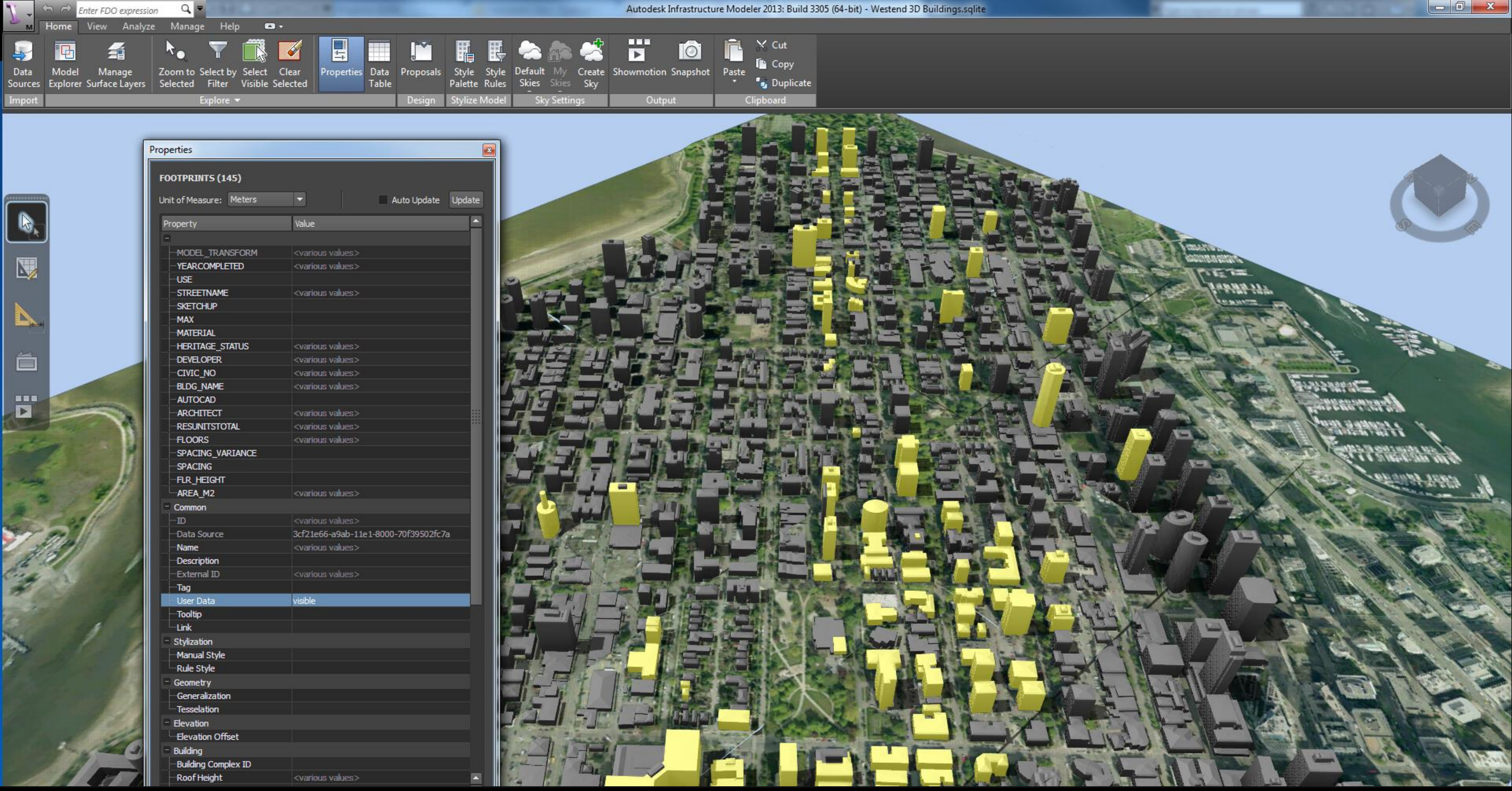
Line of Sight



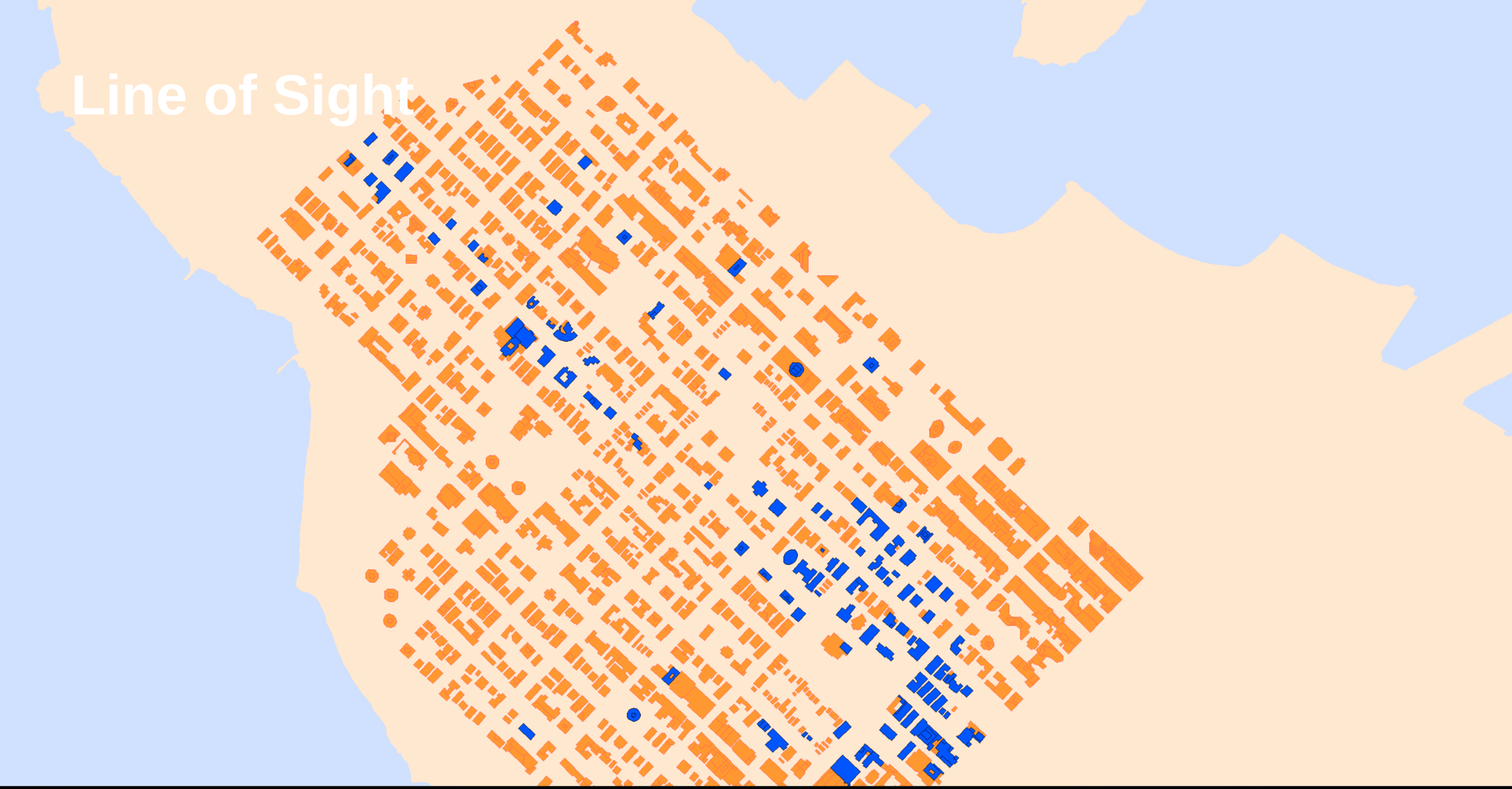
Line of Sight







Line of Sight



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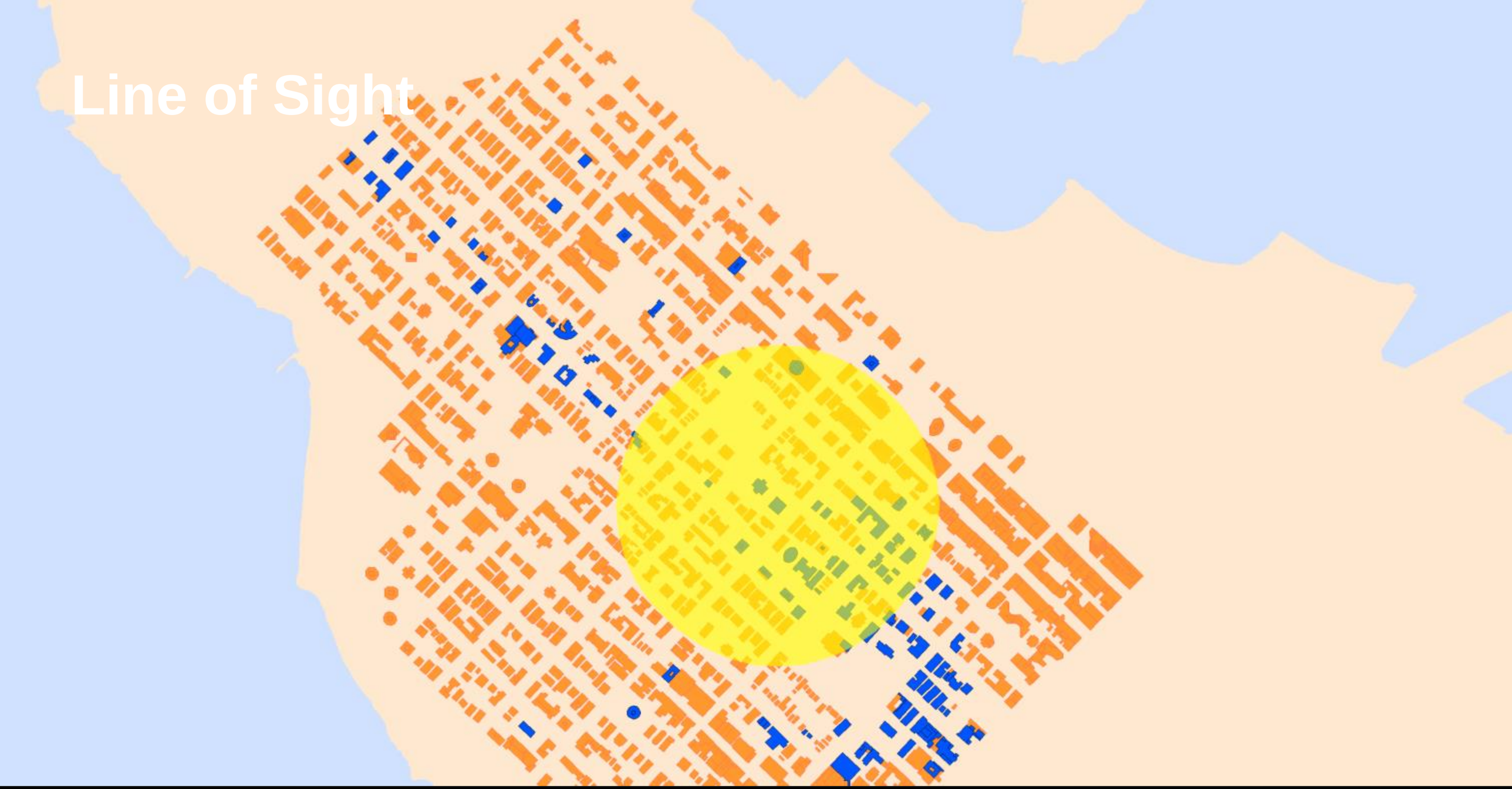

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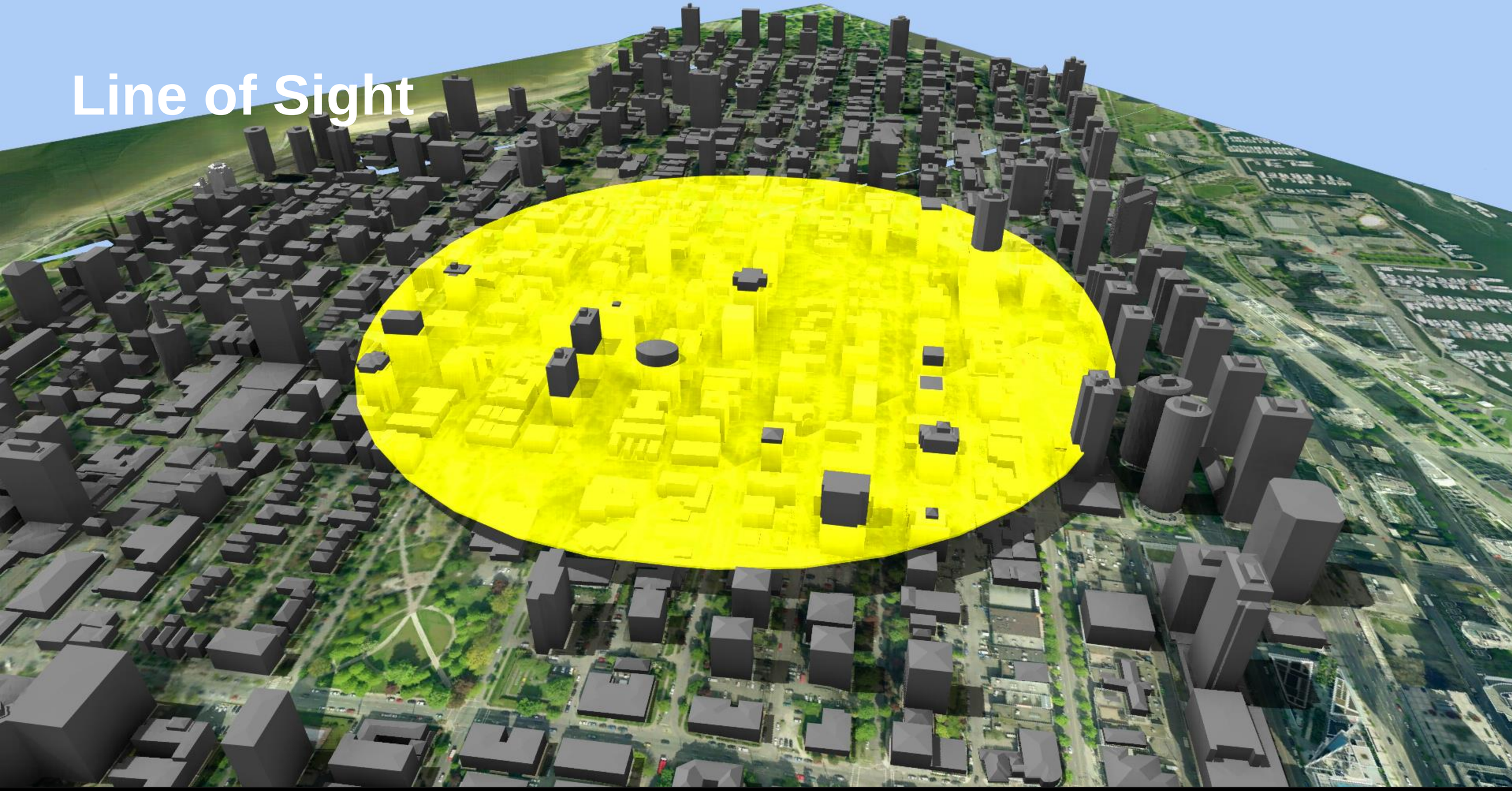

2012 Meridian Award

The Future?

- From Our Customer Viewpoint:
  - Validation of our existing GIS environment
  - Improved interoperability
  - Flexibility in workflow
  - Focus on product strengths
  - Reduced number of data sets

For more information…

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- 604-873-7405