Lab Report, HW 2

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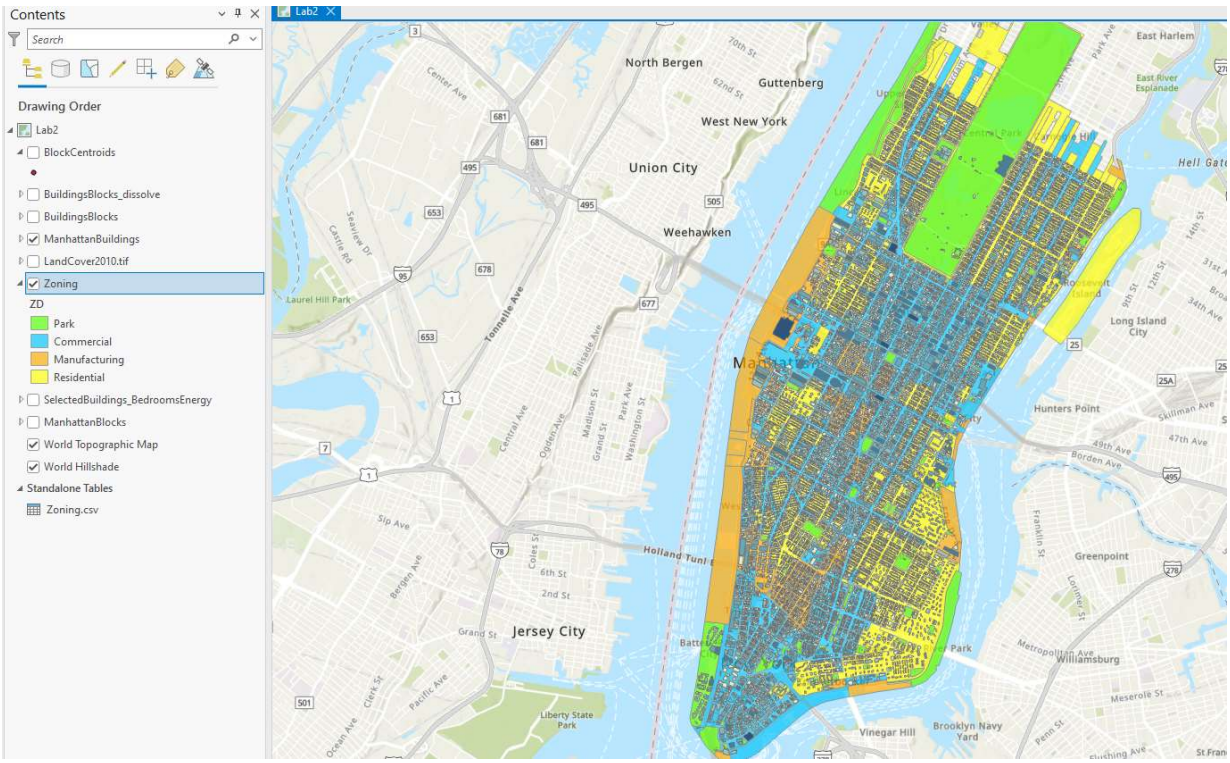
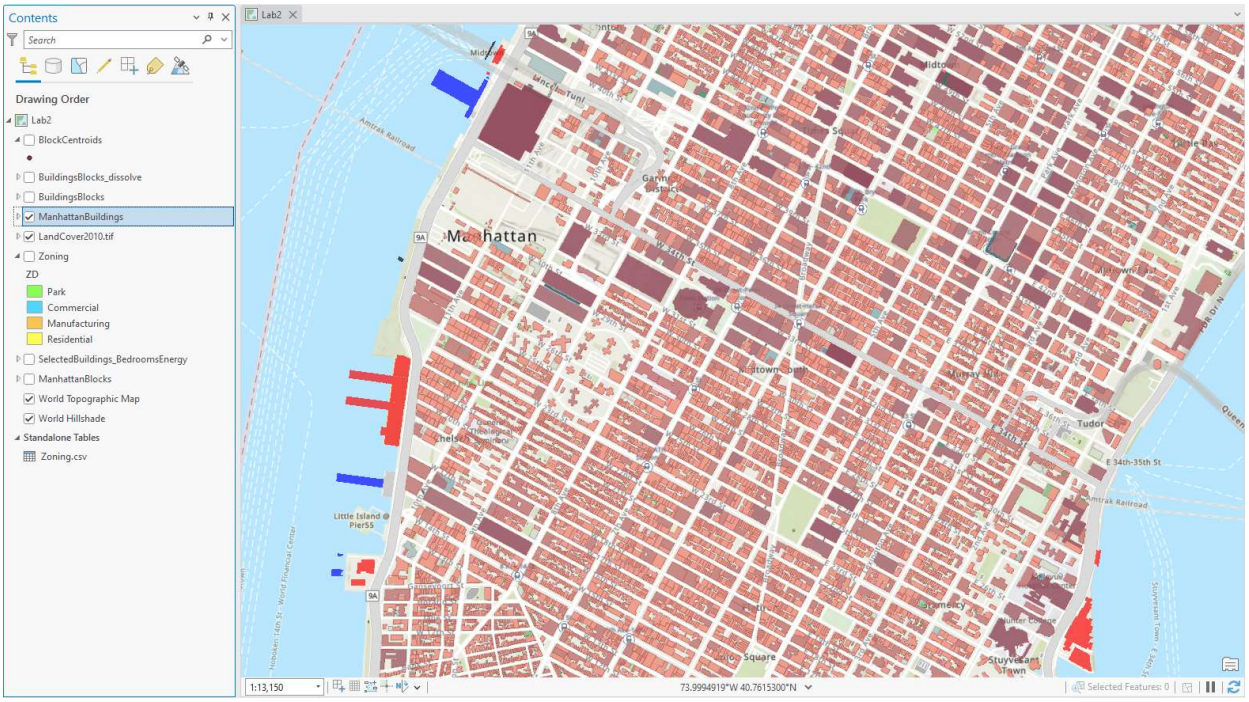
1/23/2025

1a: Which dataset better aligns with the building footprints? (Have your answer be evident in the screencaps). (2 pts)
Buildings on zoning:



Buildings on land cover:



The land cover dataset aligns better with buildings than zoning.

1b: Why might this not be a surprising answer? (Think of how the data was made). (3 pts)

Land cover might seem to be better than zoning because the land cover data and the buildings data were likely created from the same source, namely satellite imagery.

2: Given the zoning data and the population counts, do you think it is a good idea to remove buildings that are not zoned in residential areas for our analysis, why or why not? (5 pts)

No, non-residential buildings should not be removed from the analysis. When viewing block population over zoning, there are many manufacturing, commercial, and park zones that do in fact contain residents.

3a: We just selected a method called 'had their center in'. What is a polygon center called? (2 pts)

A centroid.

3b. How are these computed? (3 pts)

By creating a bounding box around the polygon, and then calculating the center point of that bounding box.

3c. Name three other encapsulating boundaries you can use to bound a spatial feature. (6 pts)

Spatial envelope(smallest rectangle that encapsulates a polygon), smallest encapsulating circle, convex hull (smallest polygon that encapsulates the root polygon without any interior angles).

3d: Are all centers INSIDE the buildings? Why or why not? (3 pts)

No, not all of them are inside the buildings. Buildings with unusual cut-outs (like horseshoe-shaped buildings) may have centroids the lie outside.

4a: Block ID is a FIPS code. What does FIPS stand for? (2 pts)

Federal Information Processing Standards

4b: Parse this block ID into spatial components including state, county, tract, block group and block (sometimes extra 0's are added): 130440025007003. (3 pts)

State: 13
County: 044
Tract: 002500
Block Group: 7
Block: 003

5: What is the before people per square mile and what is the after people per square mile for block: 360610063005000 (Census pop: 589)? (4 pts)

Old: 92,292 people/sq mi, New: 193,287 people/sq mi

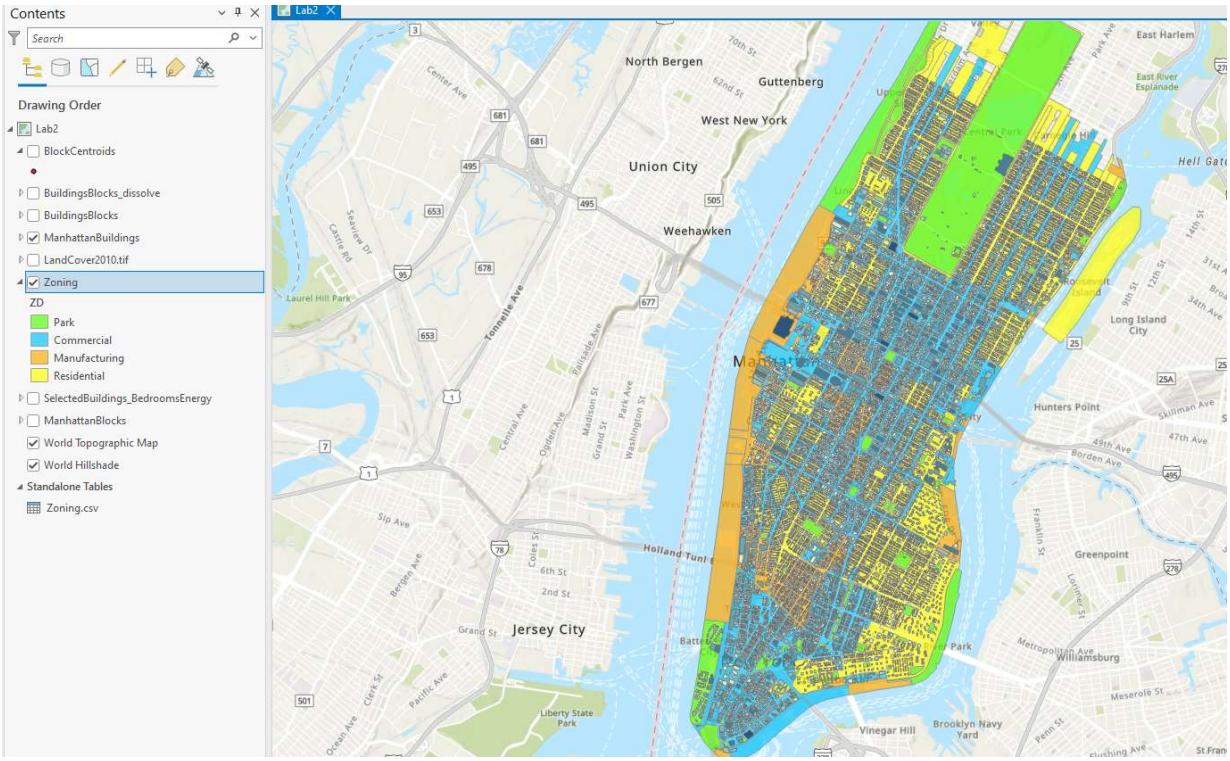
56: What is the total population of the columns BldgPop_Area and BldgPop_Volume? What was the original total population of the area? Have you preserved the number of people? What's the numeric difference? (5 pts)

BldgPop_Area population: 880,269
BldgPop_Volume population: 879,092
Original Census Blocks population: 883,867

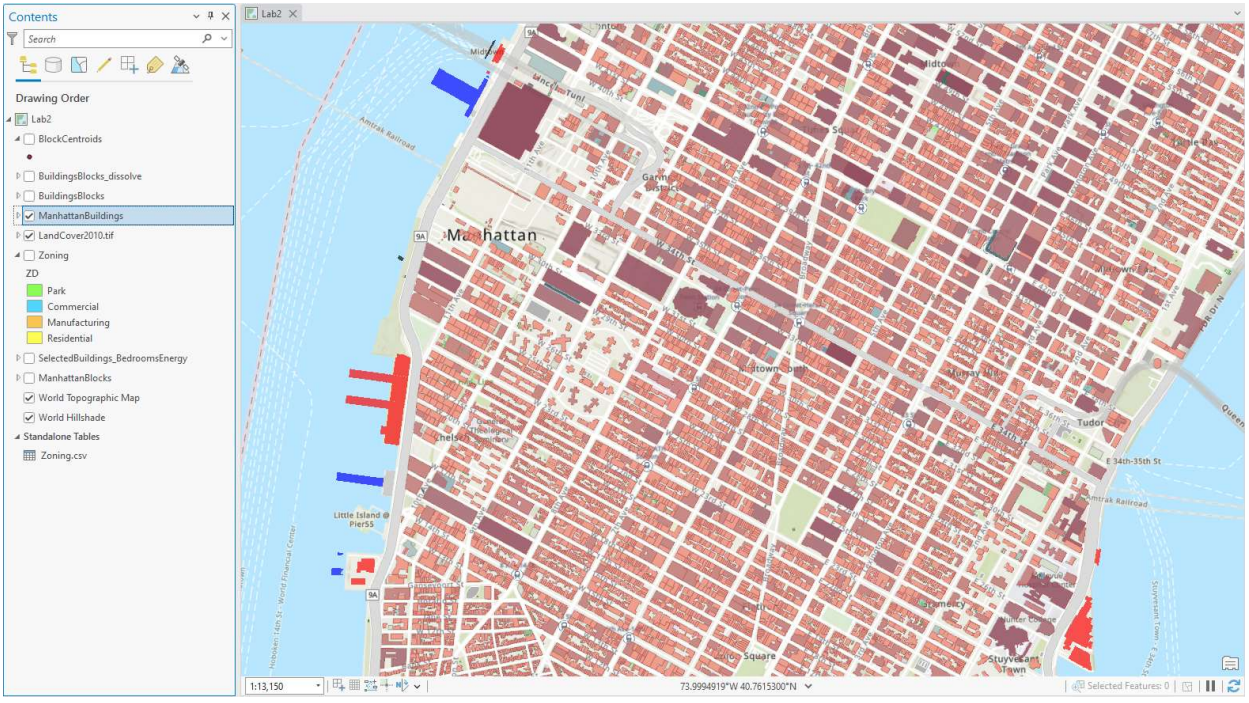
Yes, nearly all the population has been preserved. There small differences caused by at least two things. First, for volume, 194 of the over 29,000 buildings have a roof height of 0 feet which is likely bad data. As a result, building volumes, building ratio volumes, and population per cubic foot are all slightly skewed. Apart from that, rounding that occurred at each step of the two metrics' calculations likely contributed to some of the difference as well.

10 pts Screen Cap 1: Take two screencaps here, one with the building footprint outlines on top of the zoning data, and one with the building footprint outlines on top of the land cover data. (It can be zoomed in).

Buildings on zoning:

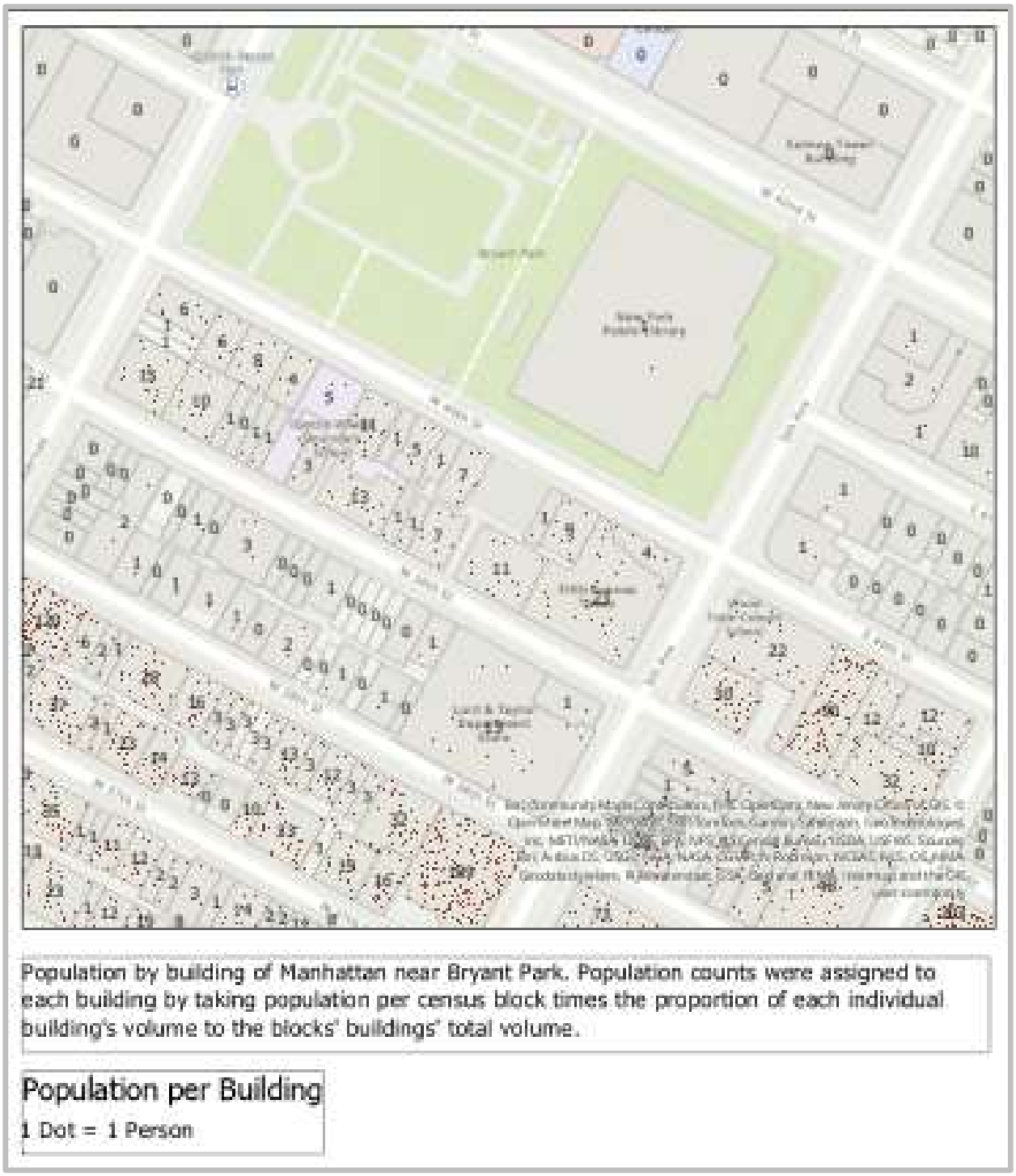


Buildings on land cover:



15 pts Graphic 1: Make a scatterplot comparing the BldgPop_Area (X axis) to BldgPop_Volume (Y axis). Make it nice by giving it axis labels on the x and y axis as well as a title. Remember that you are looking at number of people assigned to a building based on area vs volume. You can create the scatterplot anywhere you'd like. Make sure all the text is readable and of professional quality. Give it a caption that describes the trend! In the caption, say what each point represents (e.g. does it represent a particular unit of analysis?). *Give it a caption that describes the trend! For full points, In the caption, say what each point represents.*

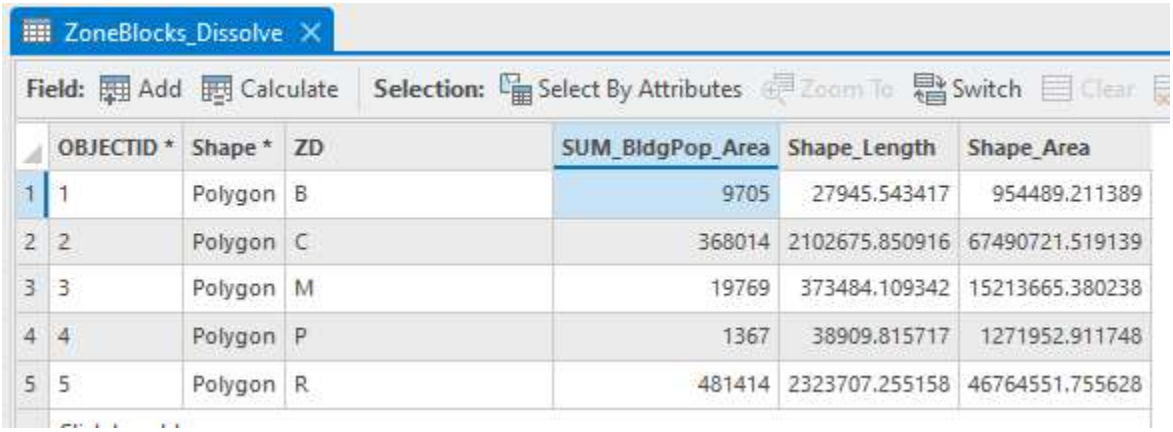
15 pts Graphic 2: Make a nice map of BldgPop_Area OR BldgPop_Volume (hopefully we have some of both examples!). Use dot density as symbology. Zoom in on an area you like and label the polygons with the number of people in them. *Give it a caption and a legend.* Make sure your labels are in "people" numbers--integers, i.e., there should not be ½ a person.



10 pts Table 1: Use the buildings population to fill out the table below (Hint: this is a special spatial join and then a dissolve, like you did above.). USE THE FIELD **ZD.**

POPULATION		ZONING (field ZD)
BldgPop	BldgPopSec	
481,414		R Residential Districts

368,014		C Commercial Districts
19,769		M Manufacturing Districts
9,705		B Battery Park City
1,367		P Areas designated as PARK, BALL FIELD, PLAYGROUND and PUBLIC SPACES in NYC GIS Zoning Features.



	OBJECTID *	Shape *	ZD	SUM_BldgPop_Area	Shape_Length	Shape_Area
1	1	Polygon	B	9705	27945.543417	954489.211389
2	2	Polygon	C	368014	2102675.850916	67490721.519139
3	3	Polygon	M	19769	373484.109342	15213665.380238
4	4	Polygon	P	1367	38909.815717	1271952.911748
5	5	Polygon	R	481414	2323707.255158	46764551.755628

9: Graphic X: Extra Credit (5 pts). Select ***Insert*** from the ribbon at the top of ArcGIS Pro window. Click the ***New Map*** and select ***New Local Scene*** from the dropdown. Copy the ***BuildingBlocks*** layer from the ***Contents pane*** of the old map and paste it in the ***Contents pane*** of the Local Scene map you just created. Extrude the buildings by height to make it 3D.

(Note on points: Labs are graded out of 100. You already get a certain number of happy points for turning something in. That number is 100 minus the sum of the points you see above.).