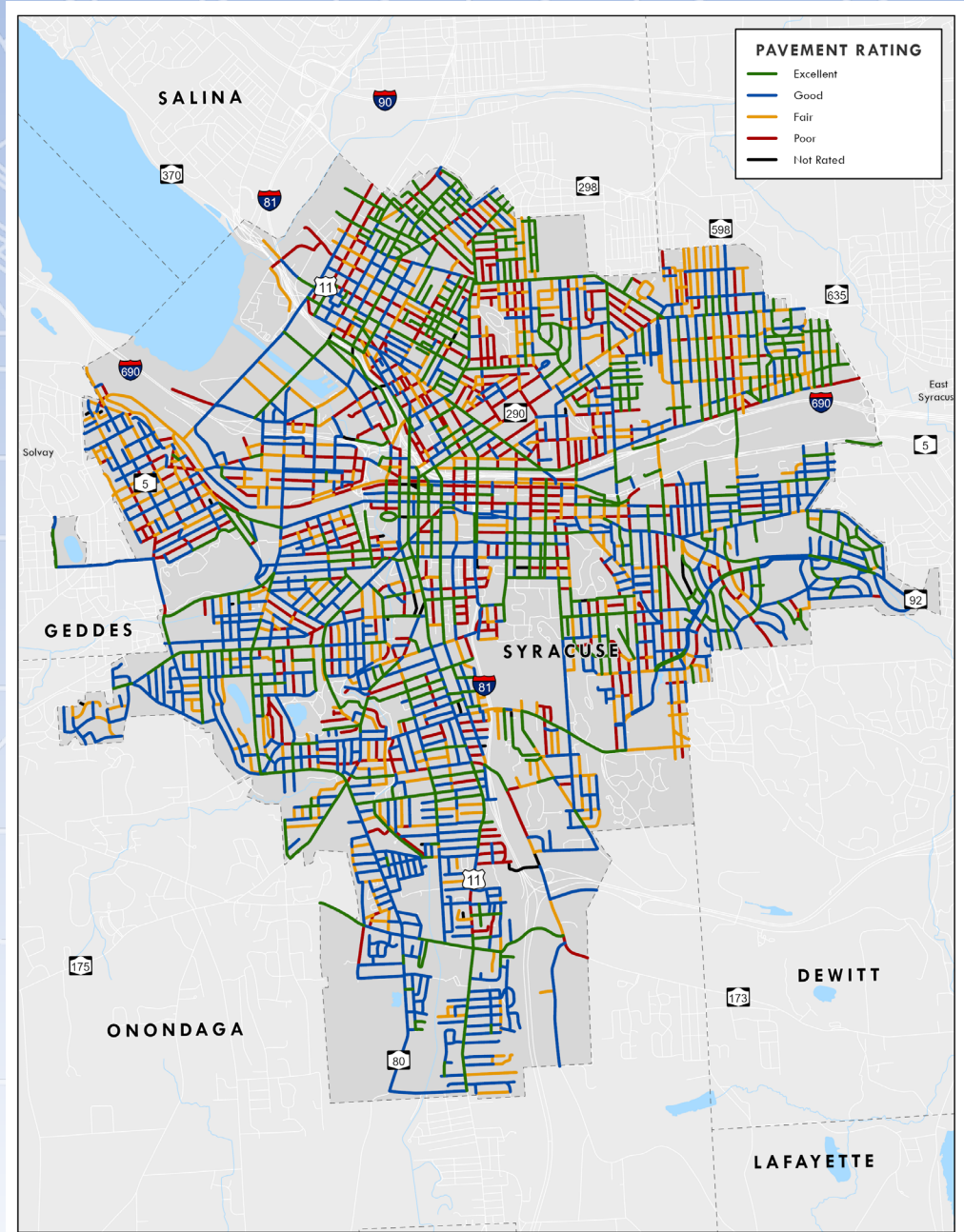# City of Syracuse Pavement Prioritization Program

Incorporating Equity in Pavement Reconstruction

Andrew Frasier

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SMTC collects condition ratings (1-10) on all City-owned roads.

How can the City prioritize maintenance on 400 miles of pavement?

Overview – Three Main Questions

- City asked the SMTC to complete an analysis using pavement data collected in 2022

- Asking the questions:
  - With a limited budget, where is maintenance justified?
  - What data can we use to help improve decision-making?
  - *How can we ensure our planning considers issues of equity?*

Two scores: infrastructure score and equity score

Equity Data

- Wanted to include equity during **quantitative** part of data analysis
- Built off model from Oakland, CA
- Seven variables considered
- Uses Decennial Census data (2020) where available and 2017-2021 American Community Survey otherwise

People of Color

Residents Below the Poverty Line

Residents with a Disability

Residents 65 Years and Older

Single Parent Households

Rent-Burdened Households

Residents with Low Educational Attainment

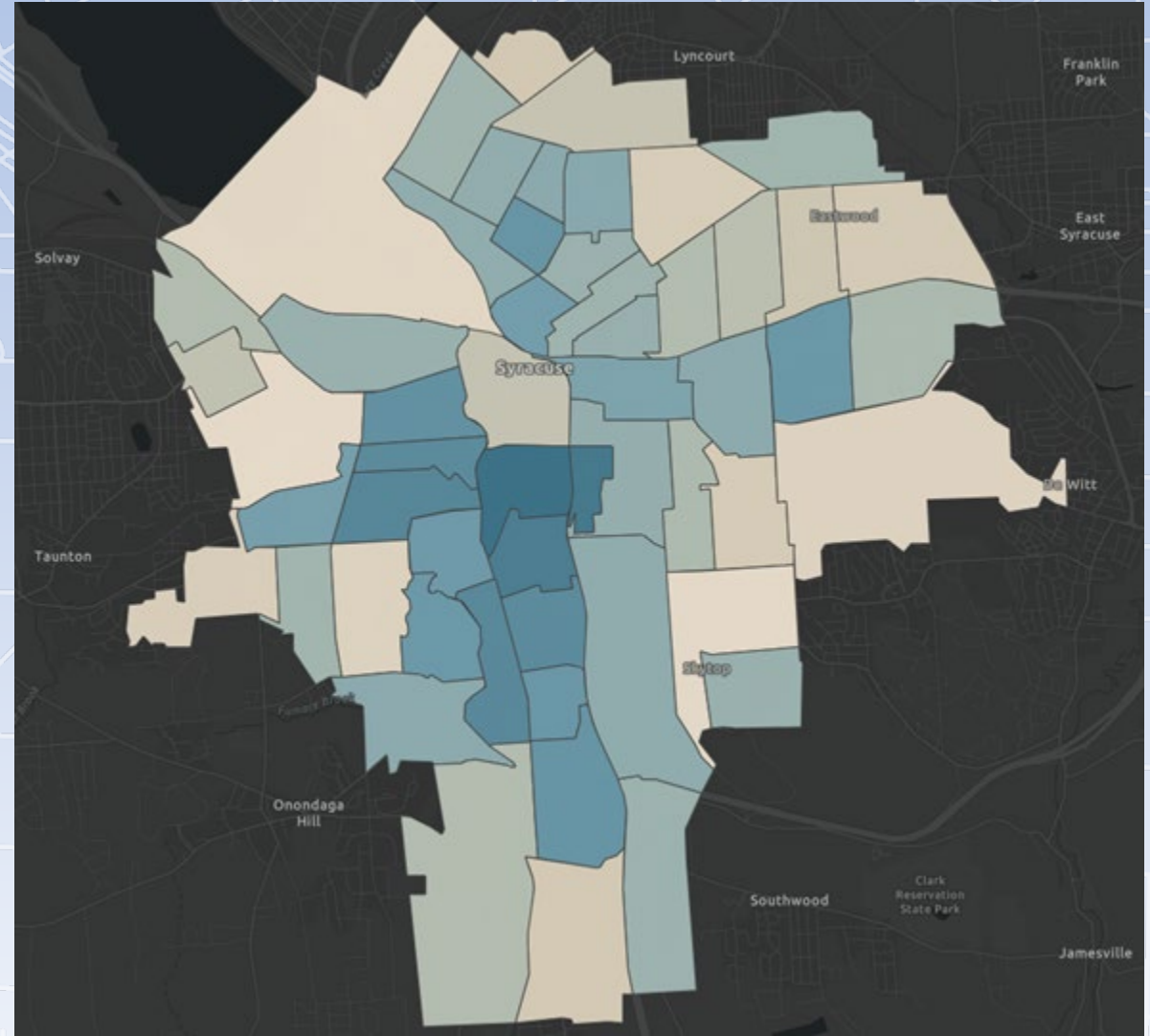| Equity Variable	Source
People of Color	All groups besides Non-Hispanic White Alone
Poverty Status	Table S1701 – Poverty Status in the Last 12 Months
Disability	Table S1810 – Disability Characteristics
Population over 65	Table DP05 – ACS Demographic and Housing Estimates
Single Parent Households	Table B11004 – Family Type by Presence and Age of Related Children Under 18 Years
Rent-Burdened	Table DP04 – Selected Housing Characteristics Category: Gross Rent as a Percentage of Household Income (GRAPI) – Selected over 30%
Low Educational Attainment	Table DP02 – Selected Social Characteristics Category: Total - Bachelor's Degree or Higher

Equity Score Calculation

- Data based on tract level
- Score can range from 0 to 1, based on proportion of historically-underserved populations residing in each tract.
- To reach this, we multiply the total percentage of each variable by its determined weight, and then take the sum.

$$E_n = (.25)(POC_n) + (.25)(Poverty_n) +$$
$$(.1)(Disability_n) + (.1)(Age_n) + (.1)(Single_n) +$$
$$(.1)(Rent_n) + (.1)(Edu_n)$$
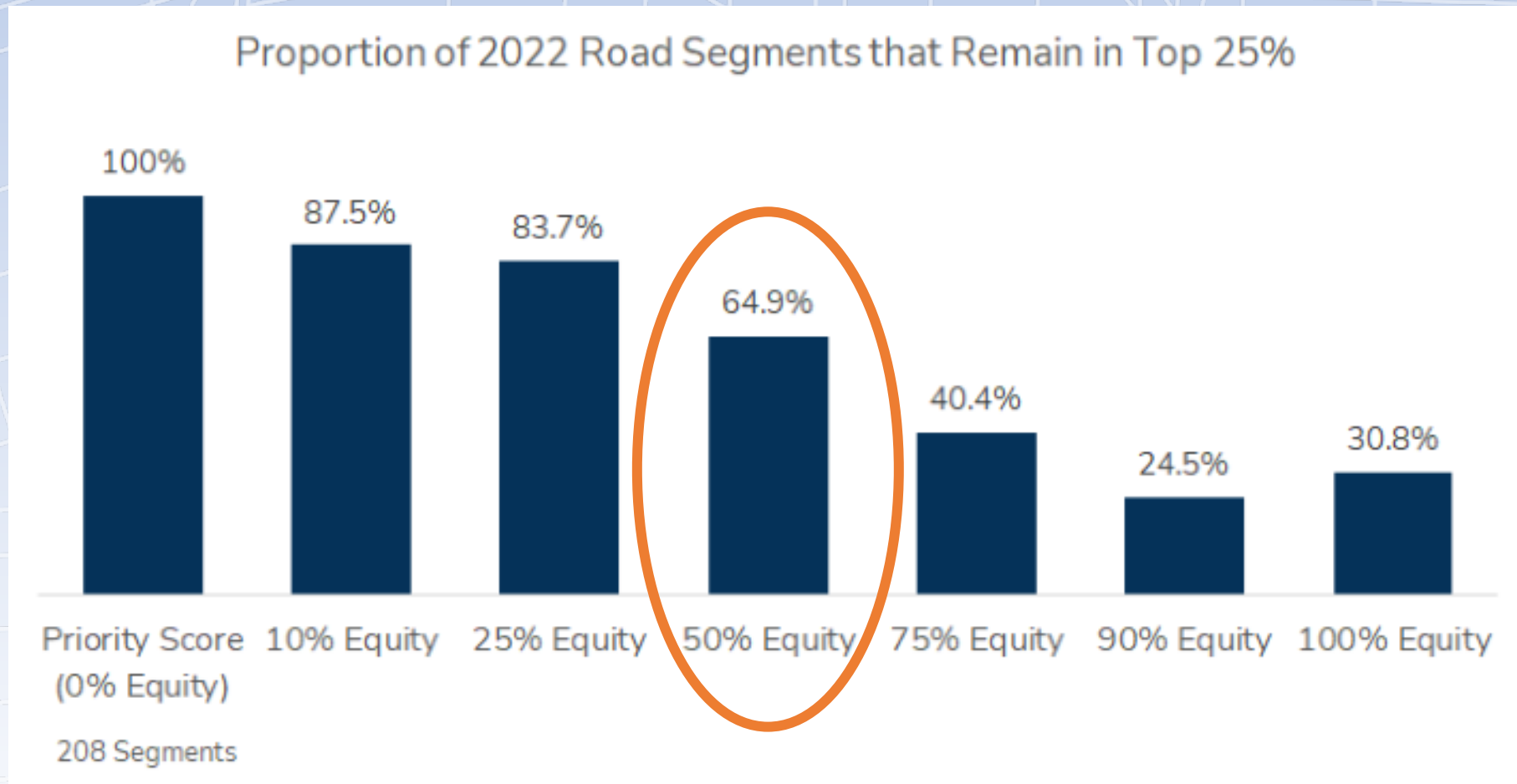
Equity Scores in Syracuse

Scores ranged from 0.15 to 0.61, with an average score of 0.39.

Darker colors indicate higher scores, lighter colors indicate lower scores.

Factoring in Equity

- How much should the equity score be incorporated into the final score?

Proportion of 2022 Road Segments that Remain in Top 25%

Priority Score (0% Equity)	10% Equity	25% Equity	50% Equity	75% Equity	90% Equity	100% Equity
100%	87.5%	83.7%	64.9%	40.4%	24.5%	30.8%

208 Segments

2023 City of Syracuse Pavement Prioritization Model

50% Infrastructure

- Pavement Condition
- Activity Level
- Transit Activity
- Emergency Snow Routes
- History of Water Main Breaks
- Proximity to Major Institutions
- Average Annual Daily Traffic

50% Equity

- Residents Below the Poverty Line
- People of Color
- Residents with a Disability
- Residents 65 Years and Older
- Single Parent Households
- Rent-Burdened Households
- Residents with Low Educational Attainment

Network Scoring

- Calculated on a block level
- Maximum possible score: 100
  - 50 from infrastructure, 50 from equity
- Priority Scores ranged from **14.13 to 66.22**
  - Categorized by percentile (by segments)

Network Scoring

Category	Lower Bound	Upper Bound	Total Mileage in Category
Minimum Score to 25th Percentile Score	14.13	36.79	24.0
25th Percentile Score To Median	36.80	43.23	20.5
Median to 75th Percentile Score	43.24	49.32	21.2
75th Percentile Score To Maximum Score	49.33	66.22	21.3

Network Scoring

- Blocks with a Priority Score of 49.33 and above would be considered *reasonable and justified candidates for reconstruction*

- There are *not* the only potential candidates – SMTC's methodology is only one of several different options.

- *What about economies of scale?*

Weighted Average Priority Score

- Created to give the City a general idea of the overall priority of a road.

- Calculation:

$$\overline{P} = \frac{\sum p_i l_i}{\sum l_i}$$

- Segments created based on federal-aid eligibility
  - FAE segments: "Syracuse Count Program" segments
  - Non-FAE segments: Road name

Deliverables

- List of blocks which fell above the 75th Percentile Score (49.33)
- All street segments, ordered by Weighted Average Priority Score
- Maps of the City with these metrics included.

APPENDIX A – Individual Street Blocks with scores above 75th Percentile (Value higher than 49.33)

BPID	STREET NAME	FROM	TO	Priority Score	Miles	Feet	2022 Rating	FAE
SYR793	Cortland Ave E	Oxford	Castle	66.22	0.15	7,962	4	Yes
SYR2865	Rose Ave	Oakwood	S. McBride	65.15	0.09	4,865	4	No
SYR1856	Jackson St	McBride	Almond	65.15	0.04	2,341	4	No
SYR2487	New St	S. Salina	Linden	64.14	0.05	2,563	5	No
SYR2447	Montgomery St	Burt	Raynor	63.07	0.19	9,929	4	No
SYR3608	Walton St	Franklin	Fayette	62.67	0.16	8,240	4	No
SYR7782	Kirk Park Dr	Crehange	Elmhurst	62.37	0.08	4,455	4	No

APPENDIX B – Combined Street Segments ordered by Weighted Average Priority Score

Road Name	From	To	Weighted Average Priority Score	Weighted Average Pavement Rating	Miles
Rose Ave	Local Applicable Segment	See Map	65.15	4.00	0.09
Linden St	Local Applicable Segment	See Map	59.96	5.00	0.12
Van Buren St	Local Applicable Segment	See Map	59.94	5.00	0.09
McBride St S	Local Applicable Segment	See Map	59.80	5.00	0.49
Fage Ave	Local Applicable Segment	See Map	59.77	4.00	0.18
Standart St	Local Applicable Segment	See Map	58.90	4.00	0.13

QUESTIONS?

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