Data Documentation

Tree Canopy Equity in Chicago: Integrating Drone Imagery, Spatial Data, and Community Stories

Ty Ferguson, Omar Sayeed Quadri, Mohammed Mazin Khan

GEO 442: GIS for Sustainable Urban Development

Dr. Michelle Stuhlmacher

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1. Data Source List

1.1 Core Spatial Datasets

ChiVes Tree Canopy Data (ShapeFile, 2017)

ChiVes Project. (2017). *Chicago Vegetation and Tree Canopy Dataset (block-group scale)*. Accessed October 8, 2025**,** from - https://chichives.com/data

- **Description:**
  LiDAR-derived tree canopy percent (treeCCov17) and related vegetation metrics at the Census block-group level for Chicago. Includes social and environmental attributes linked to each block group.
- **Use in project:**
  Primary dataset for mapping citywide canopy, calculating the Chicago mean canopy (~20%), and computing the Lincoln Park weighted mean canopy (~26%). Used for the canopy distribution histogram in the Story Map.

ChiVes-Data-Public Excel File

ChiVes Project. (2017). *ChiVes data public (CSV/Excel)*. Accessed November 11, 2025 from - https://chichives.com/data

- **Description:**
  Publicly available CSV/Excel file containing the same attribute fields used in the ChiVes feature class, including treeCCov17, neighborhood names and Census identifiers.
- **Use in project:**
  Opened in Excel for quick inspection of canopy values, checking ranges and confirming Lincoln Park block-group canopy values against ArcGIS outputs.

Chicago Community Areas

City of Chicago. (2025). *Boundaries – Community Areas (current)*. City of Chicago Data Portal. Accessed October 28, 2025**,** from - https://data.cityofchicago.org/Facilities-Geographic-Boundaries/Boundaries-Community-Areas-Map/cauq-8yn6

- **Description:**
  Polygon boundaries representing Chicago's 77 official community areas.
- **Use in project:**
  Used to situate Lincoln Park within the city, label neighborhoods, and interpret canopy patterns across community areas in the citywide map.

1.2 Basemaps and Reference Layers

World Topographic Map (Basemap)

Esri. (2025). *World Topographic Map* [basemap]. Accessed in ArcGIS Pro on September 9, 2025 through ArcGIS Online.

- **Description:**
  Multi-scale base map showing streets, landmarks, parks, and built environments.
- **Use in project:**
  Background context in layout maps for Chicago and Lincoln Park to help viewers get an idea.

World Hillshade (Basemap)

Esri. (2025). *World Hillshade* [basemap]. Accessed in ArcGIS Pro on September 9, 2025 through ArcGIS Online.

- **Description:**
  Global hill shade raster based on elevation.

- **Use in project:**
  Used as subtle background shading under thematic canopy symbology to improve visual readability.

1.3 Imagery and Media

Lincoln Park Drone Imagery – Group 8
Ty Ferguson, Omar Sayeed Quadri and Moahmmed Mazin Khan (2025). *Lincoln Park drone photographs and video stills* (JPEG images & Video). Collected September 18, 2025 over Lincoln Park and adjacent residential streets.

- **Description:**
  Aerial images showing different parts of Lincoln Park including dense park canopy, residential tree-lined streets, rail corridors, institutional roofs with low canopy and a small farm.
- **Use in project:**
  Used for Figure 3 and other visuals in the StoryMap to authorize the ChiVes canopy data and visually demonstrate what 26–30% canopy looks like on the ground.

Drone Imagery and Maps from Partner Groups
Englewood, Gage Park, Pilsen, Little Village, Pullman/Chatham, Roseland, Greater Chatham Initiative, Mi Villita Neighbors, Imani Village and Red Line Extension Coalition student groups (2025). *Neighborhood-level drone imagery and Web maps* (various formats).

- **Description:**
  Drone photos, orthomosaics and Web maps created by the other GEO 442 groups for their specific neighborhoods (e.g., Senka Park in Gage Park, Dvorak Park in Pilsen, London Townhouses and Imani Village, Fernwood Park in Roseland).
- **Use in project:**
  Not downloaded as raw datasets into our ArcGIS Pro project but, incorporated through StoryMap embeds and screenshots for qualitative comparison of canopy levels and environmental conditions across neighborhoods (Figure 2 and related narrative). Each group documents the original data sources in their own data documentation.

2. ArcGIS Pro Project Package

Our group is submitting one ArcGIS Pro project package that contains all of the core analysis layers, tables, and figures used in our final report and Story Map.

Project package name: ChiVesTreeCoverage_Group8.ppkx

Creators: Ty Ferguson, Omar Sayeed Quadri, Mohammed Mazin Khan

Key contents:

- **Community_Areas** – Polygon layers of Chicago's 77 community areas used for citywide orientation, identifying neighborhood boundaries and highlighting Lincoln Park.
- **ChiVes_TreeCanopy_2017** – A LiDAR-derived canopy dataset (treeCCov17) joined to block-group geometries, used to produce the citywide canopy map and compute canopy percentages for all neighborhoods.
- **TreeCanopy_BlockGroups_With_CommunityAreas** – Joined table linking each ChiVes block group to its Community Area name, used for neighborhood-level interpretation and locating Lincoln Park block groups.
- **Citywide_TreeCanopy_Average_Stats** – Statistics table summarizing canopy distribution across all Chicago block groups (mean ≈ 20.27%, median ≈ 19.53%), used to support the histogram and describe citywide patterns.
- **Distribution_of_TreeCanopy_Histogram** – Visualizes the distribution of canopy percentages across Chicago including mean/median markers used in the report.
- **World Topographic Map** & **World Hillshade** – Basemap layers used solely for map visualization and orientation for the viewers.

Additional project packages:
None was required; all work is contained in a single project package.

3. Metadata

Below is the metadata for every layer in our project package that was created, derived, or modified by our group. Metadata includes:
• Creator(s)
• Title
• Abstract + keywords

• Year
• Data dictionary (column definitions)
• Notes on processing (where appropriate)

These layers correspond exactly to the layers inside ChiVesTreeCoverage_Group8.ppkx.

3.1 TreeCanopy_BlockGroups_With_CommunityAreas

Creator(s)

Ty Ferguson, Omar Sayeed Quadri, Mohammed Mazin Khan

Title

Tree Canopy Percent by Block Group with Community Area Name (2017 ChiVes Dataset, Spatial Join Output)

Year Published/ Created

2025 (derived from the 2017 data source)

Abstract

This feature class was created by spatially joining Chicago block-group–level tree canopy estimates from the ChiVes 2017 Tree Canopy dataset to the Chicago Community Areas polygon layer.

The result assigns each block group its corresponding community area name so canopy statistics can be aggregated, summarized and mapped at the neighborhood level.

Keywords: Tree Canopy, Chicago, block groups, community areas, spatial join, LiDAR, urban forestry.

Data Dictionary

Field Name	Meaning	Example Values/ Notes
OBJECTID	A unique identifier is automatically assigned to each row.	1, 2, 3…

treeCCov17	Percent tree canopy coverage for the block group, derived from the 2017 LiDAR.	0.75, 6.11, 22.47…
comAreaNm	Community area name assigned to each block group based on spatial location.	GARFIELD RIDGE, OHARE, NEAR NORTH SIDE…
FREQUENCY	Always = 1. Field automatically created during Summary or Join operations. Indicates count contribution.	**1**
CONCATENATE_treeCCov17	Duplicate of treeCCov17 created by ArcGIS during Summary Statistics / Spatial Join. Not used in analysis.	Same as treeCCov17
CONCATENATE_comAreaNm	Duplicate of community area name created during Summary or Join operations. Not used further.	Same as comAreaNm

Processing Notes

- Constructed using Spatial Join (block groups → community areas).
- No geometry edits were performed.
- Used as the base for canopy distribution of histograms and community area summaries.

3.2 Citywide_TreeCanopy_Average_Stats

Creator(s)

Ty Ferguson, Omar Sayeed Quadri, Mohammed Mazin Khan

Title

Citywide Mean Tree Canopy Summary Table (Summary Statistics Output)

Year Published/ Created

2025

Abstract

This table was created using the Summary Statistics tool on the entire citywide block-group canopy dataset. It summarizes the mean tree canopy percentage across all 800 block groups in Chicago.

The resulting mean (~20.27%) was used in the report and StoryMap to describe Chicago's overall canopy baseline.

Keywords: Chicago, canopy mean, summary statistics, LiDAR canopy.

Data Dictionary

Field Name	Meaning	Example
OBJECTID	Unique table row ID	**1**
FREQUENCY	Number of records included in the statistics (block groups).	800
MEAN_treeCCov17	Average percent canopy across Chicago block groups.	20.2725

Processing Notes

- Input: TreeCanopy_BlockGroups_CommunityAreas
- Statistic type: MEAN
- Used for: Figure 1 and histogram reference line.

3.3 Distribution of Tree Canopy Coverage Across Chicago (Histogram)

Creator(s)

Ty Ferguson, Omar Sayeed Quadri, Mohammed Mazin Khan

Title

Histogram of Tree Canopy Percent Across Chicago Block Groups

Year Published/ Created

2025

Abstract

This histogram visualizes the distribution of tree canopy percentages for all Chicago block groups (n=800), using the field treeCCov17.

It highlights Chicago's citywide pattern of most neighborhoods clustering around 15–25% canopy.

Keywords: histogram, canopy distribution, Chicago, LiDAR, visualization.

Data Dictionary

Field Name	Meaning	Value Range
treeCCov17	Percent tree canopy for each block group	0.75% – 64.36%

Processing Notes

- Bins = 28
- Mean and median lines included
- Based entirely on TreeCanopy_BlockGroups_CommunityAreas