



STATE OF PLACE

# NATIONAL ACADEMIES ACCELERATING CLIMATE PROGRESS WORKSHOP:

How Data & AI can Harness the Power of  
Place to Improve Climate Resilience &  
Quality of Life

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**WHERE  
WE LIVE  
PRE-DETERMINES  
HOW  
WELL  
WE LIVE**







# POOR URBAN DESIGN COSTS US ALL - EXPONENTIALLY

**\$871B**  
VEHICLE  
COLLISIONS



**\$2.9T**  
CHRONIC  
DISEASE



**\$450B**  
CRIME &  
VIOLENCE



**\$ 87 B**  
AIR  
POLLUTION



**\$117B**  
OBESITY



**\$ 763 B**  
ECONOMIC  
OPPORTUNITY



**\$2T**  
CLIMATE  
CHANGE



URBAN  
DESIGN



STATE OF PLACE

BEHAVIORS &  
PERCEPTIONS



QUALITY OF LIFE



Thriving, Resilient Places



*Machine  
Learning*

*Computer  
Vision*

*Large  
Language  
Models  
(LLMs)*

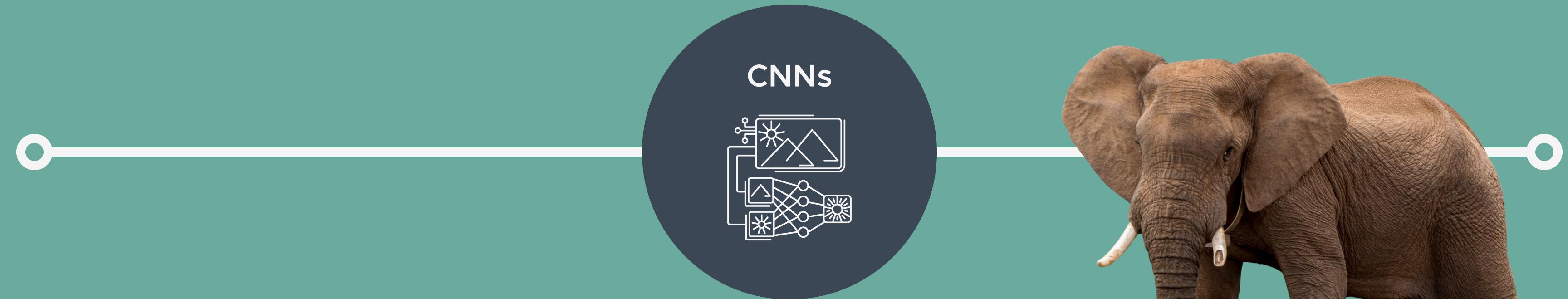
*Generative AI*

AI

# COMPUTER VISION

**PURPOSE:** *Teach machines to see, interpret, and uncover patterns in visual data – both visible and hidden*

POWERED BY



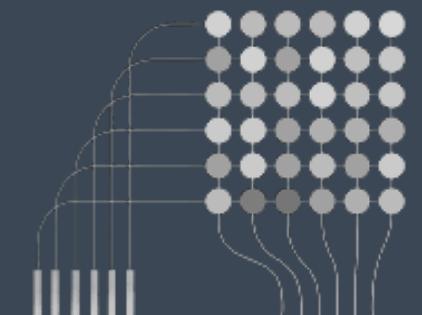
*AKA: Convolutional Neural Networks*

# LARGE LANGUAGE MODELS (LLMS)

**PURPOSE:** *Understand and generate language - sequences of text, code, speech, etc.*

**POWERED BY**

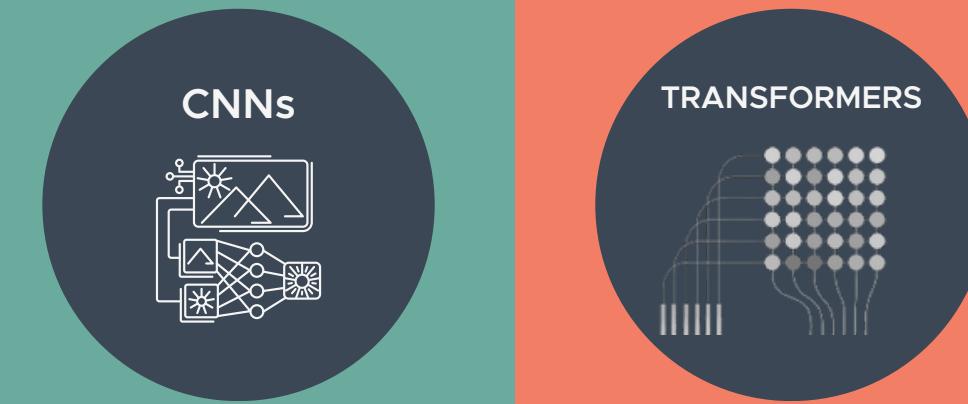
TRANSFORMERS



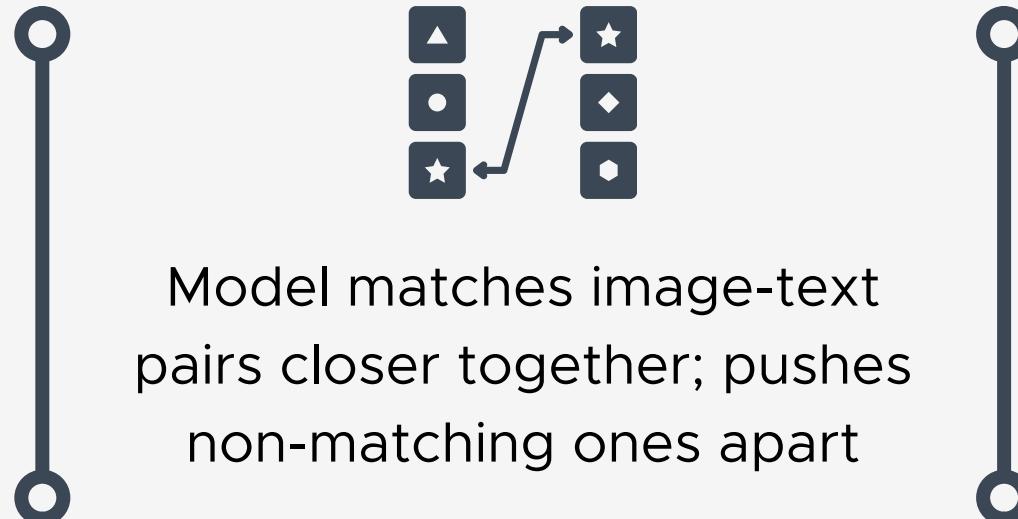
# CLIP

**PURPOSE:** *Connects images and text - model learns visual concepts from natural language; allows computers to “see” through words & “describe” through images*

## CLIP COMBINES TWO ENCODERS:



Translate inputs (image + text) into mathematical representations



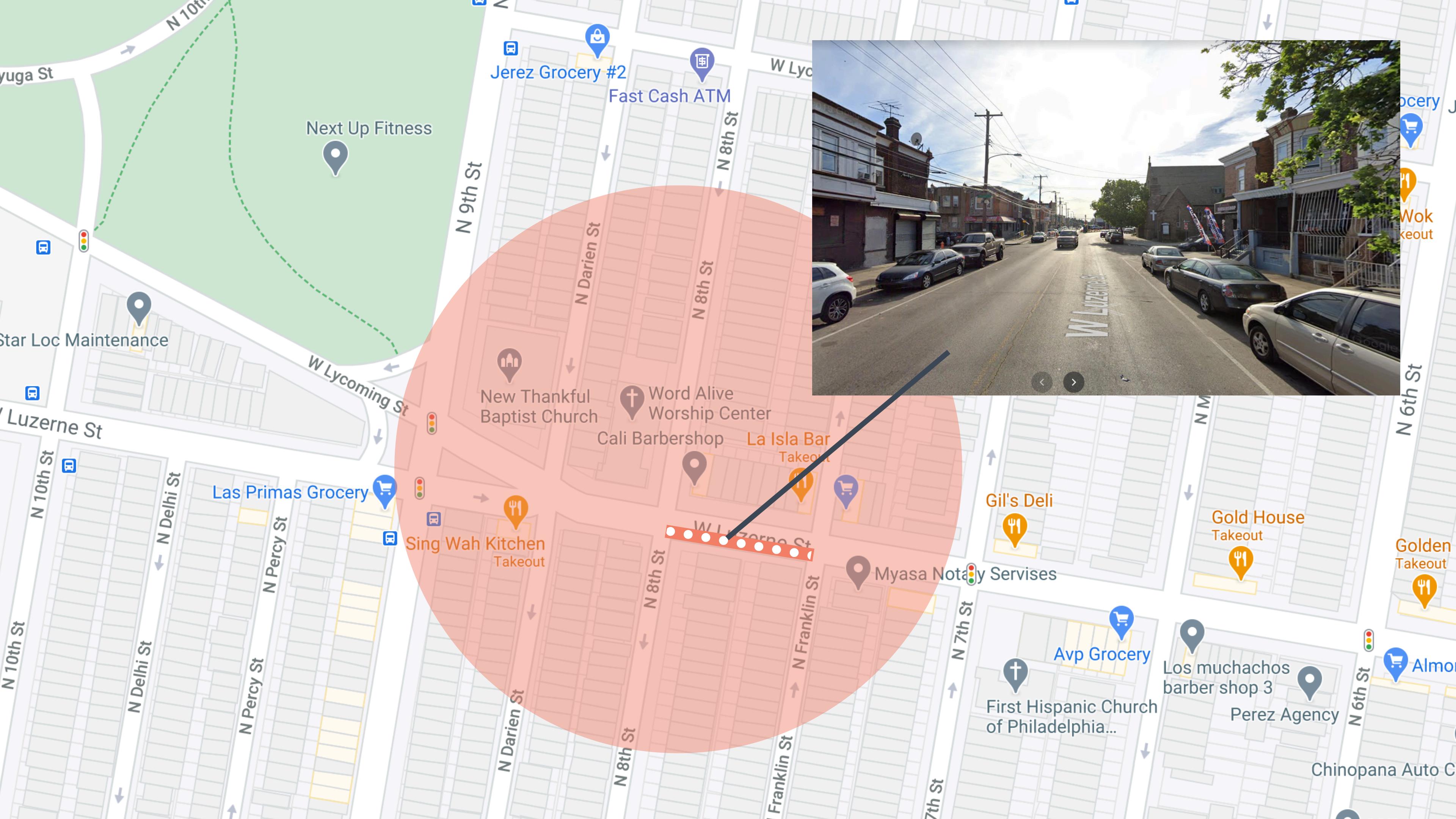
Model matches image-text pairs closer together; pushes non-matching ones apart



Trained model ranks images by how well they match concepts; no manual labeling required.



# Meet IRIS!

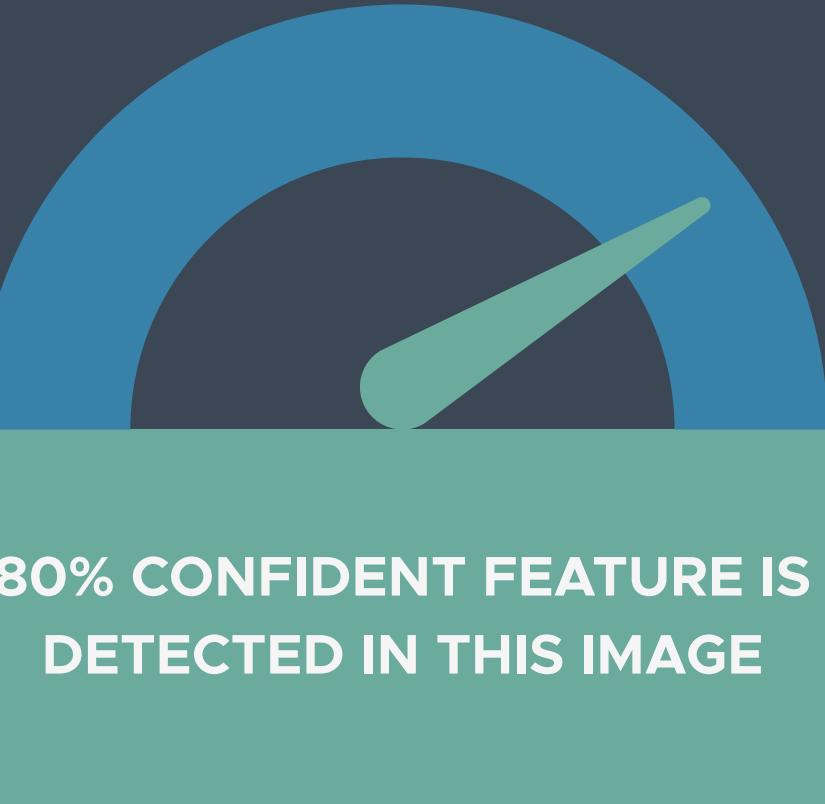




IMAGES AT 4 ANGLES

*“a sidewalk along  
a street”*

TEXT PROMPT



SIDEWALK DETECTED



150+  
TOTAL!

15

14

13

12

10

11

9

8

7

6

4

3

1

2

5



150+  
TOTAL!

91.5

...

15

14

13

12

10

11

9

7

8

6

4

1

3

2

5

# BUILT ENVIRONMENT DATA: STATE OF PLACE INDEX & 10 DIMENSIONS



Building Compactness & Height

**Density**



**Form**

Streetscape Continuity & Enclosure



**Connectivity**

Ease of Access; Lack of Pedestrian/Bike barriers



Access to Non-Residential Destinations & Diversity of Land Use

**Proximity**



**Public Spaces**

Presence, Quality, & Access to Hard & Soft Scape Public Spaces



**Rec. Facilities**

Presence of Outdoor & Indoor Physical Activity Facilities



**Ped/Bike Amenities**

Features that Make it Comfortable for Pedestrians & Bicyclists



**Traffic Safety**

Quality & Safety of the Intersection; Traffic Calming Features



**Aesthetics**

Urban Design Features that Make Places Dynamic & Inviting



**Personal Safety**

Features that Influence Perceptions of Personal Safety



SELECT LOCATIONS

HEAT MAP

BROWSE DATA

PRIORITIZE

ANALYZE SCENARIOS

FORECAST FINANCIALS

API

## Browse data

[Download report](#)

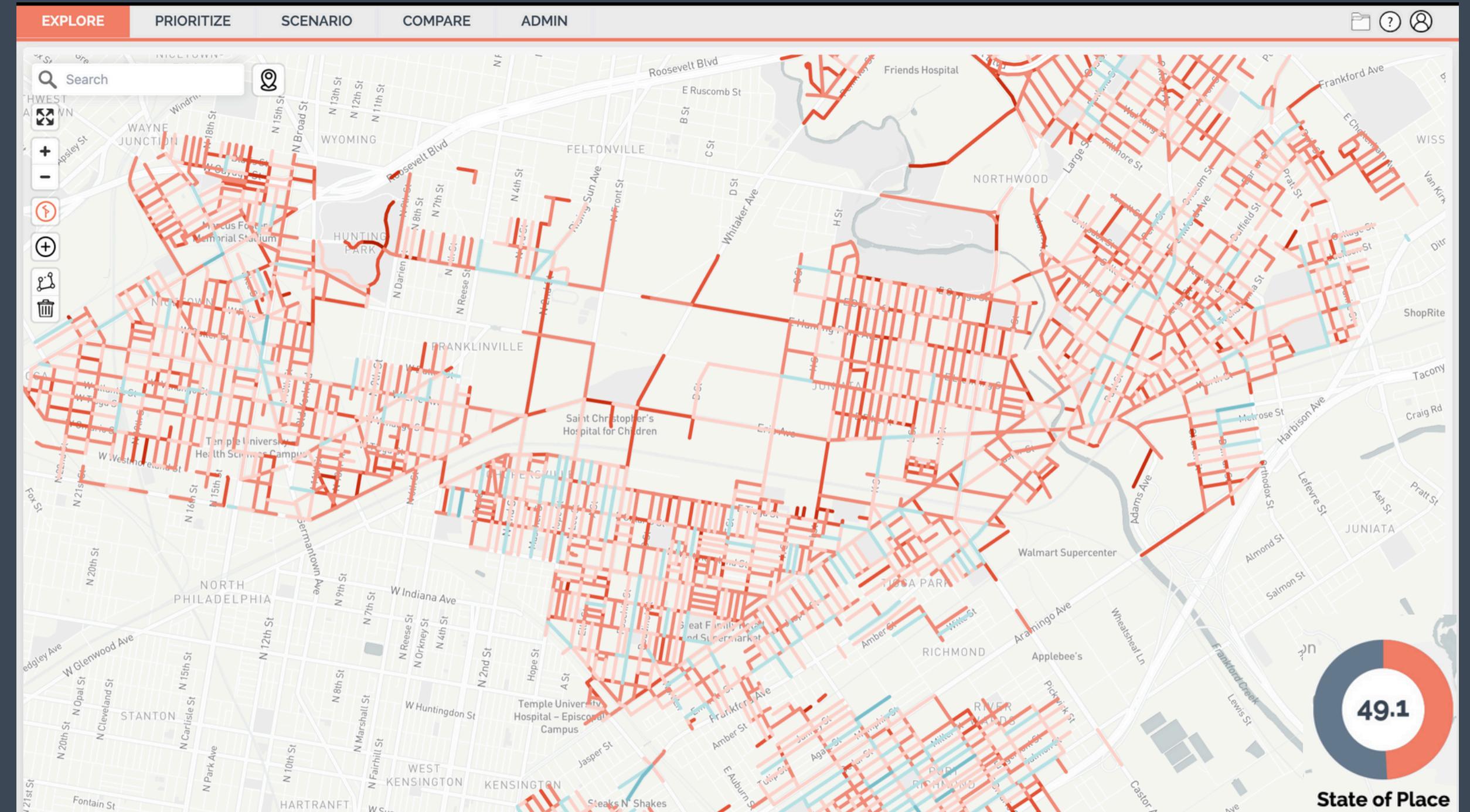
VIEW DATA FOR

All blocks in the project

### SoP Profile for all blocks in the project

The State of Place Index is composed of ten urban design dimensions empirically known to impact people's decisions to walk. Explore each dimension by clicking on it.







**STATE OF PLACE**

**Analyze Scenarios** [Download report](#)

**CREATE NEW SCENARIO** OR **DVRC New**

**SoP Profile for DVRC New**  
Created: August 18th 2020, 05:06:39, Last updated: September 4th 2020, 01:42:33

The graph below describes the State of Place indices for the DVRC New scenario, broken down into the ten urban designs dimensions.

**91.5**

**SELECT LOCATION**  
**ASSESS**  
**PRIORITIZE**  
**IMAGINE**  
**OPTIMIZE**

**Urban Fabric**

Dimension	Score
Form	85
Density	78
Connectivity	52

**Park & Public Spaces**

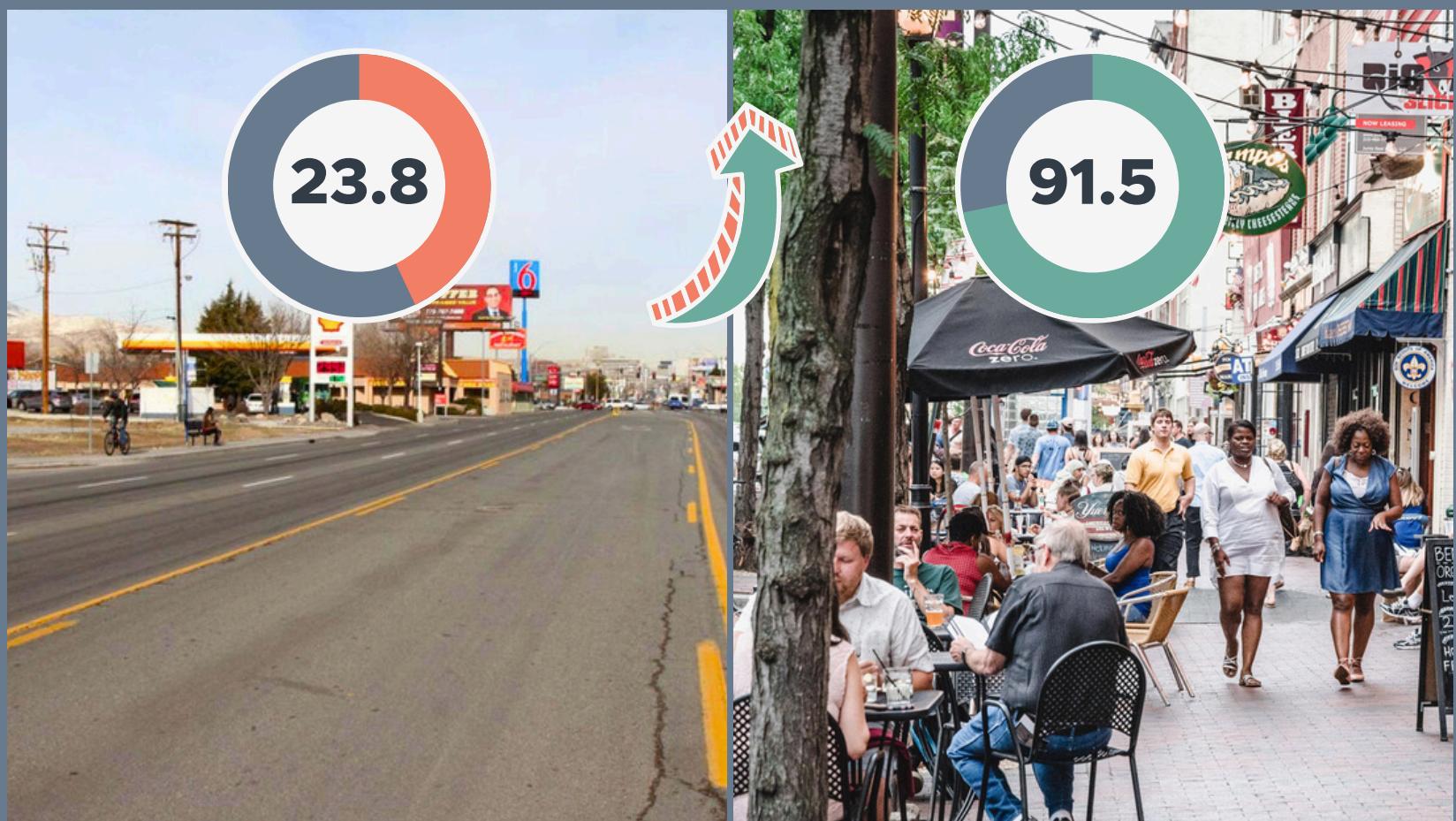
Dimension	Score
Park & Public Spaces	45
Recreational Facilities	38

**Human Needs and Comfort**

Dimension	Score
Peasant & Bike Amenities	38
Traffic Safety	65

**Liveliness and Upkeep**

Dimension	Score
Aesthetics	92
Personal Safety	95



34.3

SoP Index

SELECT LOCATION

BROWSE DATA

PRIORITIZE

ANALYZE SCENARIOS

FORECAST FINANCIALS

Analyze

Download report

SoP Profile for

The graph below shows the SoP Index for this location. Click on the segments to zoom in and scroll down into the details for each segment.

100

75

50

25

0

Existing Profile

Test 2

## Create a New Scenario

### 3. Edit urban design features for each block

Block



All edits are saved automatically

GOT IT

Herisauer Str segment: 3 Biderstrasse to Cul de sac

\* Recommended Features to Change  
(Coming Soon!)

Neighborhood ID 0

Intersection Quality 0

Sidewalks 1

Land Uses - Residential 0

Land Uses - Public 0

Land Uses - Commercial 0

Land Use Mix 0

Public Space & Gathering Places 0

Bicycle Amenities 2

Public Realm 4

Aesthetics 0

Parking 1

Traffic & Roadway Features 0

Personal Safety 0

DEFINITIONS

Is there a surface parking lot on the segment?

No       One Side       Both Sides

What is the average size of the parking lot?

Small       Medium       Large       Extra large

How much of the segment does the parking lot cover?

Little       Some/A lot

Is there a parking structure visible on this segment? Do not include parking structures that are completely under ground.

Looking at the front of the parking structure on the street level floor, what is the predominant use that is visible to you?

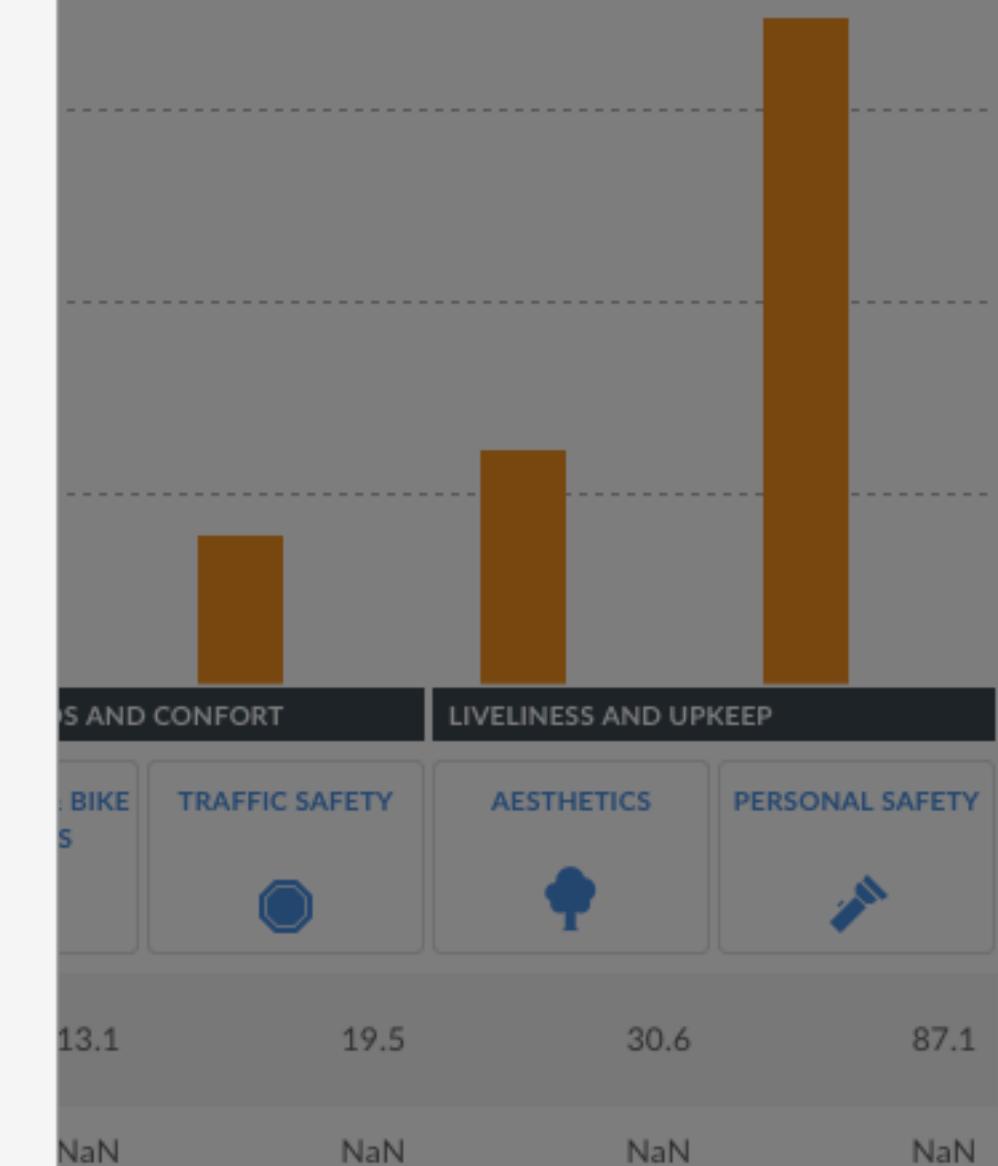
Not Parking, Other Uses       Varied       Parking

How many driveways are visible on the segment?

SAVED SCENARIO

Test 2

Edit Scenario

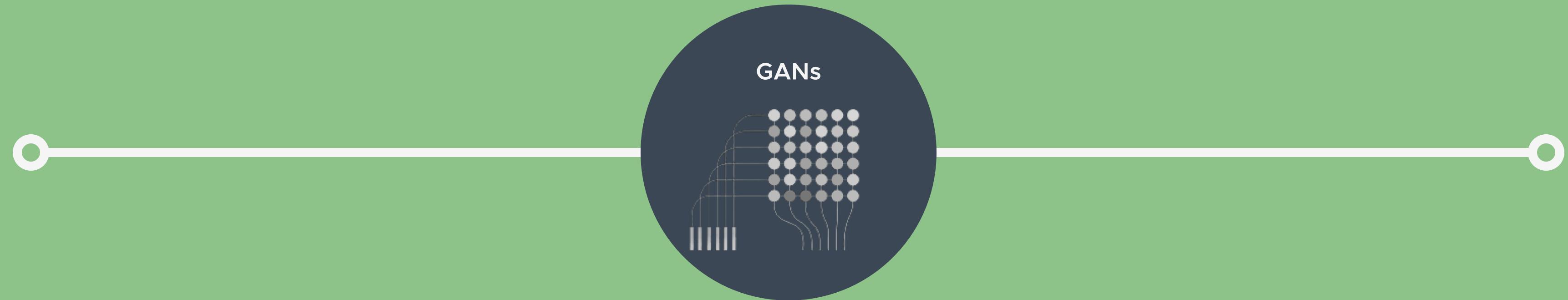


# GENERATIVE AI

## PURPOSE:

- *Creates new content - text, images, audio, or designs - that resemble the data it learned from*
- *Gen-AI doesn't predict - it synthesizes something NEW*

## POWERED BY



AKA: *Generative Adversarial Networks*

# MACHINE LEARNING

## PURPOSE:

- *Find statistical relationships in structured, tabular data*
- *Algorithms use data and optimization to minimize prediction error*

## POWERED BY



23.8

SELECT LOCATION

ASSESS

PRIORITIZE

IMAGINE

OPTIMIZE

**STATE OF PLACE**

## Prioritize Goals

My projects ▾ Feedback Help Account ▾

VIEW DATA FOR **All blocks in the project**

What are this project's most important goals?

- Walkability
- Office Rents
- Retail Rents
- Retail Revenues
- Commercial Property Values
- Job Creation
- Visitor Satisfaction
- Visits
- Chronic Disease Reduction
- Vehicle Collision Mitigation
- Vehicle Miles Traveled
- Flood Mitigation

Relative importance of each dimension  
**All blocks in the project**



1. Pedestrian & Bike Amenities  
2. Proximity  
3. Park & Public Spaces  
4. Traffic Safety  
5. Density  
6. Aesthetics  
7. Recreational Facilities  
8. Connectivity  
9. Form  
10. Personal Safety

Relative importance of each dimension

State of Place prioritization identifies which urban design dimensions should be emphasized, considering three key factors:

- The project area's current performance across the ten dimensions (SoP Index)
- Predicted impact on key goals
- The feasibility (level of difficulty) in improving each of the ten dimensions

ADJUST FEASIBILITY

ADD



MODIFY



34.3

SoP Index

## Prioritize G

 Download report

### What are this project's goals?

Increase walkability

Increase office rents

Increase retail rents

Increase retail revenue

Increase residential rents

Increase residential density

SELECT LOCATION

BROWSE DATA

PRIORITIZE

ANALYZE SCENARIOS

FORECAST FINANCIALS

### Adjust Feasibility

How difficult is to make changes in the following areas? Adjust the sliders for each dimension below.

#### Definitions

DIMENSION	HARDEST TO CHANGE	EASIEST TO CHANGE
Form	<div><div style="width: 10%;">Hardest</div></div>	<div><div style="width: 90%;">Easiest</div></div>
Density	<div><div style="width: 10%;">Hardest</div></div>	<div><div style="width: 90%;">Easiest</div></div>
Connectivity	<div><div style="width: 10%;">Hardest</div></div>	<div><div style="width: 90%;">Easiest</div></div>
Proximity	<div><div style="width: 20%;">Hardest</div></div>	<div><div style="width: 80%;">Easiest</div></div>
Park & Public Spaces	<div><div style="width: 15%;">Hardest</div></div>	<div><div style="width: 85%;">Easiest</div></div>
Recreational Facilities	<div><div style="width: 10%;">Hardest</div></div>	<div><div style="width: 90%;">Easiest</div></div>
Pedestrian & Bike Amenities	<div><div style="width: 30%;">Hardest</div></div>	<div><div style="width: 70%;">Easiest</div></div>
Traffic Safety	<div><div style="width: 40%;">Hardest</div></div>	<div><div style="width: 60%;">Easiest</div></div>
Aesthetics	<div><div style="width: 50%;">Hardest</div></div>	<div><div style="width: 50%;">Easiest</div></div>
Personal Safety	<div><div style="width: 60%;">Hardest</div></div>	<div><div style="width: 40%;">Easiest</div></div>

CANCEL

SAVE CHANGES

risauer Str segment: 3 Biderstrasse to Cul de sac

de sac



sign dimensions should be

ten dimensions (SoP Index)

of the ten dimensions

ADJUST FEASIBILITY

Downtown Austin



SELECT LOCATIONS

HEAT MAP

BROWSE DATA

PRIORITIZE

ANALYZE SCENARIOS

FORECAST FINANCIALS

### 3. Financial Forecast for Philly

Total value captured

**\$377,401,453.40**

Office Rent

STATE OF PLACE PREMIUM

**\$11.51**/sq. foot

\$2.52 Additional transit premium

VALUE CAPTURED

**\$22,059,550.35**

\$23,820,307.98 Additional transit premium

ROI (Total Value/Dollar)

**\$3.77**

Retail Rent

STATE OF PLACE PREMIUM

**\$8.76**/sq. foot

\$7.30 Additional transit premium

VALUE CAPTURED

**\$8,054,060.17**

\$10,096,746.09 Additional transit premium

Retail Revenues

STATE OF PLACE PREMIUM

**\$185.24**/sq. foot

\$101.04 Additional transit premium

VALUE CAPTURED

**\$134,834,000.00**

\$170,198,000.00 Additional transit premium

Residential Rent

STATE OF PLACE PREMIUM

**\$409.37**/unit

\$10.10 Additional transit premium

VALUE CAPTURED

**\$986,560.75**

\$11,923,603.80 Additional transit premium

Residential For Sale

STATE OF PLACE PREMIUM

**\$610.48**/sq. foot

\$53.39 Additional transit premium

VALUE CAPTURED

**\$211,467,282.13**

\$218,942,084.28 Additional transit premium

Durham Guess Road



Guess Street  
Scenario(+51.8)  
SELECT LOCATION

BROWSE DATA

PRIORITIZE

ANALYZE SCENARIOS

FORECAST VALUE-ADD

## Benefits Forecast for Guess Street Scenario

Total value captured

\$7,388,129.96

ROI (Total Value/Dollar)

\$9.85

ESTIMATED HEALTH IMPACTS



42.7% ↓

ESTIMATED ENVIRONMENTAL IMPACT



32.5% ↓

ESTIMATED ECONOMIC IMPACT



35.2% ↑



21.9% ↓



33.6% ↓



23.4% ↑



34.6% ↓



43.1% ↓



29.9% ↑



## STATE OF PLACE

### High Vulnerability

19116 Somerton

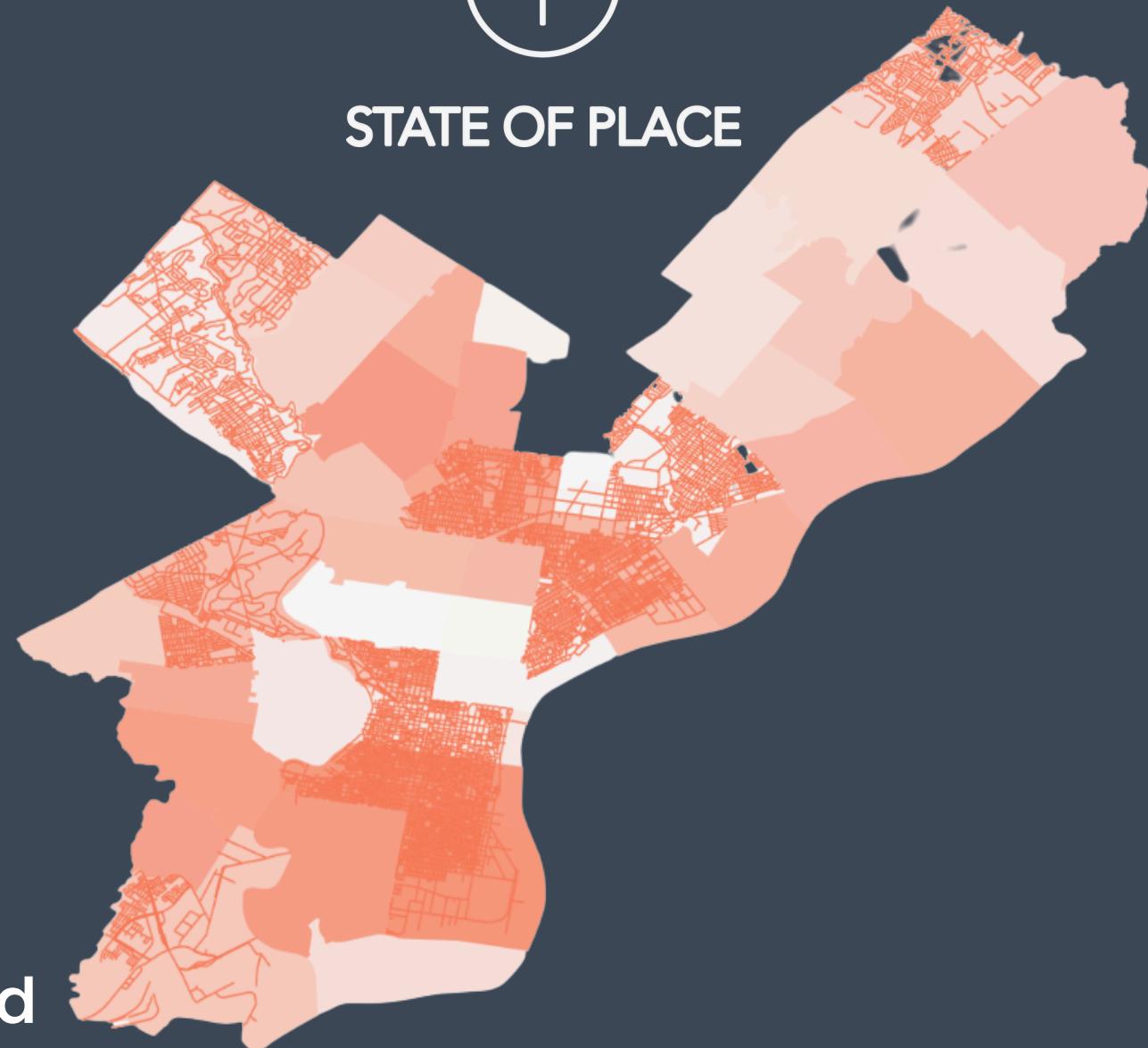
19124 Juanita, Frankford

19131 Parkside

19140 Hunting Park

19153 Southwest

19134 Kensington, Port Richmond



### Mixed Vulnerability

Roxborough 19128

Greys Ferry/Forgotten 19146

Bottom 19148

Pennsport/Lower 19125

Moyamensing

Fishtown

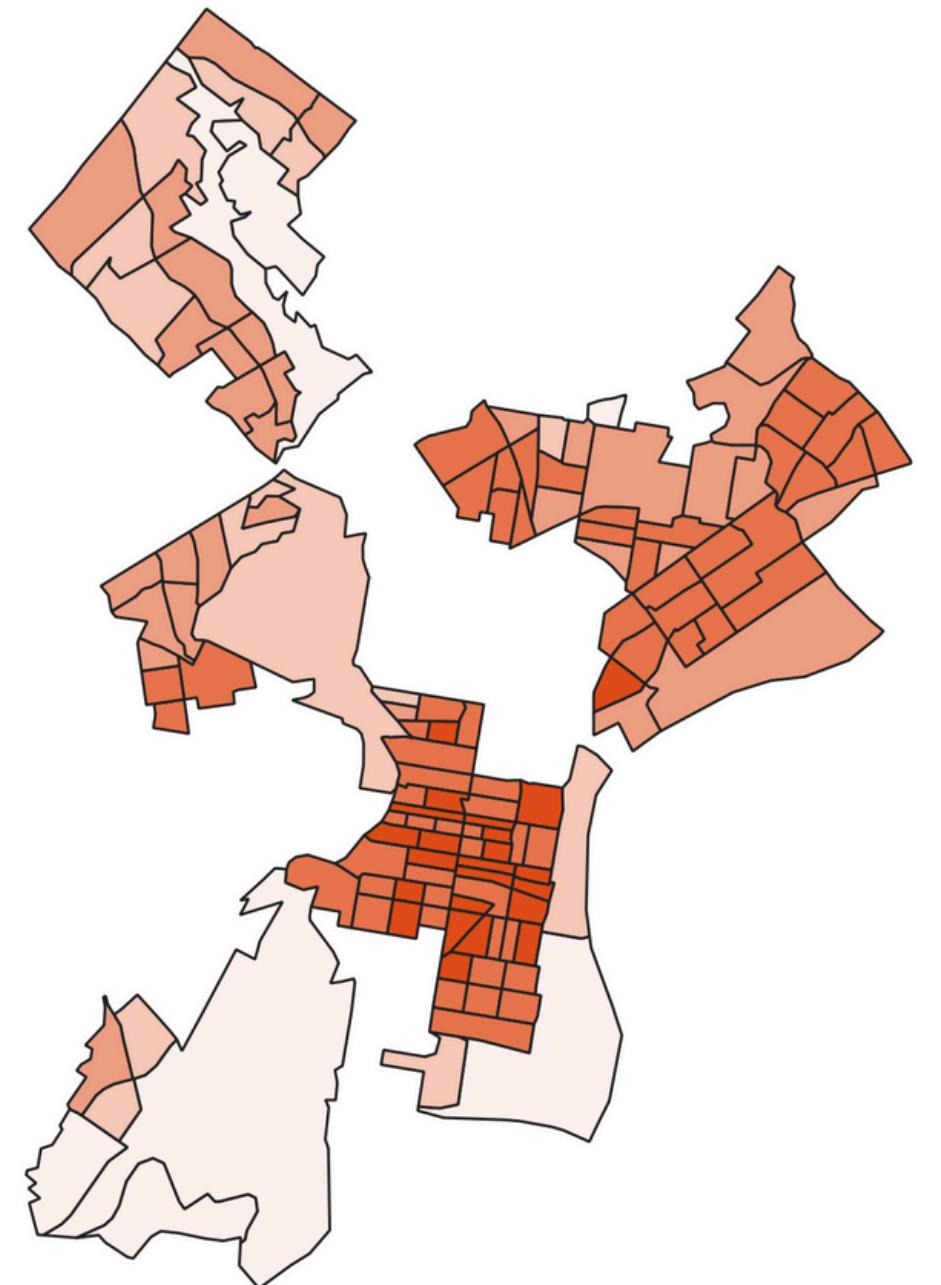
### Low Vulnerability

19102,19103,19106,19107 Center City

19130 Fairmount

19147 Queen Village/ Bella Vista/ Passyunk Square

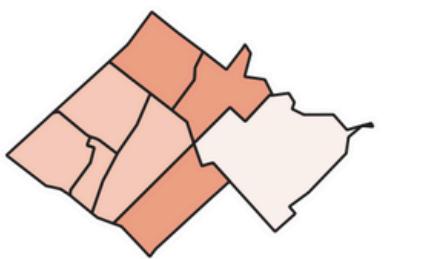
19118 Chestnut Hill

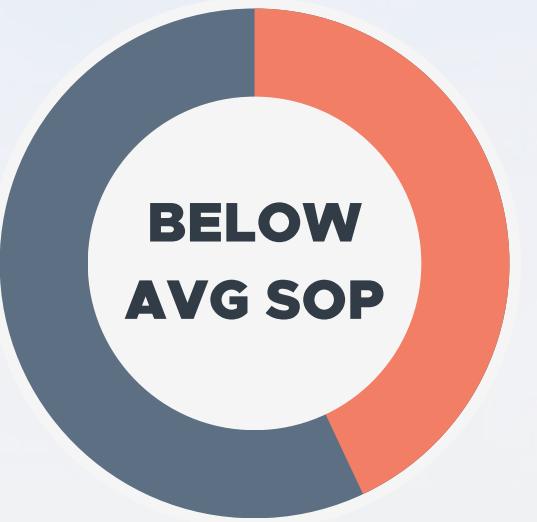


0 2.5 5 mi

**Census Tracts**  
State of Place Index

0 - 17
17 - 38
38 - 59
59 - 80
80 - 100

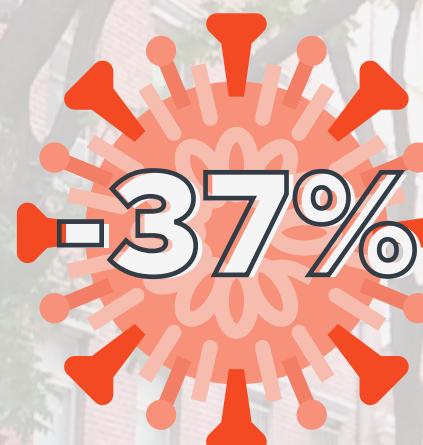




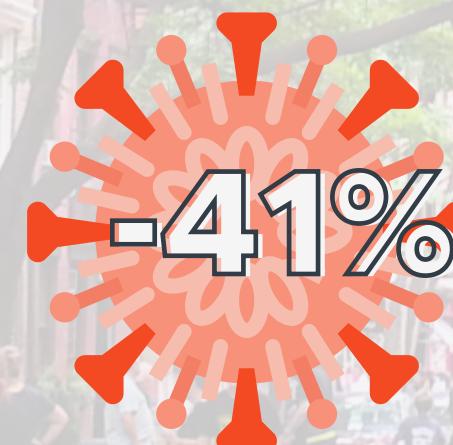
VS



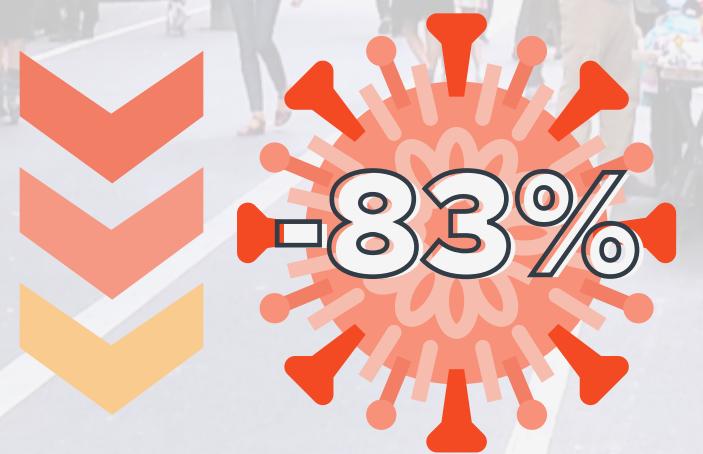
POSITIVITY  
RATE

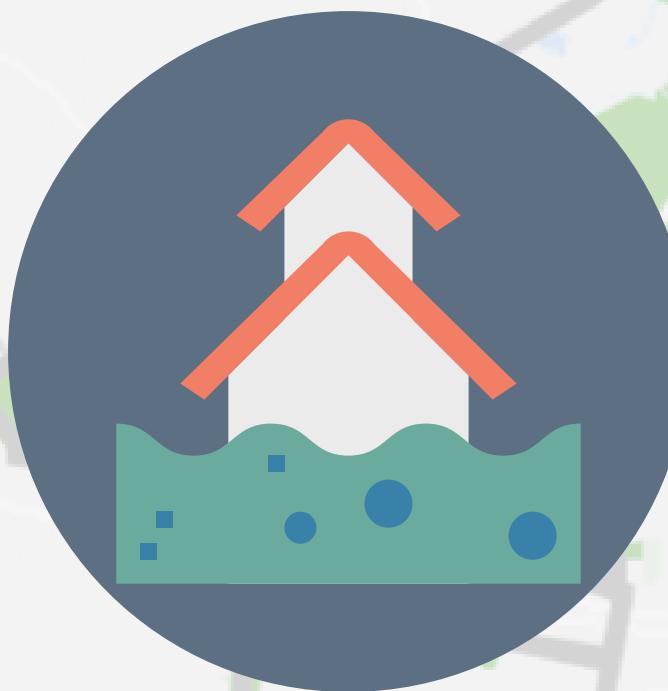


HOSPITALIZATION  
RATE

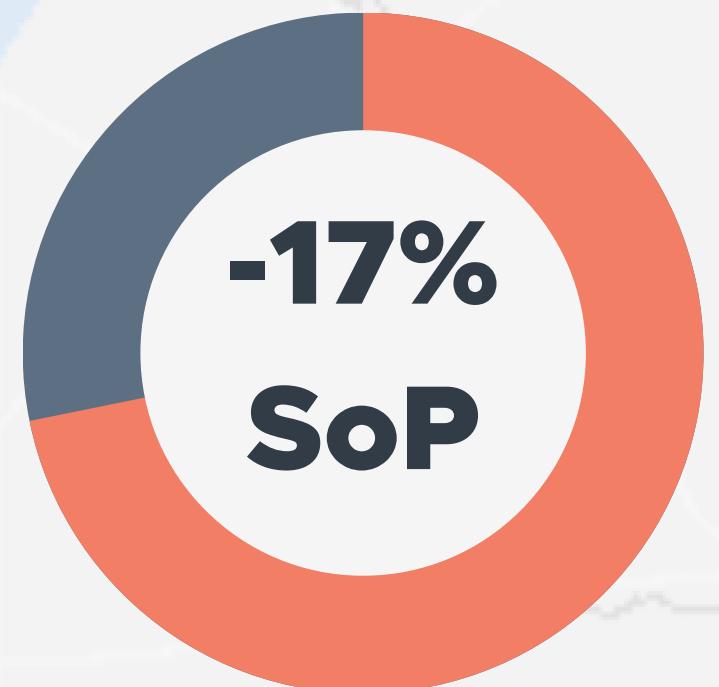


FATALITY  
RATE



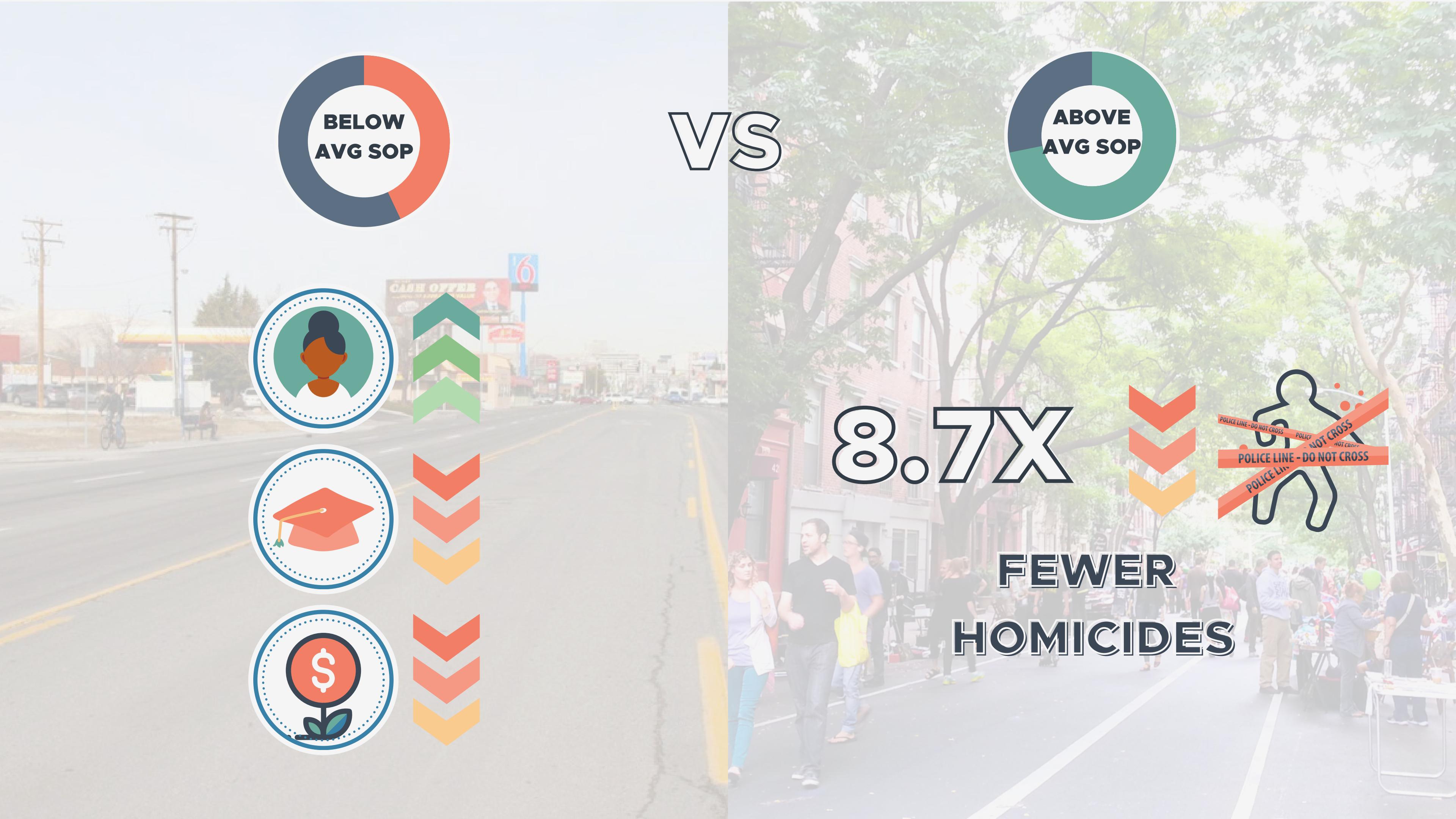


**FLOOD  
PLAIN**



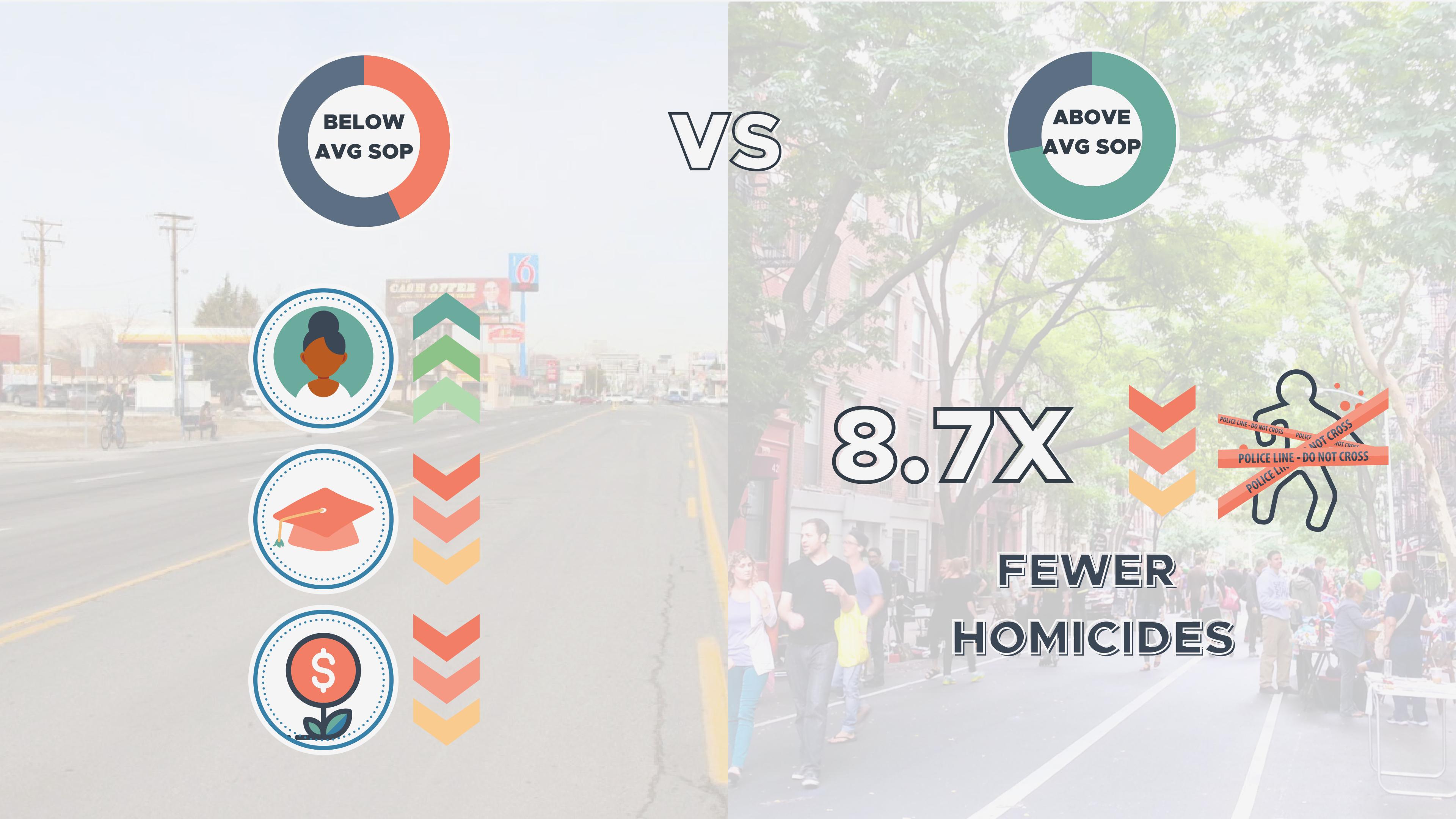


**HEAT  
DIFFERENTIAL**



**BELOW  
AVG SOP**

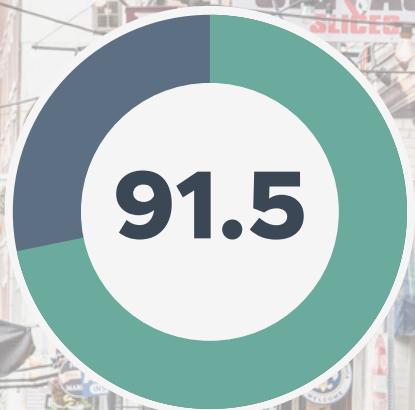
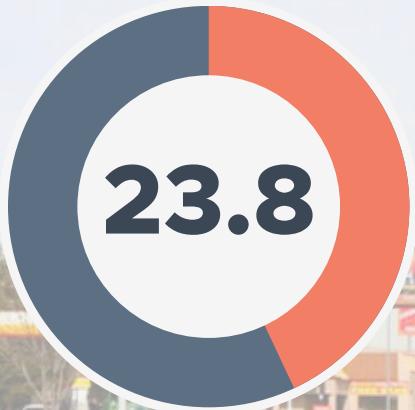
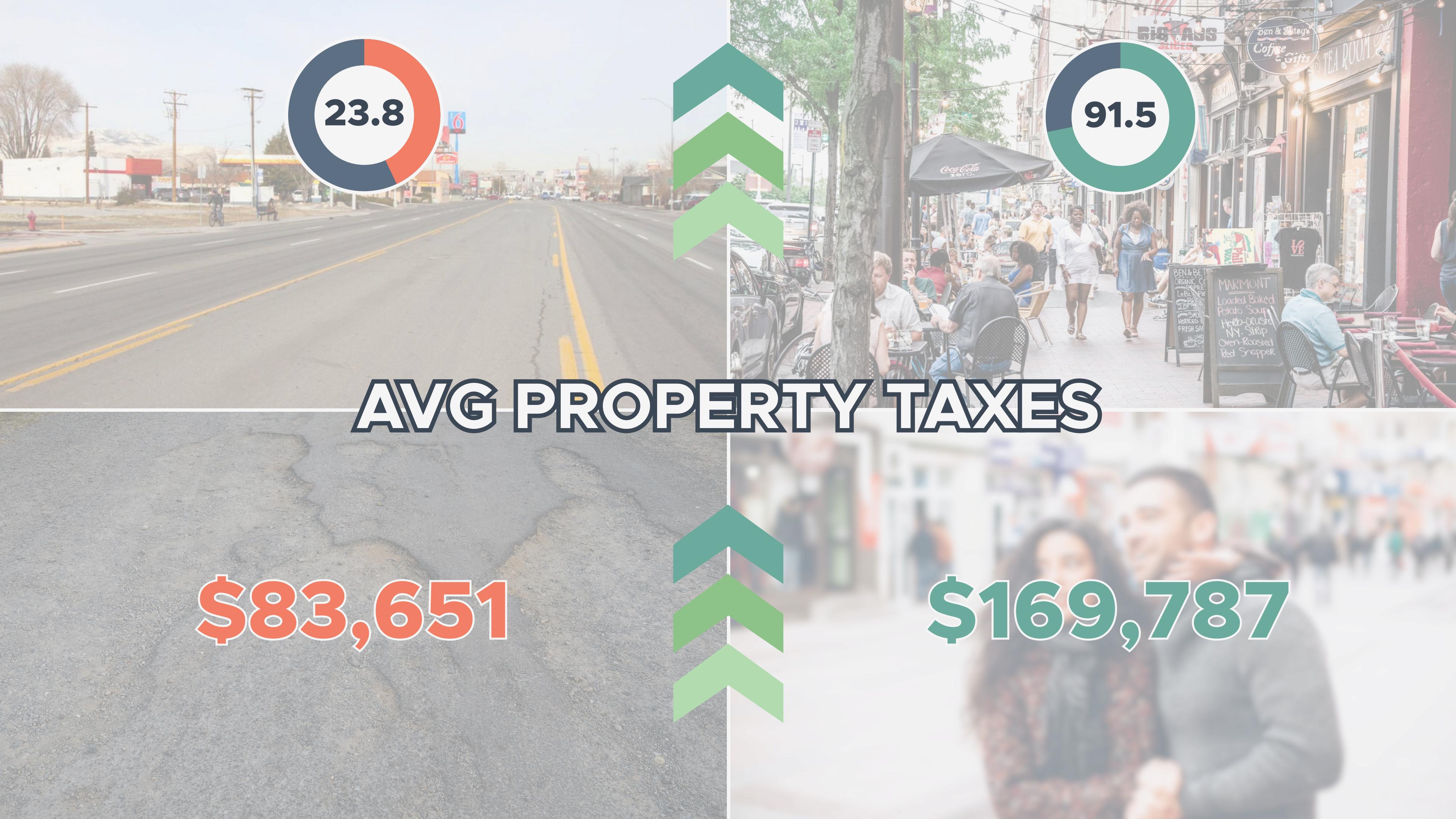
VS



**ABOVE  
AVG SOP**

**8.7X**  
**FEWER**  
**HOMICIDES**





## AVG PROPERTY TAXES

**\$83,651**

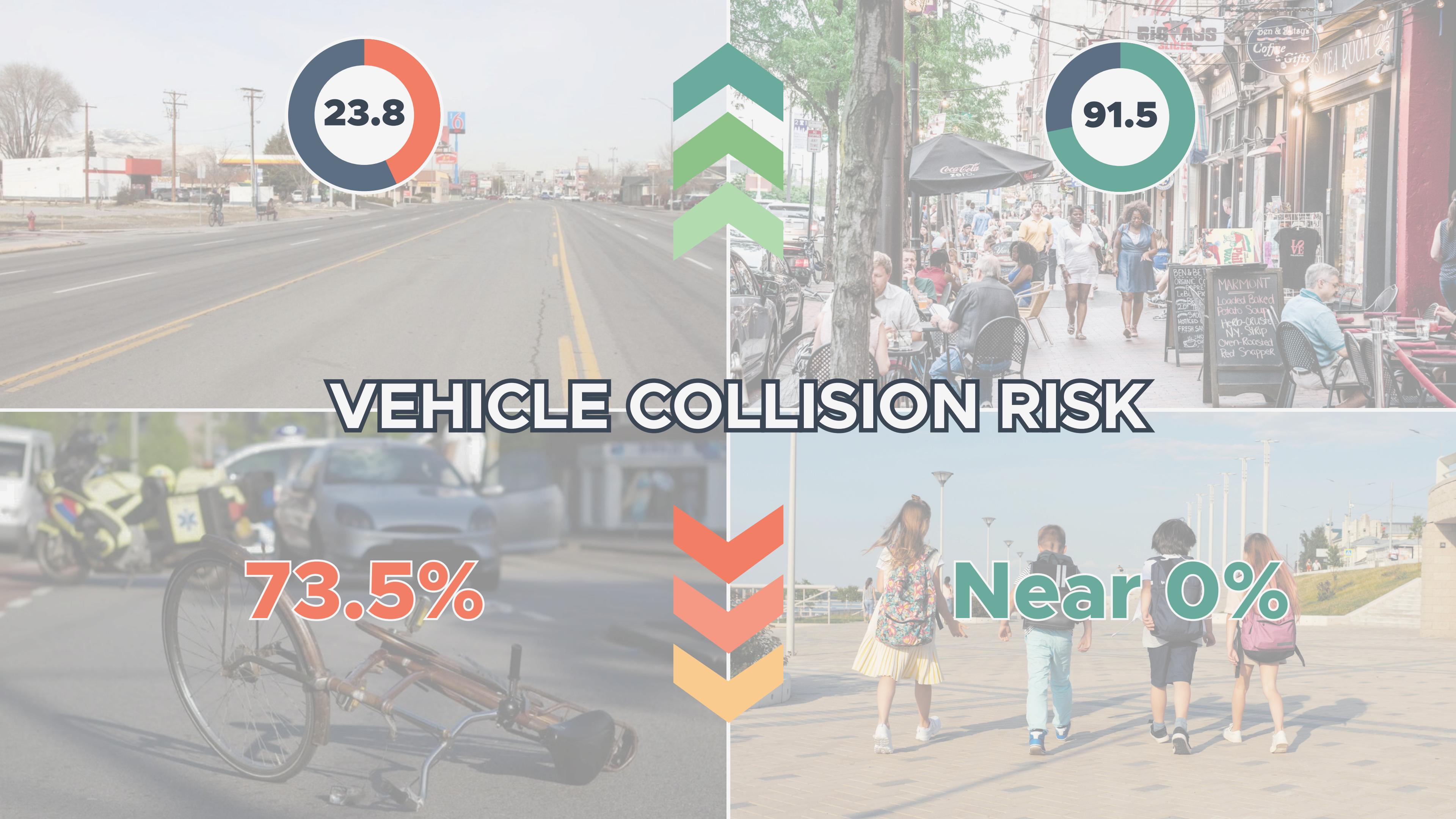


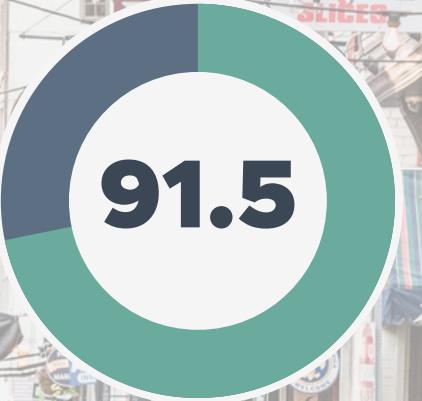
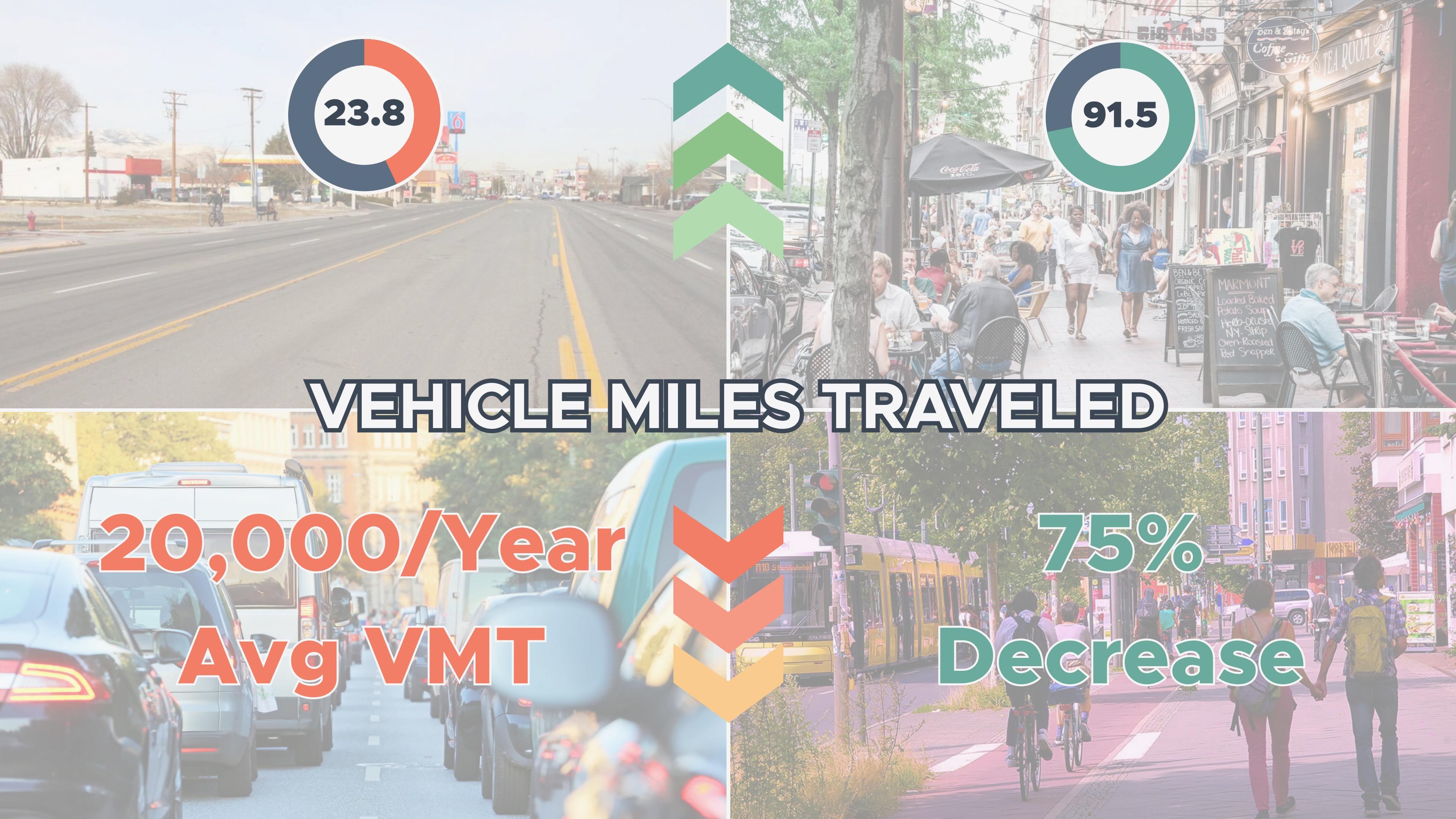
**\$169,787**



# DIABETES RATE







URBAN  
DESIGN



STATE OF PLACE

BEHAVIORS &  
PERCEPTIONS



QUALITY OF LIFE



KEY POINTS:

THE WHOLE IS BIGGER THAN THE SUM OF ITS PARTS

KNOW YOUR AUDIENCE

A woman with long brown hair, wearing a grey t-shirt, is smiling at the camera. She is standing on a city street with buildings in the background.

# THANK YOU!



## STATE OF PLACE



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