Appendix A: Priority Scoring Systems

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Transportation Capital Projects

The City of Urbana uses a scoring system to guide prioritization of transportation capital projects. In this system, a total priority score is calculated for each street segment as the sum of seven category scores: Safety Record, Functional Classification of the Street, Pavement Condition, Funding Assistance, Project Linking, Bus Route, and Community Development Target Area (CDTA). The total score ranges from 0 to 100, with 100 representing the highest priority project. Each category has a maximum score according to the relative importance assigned to it. The relative importance of each category was determined by a committee of staff in the Public Works Department. A transportation project consists of one or more street segments, and each project is assigned the highest total score from one of its street segments.

$$Total\ Priority\ Score = Safety + Class + Condition + Funding + Linking + Bus + CDTA$$

Max. Score = 100.0 = 25.2 + 22.4 + 17.0 + 12.9 + 11.6 + 8.2 + 2.7

In response to Mayor and Council goals, the CDTA category was introduced to replace the category for age of pavement. The CDTA category is intended to introduce an "equity lens" into the scoring system by providing additional points to low-to-moderate income areas of the City. There is a discussion about the CDTA metric and others that were considered in the next section, "Evaluation of Equity Metrics". The age of pavement category was considered unnecessary since pavement condition data is available and current.

Also, the scoring system was updated with the FY24 Capital Improvement Plan (CIP) to normalize the total score range from 0 to 100. Previously, there was no defined maximum total score. With a range from 0 to 100, the total score is made more intuitively meaningful.

The following discussion explains each category in more detail, lists what criteria are used to assign a score to each street segment, and cites data sources, as appropriate.

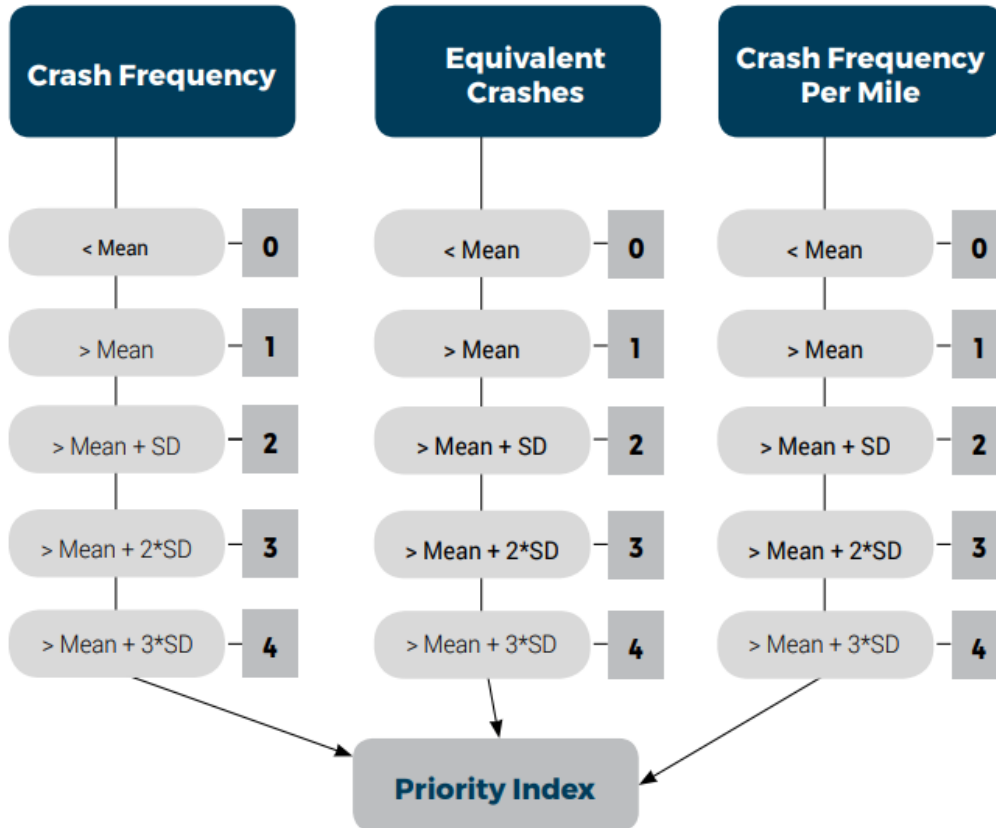| Safety Record	Max. Score = 25.2

Score	Criteria
25.2	Segment or intersection in Regional Safety Plan
0 - 25.2	Max. of Segment or intersection safety record score

Safety is the most important category in the scoring system, and staff looks to crash records to identify safety problems. The Champaign County Regional Planning Commission (RPC) provided the City of Urbana with a way to systematically quantify safety priority locations with a Priority Index. RPC determined a Priority Index for each street segment and intersection in the City of Urbana through a statistical analysis of the most recent five years of available crash records (2017 through 2021).

The Priority Index is the sum of three metrics: Crash Frequency (up to 4 points), Equivalent Crashes (up to 4 points), and Crash Frequency per Mile (up to 4 points). Each metric is assigned points based on how much the street segment's crash statistics exceed the average (mean) value, in terms of standard deviations (SD) from the mean. The metric for Equivalent

Crashes gives more weight to crashes with a fatality (25 times) or an incapacitating injury (10 times) compared with other types of crashes with injuries. Crash Frequency per Mile only counts for street segments. Therefore, the maximum Priority Index for segments is 12 (4+4+4), whereas the maximum Priority Index for intersections is 8 (4+4+0).

Crash Frequency

< Mean	0
> Mean	1
> Mean + SD	2
> Mean + 2*SD	3
> Mean + 3*SD	4

Equivalent Crashes

< Mean	0
> Mean	1
> Mean + SD	2
> Mean + 2*SD	3
> Mean + 3*SD	4

Crash Frequency Per Mile

< Mean	0
> Mean	1
> Mean + SD	2
> Mean + 2*SD	3
> Mean + 3*SD	4

Priority Index

Flow Chart of Crash Statistics and Priority Index

$$Crash\ Frequency\ (no.\,per\ year) = \frac{K + A + B + C}{Study\ Period\ (yrs)}$$

$$Equivalent\ Crashes\ (no.\,per\ year) = \frac{25K + 10A + B + C}{Study\ Period\ (yrs)}$$

$$Crash\ Frequency\ per\ Mile\ (no.\,per\ year, per\ mile) = \frac{Crash\ Frequency\ (no.\,per\ year)}{Segment\ Length\ (miles)}$$

Table of Standard Crash Injury Codes

Injury Code	Description
K	Fatal
A	Incapacitating Injury
B	Non-incapacitating Injury
C	Reported Injury / Not Evident
O	No Indication of Injury

The Priority Indices for each street segment and intersection are then converted to a score for our priority scoring system using the following formulas. Each street segment in the City is then assigned the maximum of its Segment Score or Intersection Score, if the segment is part of an intersection.

$$Segment\ Safety\ Record\ Score = \frac{Segment\ Priority\ Index\ \times 25.2}{12}$$

$$Intersection\ Safety\ Record\ Score = \frac{Intersection\ Priority\ Index\ \times 25.2}{8}$$

Sources:

- [Champaign-Urbana Urban Area Safety Plan](#)
- [Champaign County Traffic Crash Dashboard](#)

Functional Classification of Streets Max. Score = 22.4

Score	Criteria
22.4	Other Principal Arterial
20.2	Minor Arterial
17.9	Major Collector
15.7	Minor Collector
13.4	Local Street
9.0	Alley
4.5	Parking Lot

Functional classification is based on the importance of a route to the transportation network, and each street is assigned a functional classification through a process that involves the Champaign-Urbana Urbanized Area Transportation Study (CUUATS) and the Illinois Department of Transportation (IDOT).

Source:

- [Illinois Roadway Analysis Database System (IROADS)](#)

Pavement Condition Max. Score = 17.0

The pavement condition is measured by the Pavement Condition Index (PCI) for all pavement surfaces except for brick streets. All streets in the City of Urbana were scanned by vehicle-mounted sensors in 2019 and assigned a PCI. The PCI for each street segment is converted to a condition score for our priority system using the following equation. A high PCI indicates good condition, whereas a high pavement condition score indicates poor condition.

$$Pavement\ Condition\ Score = (100 - Pavement\ Condition\ Index\ (PCI)) \times 0.170$$

PCI Condition Ranges			
Excellent		100-86	100 – 65: Feasible for pavement preservation
Very Good		85-71	
Good		70-56	
Fair		55-41	64 - 0: Not feasible for pavement preservation
Poor		40-26	
Very Poor		25-11	
Failed		10-0	

PCI Ranges and Descriptive Condition
(IDOT Bureau of Local Roads and Streets Manual)

Source:

- Urbana Roadway Pavement Management Summary

Funding Assistance   Max. Score = 12.9

Score	Criteria
12.9	Eligible for 80-100% assistance
9.7	Eligible for 50-79% assistance
6.5	Eligible for 20-49% assistance
3.2	Eligible for less than 20% assistance
0.0	Not eligible for assistance
3.2	Eligible for CDBG assistance (additive score)
3.2	Eligible for TIF assistance (additive score)
3.2	Eligible for DCEO assistance (additive score)

"Funding assistance" is considered any funding that is outside the typical funds available for transportation projects, such as CR&I, State MFT, or Local MFT. Federal funds available through CUUATS (STBG/STPU) are periodically available to Urbana, so it is not considered outside funding for the purpose of the scoring system.

The additive scores for CDBG, TIF, or DCEO eligibility will be calculated as a fraction of 3.2 if a road segment is partially within or on the border of an eligible area.

Sources:

- Community Development Target Areas (CDTA) map, see Evaluation of Equity Metrics section.
- Tax Increment Financing (TIF) map for TIF funding eligibility
- Illinois Department of Commerce and Economic Opportunity (DCEO) underserved areas map for DCEO funding eligibility

Project Linking   Max. Score = 11.6

Score	Criteria (each is additive)
2.3	Multiple contiguous pavement sections with similar pavement condition
2.3	Partnership with other agency
2.3	Sewer or utility reconstruction within pavement is warranted
1.2	Drainage problems related to street surface
1.2	Traffic signal improvements are warranted (a top 20 intersection in traffic signal asset management plan)
1.2	Bridge improvements are warranted
1.2	Pedestrian or bicycle improvements are warranted (bicycle or pedestrian master plan recommendation)

Sources:
- Urbana Bicycle Master Plan 2016
- Urbana Pedestrian Master Plan 2020

MTD Bus Route   Max. Score = 8.2

Score	Criteria
8.2	Street is on an MTD bus route
0.0	Street is not on an MTD bus route

Source:
- Champaign-Urbana Mass Transit District (MTD) Route Maps

Community Development Target Area   Max. Score = 2.7

Score	Criteria
2.7	Street within a CDTA
1.4	Street partially within a CDTA
0.0	Street not within any CDTA

A Community Development Target Area (CDTA) is a block group within a census tract that meets certain low-to-moderate income thresholds set by the City of Urbana.

Source:
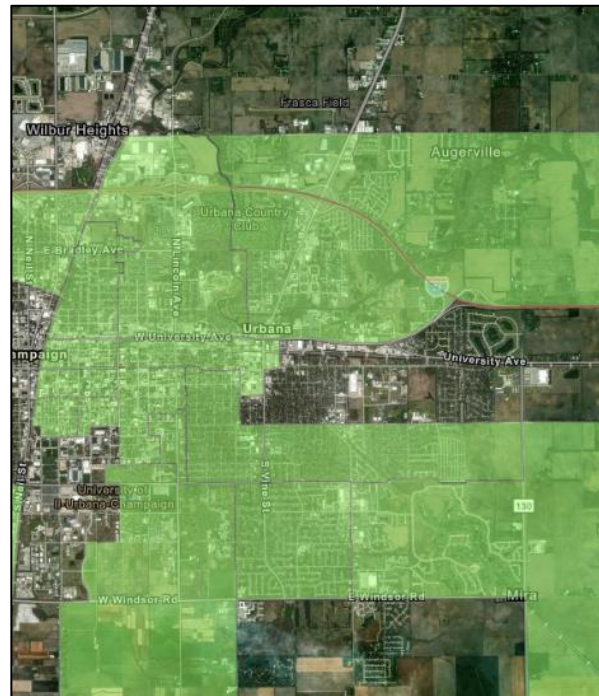- Community Development Target Areas (CDTA) map, see Evaluation of Equity Metrics section.

Evaluation of Equity Metrics

In the City of Urbana, a 2022-2023 goal of the Mayor and City Council was to increase investment in infrastructure equity. An action step for this goal is to incorporate an "equity lens" into priorities evaluation. Staff evaluated different metrics that represent equity considerations and have already been mapped, making them readily applicable to street segments or other project areas. The metrics considered were the Social Vulnerability Index from the Center for Disease Control (CDC), Underserved Areas from the Illinois Department of Commerce and Economic Opportunity (DCEO), Environmental Justice Demographic Indices from the Environmental Protection Agency (EPA), Community Development Target Areas (CDTA) from the City of Urbana, and Equitable Transportation Community metrics from the US DOT.
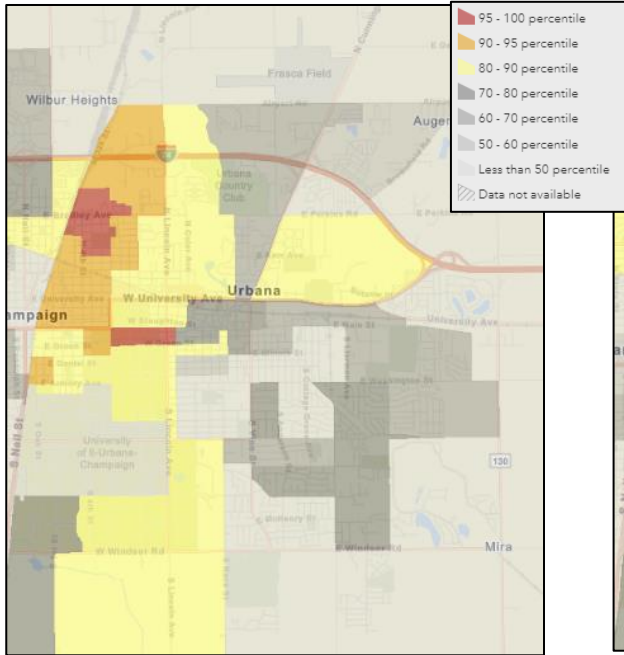
Below are map images for the different equity metrics considered, along with web links to data sources.
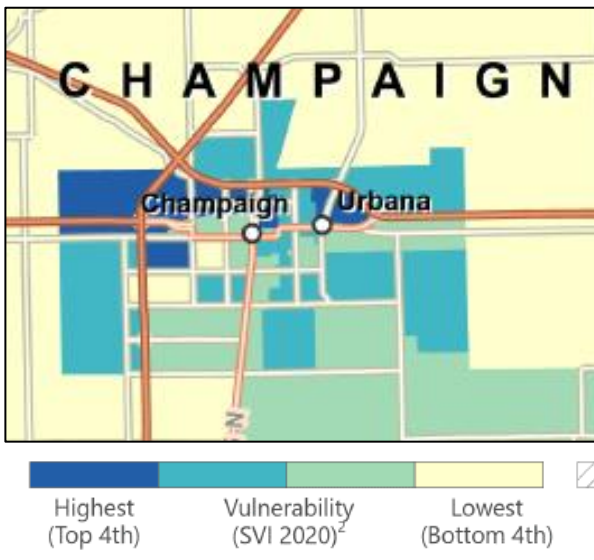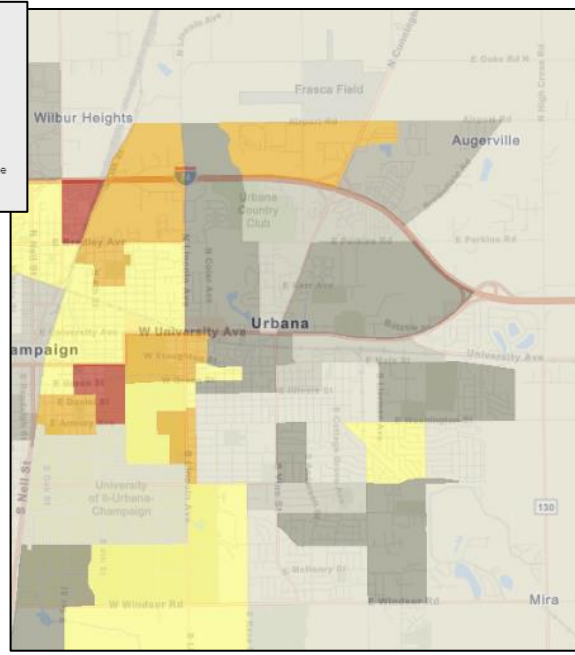

CDC/ATSDR Social Vulnerability Index

DCEO Underserved Areas

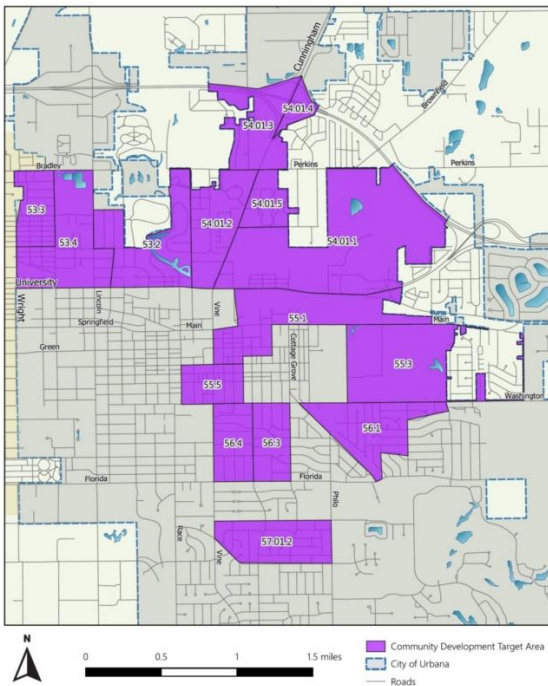**EPA Environmental Justice Demographic Index**

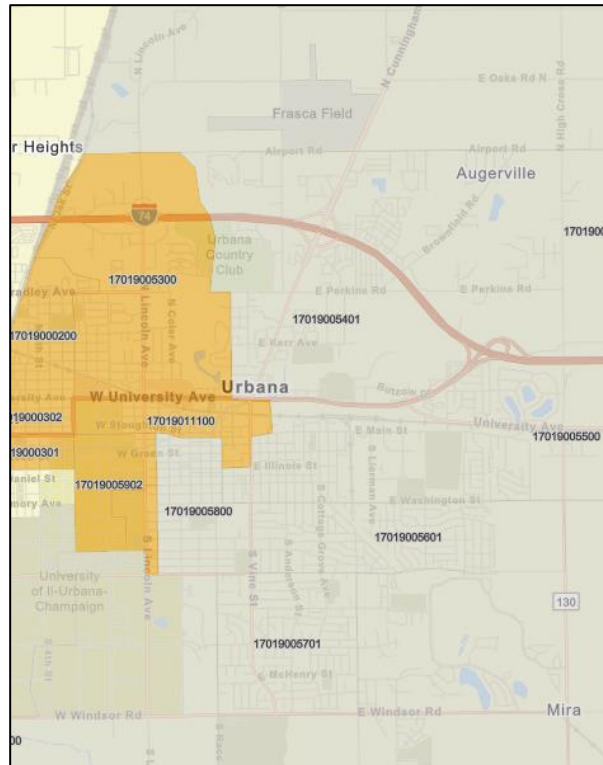**EPA Environmental Justice Supplemental Demographic Index**

Comm. Develop. Target Areas (CDTA)

US DOT Equitable Transportation Community

Staff selected CDTA as the most effective equity metric because it identifies areas of the City with low-to-moderate income populations, the data is mapped by the Champaign County Geographical Information System (GIS) Consortium (making it readily available and easy to use), and CDTA is determined at the block group level, which is a subset of census tracts, allowing for an analysis of census data in smaller population groups. By comparison, the CDC Social Vulnerability Index, the DCEO Underserved Area, and the US DOT Equitable Transportation Community are metrics determined at the census tract level, leading to conclusions that are less meaningful for a community the size of Urbana's. The US Census Bureau defines block groups as containing between 600 and 3,000 people, whereas census tracts contain between 1,200 and 8,000 people.
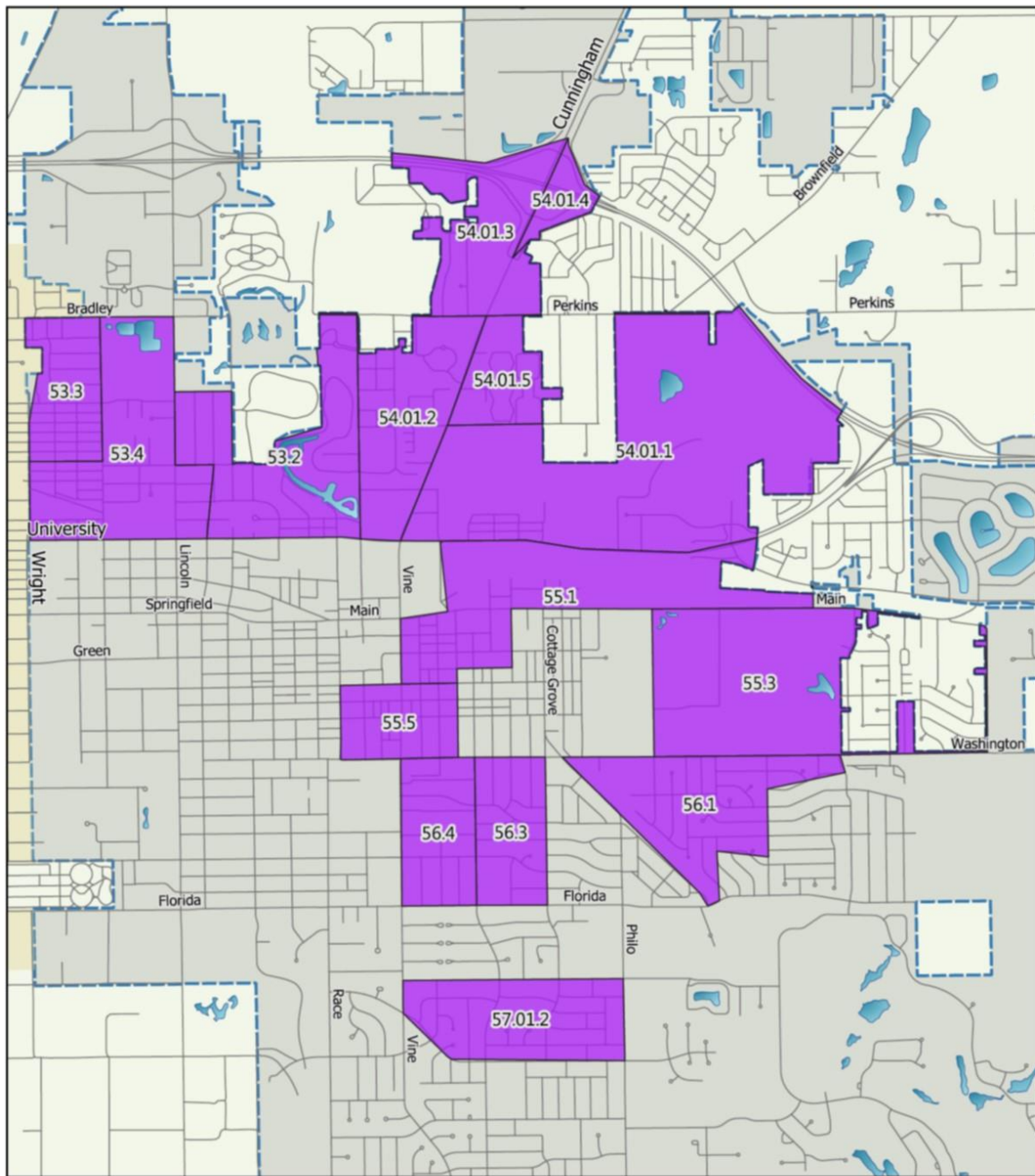
By choosing CDTA as the equity metric, the focus is on income disparity across the City. The underlying assumption is that the concentration of low-to-moderate income households in certain areas of the City may have resulted, in part, from historic discriminatory practices and disinvestment in underserved communities. Staff considered this approach to be the most straight-forward and objective proxy for historical inequity. Staff did not attempt to account for other demographic data commonly associated with historical inequity, including but not limited to race, disability, age, gender, sexual orientation, language, religion, and criminal history.

The EPA Environmental Justice socioeconomic indicators attempt to account for populations such as low-income, people of color, unemployment, less than high school education, limited English speaking, and low life expectancy. However, when the EPA Environmental Justice metrics are applied in Urbana, they appear to favor college student populations over other low-income populations in the City.

By providing additional priority points to capital projects in CDTA, the intention is to begin to shift infrastructure investment to historically underserved areas of the City and thereby improve quality of life and property values in those areas.

Considering the eligibility of a capital project for Community Development Block Grant (CDBG) funding is another way that equity is incorporated into the scoring system. Because there is a direct relationship between CDTA and CDBG eligibility, any project within a CDTA gets points for both the CDTA category and for the funding assistance category.

Community Development Target Area