

**Welcome**

**Please Sign In**

**Bienvenidos**

**(Hablamos Español)**

**Por Favor Regístrese**

**Presentation Schedule (Salons E, F, G & H)  
7:00 pm**

**For more information - Para más información:**



# Midtown Reliability Project

Meeting everyday energy needs in the heart of Tucson for a lifetime



## SHORTER, LESS FREQUENT OUTAGES

- **36,936 households**
- **62 neighborhoods**
- **6,834 businesses**

All will benefit from a new 138-kilovolt (kV) "loop" around central Tucson supplying energy from more than one direction.

## ENERGY FOR A GENERATION OF TUCSONANS

The project would provide over 3x the capacity of the current systems



### **212% increase**

In Tucson's peak energy demand since 1975

## STRONG, HEALTHY COMMUNITY

Supports growing economy, population



Improves reliability in extreme weather

Provides midtown residents with same reliability benefits enjoyed in other areas



**100,000+ newsletters**

**55,000+ emails**

Sent to midtown homes, businesses and others about the project

## COST SAVINGS, GREATER EFFICIENCY



### **19 miles**

46-kV lines removed

### **8 46-kV substations retired**

### **\$52 million**

saved over 15 years by avoiding replacement of older equipment



### **268 miles**

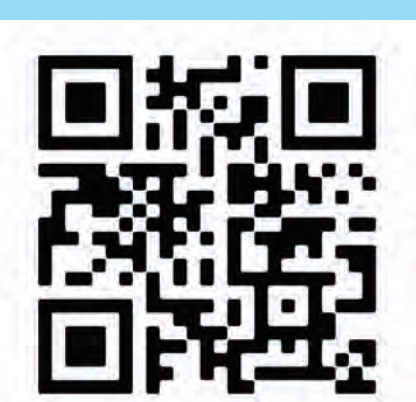
4-kV distribution circuits upgraded to 14-kV

with new poles, wires, switchgear and more

### **\$52 million investment**

in our local energy grid

- 7-8 miles of new 138-kV lines
- A new 138-kV substation

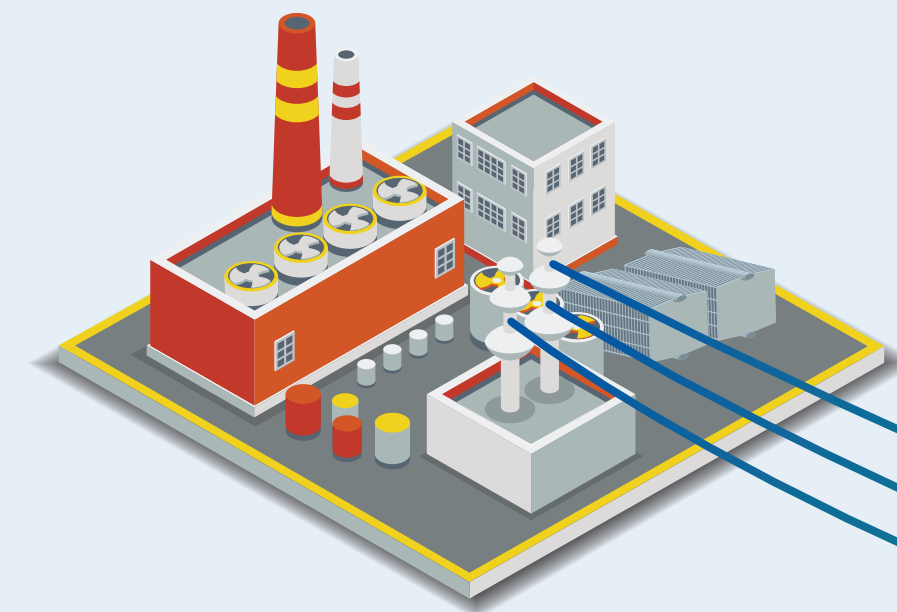


Learn more at [tep.com/midtown-reliability-project](http://tep.com/midtown-reliability-project)

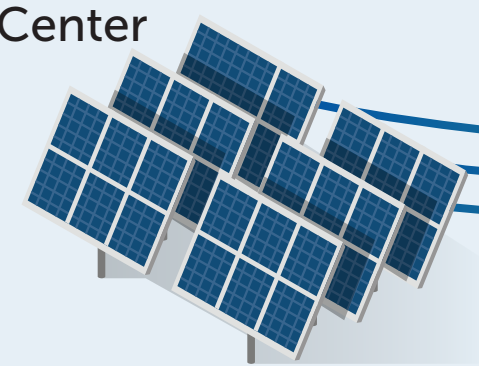
# Our Energy Grid

## How we deliver electric service to you

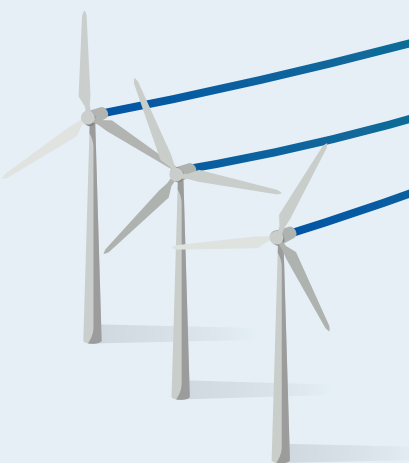
**Natural Gas**  
Sundt Generating Station  
in Tucson and others



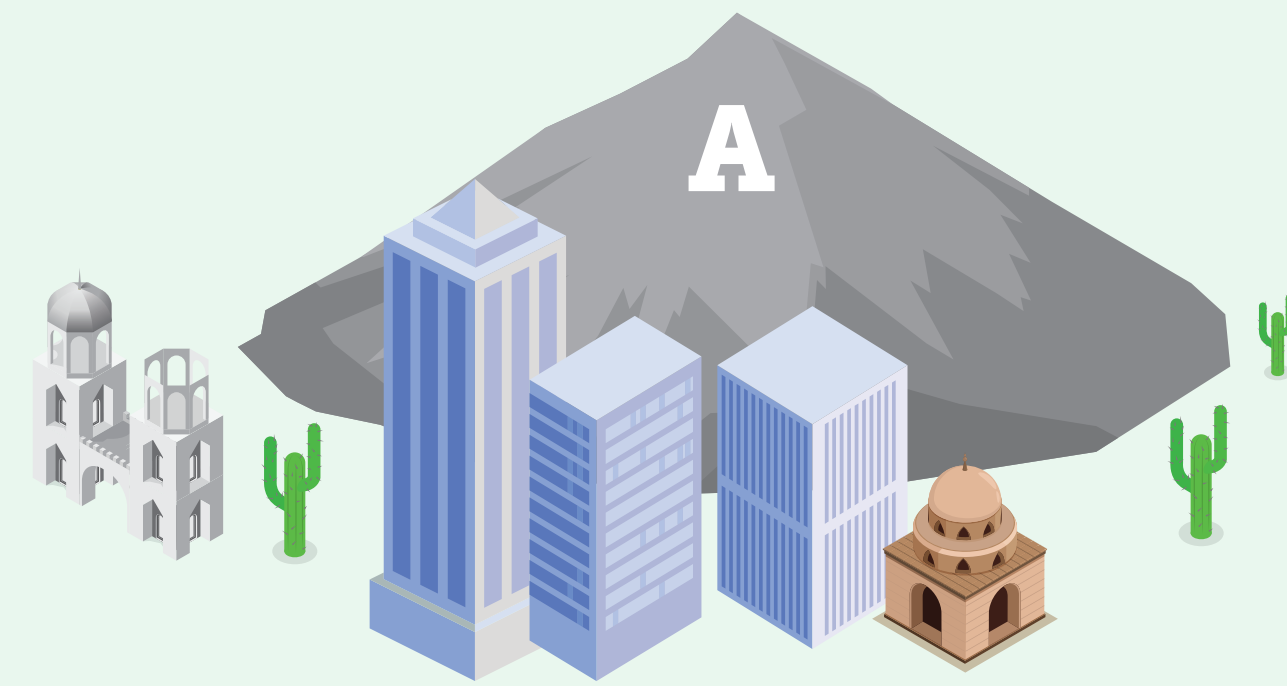
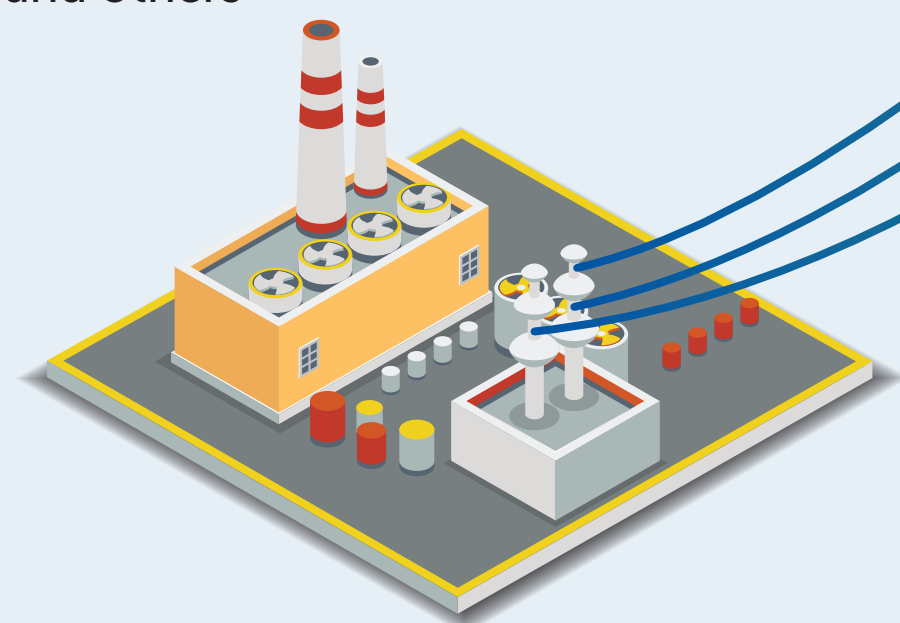
**Community Scale Solar**  
Wilnot Energy Center  
and others



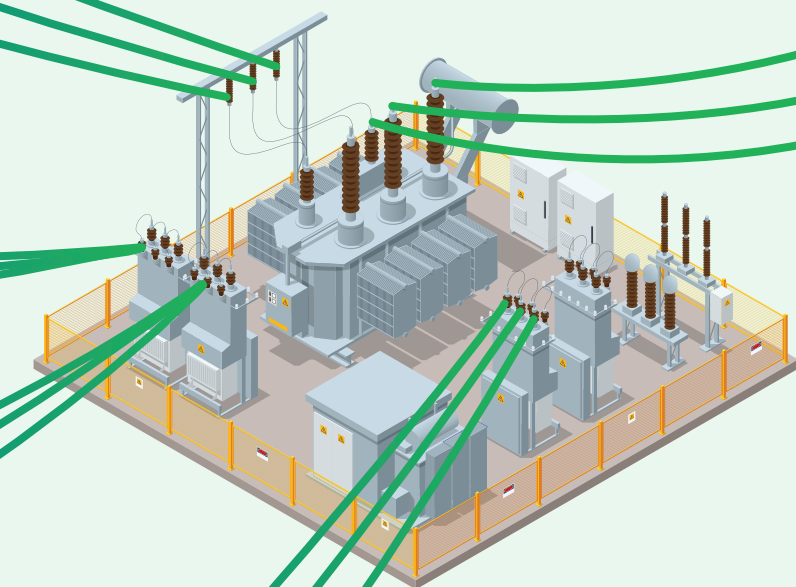
**Wind Resources**  
Oso Grande Wind  
and others



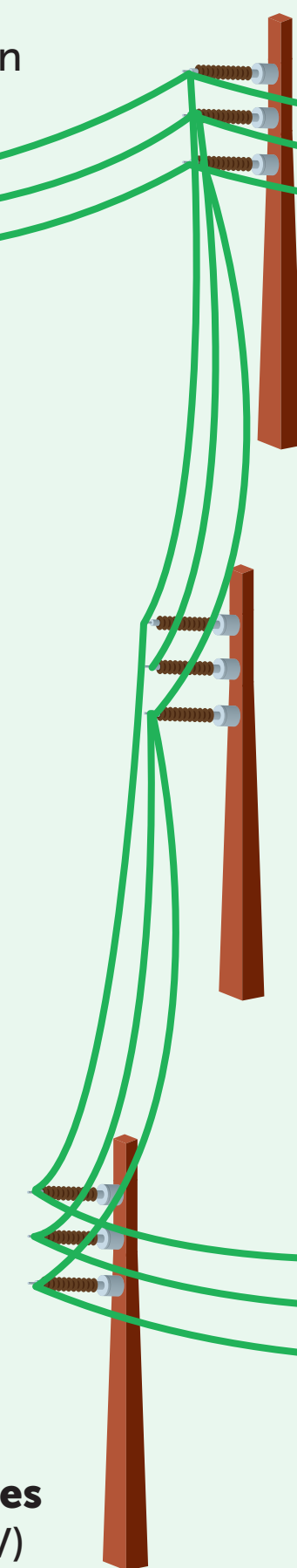
**Coal**  
Springerville Generating Station  
and others



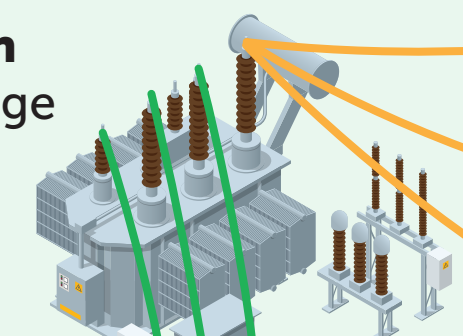
**High Voltage Substation**  
Steps up voltage for transmission



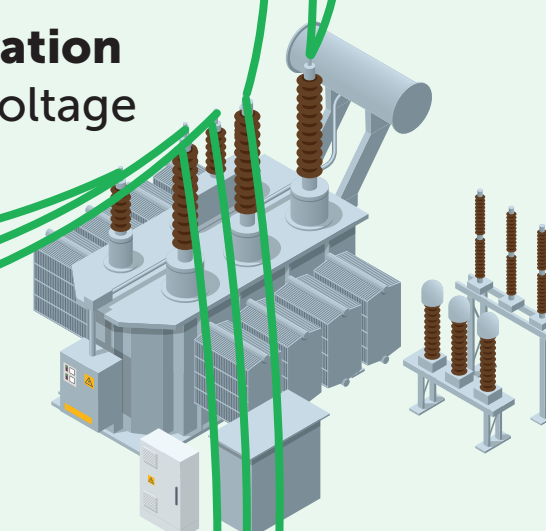
**High Voltage Transmission Lines**  
(500 kV / 345 kV / 230 kV 138 kV)



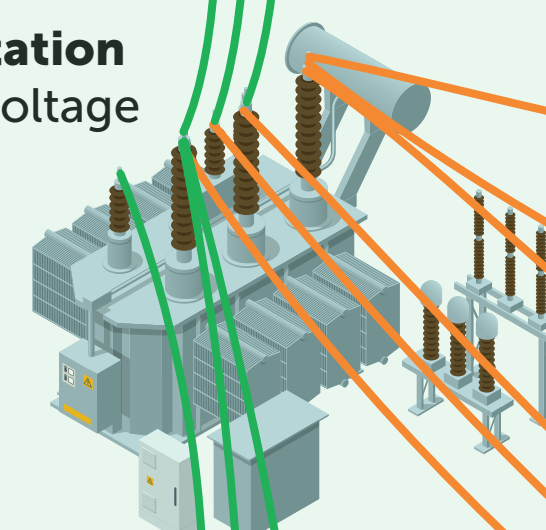
**46 kV Substation**  
Steps down voltage



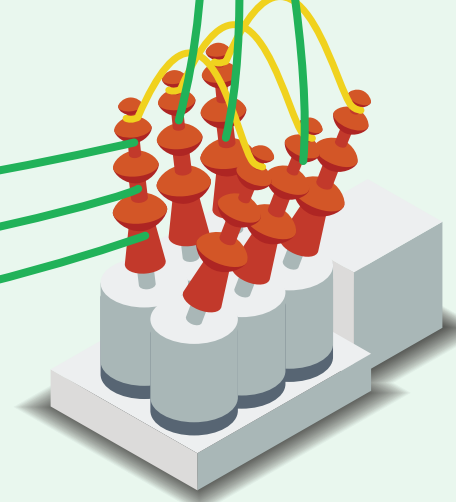
**138 kV Substation**  
Steps down voltage



**138 kV Substation**  
Steps down voltage



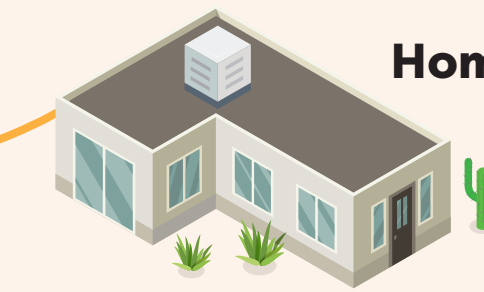
**Switchyard**



**4 kV Distribution Lines**

**14 kV Distribution Lines**

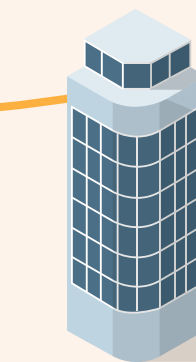
**Homes**



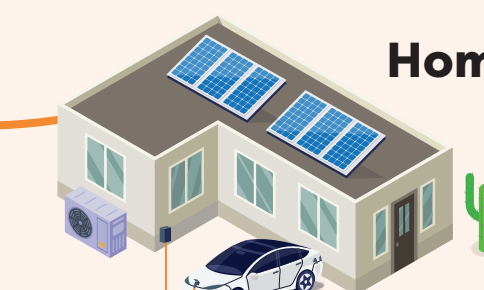
**Businesses**



**Commercial Facilities**



**Homes**



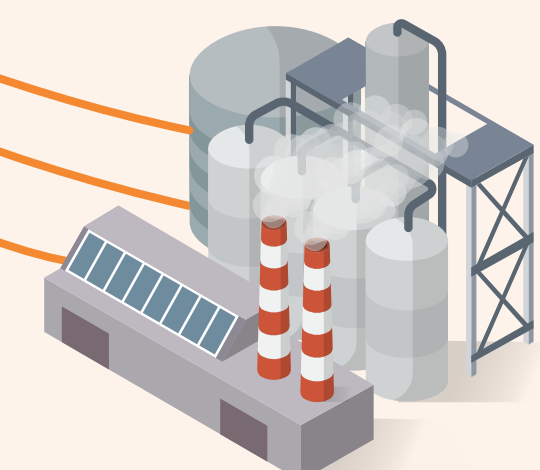
**Businesses**



**Commercial Facilities**



**Industrial Facilities**



Generation

Transmission and Sub-Transmission

Distribution

## Vine Substation

- Gas Insulated Substation (GIS)
- Located on a 1.6-acre site
- The substation will contain:
  - Three - 75 MVA transformers
  - Switchgear
  - Static Masts
  - Structural Canopy
- 12-foot decorative masonry block wall
- Perimeter landscaping



EXISTING CONDITION



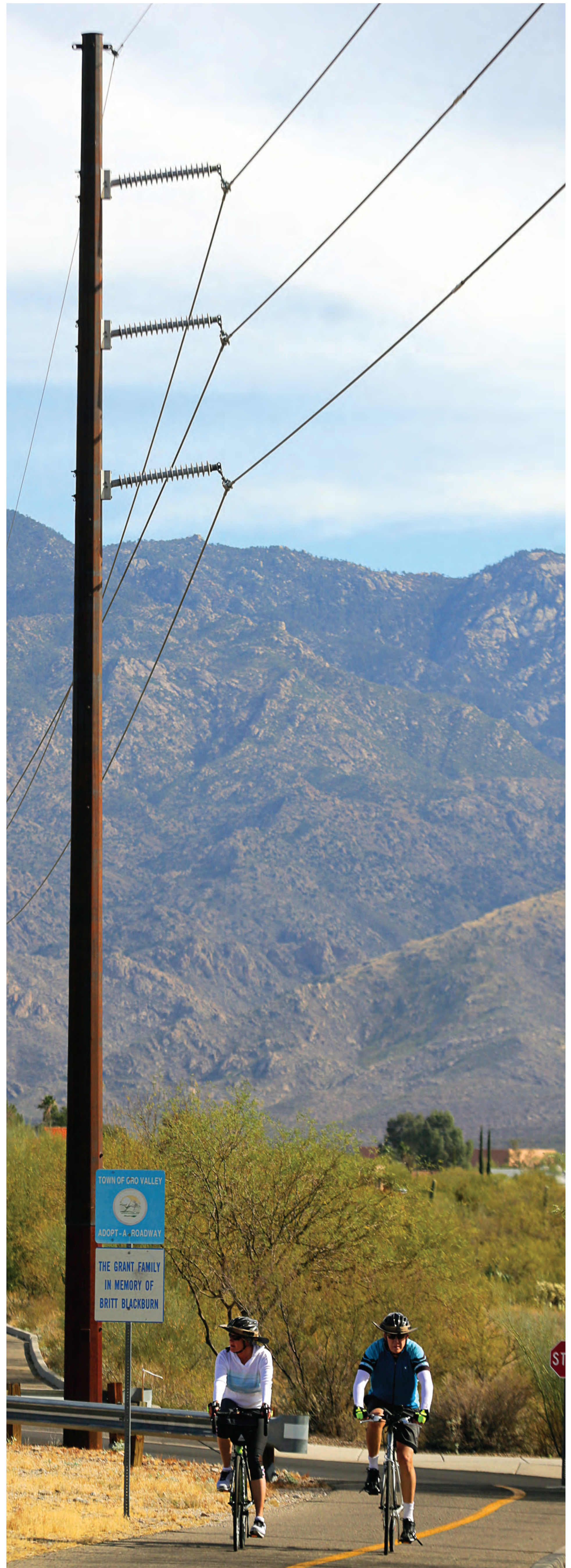
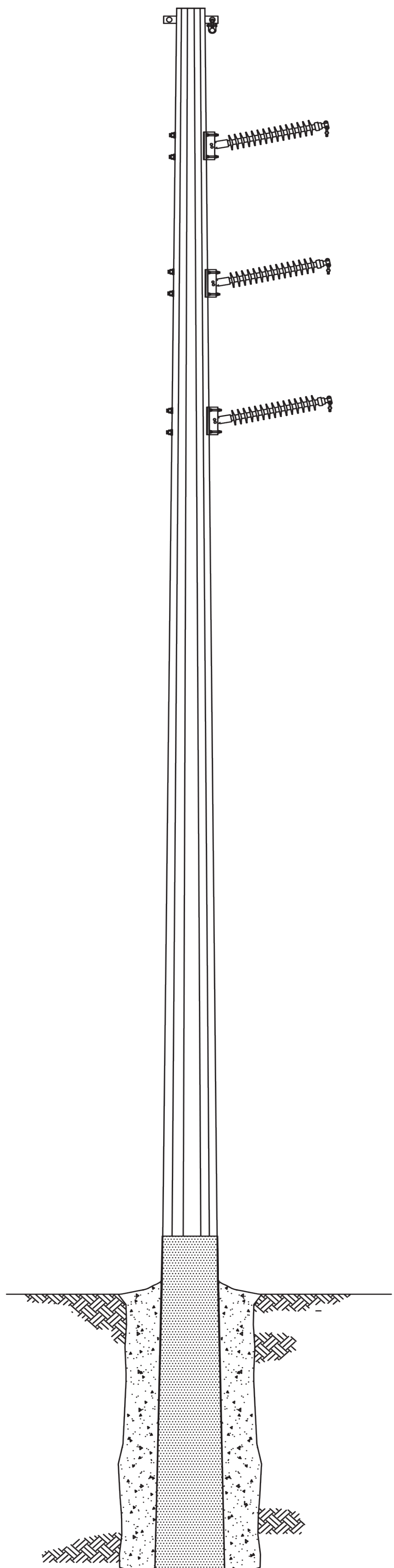
PHOTO SIMULATION



Transmission line is not depicted because the final route is not known at this time.

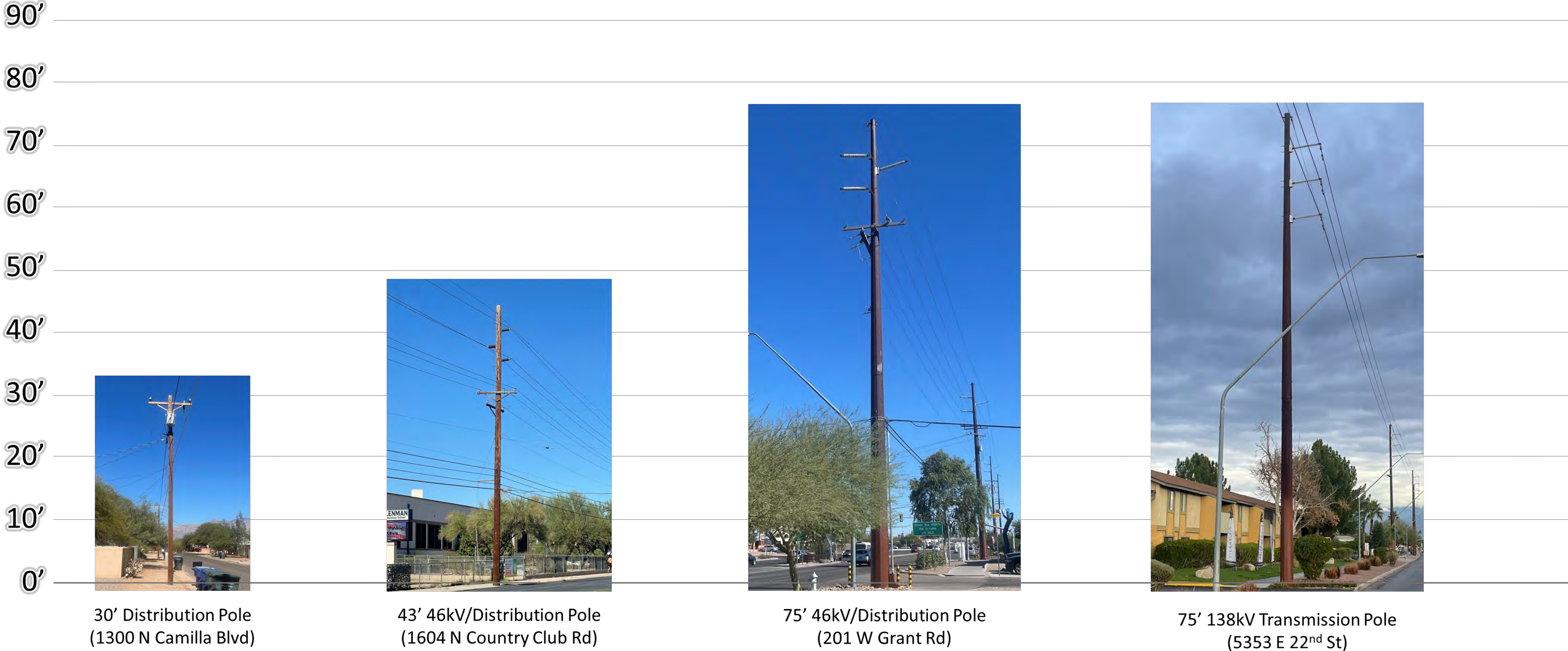
## Transmission Line Characteristics

- Single-circuit 138-kV transmission line
- Tubular, weathering steel monopoles
- Typical structure heights of around 75 feet
- Around 600-foot span between poles
- Non-specular, aluminum conductor wire



*A typical weathering steel monopole supporting a 138 kilovolt transmission line*

## Pole Comparison



30' Distribution Pole  
(1300 N Camilla Blvd)



43' 46kV/Distribution Pole  
(1604 N Country Club Rd)



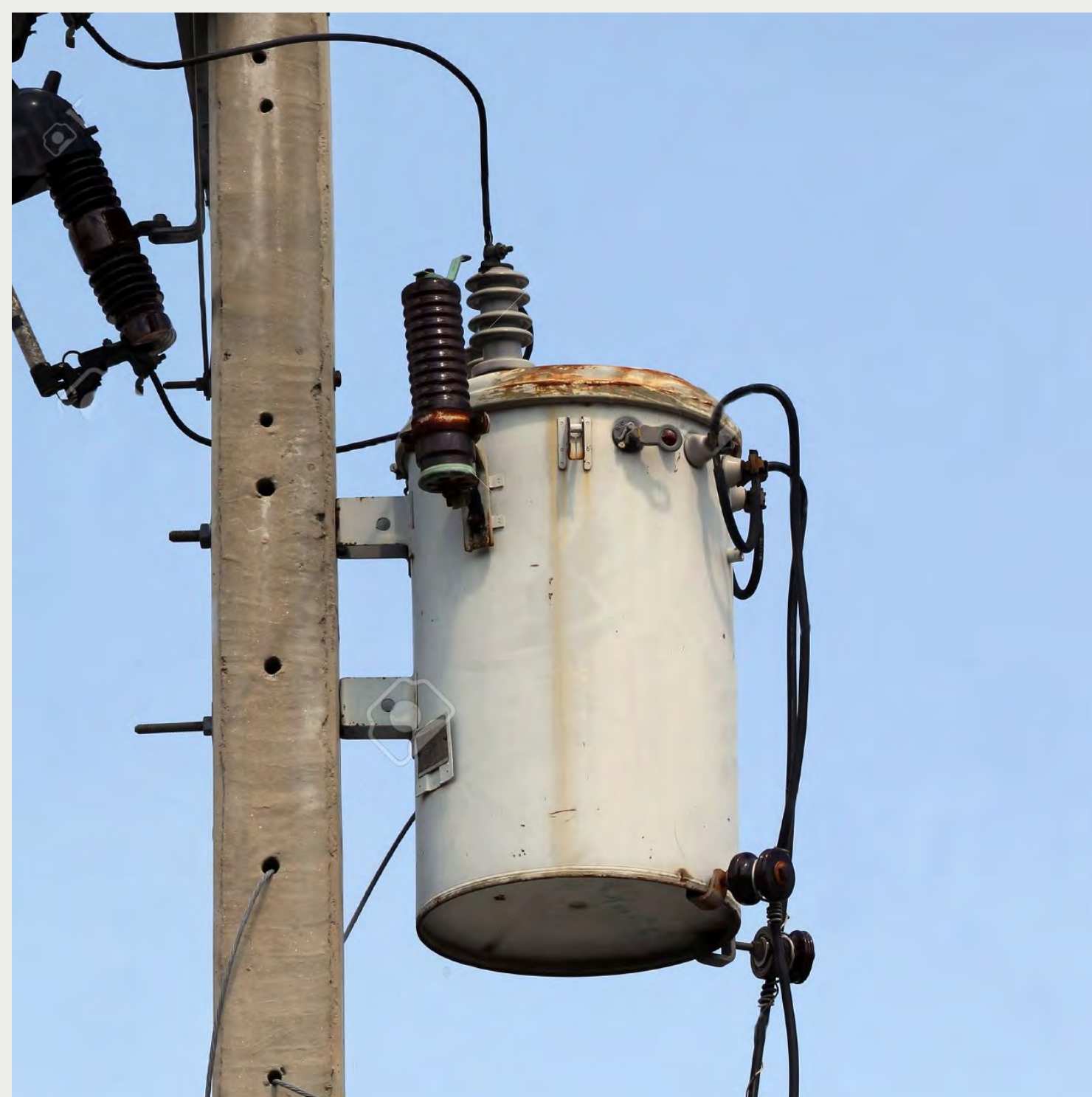
75' 46kV/Distribution Pole  
(201 W Grant Rd)



75' 138kV Transmission Pole  
(5353 E 22<sup>nd</sup> St)

## UPGRADING THE DISTRIBUTION SYSTEM

Providing additional capacity and improving reliability of service in support of growth, electrical vehicle charging and rooftop solar installations.



### SYSTEM UPGRADES INCLUDE:

Convert distribution circuits from 4-kV to 13.8-kV

Replace transformers

Replace conductors (wires), where merited

Replace poles, where needed

# Midtown Reliability Project

## Fewer Power Lines, Better Service



### Aging Assets in Project Study Area



On average, major 46-kV substation equipment is **47 years old**.

Some equipment is in 'poor' or 'very poor' condition.

It would cost **\$41 million** to replace this equipment over the next 5 years.



On average, 46-kV power poles in the study area are **61 years old**.

Some equipment is in 'poor' or 'very poor' condition.

**More than 430 poles** need to be replaced within 15 years at a cost of **\$11 million**.

### Options

	Maintain existing 46-kV System	Upgrade to new 138-kV System
<b>Built for:</b>	Late 20th Century	21st Century
<b>Substations:</b>	<ul style="list-style-type: none"> <li>• 8 46-kV substations</li> <li>• Cost: \$41 million</li> <li>• Additional substations may be required</li> </ul>	<ul style="list-style-type: none"> <li>• 1 138-kV substation added</li> <li>• <b>8 46 kV substations removed</b></li> <li>• Cost: \$34 million</li> </ul>
<b>Power lines:</b>	<ul style="list-style-type: none"> <li>• 19 miles of 46-kV lines</li> <li>• Poles in poor condition replaced with larger metal poles (similar to 138-kV poles)</li> <li>• Cost: \$11 million</li> </ul>	<ul style="list-style-type: none"> <li>• 7-8 miles 138-kV lines added</li> <li>• <b>19 miles 46-kV power lines removed</b></li> <li>• Cost: \$18 million</li> </ul>
<b>Added Capacity:</b>	None	3X
<b>Total:</b>	<b>\$52 million</b> investment in 46 kV system	<b>\$52 million</b> investment in new 138-kV facilities





## Why won't TEP install this transmission line underground?



### COST

- Underground transmission lines cost significantly more to build and maintain.
  - The difference escalates with voltage. Higher voltages = higher underground costs.
  - 5-10x more expensive – or more. Costs vary for each project.
- Higher costs lead to higher electric rates.
- In October 2023, the Arizona Corporation Commission approved a policy statement instructing regulated utilities like TEP to avoid underground installation. A portion of the statement says: *“As a general matter, utilities under the Commissions jurisdiction should avoid incurring these higher costs unless underground installation of a transmission line is necessary for reliability or safety purposes or to satisfy other prudent operational needs.”*
- Voters rejected proposal to pay for underground construction in a new franchise agreement.
- Stakeholders can create improvement district to fund undergrounding in their area.



### EFFICIENCY, CONSISTENCY

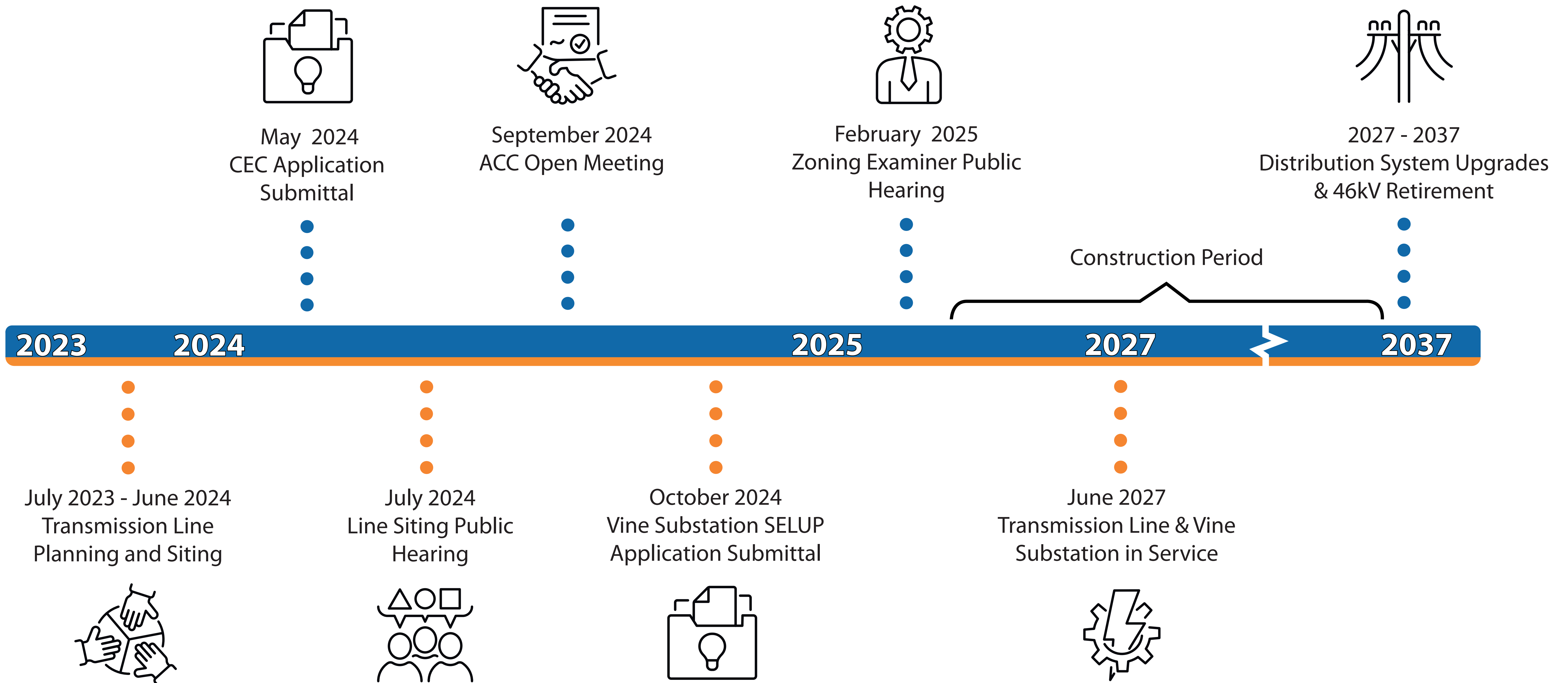
- No engineering or safety justification.
- Every other TEP transmission line is installed overhead.
- Majority of transmission lines in the United States are installed overhead.
- Underground construction disturbs more land, existing facilities and archaeological resources.



### RELIABILITY

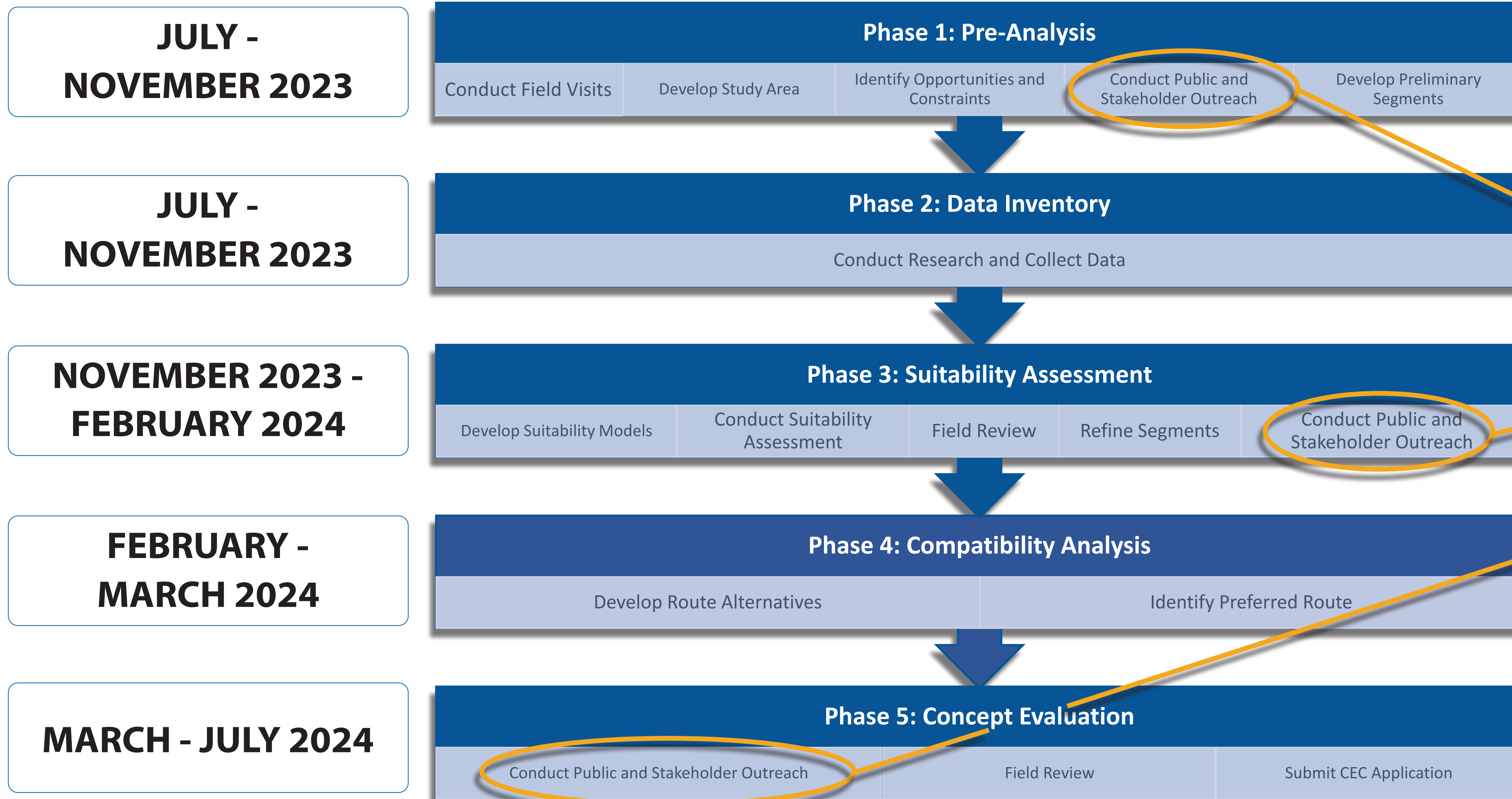
- Comparable to overhead construction, with higher maintenance costs.
- Fewer outages but longer repair times.
- Life expectancy of underground equipment is lower.
- 138-kV transmission poles withstand extreme weather, traffic impacts.

# Midtown Reliability Project



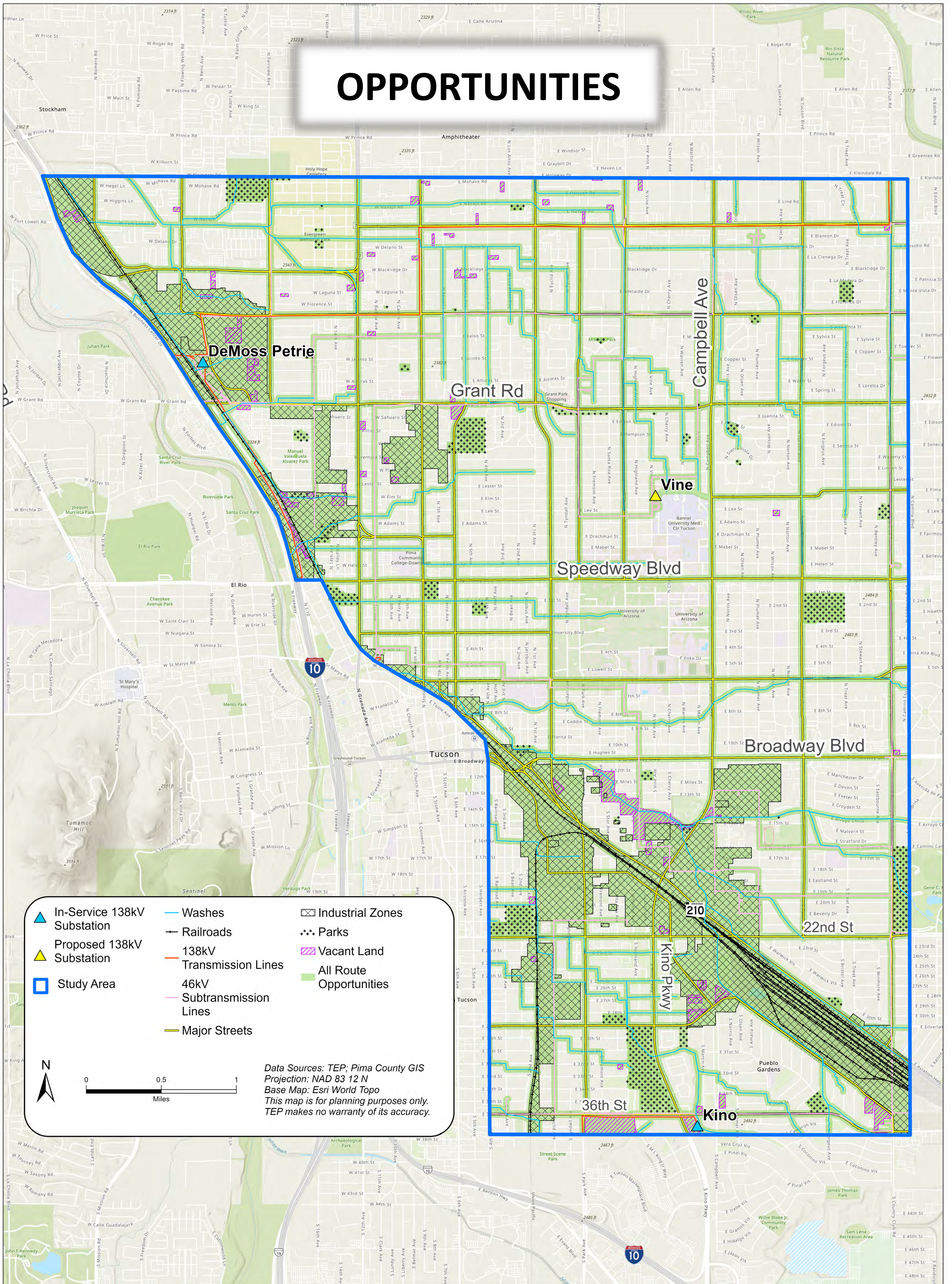
Target schedule, subject to change.

## PLANNING AND SITING PROCESS



- OUTREACH EFFORTS**
- Neighborhood Listening Sessions
  - Neighborhood Advisory Group
  - Public Open House
  - Elected Official Briefings
  - Agency Briefings

## OPPORTUNITIES

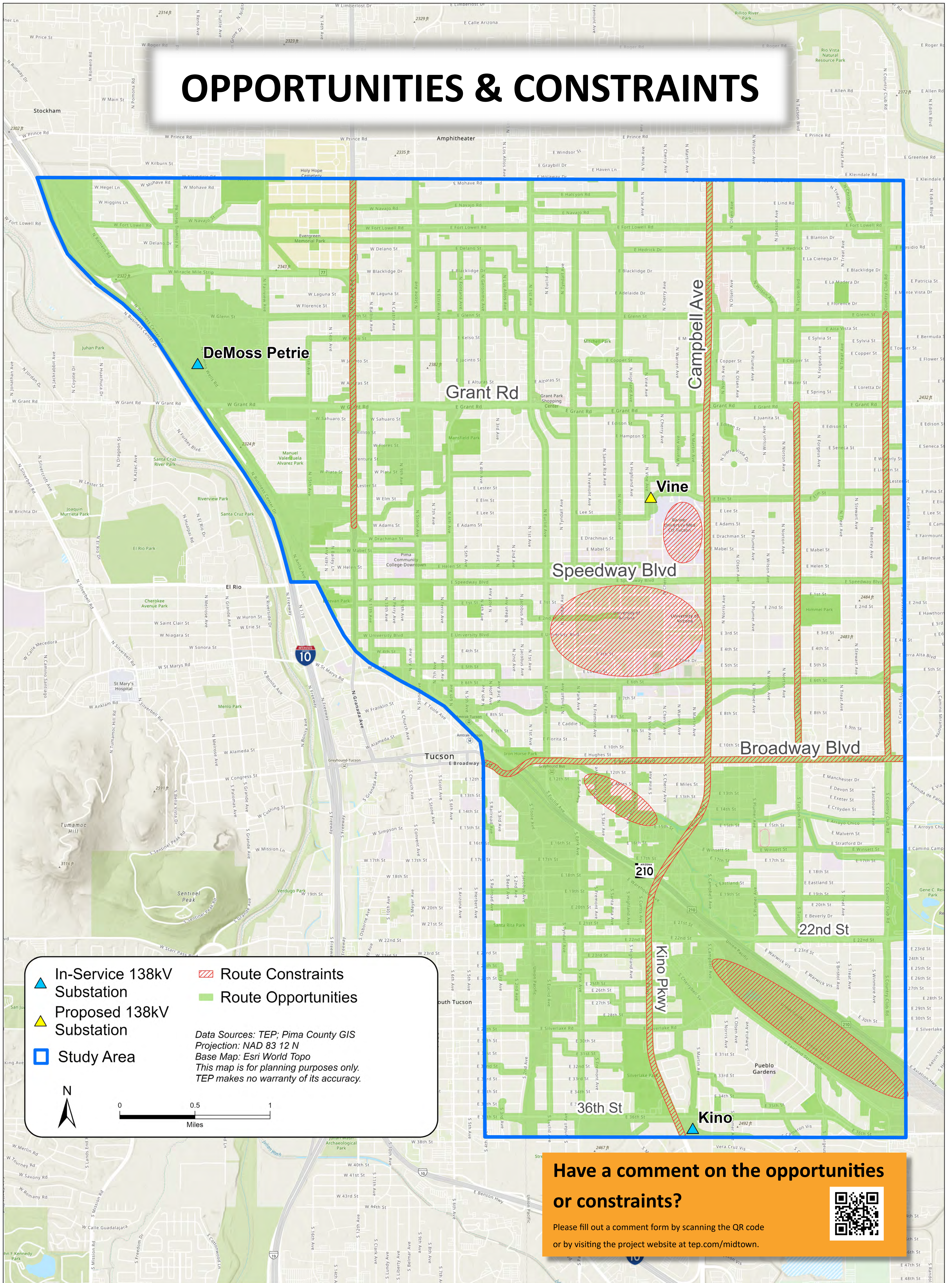


In-Service 138kV Substation	Washes	Industrial Zones
Proposed 138kV Substation	Railroads	Parks
Study Area	138kV Transmission Lines	Vacant Land
	46kV Subtransmission Lines	All Route Opportunities
	Major Streets	

*Data Sources: TEP; Pima County GIS  
Projection: NAD 83 12 N  
Base Map: Esri World Topo  
This map is for planning purposes only.  
TEP makes no warranty of its accuracy.*



## OPPORTUNITIES & CONSTRAINTS



	In-Service 138kV Substation		Route Constraints
	Proposed 138kV Substation		Route Opportunities
	Study Area		

Data Sources: TEP; Pima County GIS  
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0 0.5 1 Miles

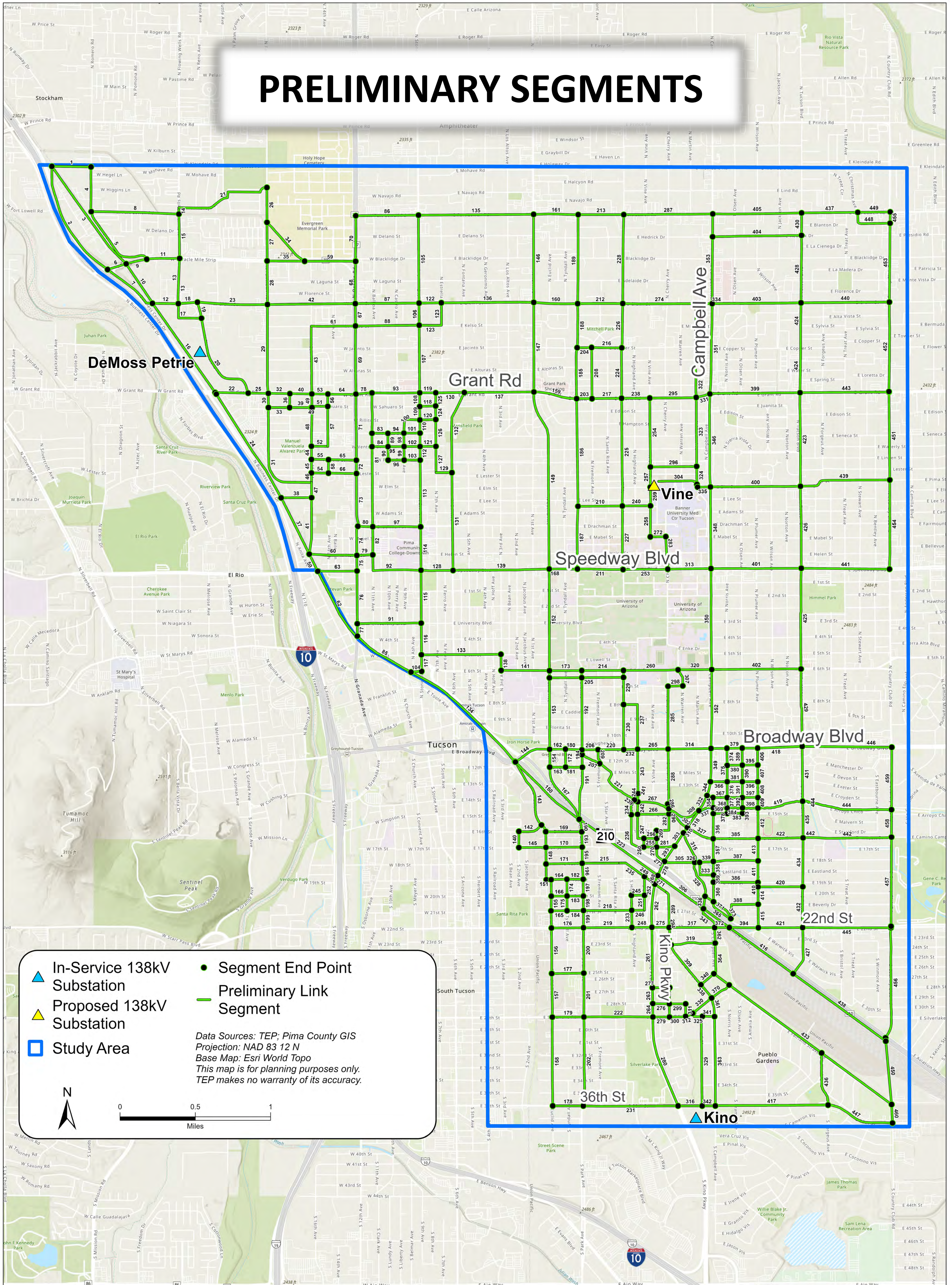
**Have a comment on the opportunities or constraints?**

Please fill out a comment form by scanning the QR code or by visiting the project website at [tep.com/midtown](http://tep.com/midtown).

# Midtown Reliability Project



## PRELIMINARY SEGMENTS



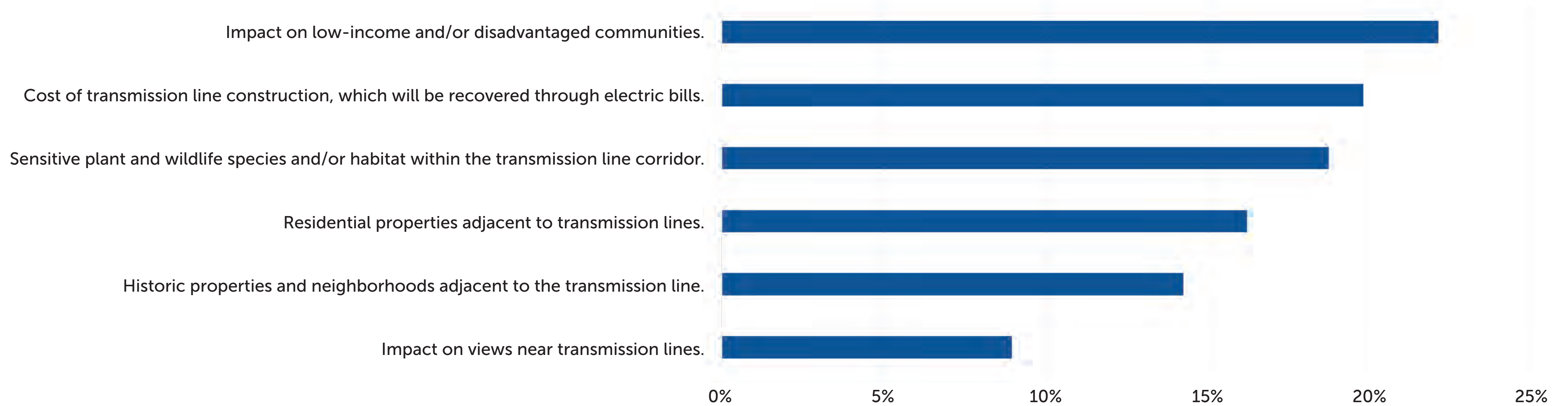
## Project Criteria Survey Results

August 31— October 15, 2023

2,792 Participants

In your opinion, which criteria are most important in considering the route of the proposed transmission line for the Midtown Reliability Project? Select up to TWO (2).

### Most Important Criteria to Consider



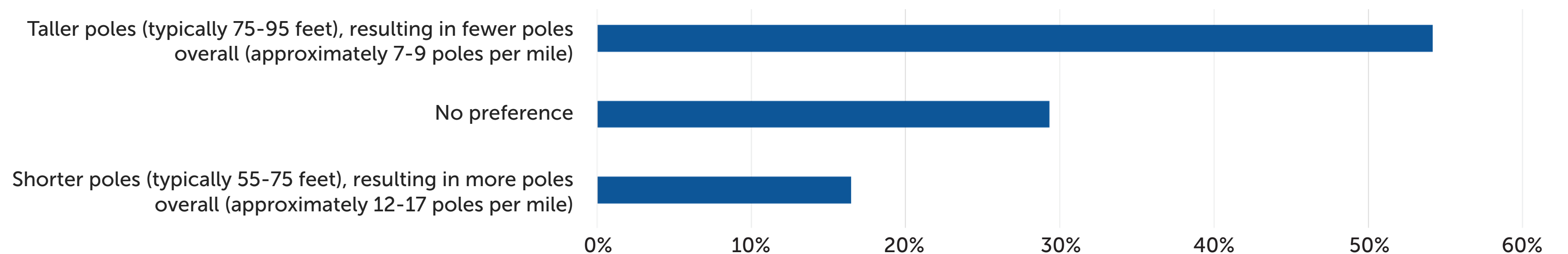
If there are other criteria you would like TEP to consider, please share your suggestion(s) in the box below:

- Health and Safety
- Reliability and Maintenance
- Transit Impacts – Pedestrian, Public Transit, and Traffic
- Use of Existing Utility Corridors
- Avoidance of Gateway Corridors
- Impact on Future Land Uses
- Impact on Native Lands
- Impact on Water
- Length of the Project
- Overall Environmental Impact
- RFI/Communications Interference



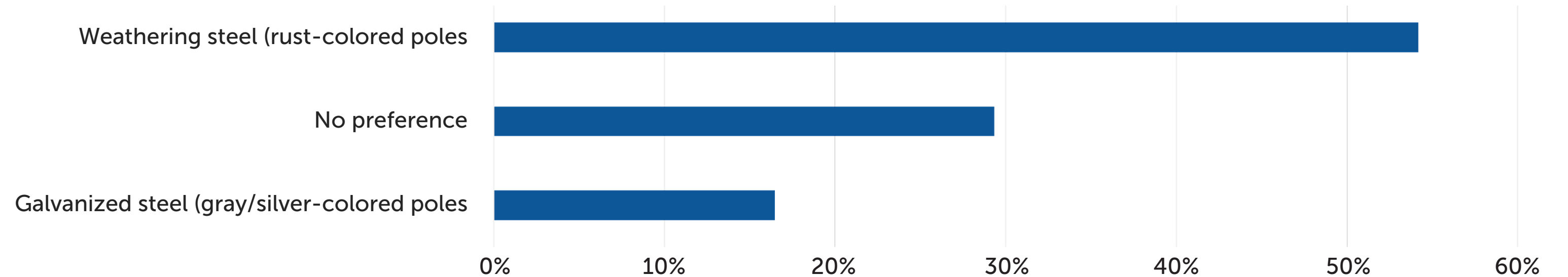
Please indicate your preference for pole height and number of poles per mile:

### Preference for Pole Height



Please indicate your preference for the type of steel pole used:

### Preference for Type of Steel Pole



## Project Evaluation Criteria



Impact on low-income and/or disadvantaged communities



Impact on the total environment



Cost of transmission line construction, including relocation/undergrounding of distribution lines, which will be recovered through electric bills.



Noise emission levels and interference with communication signals



Existing development plans



Engineering feasibility and challenges



Sensitive plant and wildlife species and/or habitat within the transmission line corridor.



Compliance with applicable ordinances, master plans and regulations



Residential properties adjacent to transmission lines.



Health and safety impacts



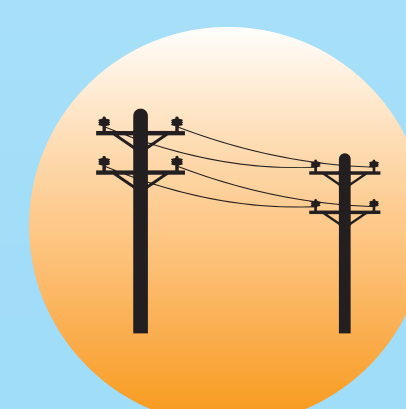
Historic properties adjacent to the transmission line.



Transit Impacts (Pedestrian, Public Transit, Traffic)



Impact on views near transmission lines.



Use of existing utility corridors



Impact on native lands



# Midtown Reliability Project



## Suitability Criteria Models

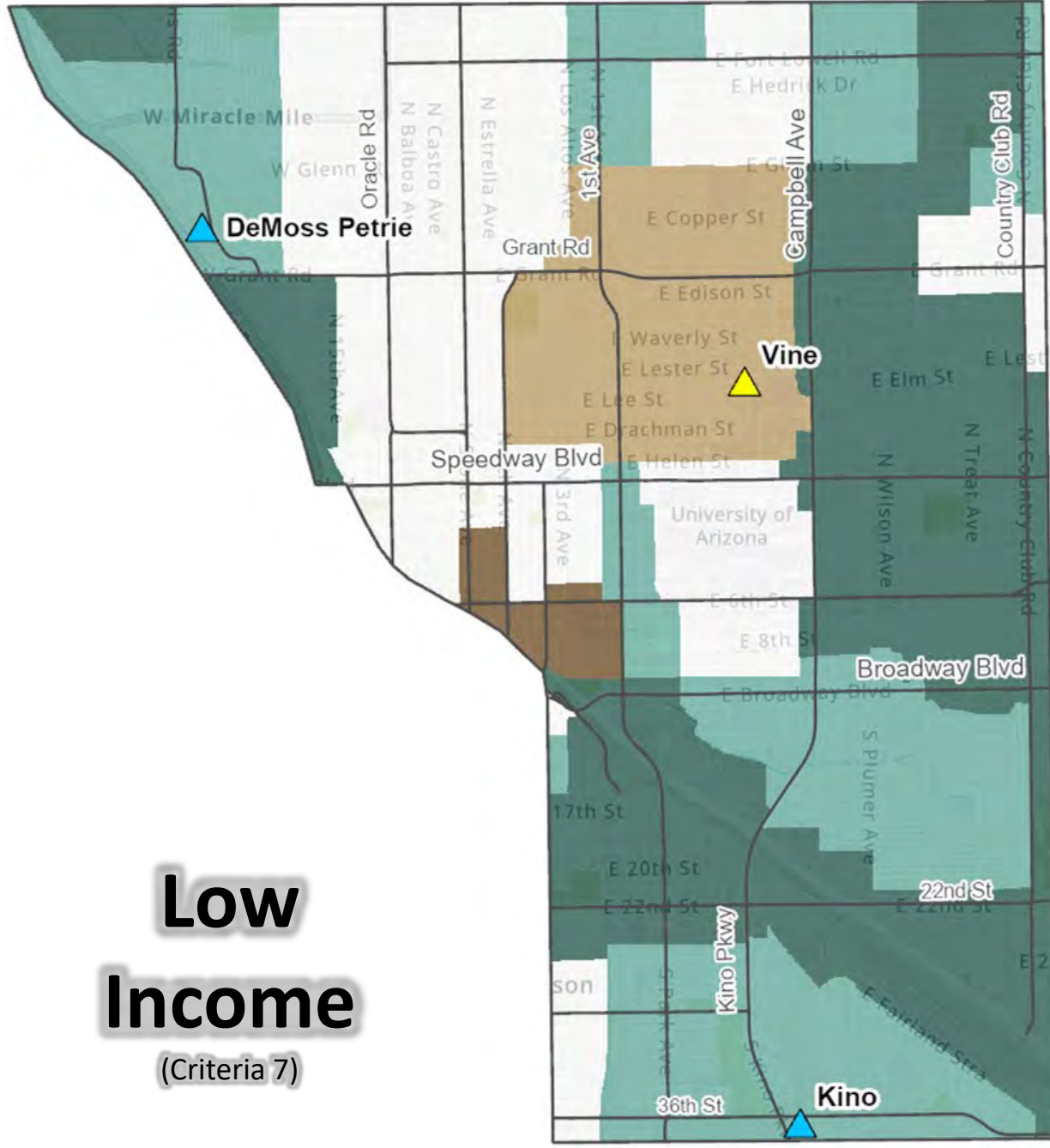
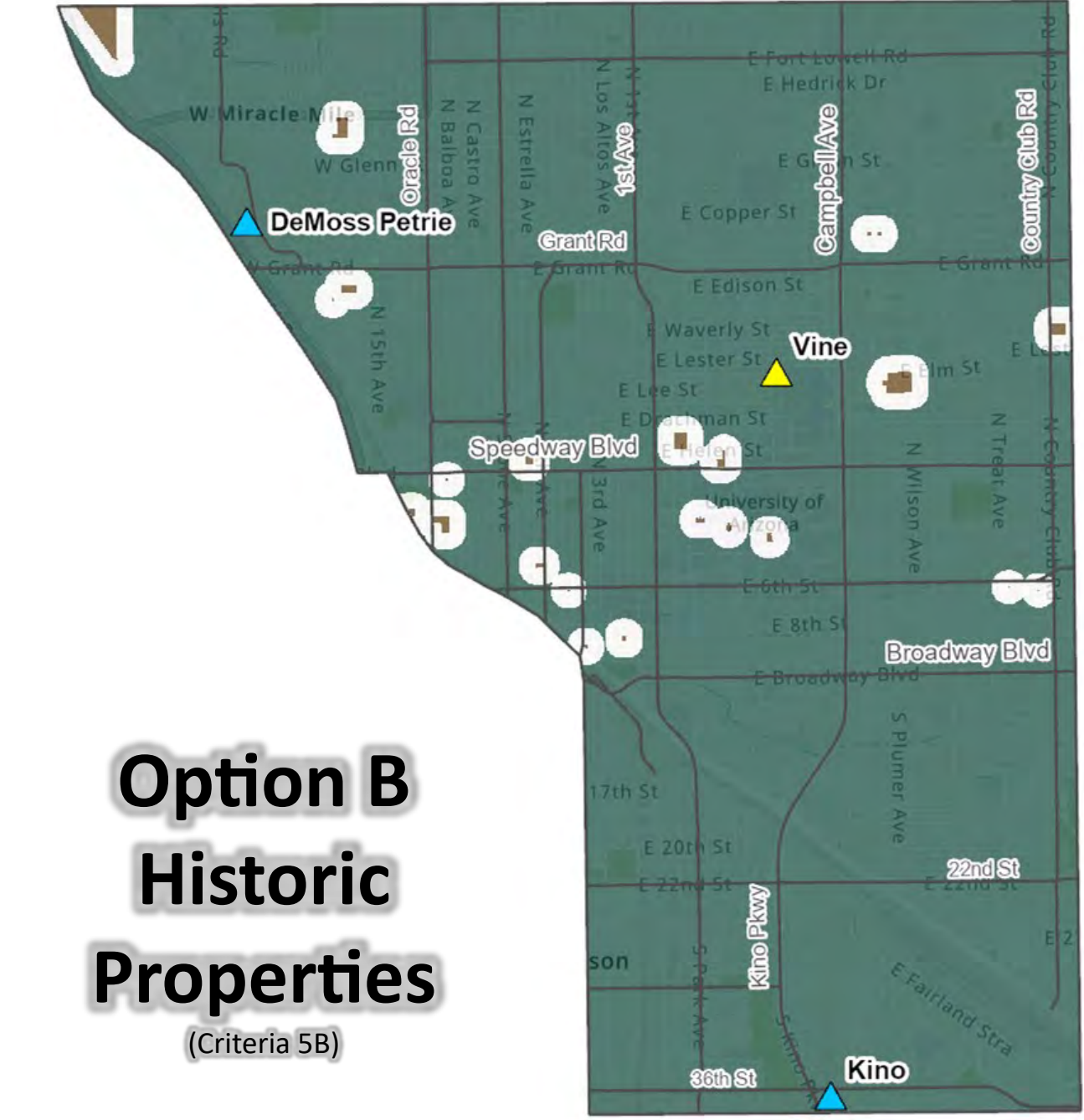
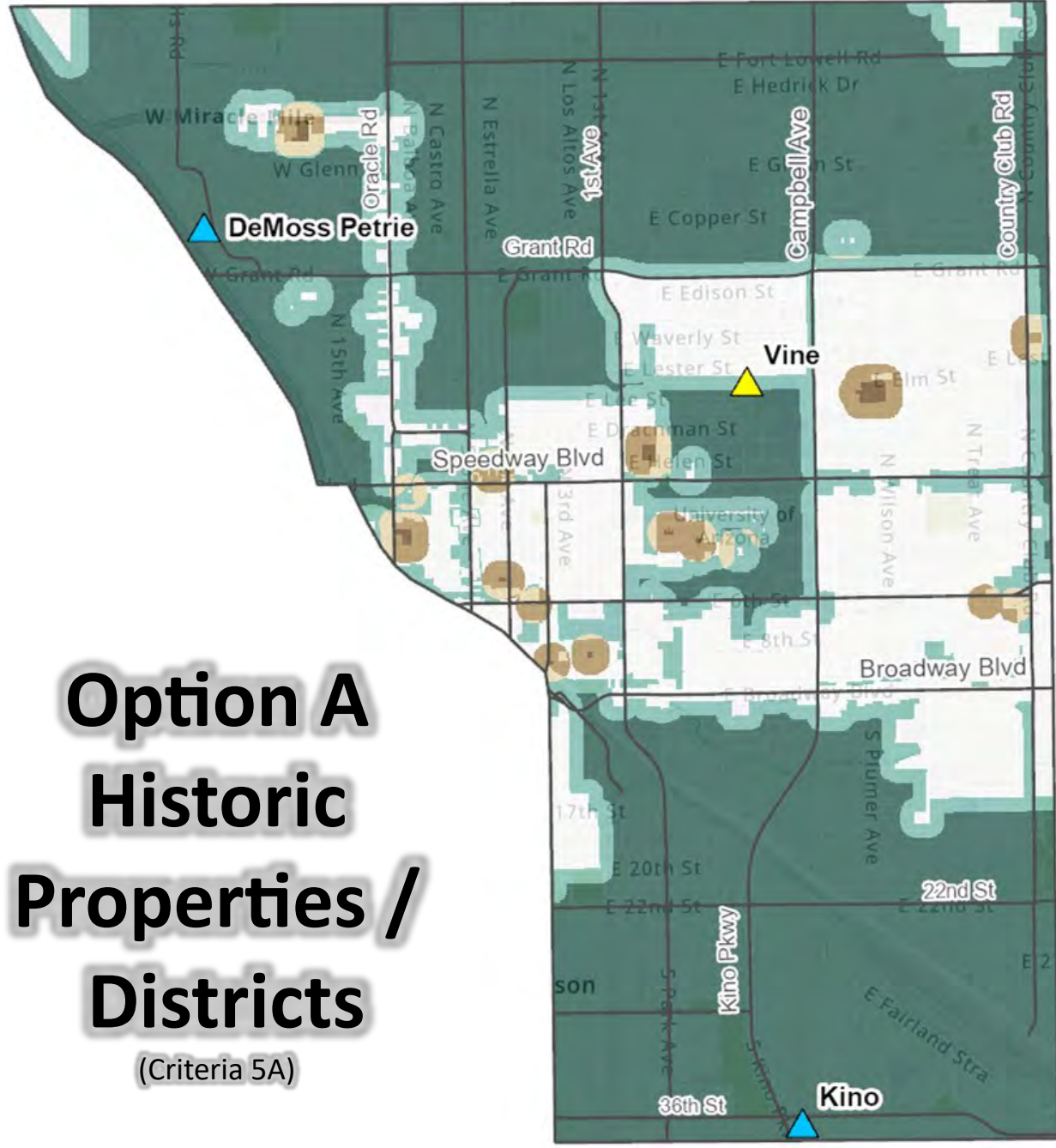
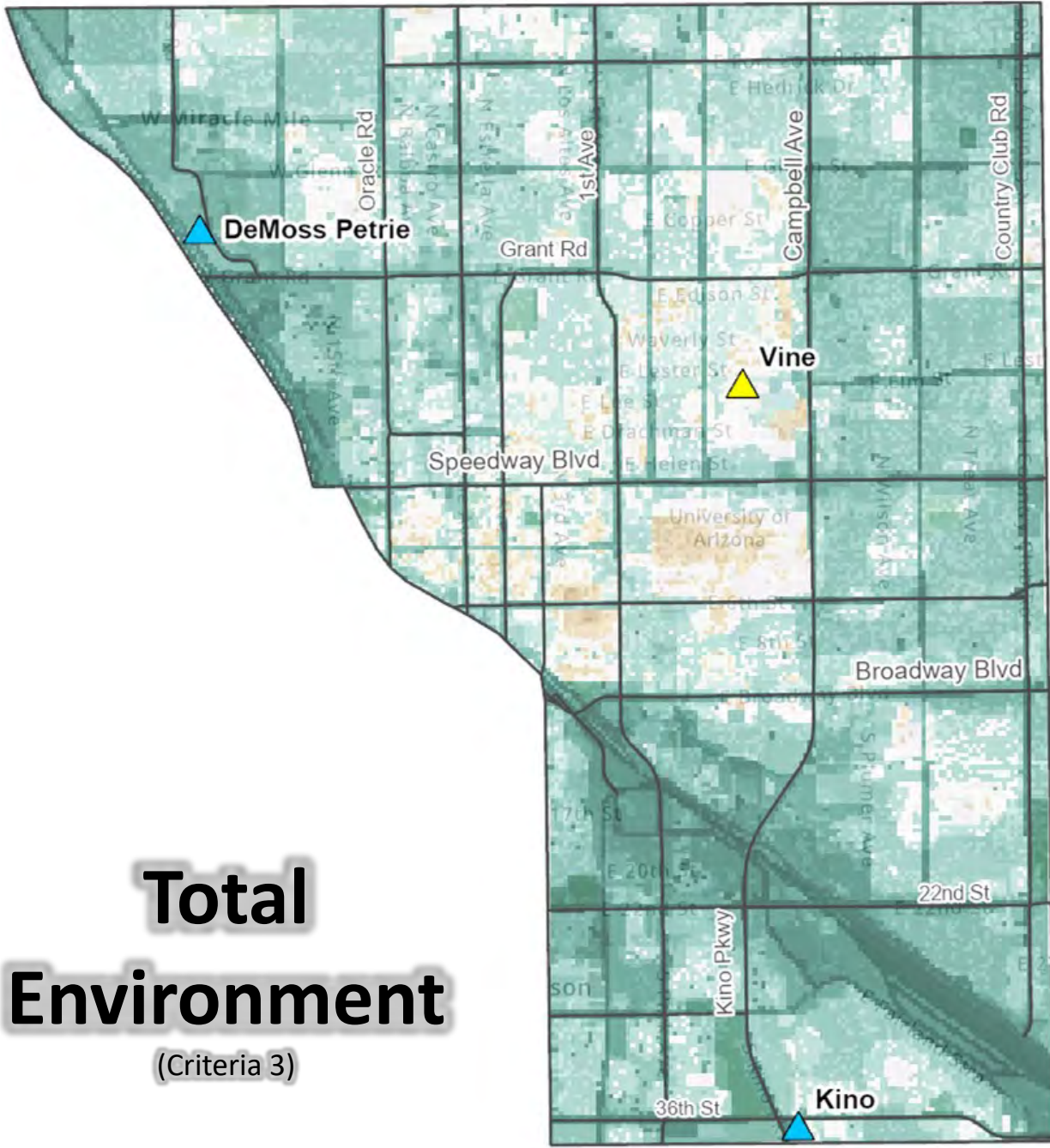
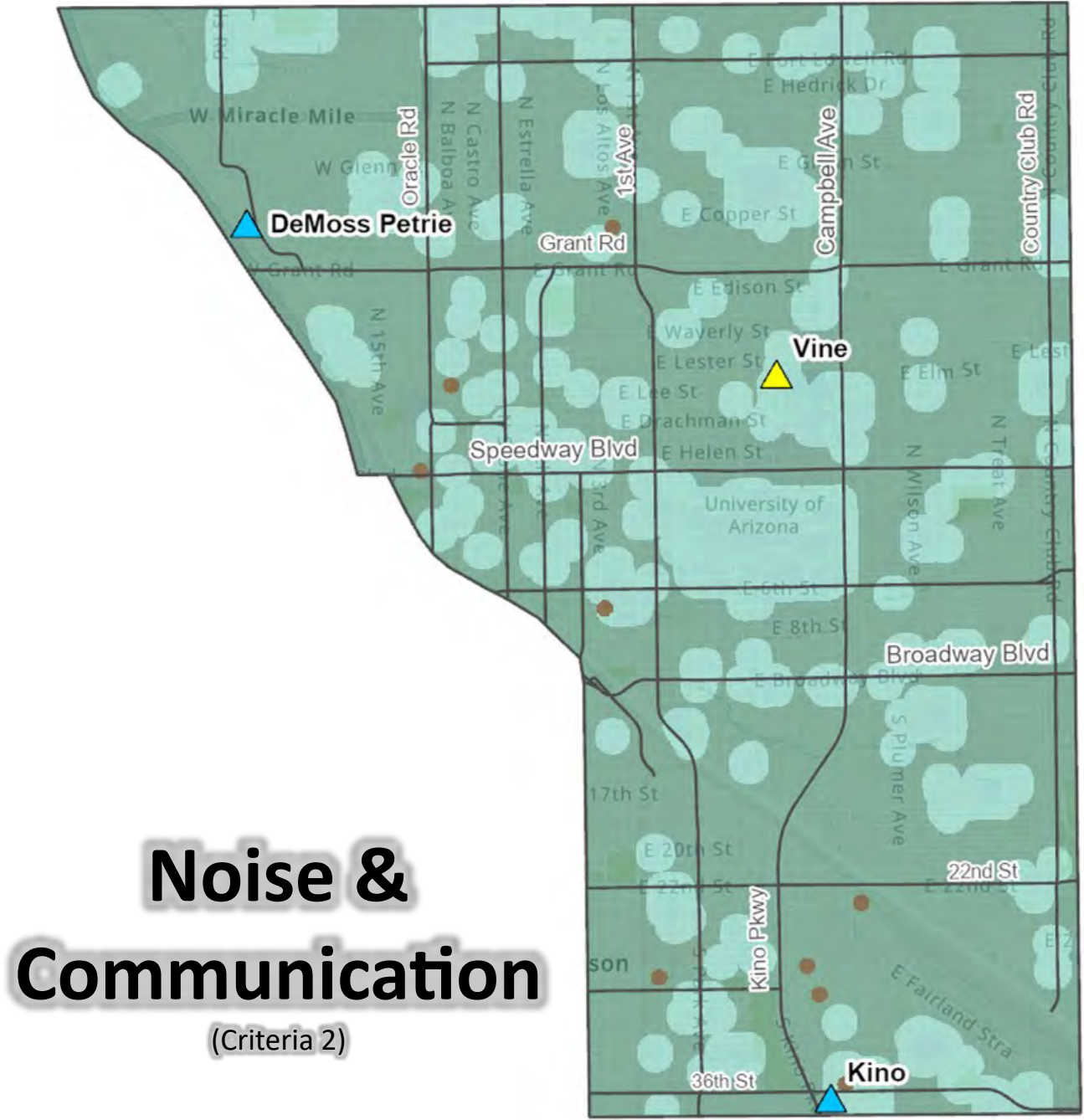
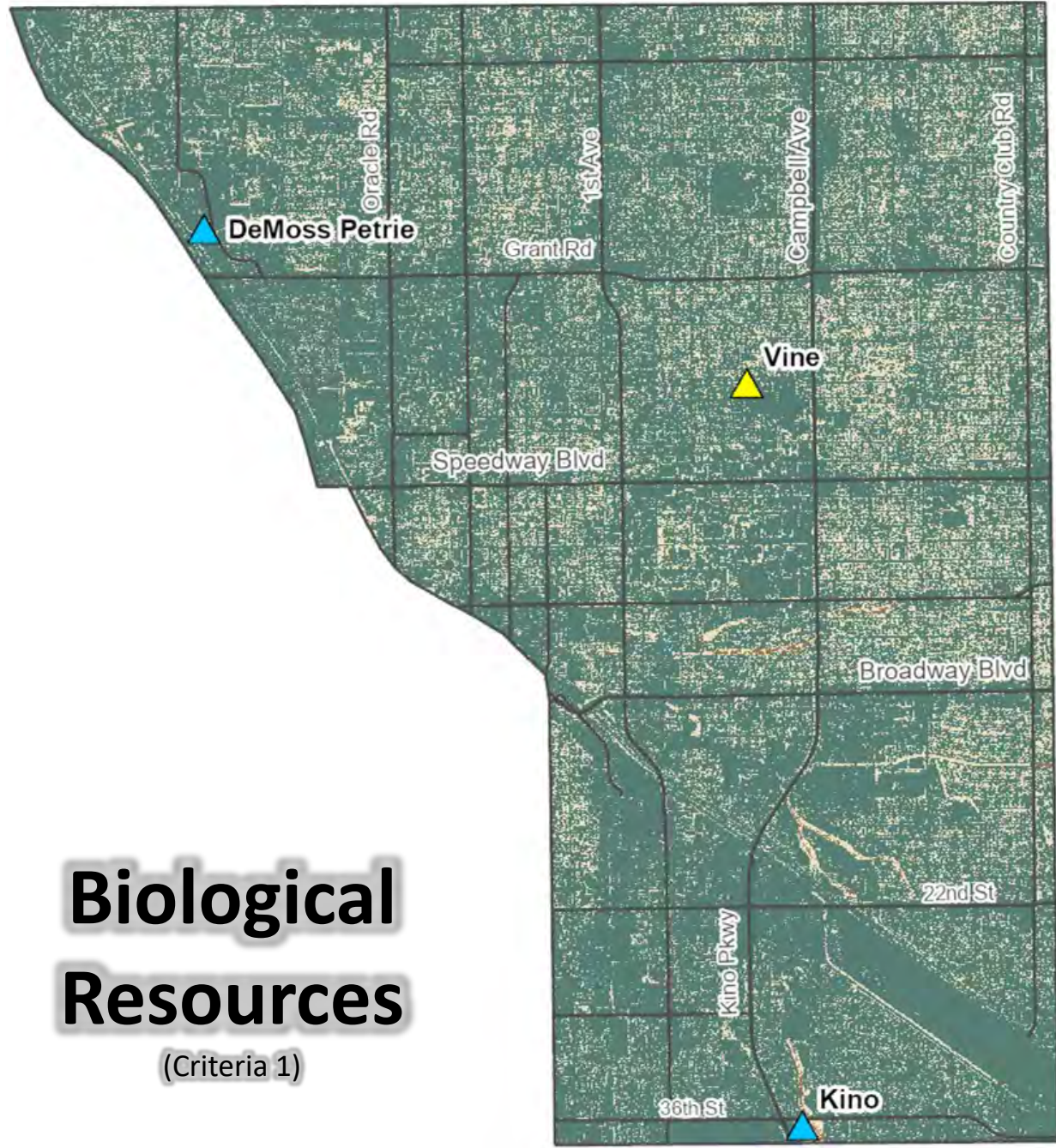
**LEGEND**

- ▲ In-Service 138kV Substation
- ▲ Proposed 138kV Substation

**Suitability Analysis**

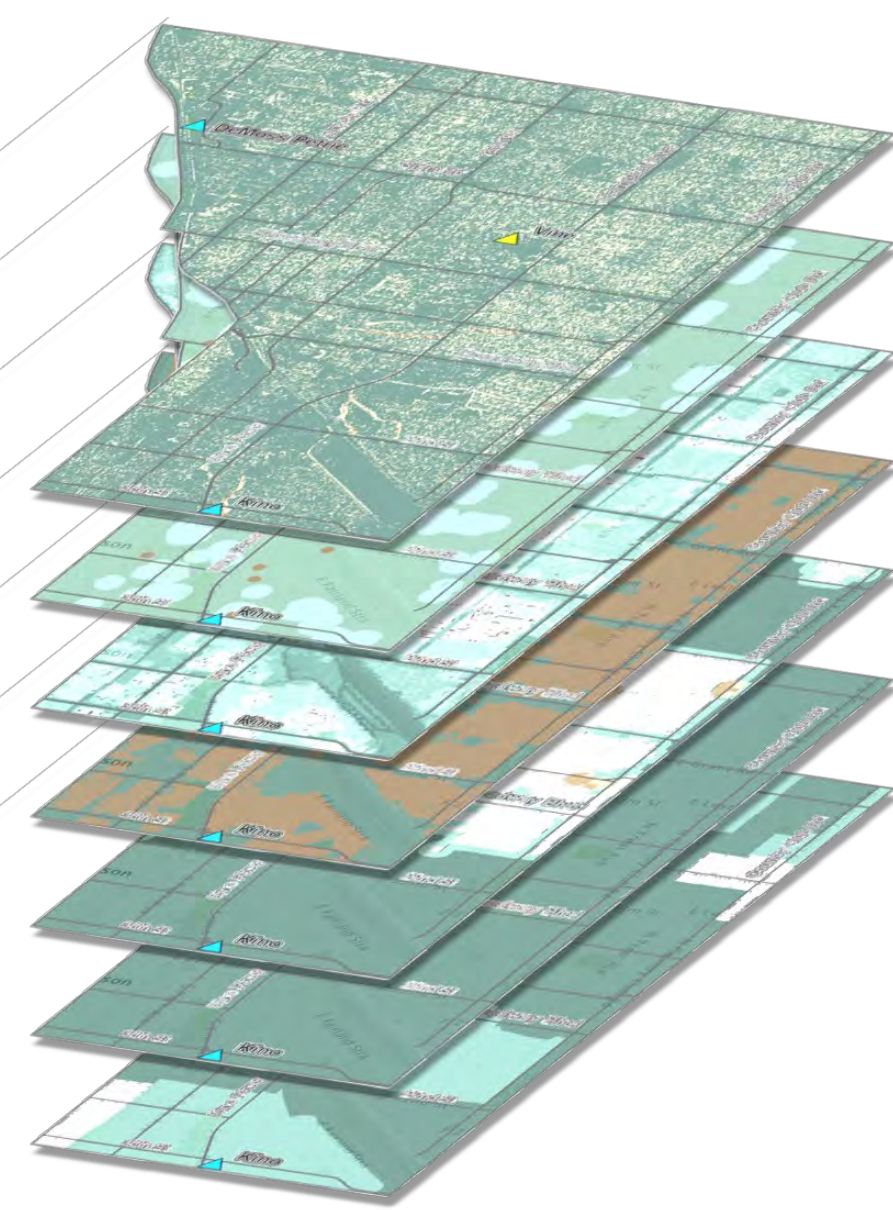
Less Suitable

More Suitable

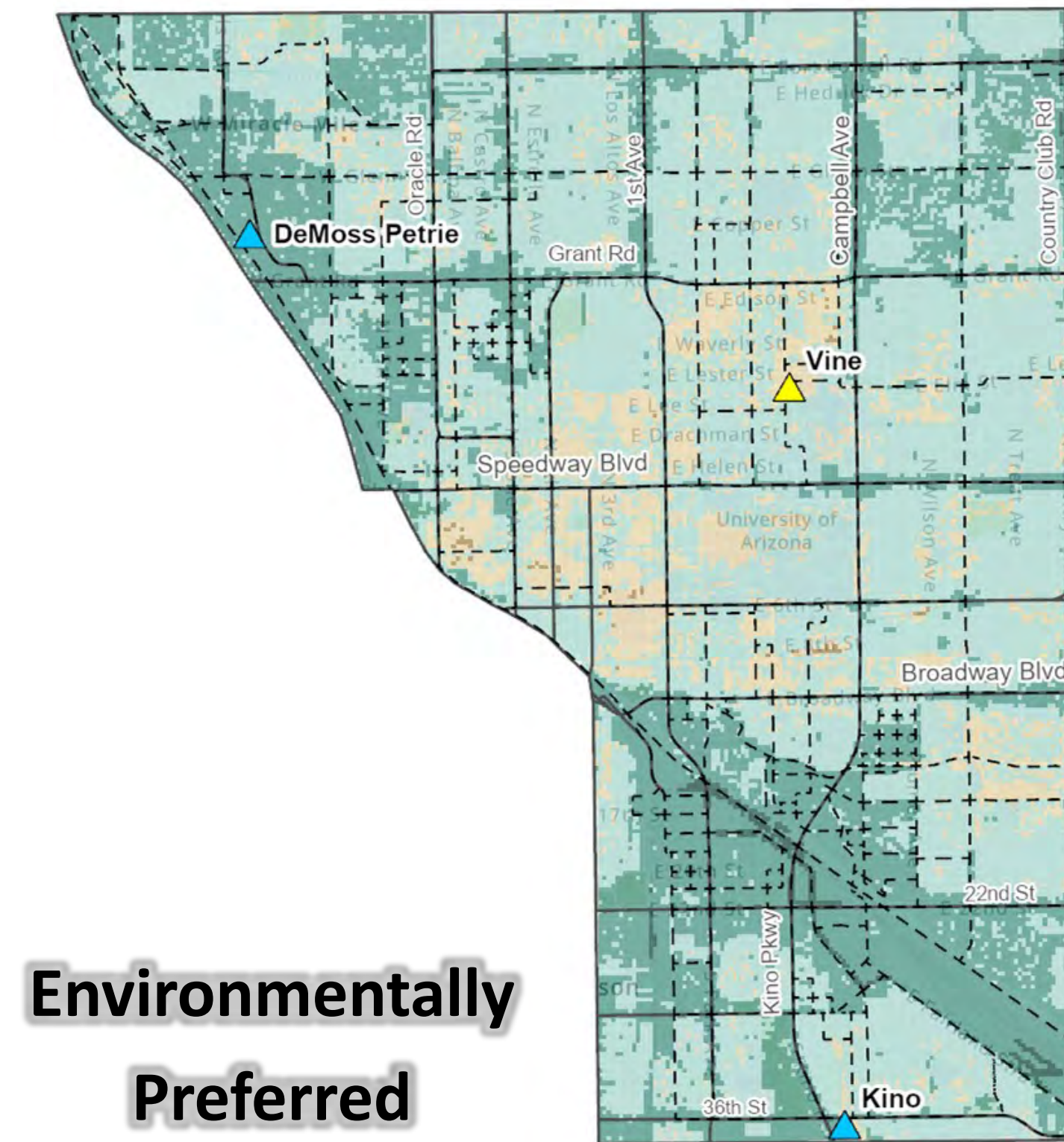


## Composite Suitability Models

- Criteria 1 x Weight
- Criteria 2 x Weight
- Criteria 3 x Weight
- Criteria 4 x Weight
- Criteria 5A x Weight
- Criteria 6 x Weight
- Criteria 7 x Weight



Suitability criteria models are weighted and added together to create composite models.

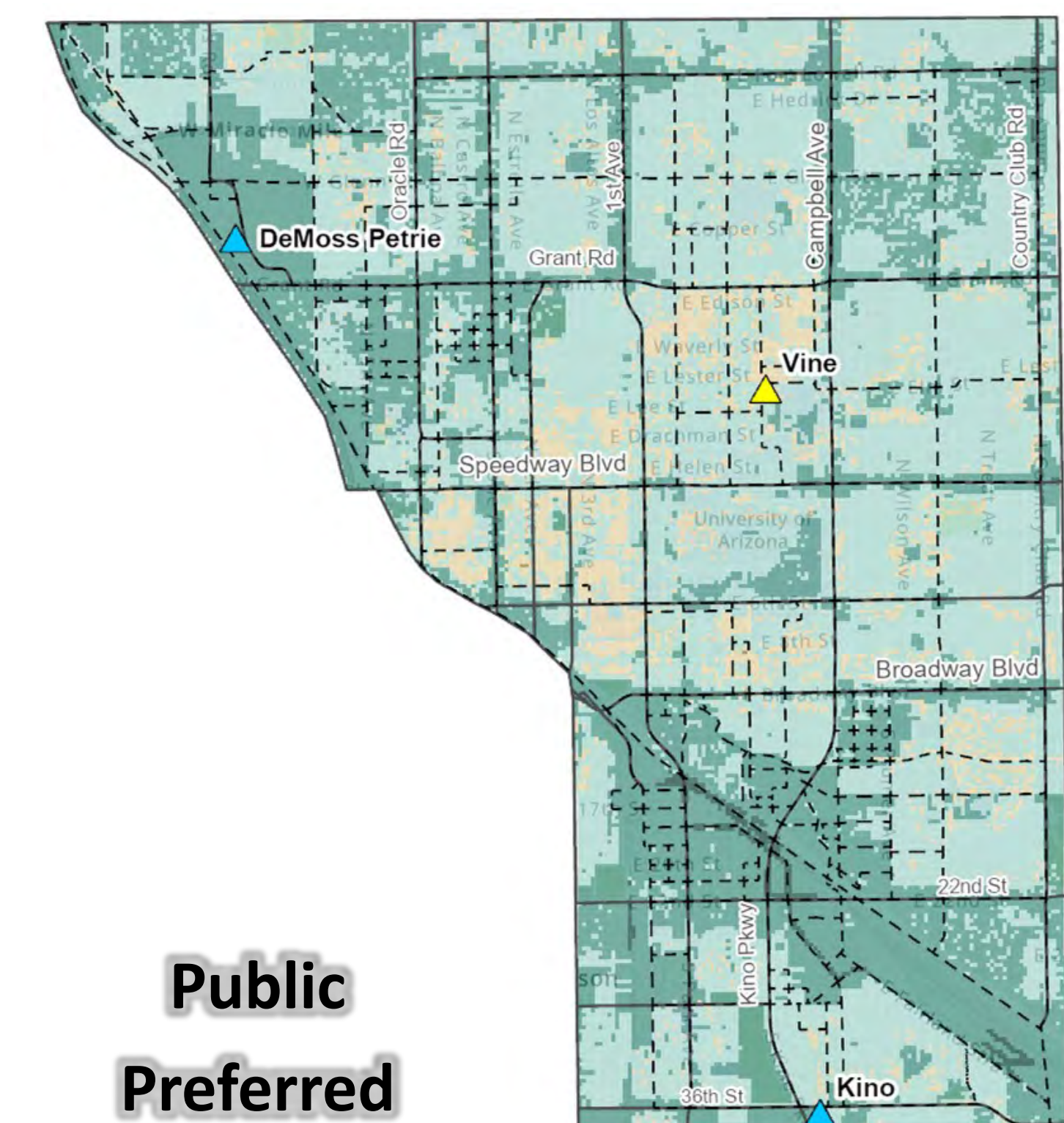
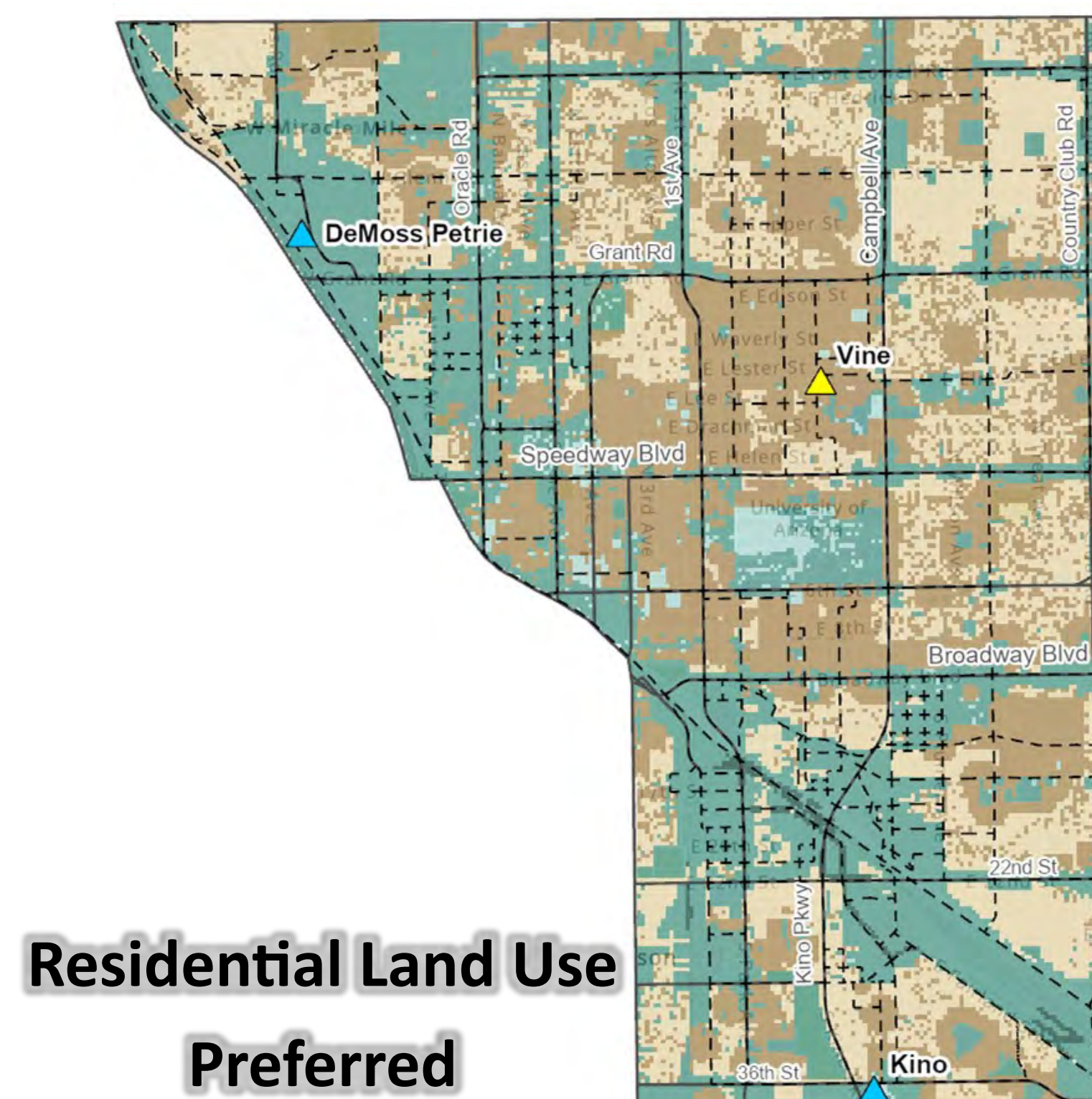
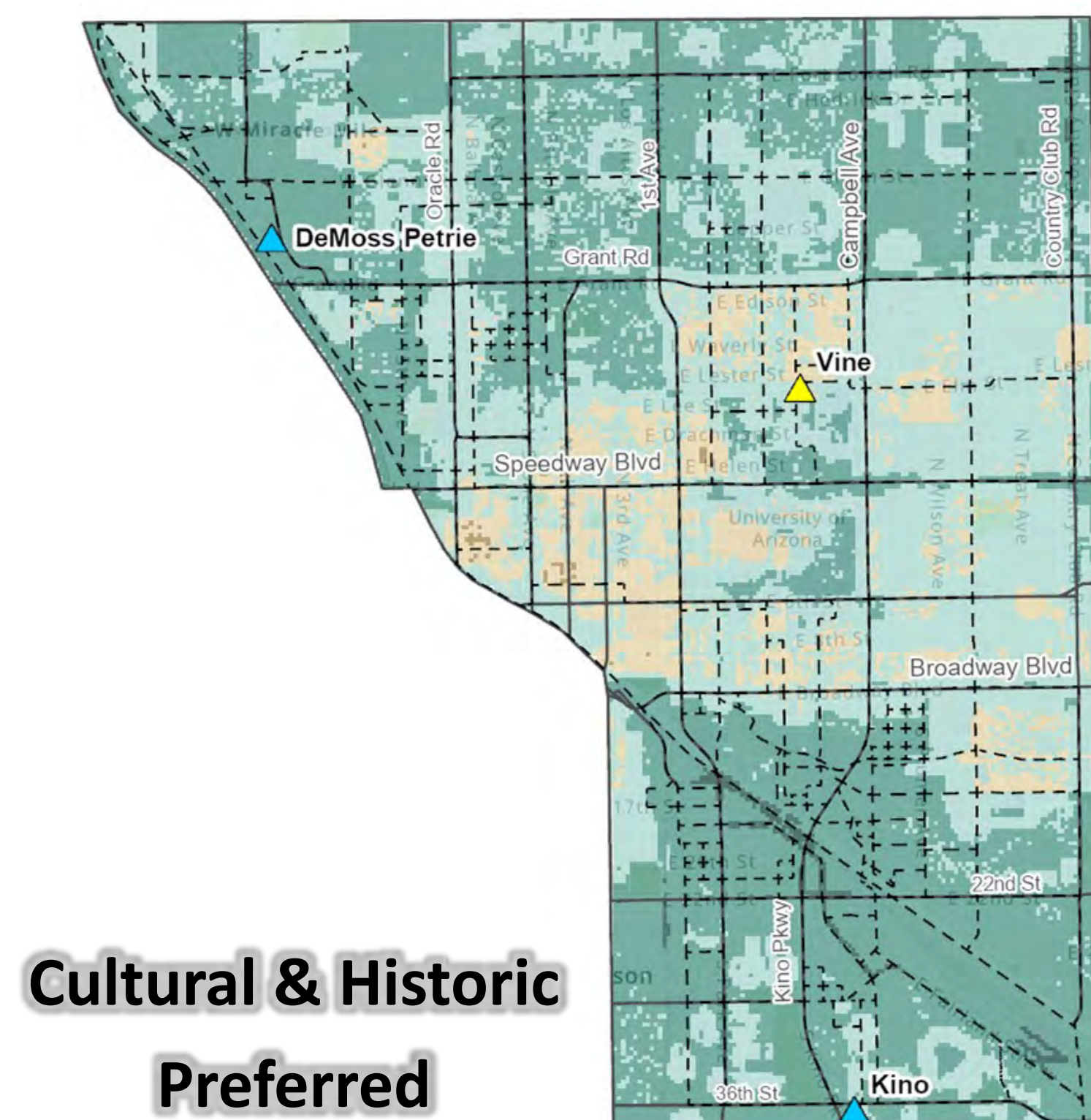


**LEGEND**

- In-Service 138kV Substation
- Proposed 138kV Substation
- Preliminary Segments

**Suitability Analysis**

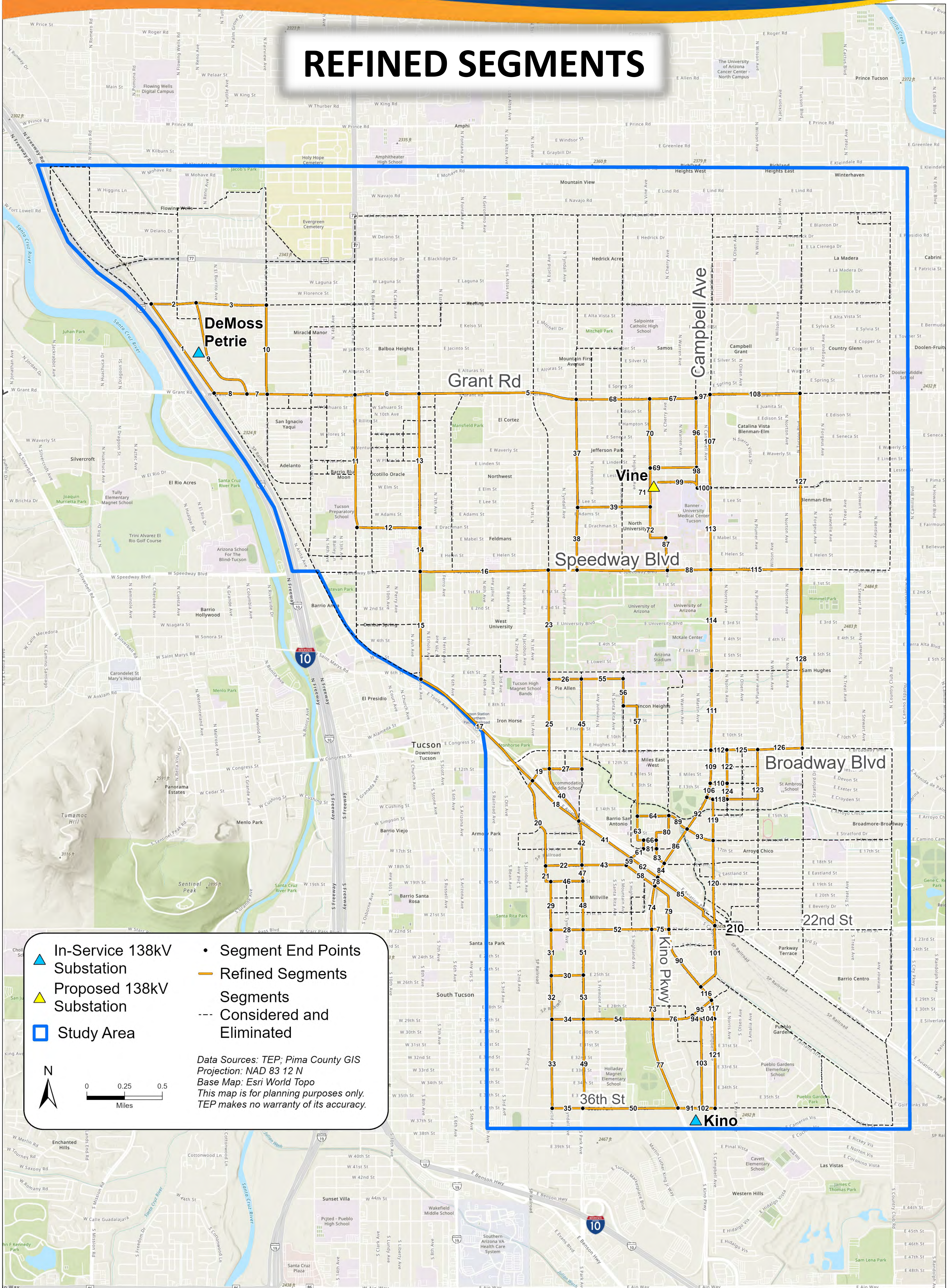
- Less Suitable
- More Suitable



# Midtown Reliability Project

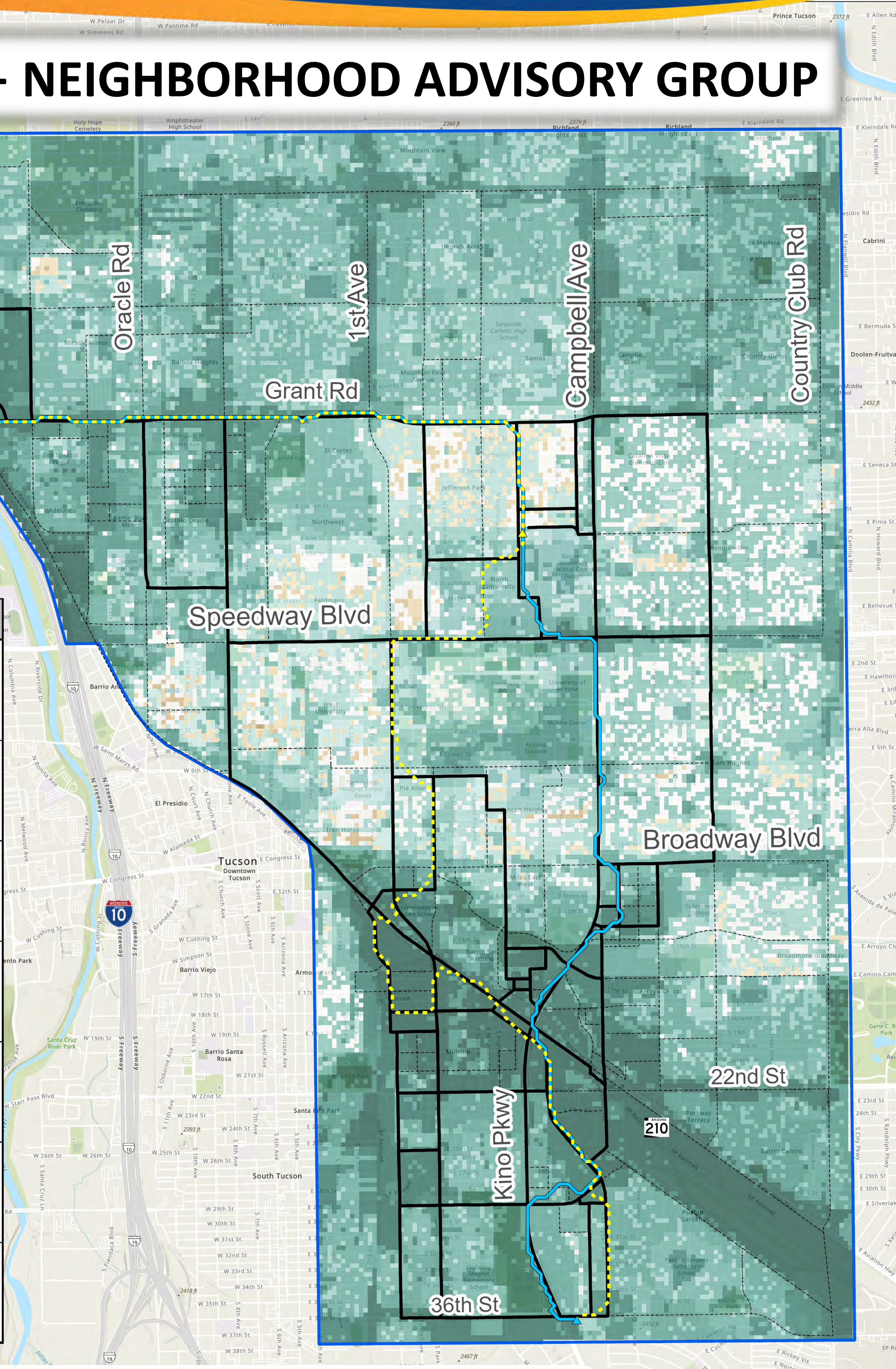


## REFINED SEGMENTS



## MODEL 1 — NEIGHBORHOOD ADVISORY GROUP

Criteria Models	Model 1 Weighted Criteria
<p><b>BIOLOGY &amp; WILDLIFE</b></p>	20.0%
<p><b>Total Environment</b></p>	10.0%
<p><b>Residential Land Use</b></p>	15.0%
<p><b>Historic Properties</b></p>	30.0%
<p><b>Noise &amp; Communication</b></p>	5.0%
<p><b>Native Lands</b></p>	10.0%
<p><b>Low Income Community</b></p>	10.0%



- ▲ In-Service 138kV Substation
- ▲ Proposed 138kV Substation
- Study Area
- Refined Segments
- Considered and Eliminated Segments

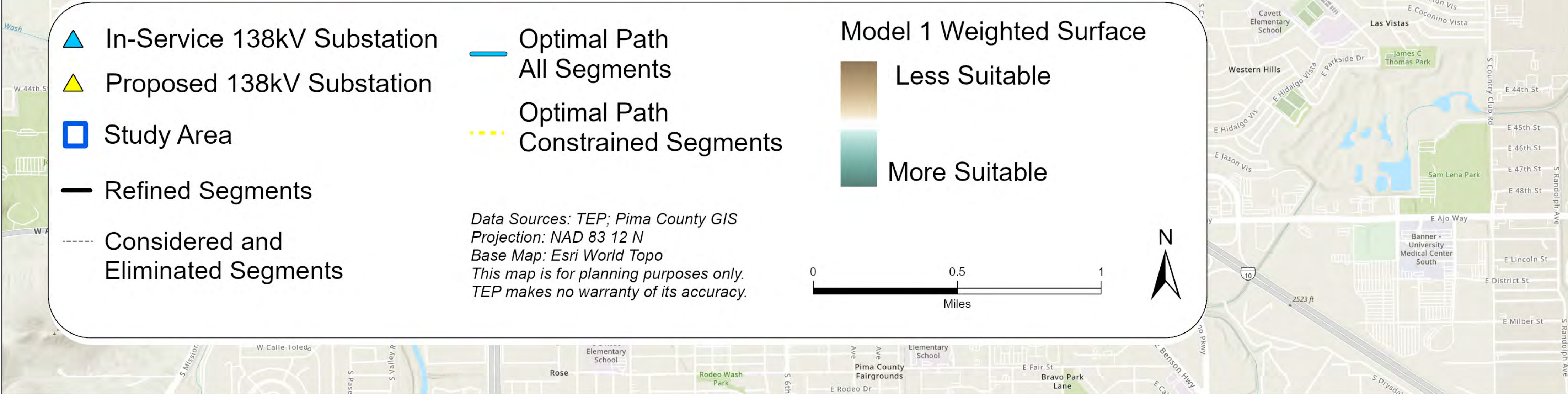
- Optimal Path All Segments
- Optimal Path Constrained Segments

**Model 1 Weighted Surface**

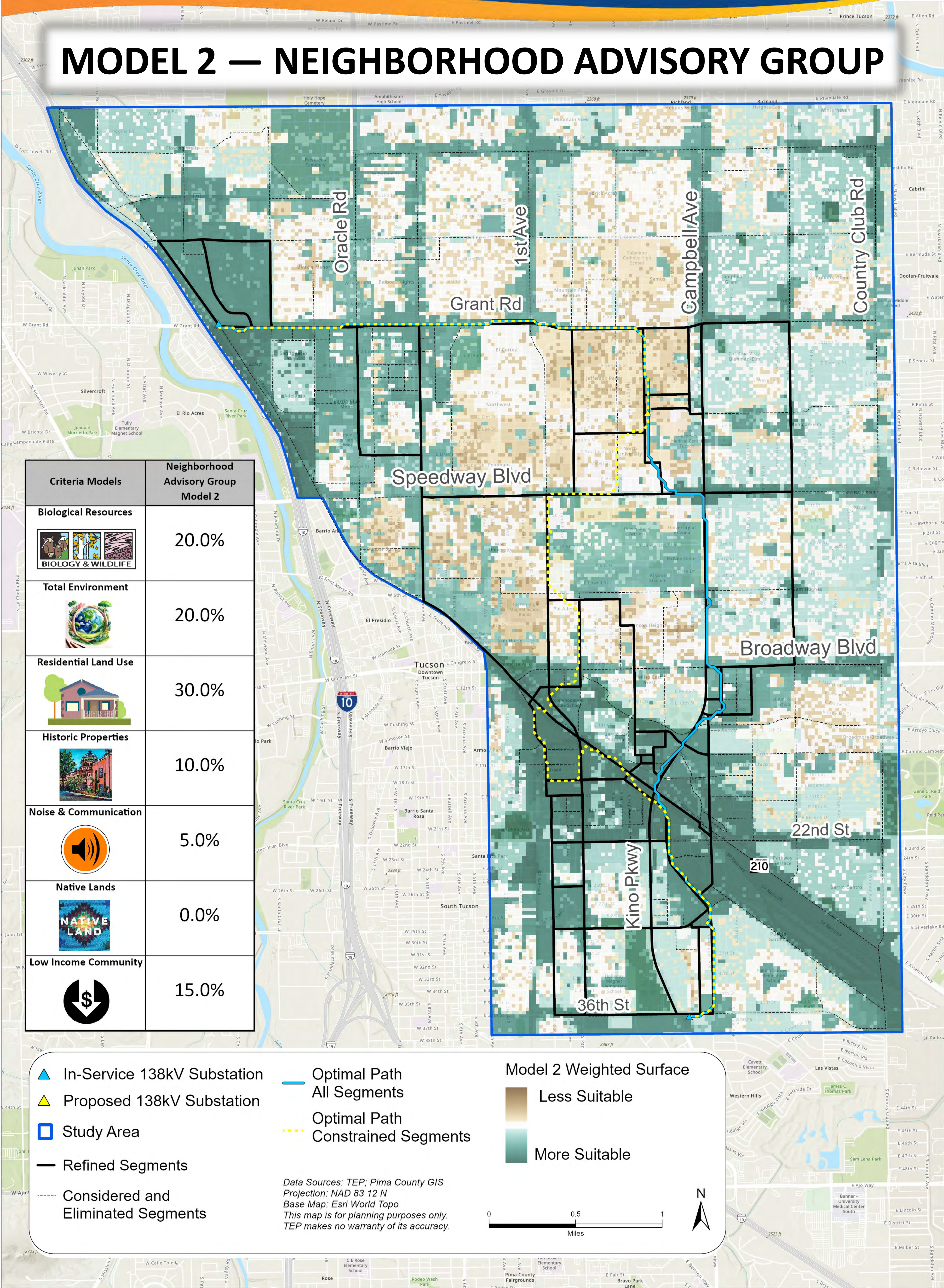
Less Suitable

More Suitable

Data Sources: TEP; Pima County GIS  
 Projection: NAD 83 12 N  
 Base Map: Esri World Topo  
 This map is for planning purposes only.  
 TEP makes no warranty of its accuracy.



## MODEL 2 — NEIGHBORHOOD ADVISORY GROUP



Criteria Models	Neighborhood Advisory Group Model 2
 BIOLOGY & WILDLIFE	20.0%
 Total Environment	20.0%
 Residential Land Use	30.0%
 Historic Properties	10.0%
 Noise & Communication	5.0%
 Native Lands	0.0%
 Low Income Community	15.0%

▲ In-Service 138kV Substation     — Optimal Path All Segments  
▲ Proposed 138kV Substation     - - - Optimal Path Constrained Segments  
  Study Area  
 Refined Segments  
 Considered and Eliminated Segments

**Model 2 Weighted Surface**  
 Less Suitable  
 More Suitable

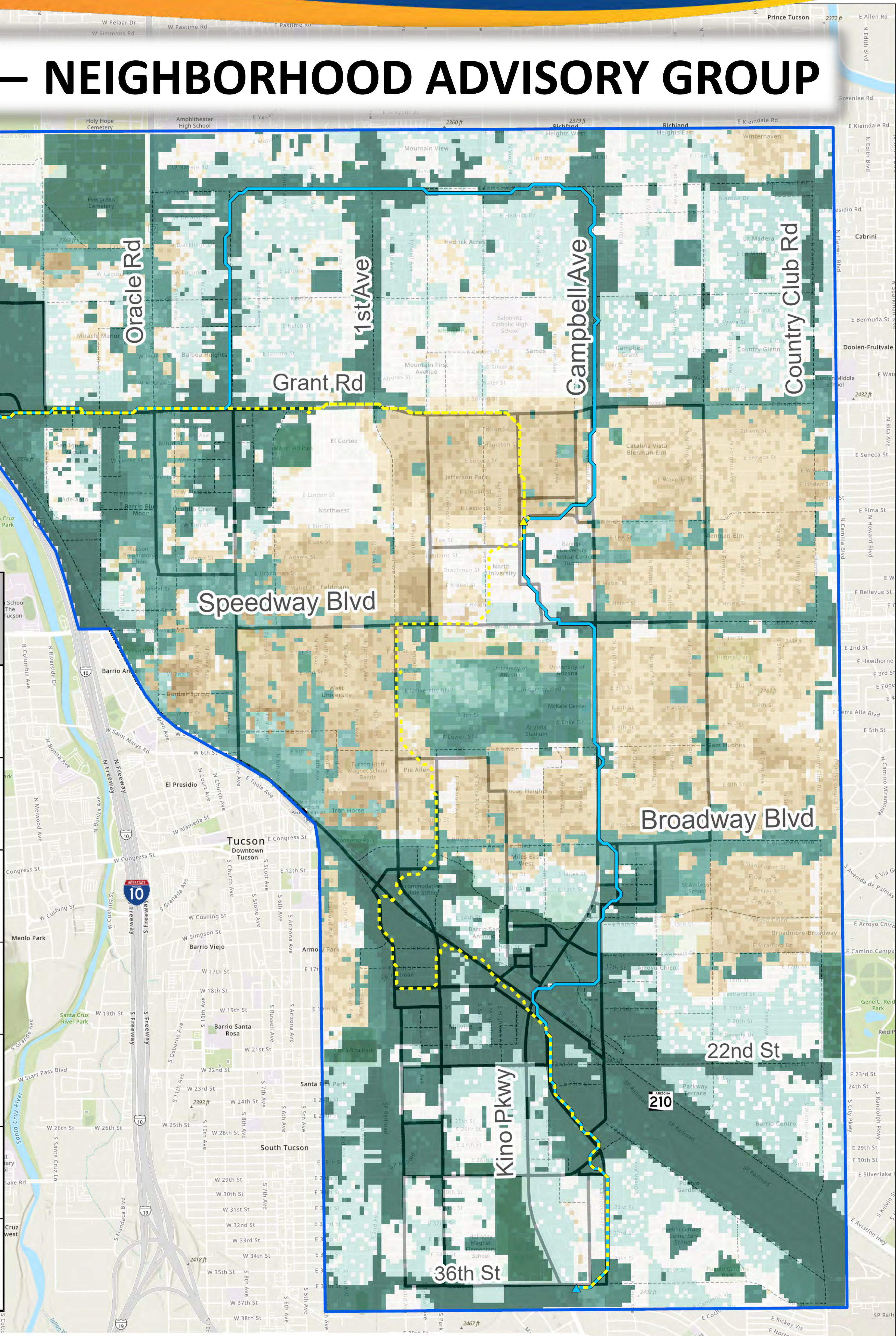
Data Sources: TEP; Pima County GIS  
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 Miles

N

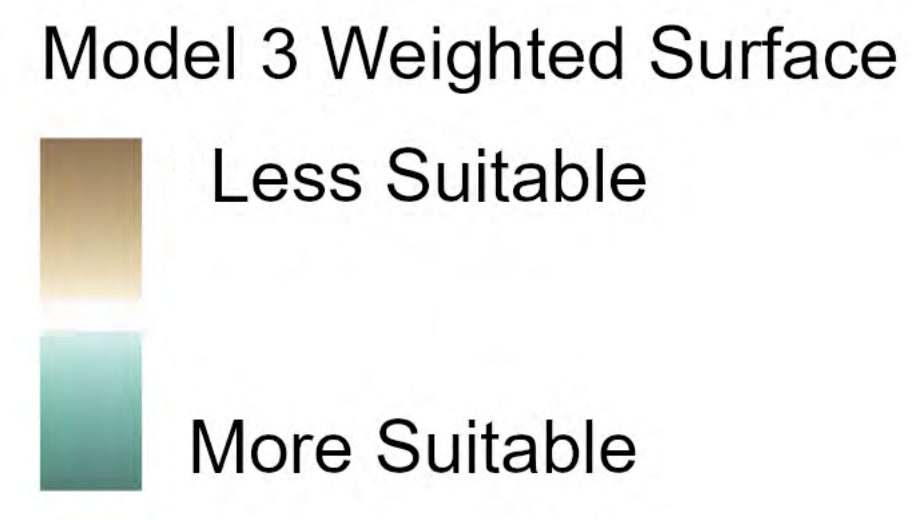
## MODEL 3 — NEIGHBORHOOD ADVISORY GROUP

Criteria Models	Neighborhood Advisory Group Model 3
 BIOLOGY & WILDLIFE	10.0%
 Total Environment	5.0%
 Residential Land Use	40.0%
 Historic Properties	30.0%
 Noise & Communication	5.0%
 Native Lands	5.0%
 Low Income Community	5.0%

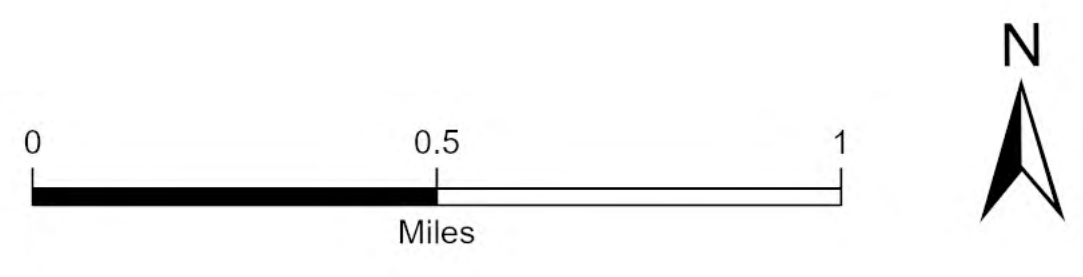


- In-Service 138kV Substation
- Proposed 138kV Substation
- Study Area
- Refined Segments
- Considered and Eliminated Segments

- Optimal Path All Segments
- Optimal Path Constrained Segments

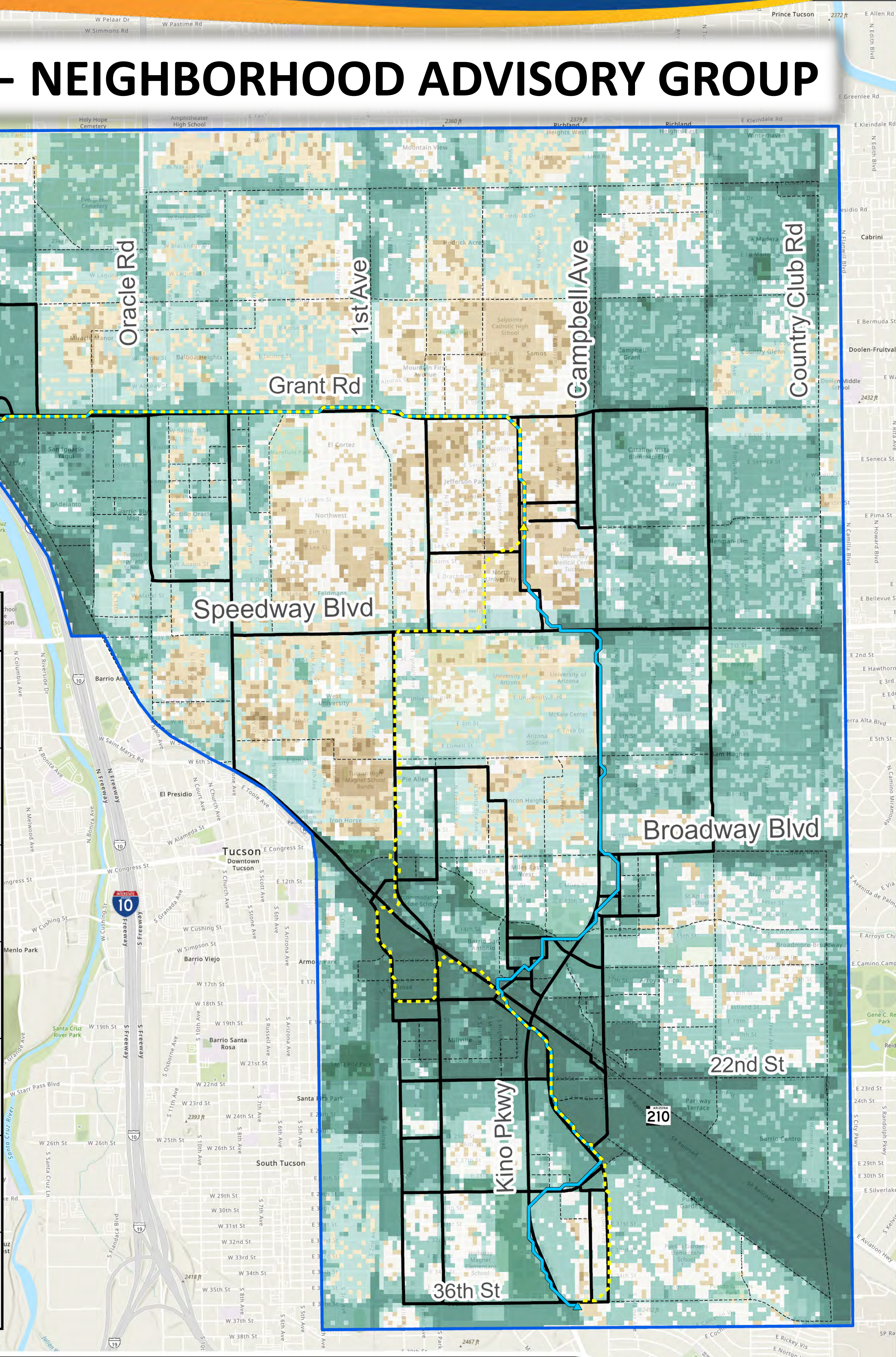


Data Sources: TEP; Pima County GIS  
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## MODEL 4 — NEIGHBORHOOD ADVISORY GROUP

Criteria Models	Neighborhood Advisory Group Model 4
 BIOLOGY & WILDLIFE	20.0%
 Total Environment	25.0%
 Residential Land Use	14.3%
 Historic Properties	3.2%
 Noise & Communication	14.3%
 NATIVE LANDS	3.2%
 Low Income Community	30.0%



▲ In-Service 138kV Substation  
▲ Proposed 138kV Substation  
□ Study Area  
 Refined Segments  
 Considered and Eliminated Segments

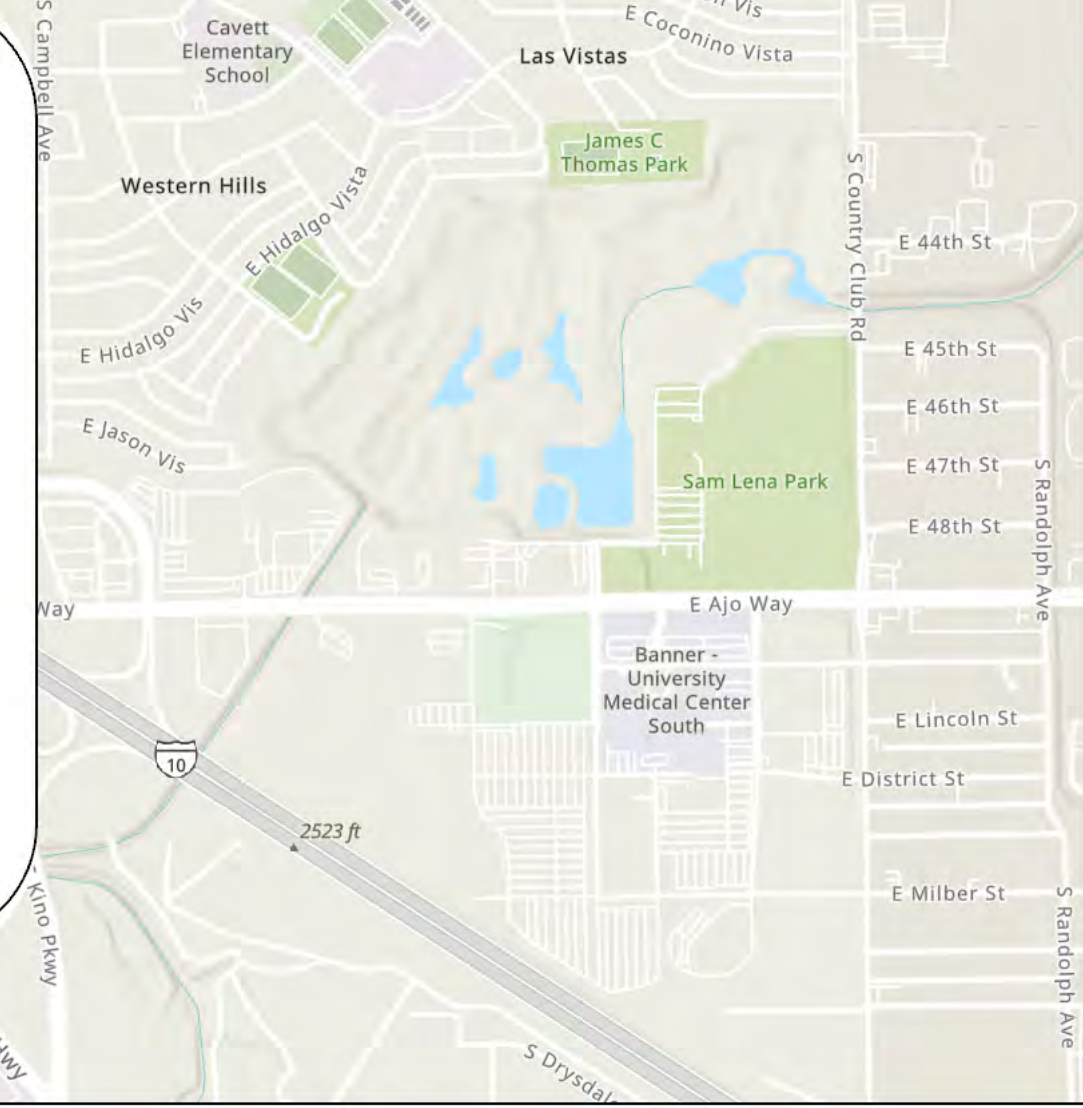
Optimal Path All Segments  
 Optimal Path Constrained Segments

**Model 4 Weighted Surface**  
 Less Suitable  
 More Suitable

Data Sources: TEP; Pima County GIS  
 Projection: NAD 83 12 N  
 Base Map: Esri World Topo  
 This map is for planning purposes only.  
 TEP makes no warranty of its accuracy.

0 0.5 1  
 Miles

N















# Midtown Reliability Project



## COMPOSITE SUITABILITY MODELS

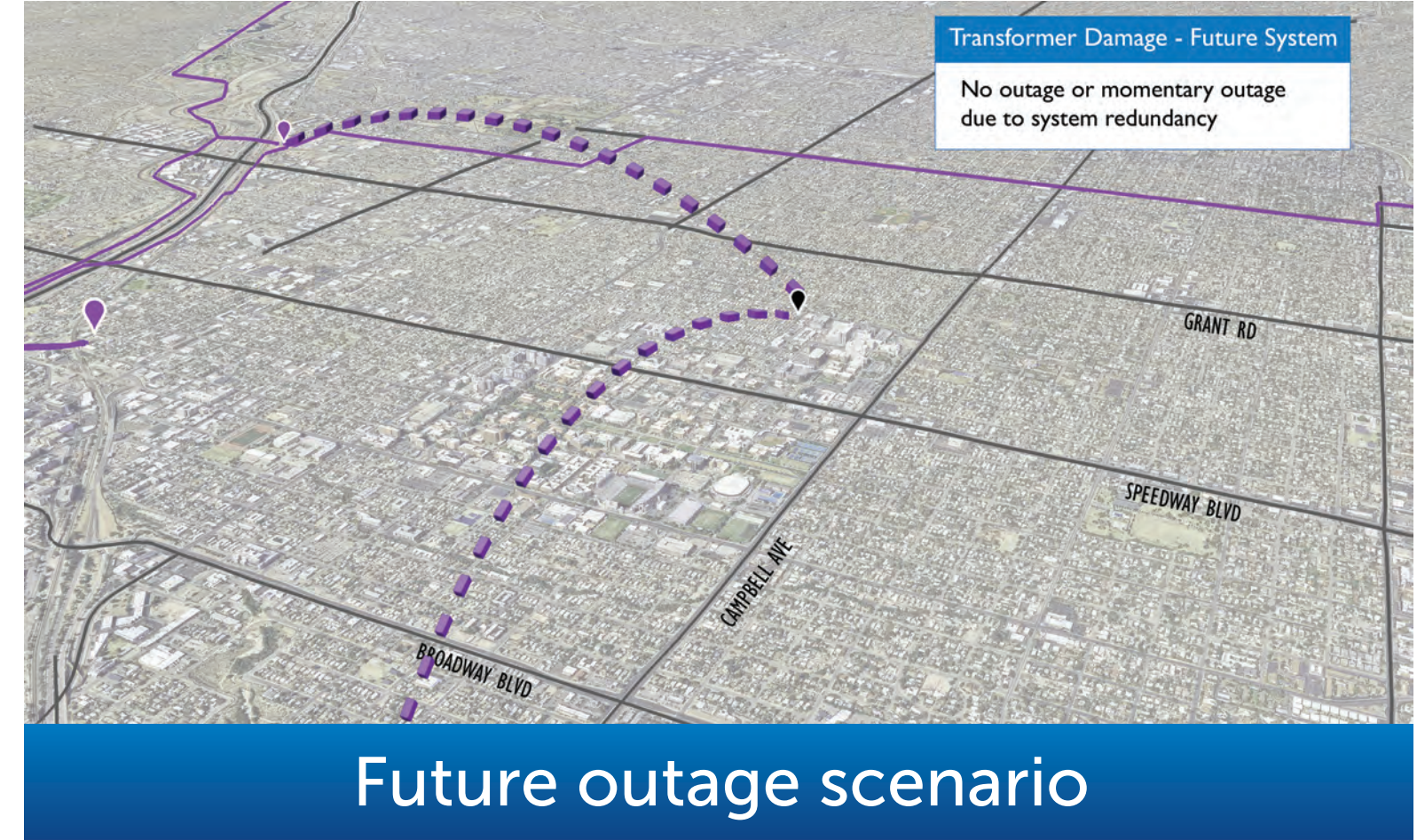
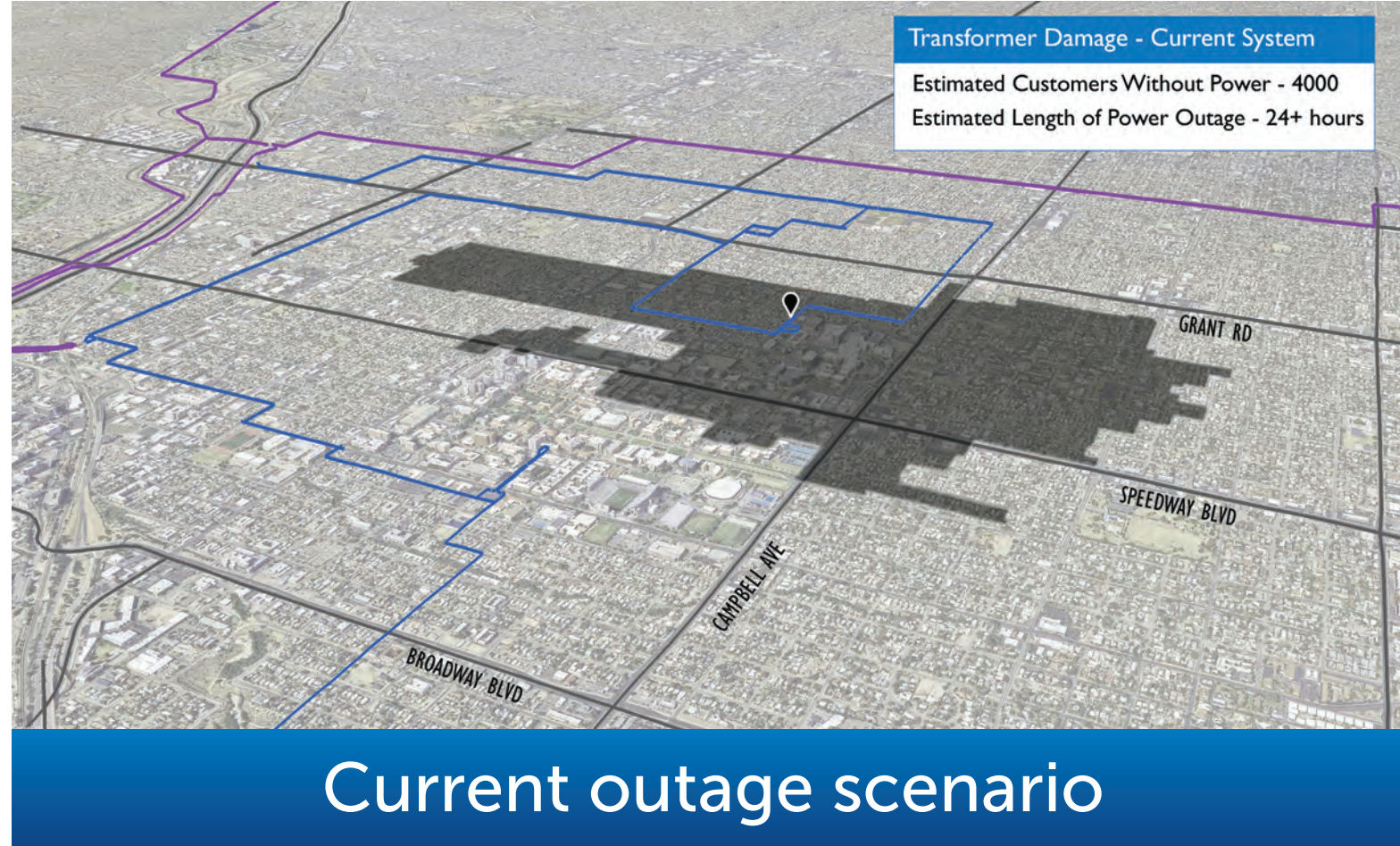
CRITERIA MODELS

	Balanced	Environmentally Preferred	Cultural/Historic Preferred	Residential Land Use Preferred	Public Preferred	Neighborhood Advisory Group Model 1	Neighborhood Advisory Group Model 2	Neighborhood Advisory Group Model 3	Neighborhood Advisory Group Model 4
Biological Resources 	14.3%	20.0%	8.0%	8.3%	19.0%	20.0%	20.0%	10.0%	20.0%
Total Environment 	14.3%	20.0%	8.0%	8.3%	9.5%	10.0%	20.0%	5.0%	25.0%
Residential Land Use 	14.3%	10.0%	8.0%	50.0%	16.0%	15.0%	30.0%	40.0%	14.3%
Historic Properties 	14.3%	20.0%	40.0%	8.3%	14.0%	30.0%	10.0%	30.0%	3.2%
Noise & Communication 	14.3%	10.0%	8.0%	8.3%	9.5%	5.0%	5.0%	5.0%	14.3%
Native Lands 	14.3%	10.0%	20.0%	8.3%	10.0%	10.0%	0.0%	5.0%	3.2%
Low Income Community 	14.3%	10.0%	8.0%	8.3%	22.0%	10.0%	15.0%	5.0%	30.0%
Which model best represents <u>your</u> perspective? 				★					

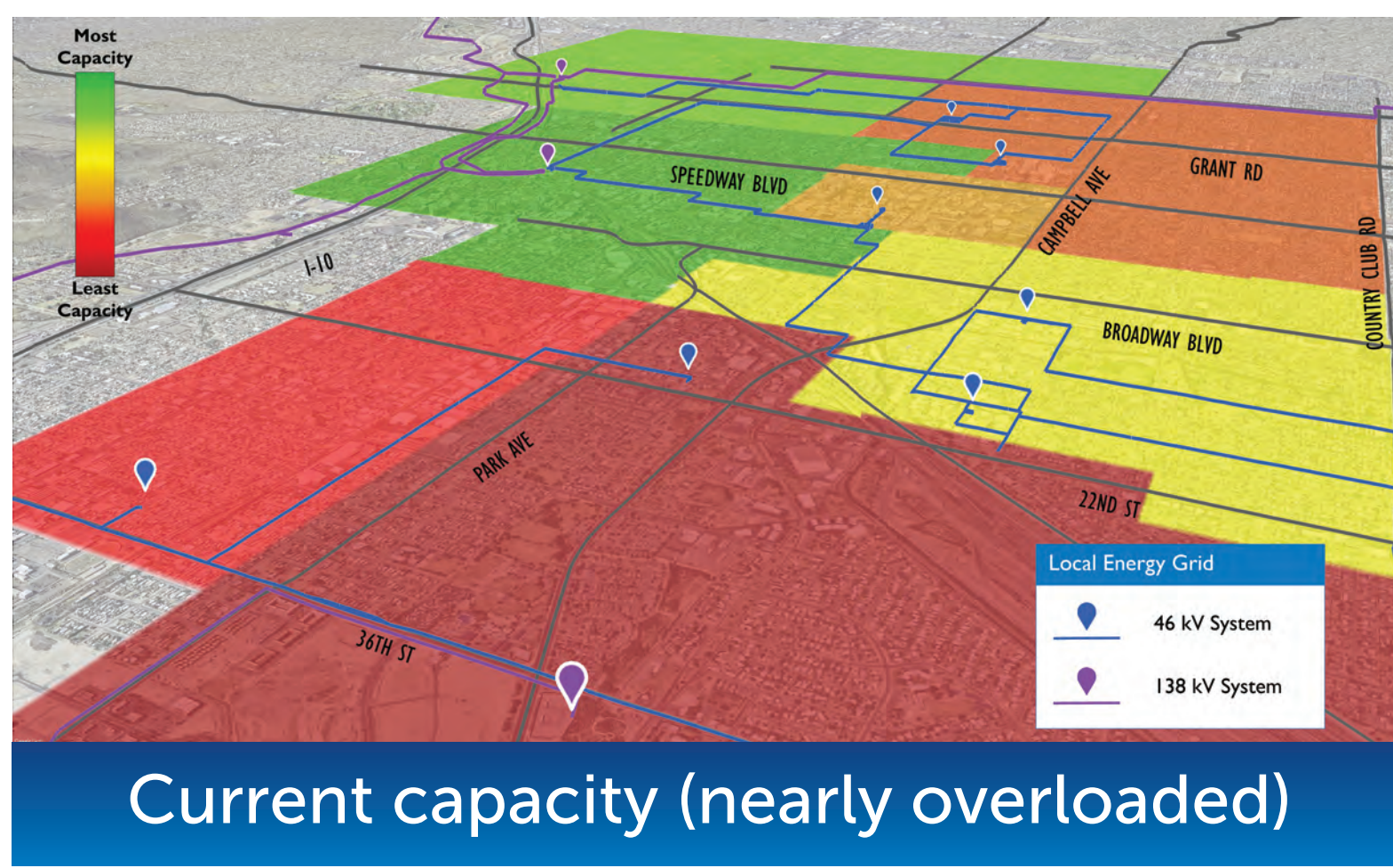
# Midtown Reliability Project Benefits



## Fewer, shorter power outages



## Greater capacity for growing energy needs



## More customer-owned solar, storage and EVs



## Improved service citywide



## Removal of aging substations, power lines

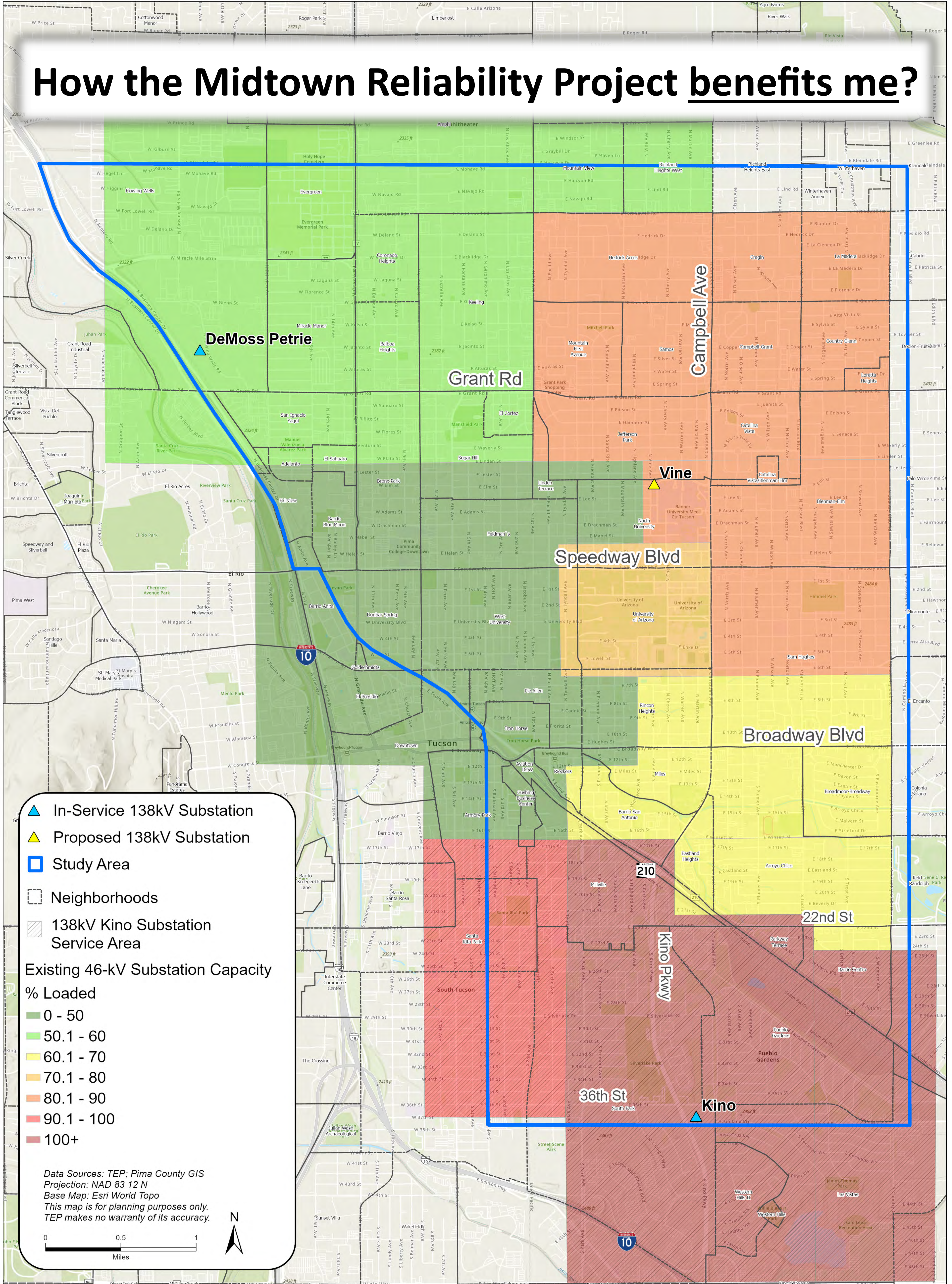


## Support for economic growth and a healthy community



Learn more about these benefits at:  
[tep.com/midtown-reliability-project](http://tep.com/midtown-reliability-project)

## How the Midtown Reliability Project benefits me?



# INTERACTIVE MAP STATION



**Provide your Spatial  
Comments**