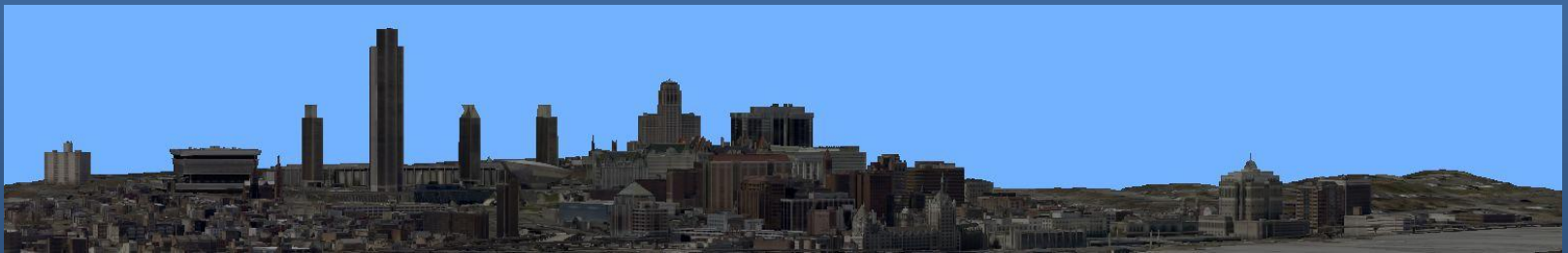


Realistic 3D Building Modeling for Use in GIS and other Software



Jeffrey Langella, *NYS Office of Information Technology Services*
Matthew Palmer, *Erdman Anthony Associates*

Project Description

To create a full realistic 3D urban model that can be used for analytical functions

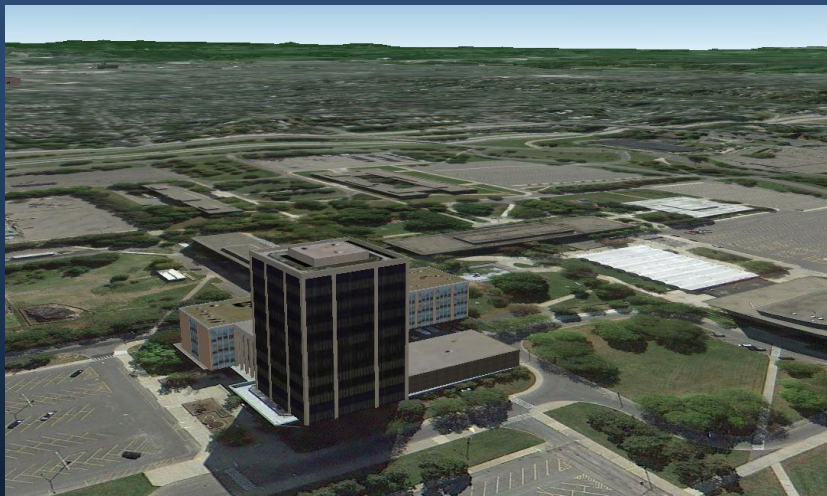
- Viewsheds
- Line of site
- Plume modeling
- Visual presentations

Existing 3D Buildings?

Existing Buildings from Google Earth



Buildings created from 3D project



Project Areas

Harriman State Office Campus

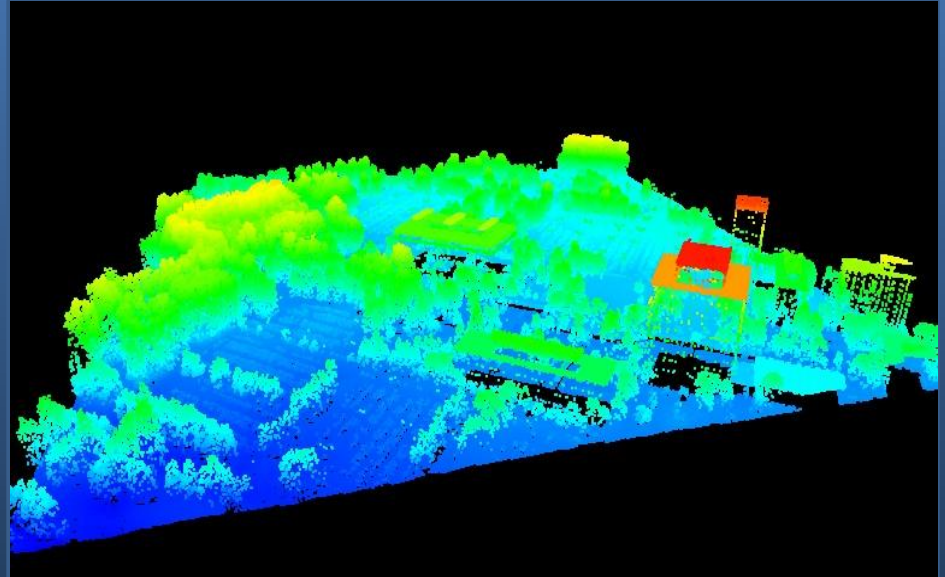


Downtown Albany



Existing Data Supplied to Erdman

- Unclassified LiDAR (Bare Earth)



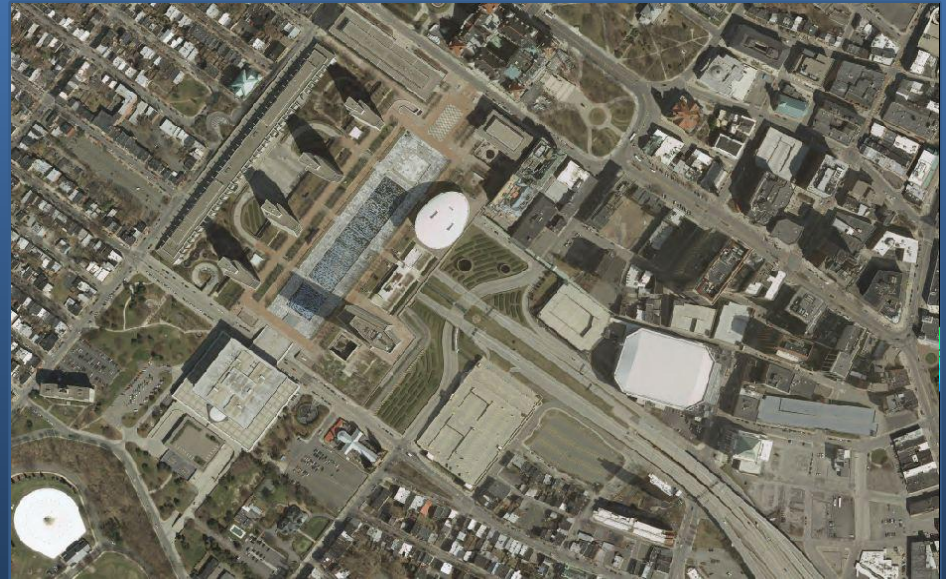
Existing Data Supplied to Erdman

- Unclassified LiDAR (Bare Earth)
- **Stereo Imagery**



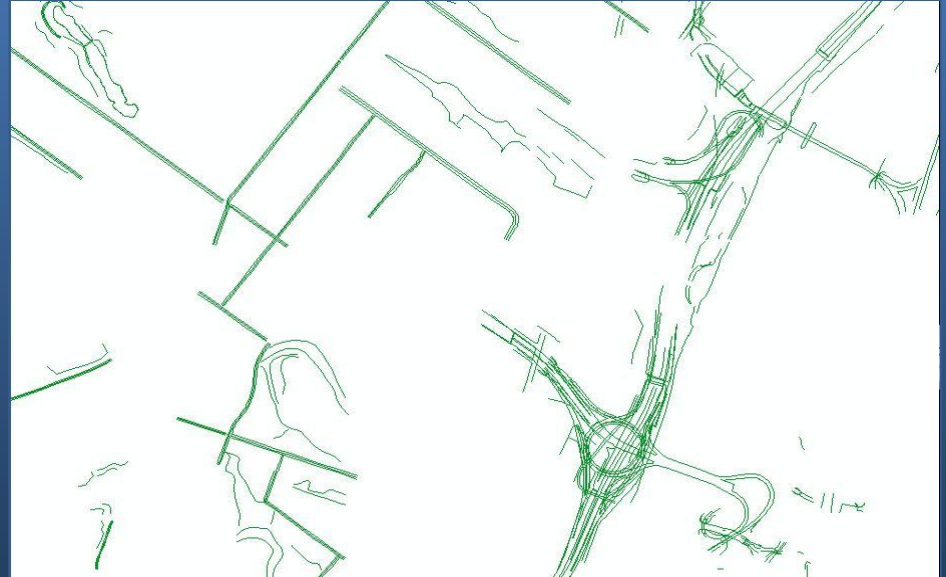
Existing Data Supplied to Erdman

- Unclassified LiDAR (Bare Earth)
- Stereo Imagery
- **Orthoimagery**



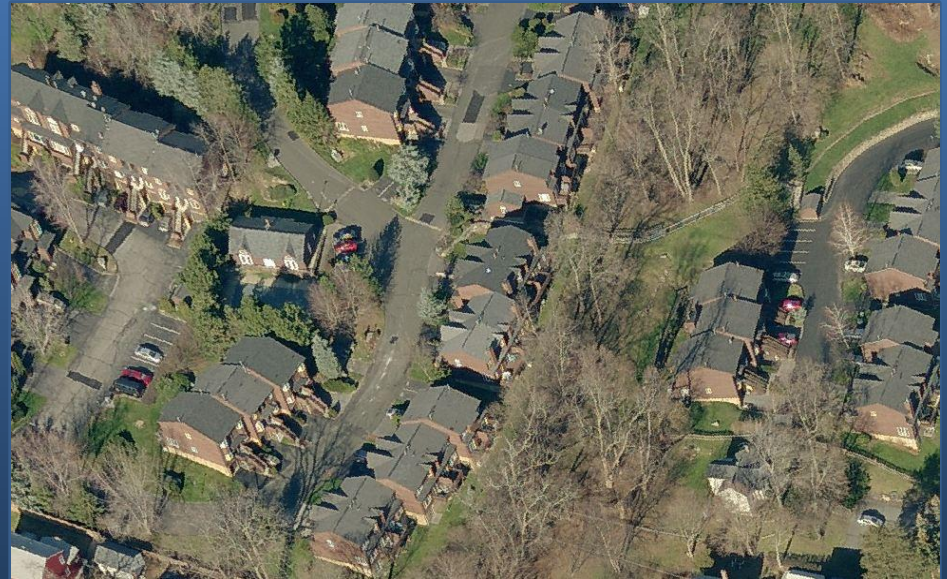
Existing Data Supplied to Erdman

- Unclassified LiDAR (Bare Earth)
- Stereo Imagery
- Orthoimagery
- **Digital Terrain Models (DTM)**



Existing Data Supplied to Erdman

- Unclassified LiDAR (Bare Earth)
- Stereo Imagery
- Orthoimagery
- Digital Terrain Models (DTM)
- **Oblique Imagery**



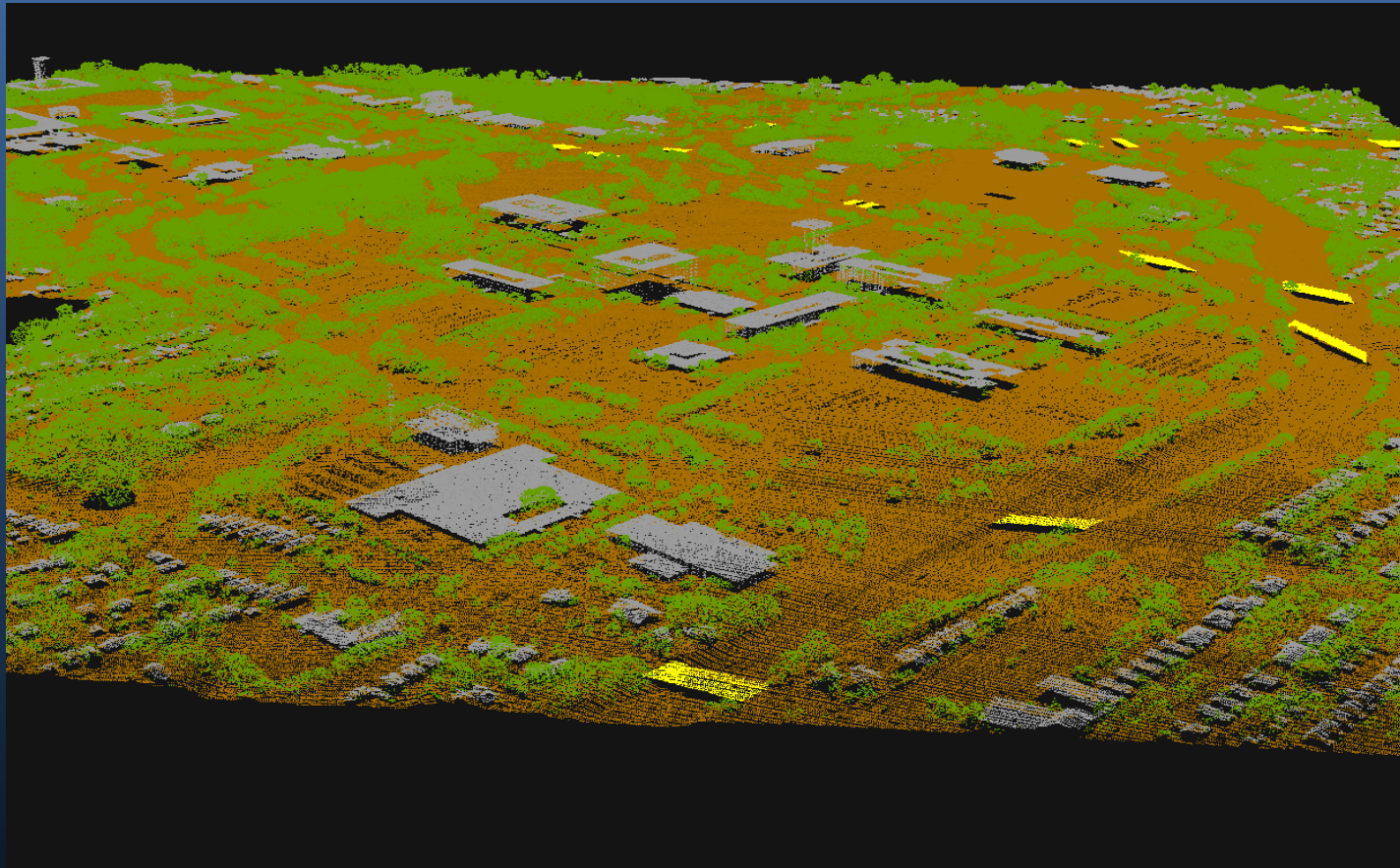
Digital Elevation Model

Original LiDAR Classes

- Class 0 – Created, never classified
- Class 1 – Unclassified
- Class 2 – Ground
- Class 7 – Low Point (Low Noise)

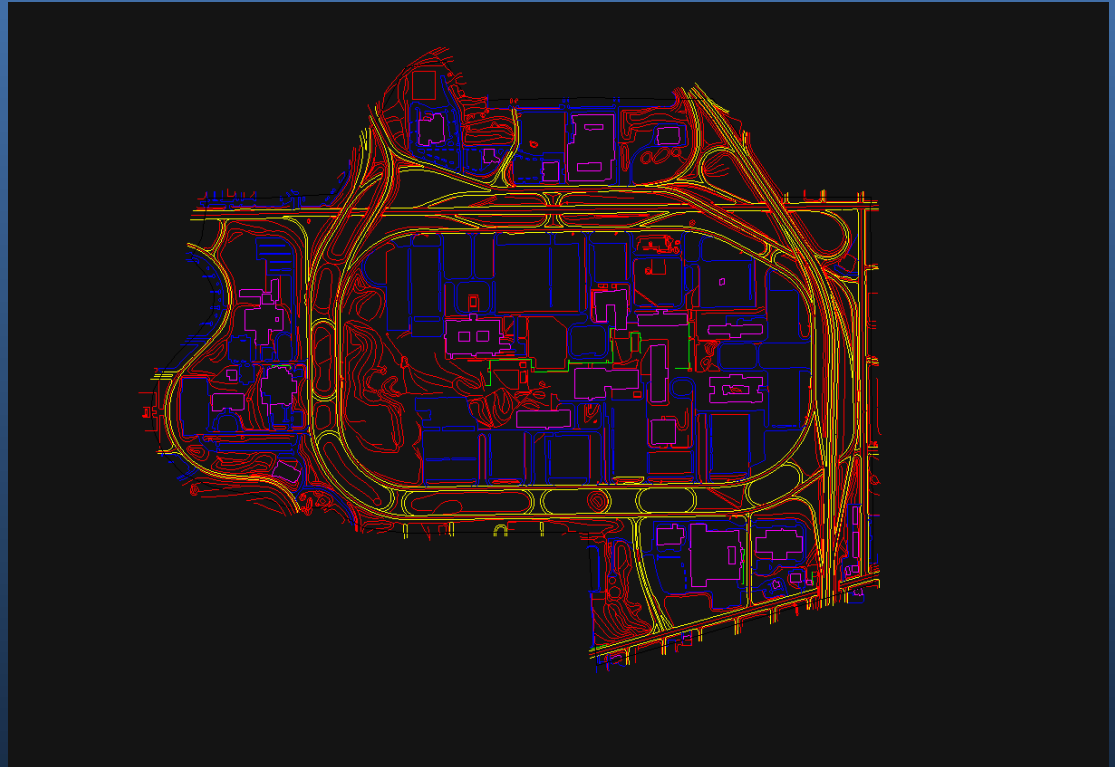
New Classes

- Class 4 – Medium Vegetation
- Class 5 – High Vegetation
- Class 6 – Building
- Class 12 – Overlap



Digital Elevation Model

- 3D Breaklines
 - Existing stereoimagery
 - 2 foot or greater vertical change
 - Pavement and sidewalk edges
 - Swamp and wetlands
 - Edge of water
 - Elevation breaks

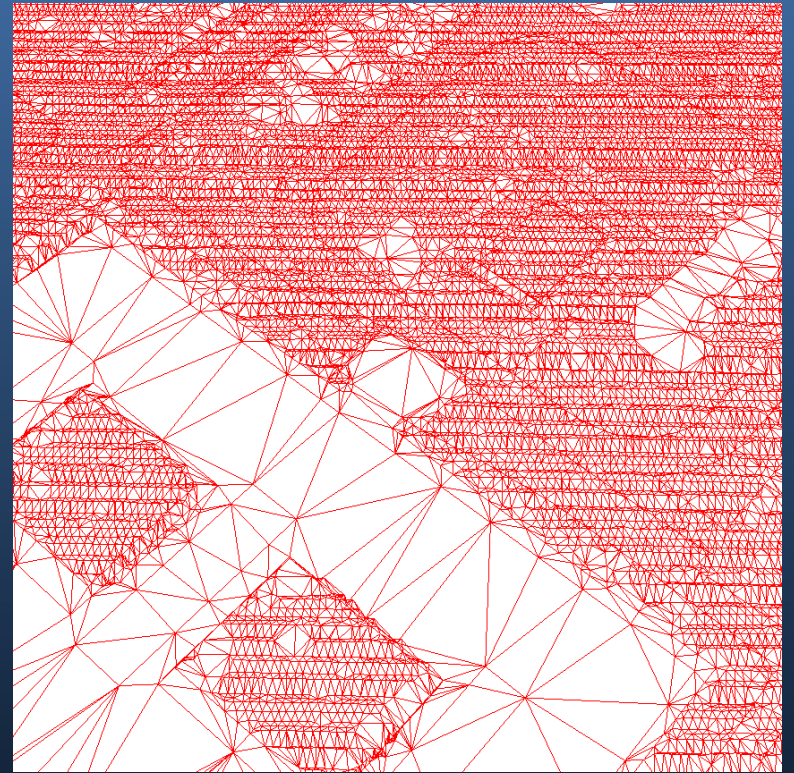


Digital Elevation Model

Raster



Vector

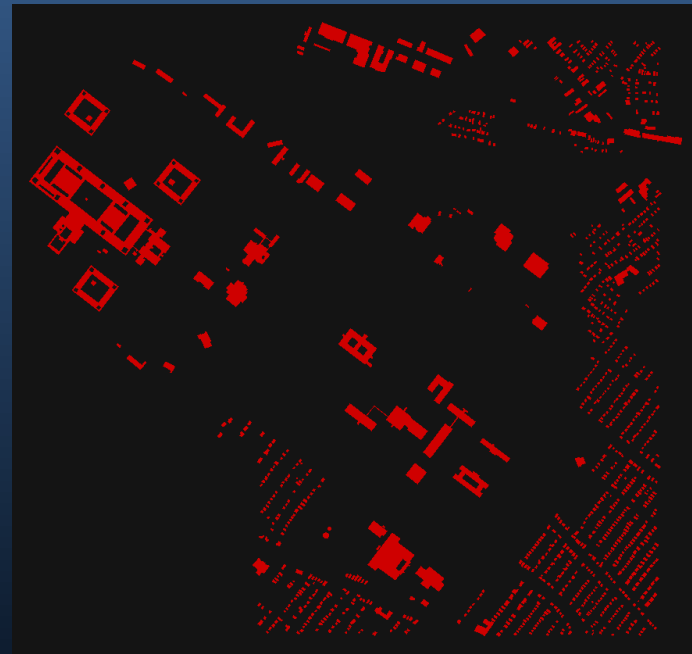


3D Buildings

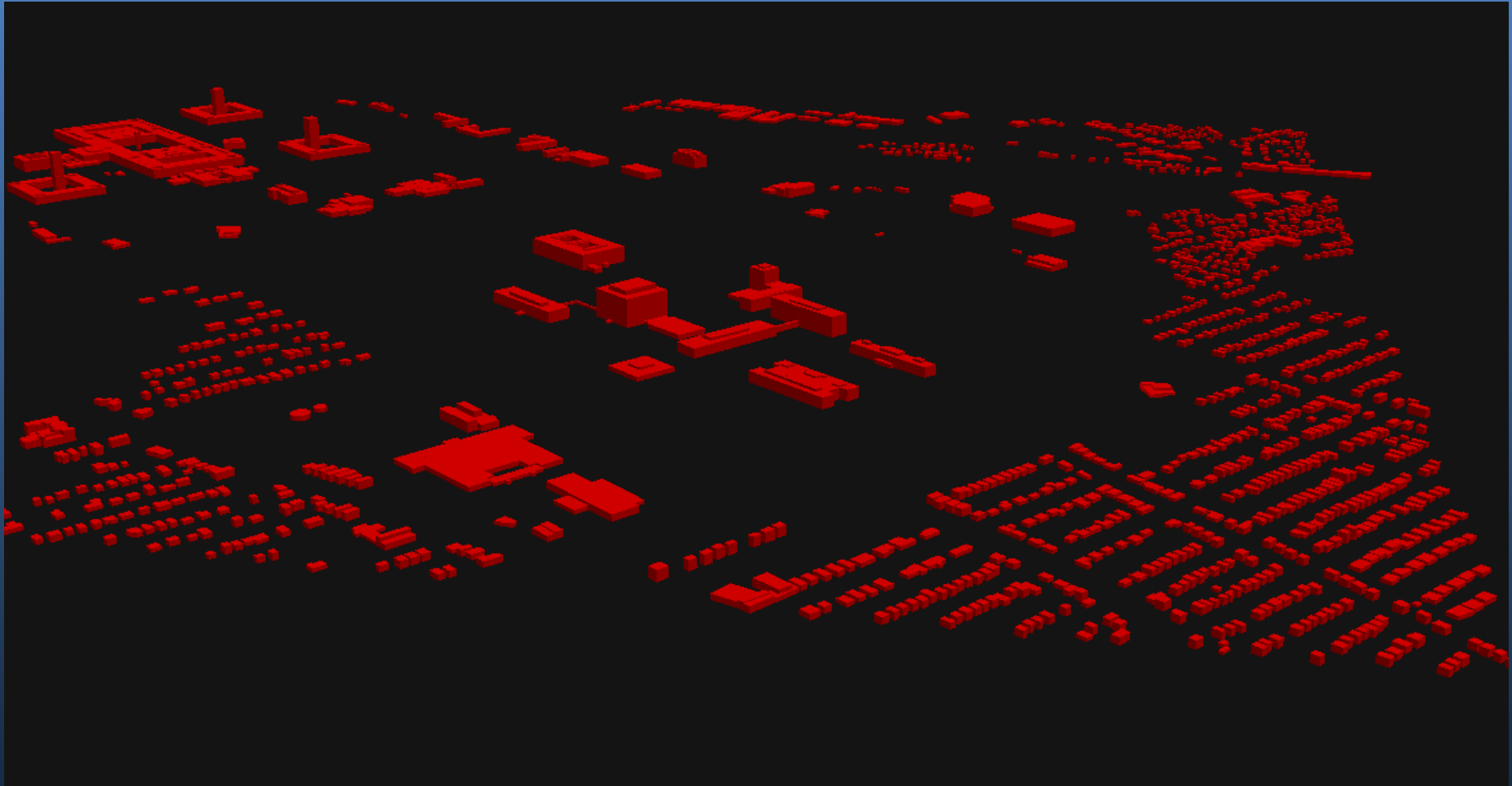
- **Footprints**

- Data provided by GIS Program Office
- Update data
- Top elevation & base Elevation
- Extrude
- Multipatch
- Export to COLLADA

FID	Shape	TOPELEV_M	BASELEV_M	HGT_AGL	MED_SLOPE	ROOFTYPE	SSR	ID	BLDGID	AREA_M2	AVGHT_M
0	Polygon	79.72	67.08	12.4	36	Pitched	42	35875	26413	2559.642	9.59
1	Polygon	84.12	81.6	2.36	47	Pitched	42	35877	24977	7965.041	6.38
2	Polygon	78.36	72.2	6.04	28	Pitched	42	35878	26152	15569.532	4.68
3	Polygon	87.84	81.48	6.28	37	Pitched	42	35879	25004	866.489	4.32
4	Polygon	88.36	79.8	8.4	25	Pitched	42	35882	25078	5688.267	8.16
5	Polygon	74.52	70.84	3.6	34	Pitched	42	35901	25797	38.157	3.26
6	Polygon	90.68	75.16	15.16	33	Pitched	42	35956	24783	1006.115	8.99
7	Polygon	77.4	73.88	2.96	28	Pitched	42	35985	26762	45.564	2.91
8	Polygon	77.48	73.92	3.12	33	Pitched	42	36001	27081	46.241	4.86
9	Polygon	73.16	70.04	3	23	Pitched	42	36005	25731	46.423	2.88

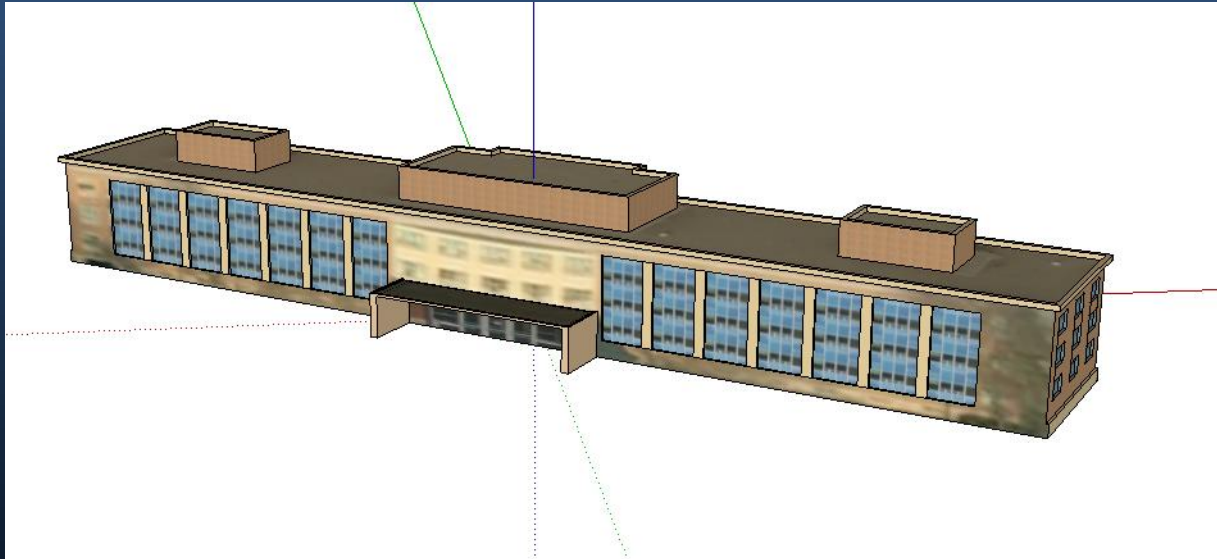
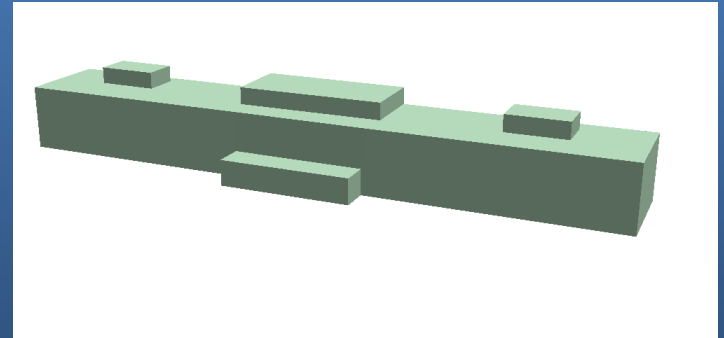


3D Buildings



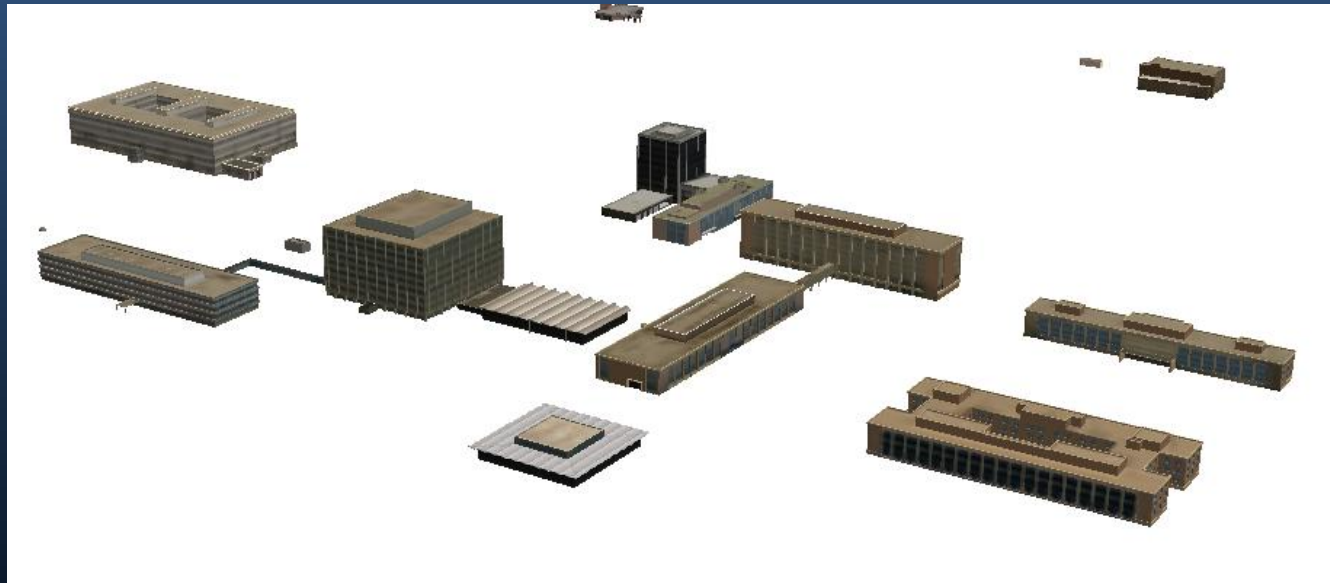
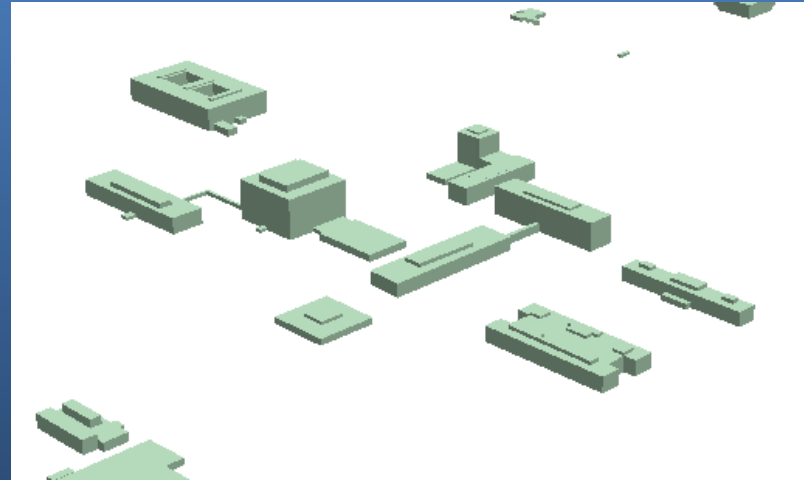
3D Buildings

- **Trimble SketchUp**
 - **Manipulate shape**
 - Measure distance using Pictometry®
 - **Add textures**
 - Export textures from Pictometry® oblique imagery
 - Manually create textures
 - Stock textures



3D Buildings

- Replace with model



3D Buildings



3D Trees Using Point Data

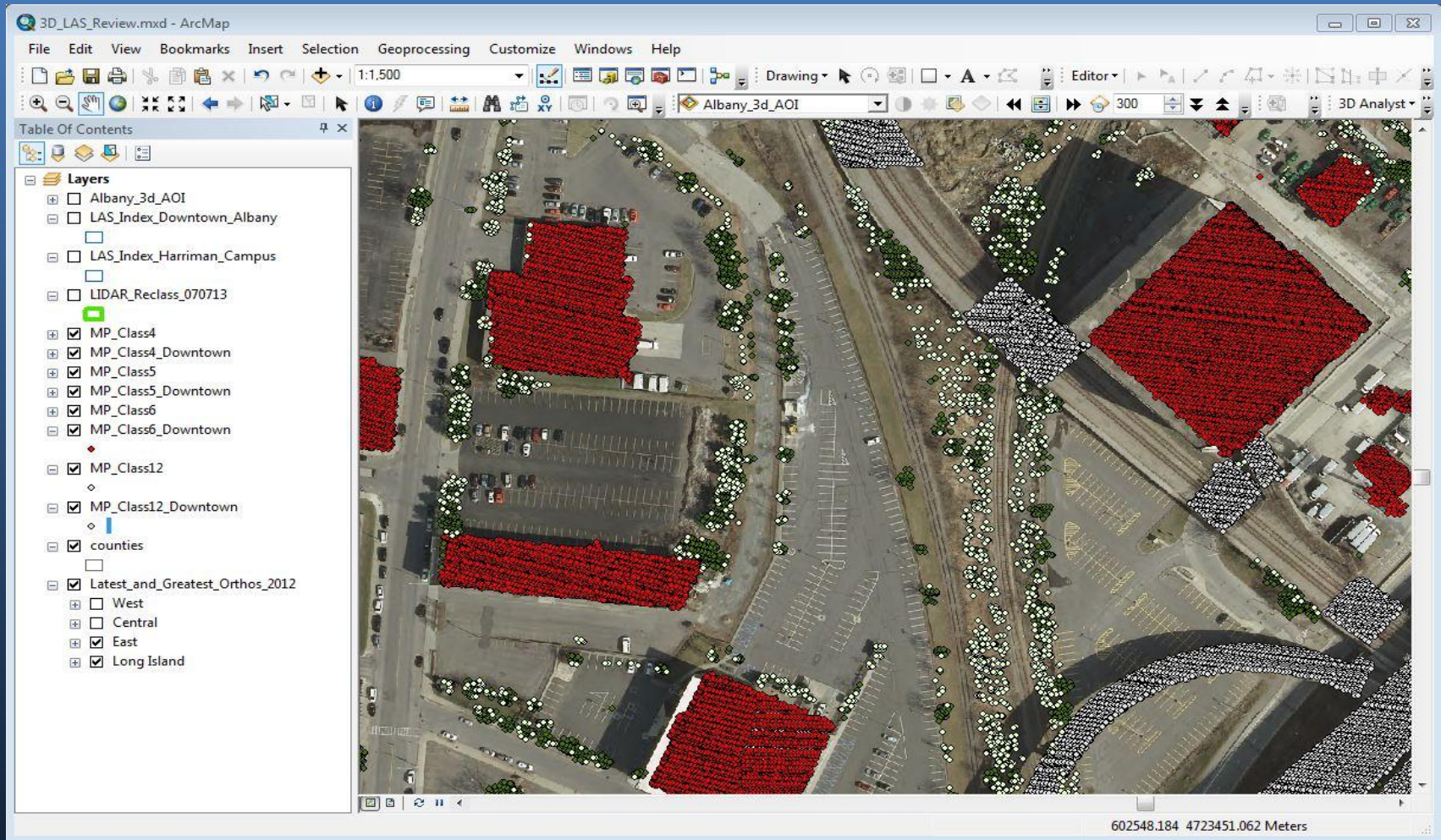


3D Trees Multipatch



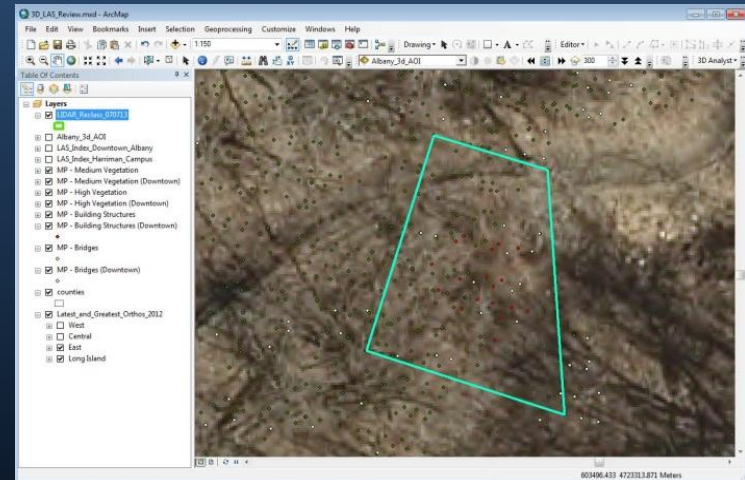
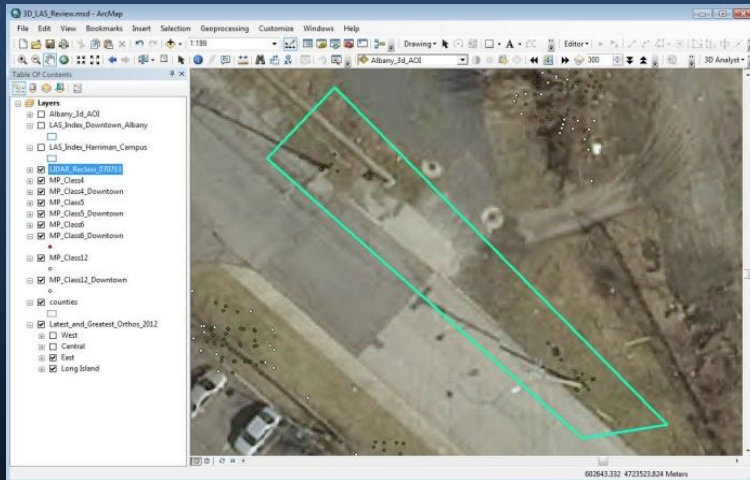
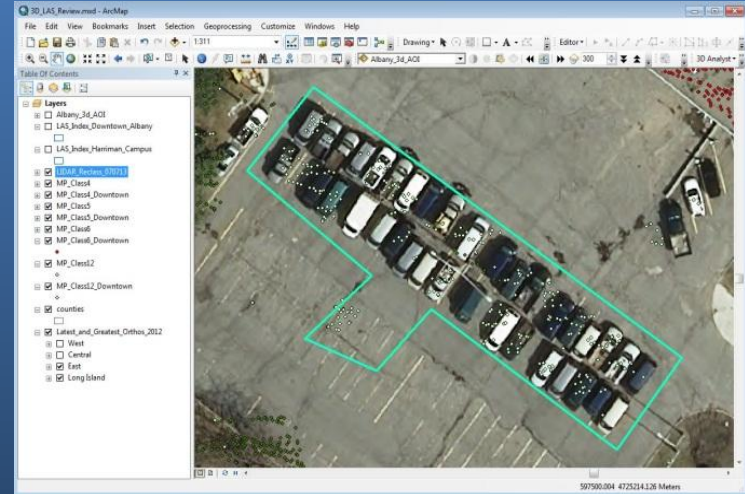
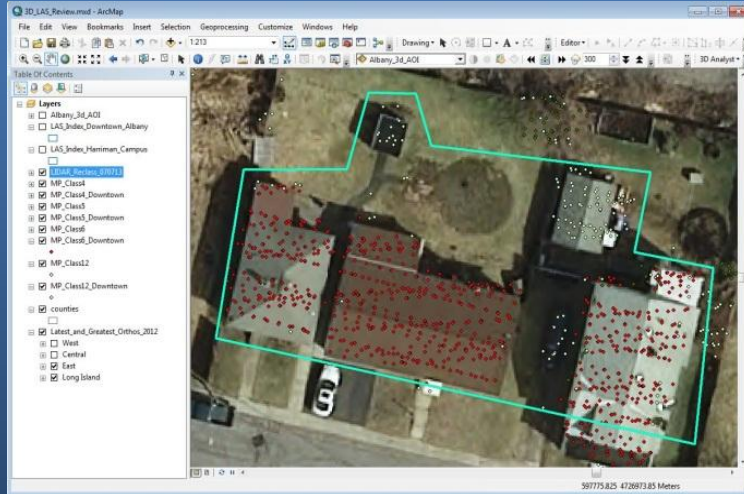
QA/QC of Deliveries

Re-Classified LiDAR

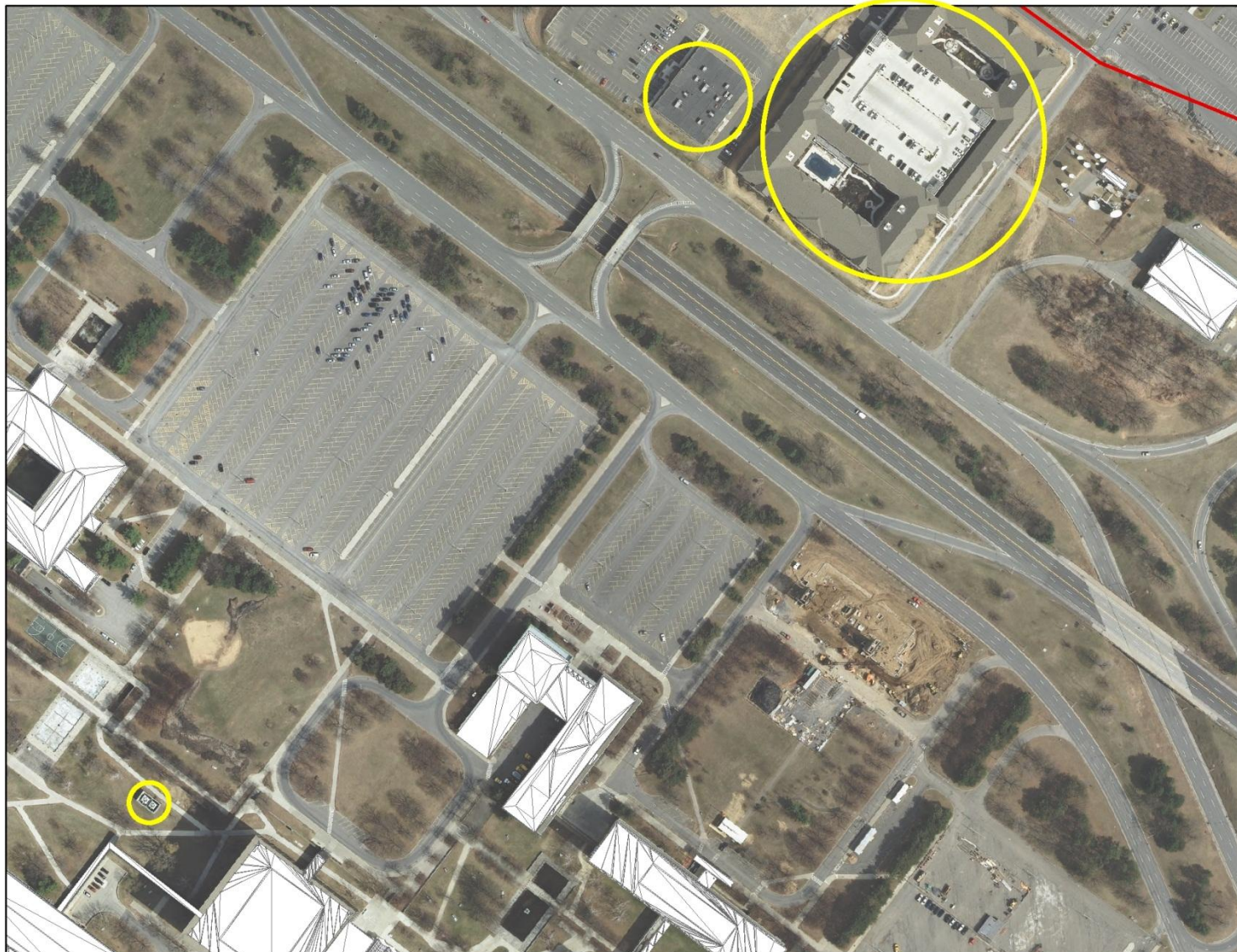


QA/QC of Deliveries

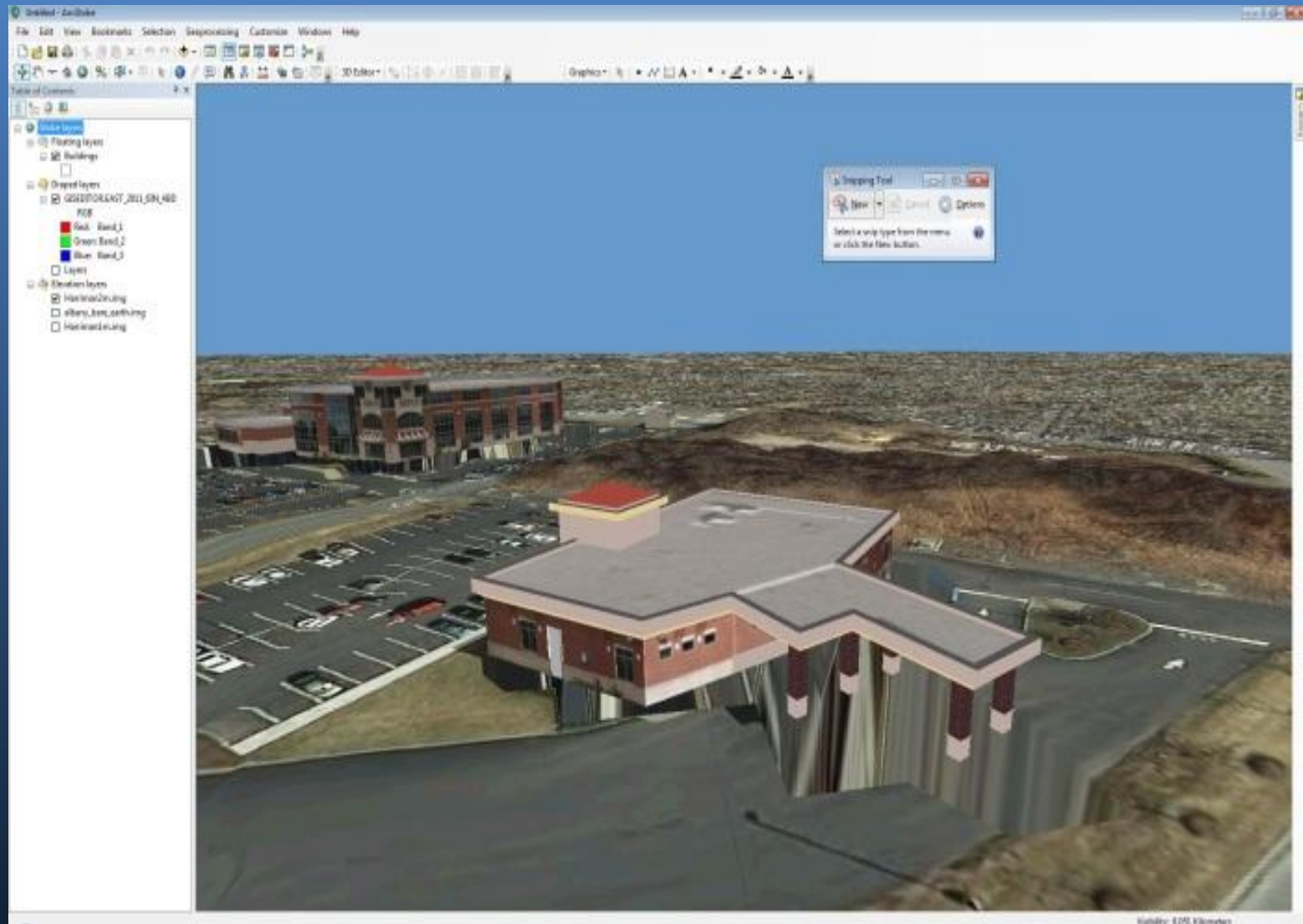
Re-Classified LiDAR – samples of misclassifications



Building Completeness



Digital Elevation Models

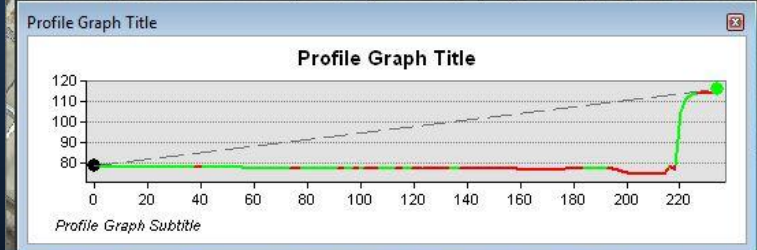
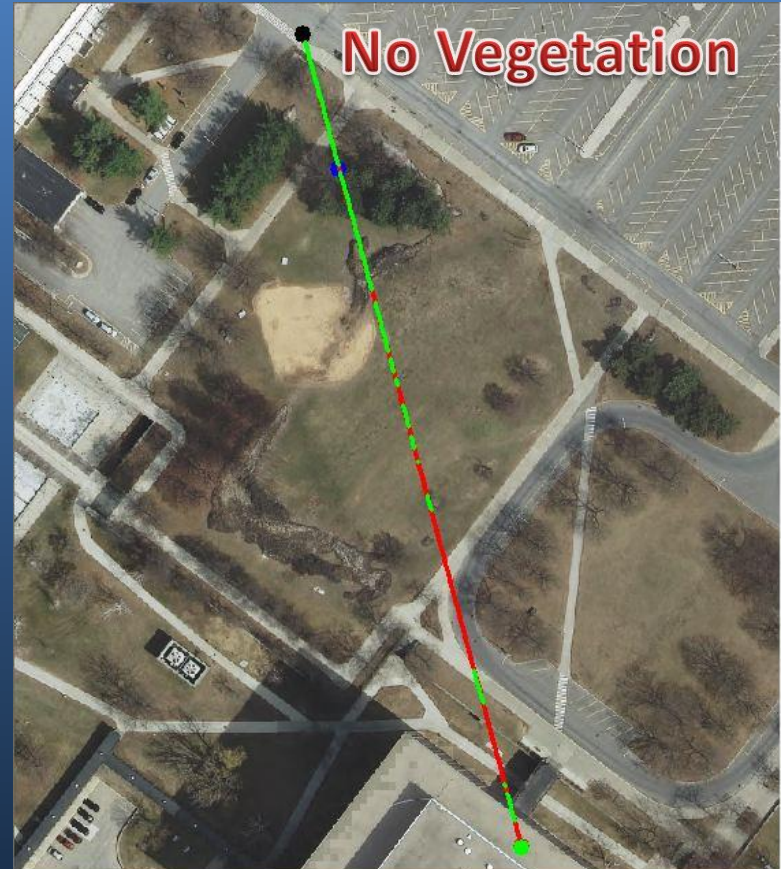
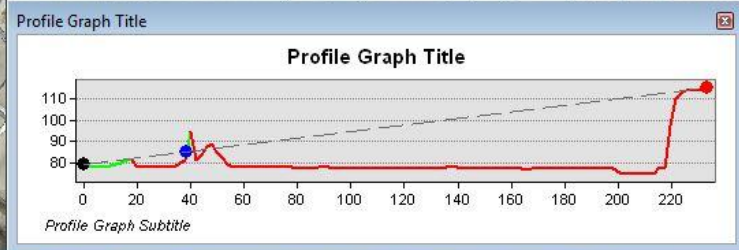


Building Textures

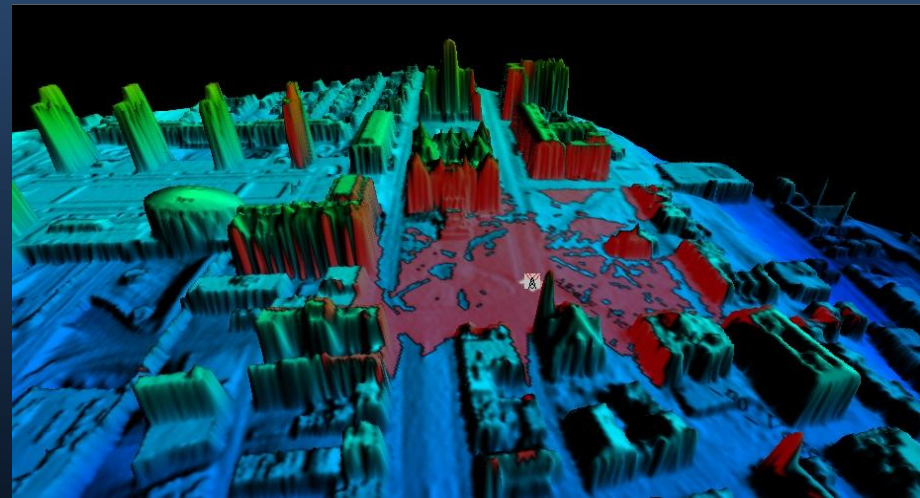
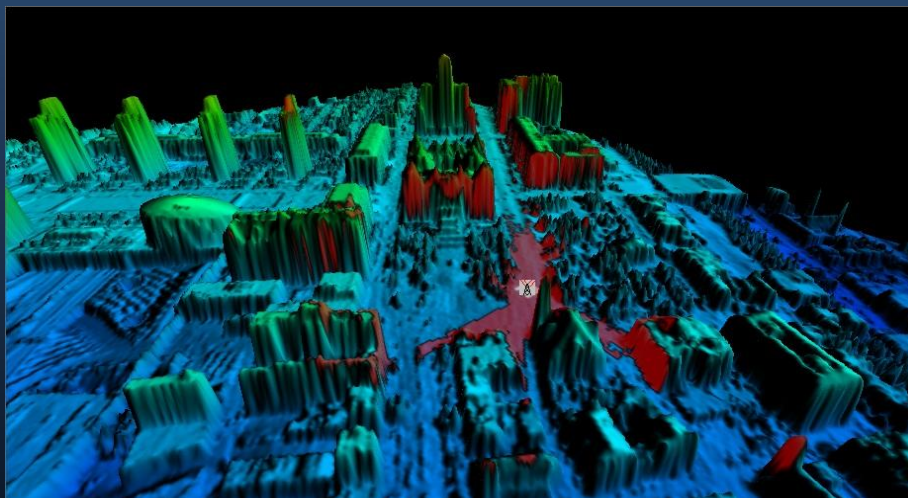
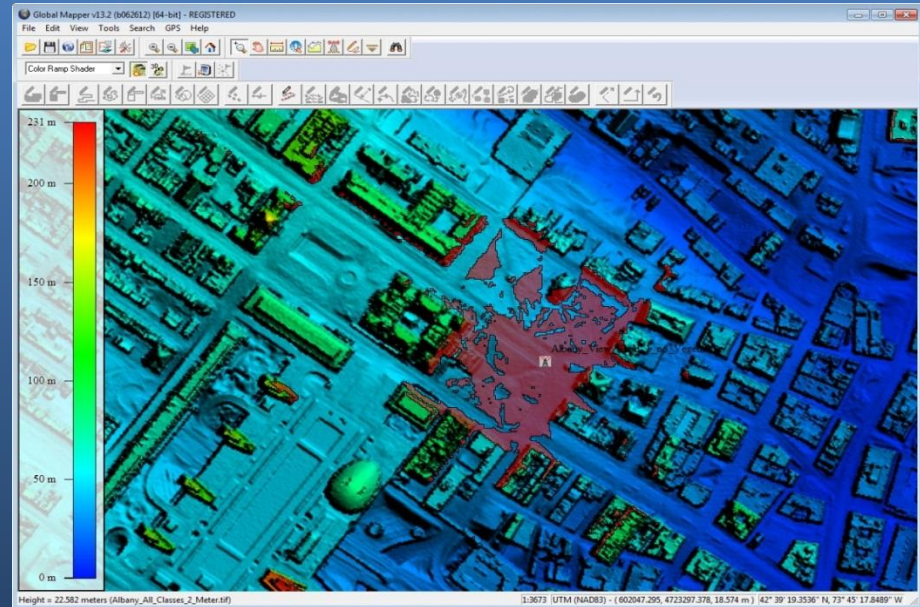
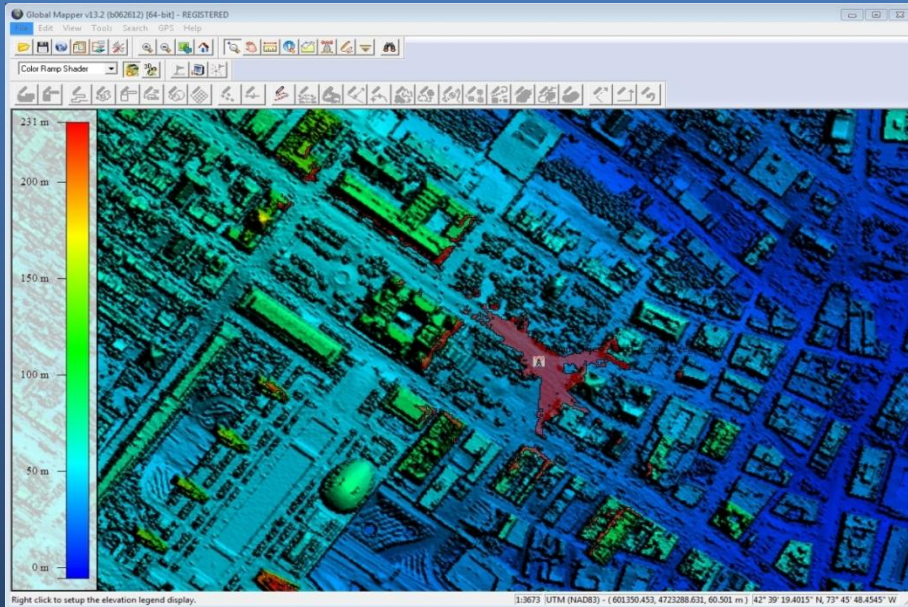


Analysis Using Updated Data

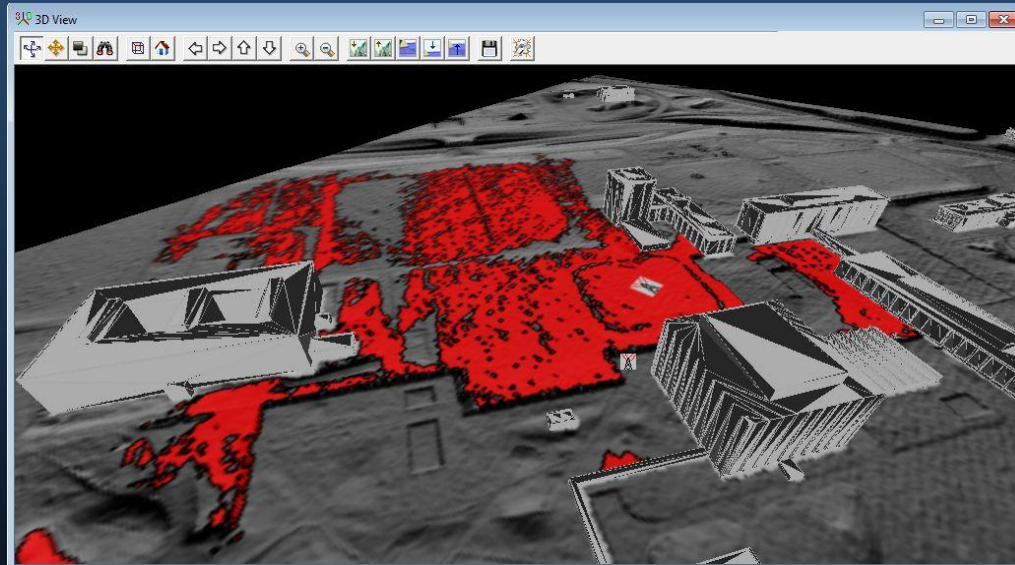
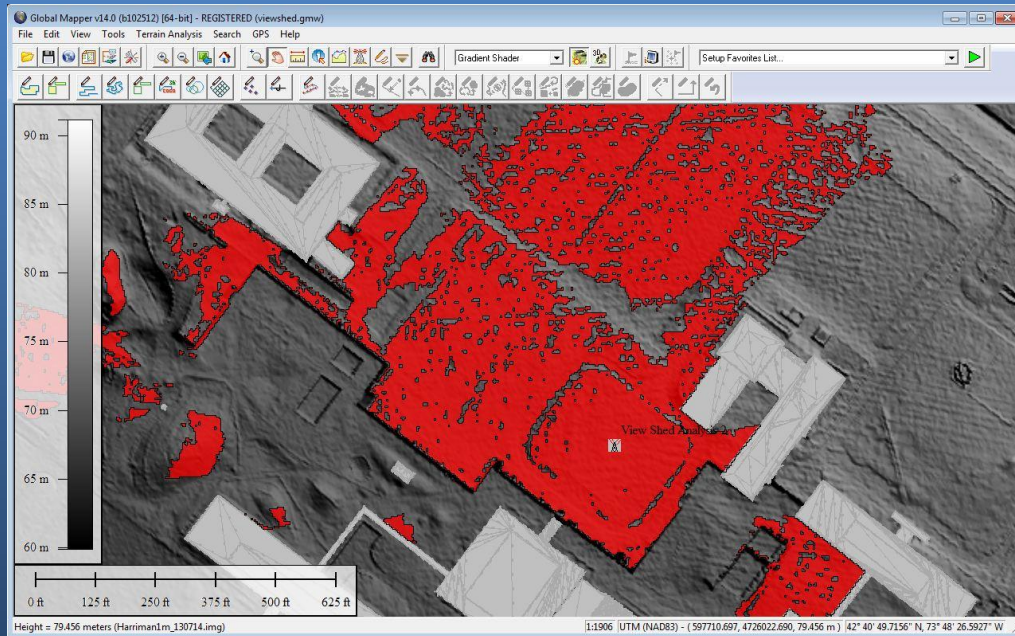
Line of Site Analysis



Viewshed (Using Reclassified LiDAR)



Viewshed (Using 3D Building)



Comparison Shots

3D Model



Google Street view



3D Model



Bing Birds Eye



Comparison Shots

3D Model



Google Street view



3D Model



Bing Birds Eye



Questions?

