Kino to DeMoss-Petrie 138 Kilovolt (kV) Transmission Line Project

Open House Meeting #2

(Virtual)

Presented:
Thursday, August 13, 2020
6-8 p.m.

Kino to DeMoss-Petrie 138 Kilovolt (kV)
Transmission Line Project

The TEP Line Siting Team

Introductions

Kino to DeMoss-Petrie Transmission Line Project

April Online Project Update

TEP prepared an online project update to continue public outreach efforts during the COVID-19 pandemic

tucson.com

TEP cancels 2 public meetings next week on transmission line due to COVID-19 concerns

Tucson Electric Power crews at work.

Mamta Popat / Arizona Daily Star file

Due to COVID-19 concerns, Tucson Electric Power is suspending two public open house meetings that were scheduled on Tuesday and Wednesday next week on its proposed Kino to DeMoss-Petrie 138-kilovolt transmission line.

The Project Update provided:

- An overview of the project
- The purpose and need for the project
- Information regarding potential line route links
- A request for public input regarding the potential line route links

Why a Virtual Open House?

- The Project is needed by 2023 to meet TEP's longterm planning requirements.
- TEP must continue public outreach during the pandemic to keep the Project on schedule.
- On June 29th, Governor Ducey signed an executive order prohibiting public events of more than 50 people.

Submitting Questions

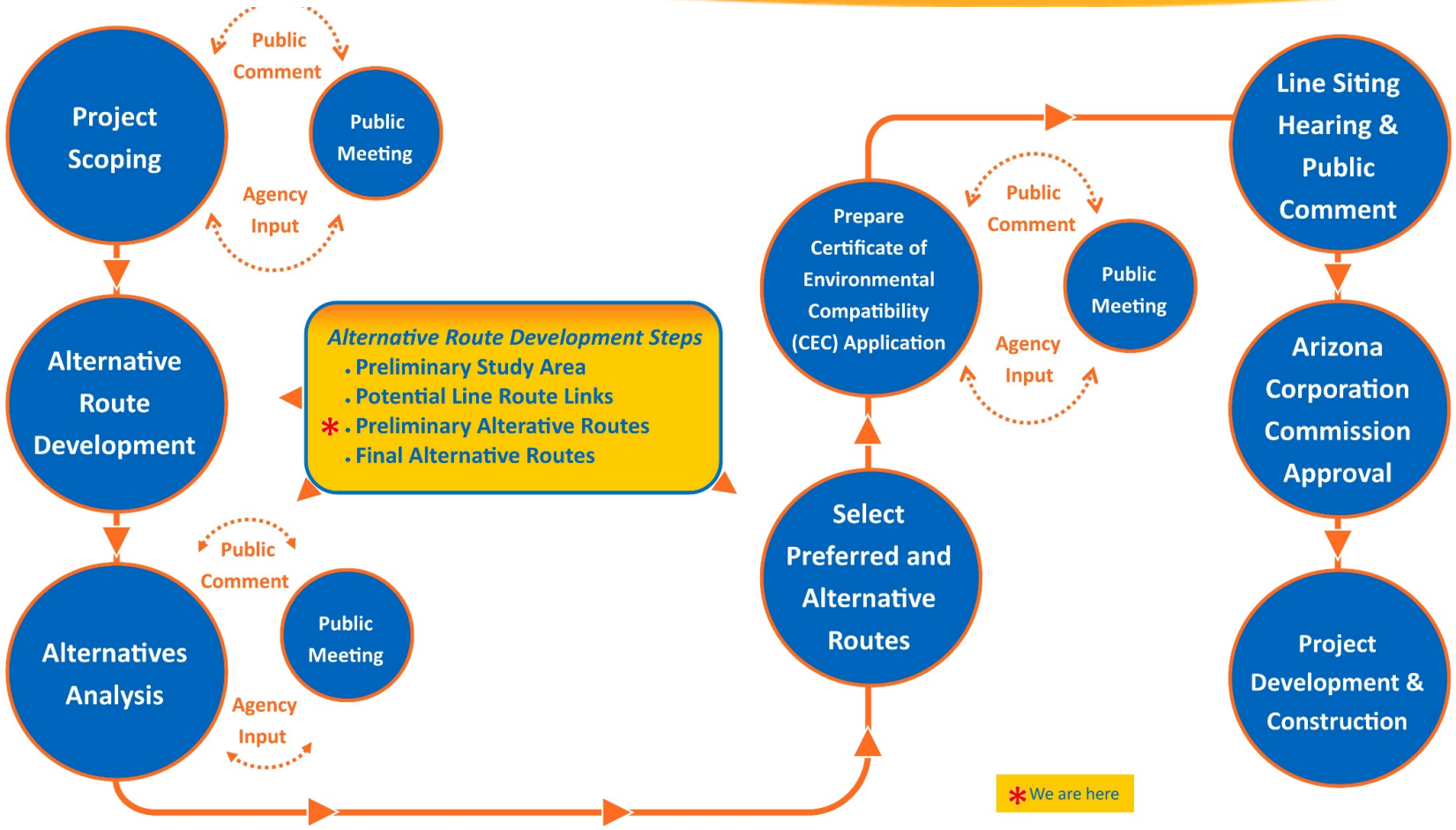
How to submit questions during virtual presentation:

- **Via text message at 520-302-5527**
- **Via phone at 520-918-9206**

Questions?

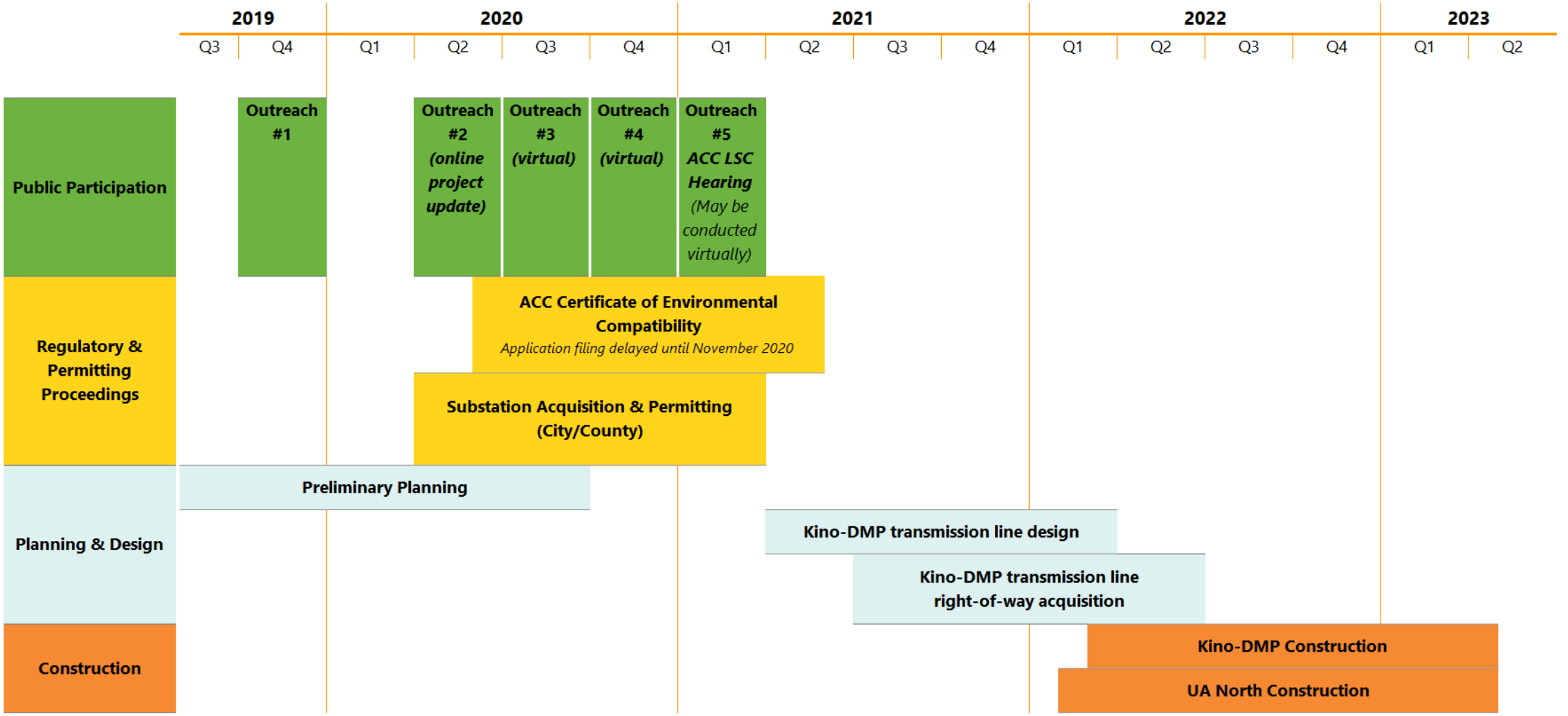
Kino to DeMoss-Petrie Transmission Line Project

Transmission Line Siting Process



Kino to DeMoss-Petrie Transmission Line Project

Project Timeline



Questions?

Why is this project needed?

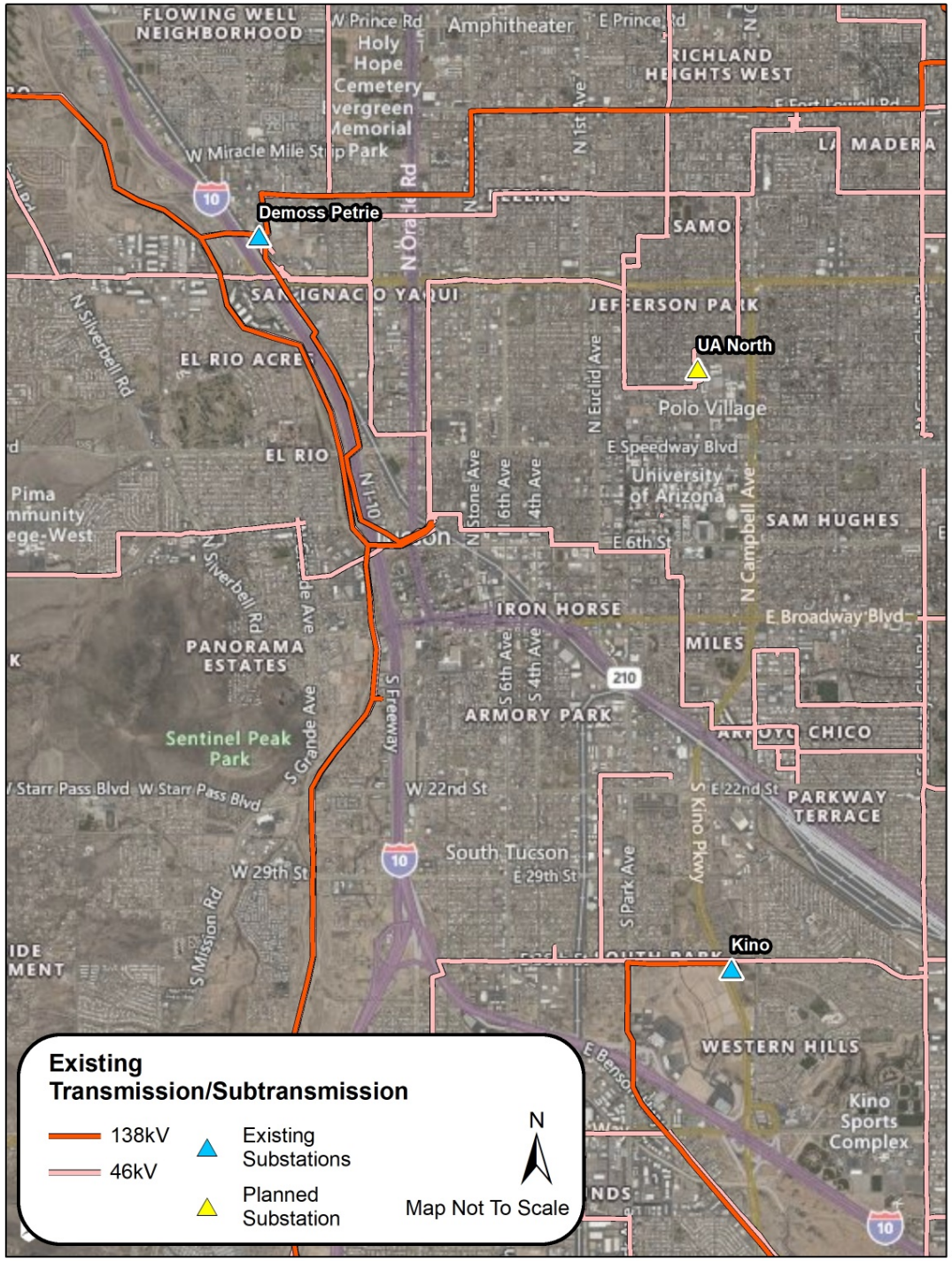
- In 2008, TEP studies determined new facilities would be needed in the Project area to meet future energy demands.
- Existing facilities are now approaching the capacity thresholds identified in the 2008 studies, driving the need for the Project.

Project Drivers:

- Energy demand within the project area has increased
- TEP's existing 46 kV system is nearing the end of its useful life, needs replacement and cannot support increasing demand
- Some distribution lines in the study area have reached or are approaching their capacity limitations

Project Drivers:

Existing Transmission System



Project Benefits

- Improved electric reliability. New energy infrastructure will strengthen reliability for homes and businesses in the study area by adding redundancy, allowing TEP to deliver energy from more than one direction
- Replacement of aging infrastructure. A large transformer, electric switchgear and other substation equipment currently providing service to some area customers are nearing the end of their useful lives and must be replaced within the next five years.
- Support for the University of Arizona and the Banner – University Medical Center Tucson campus and emergency room.

Project Benefits

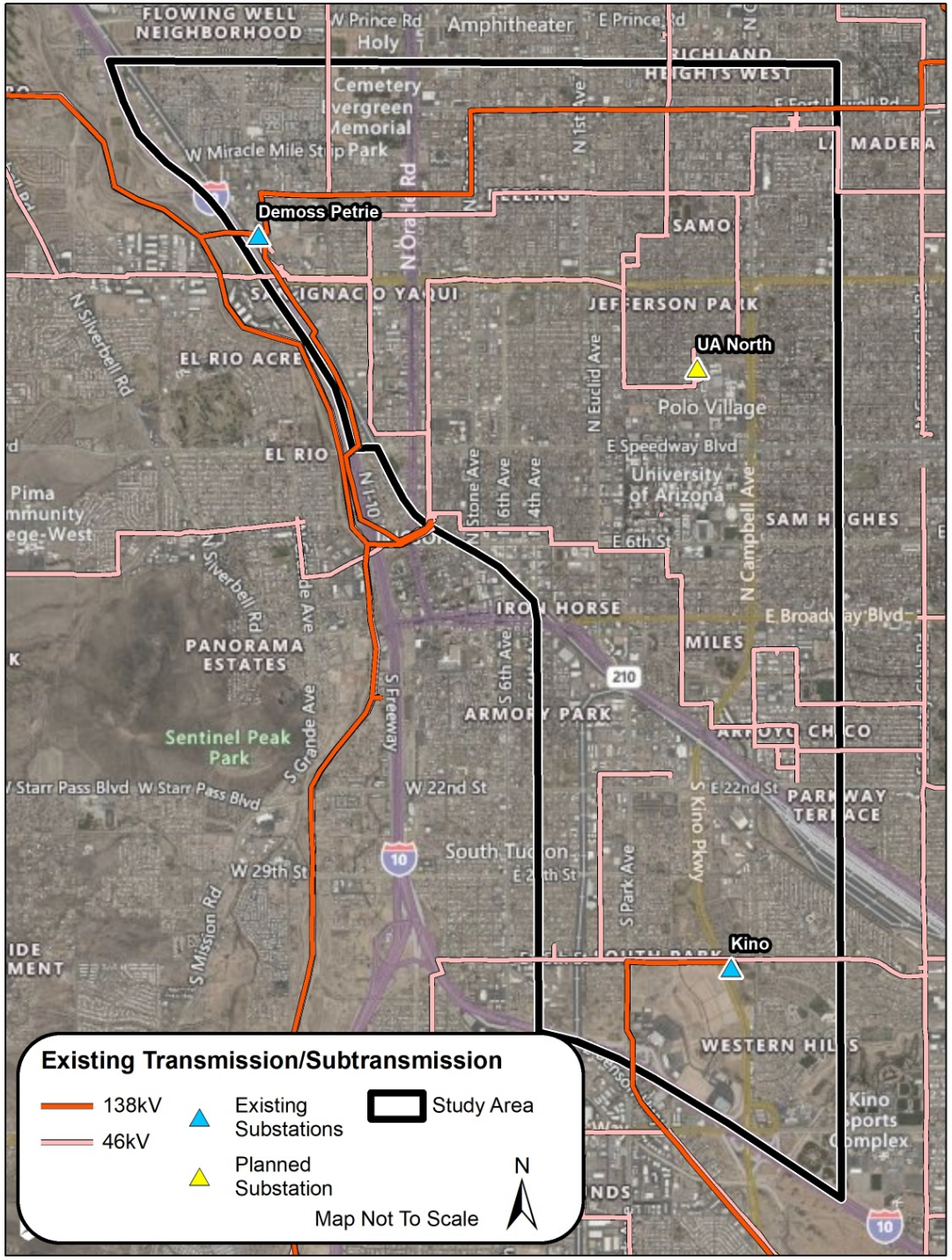
- The project will create a “looped” 138 kV transmission system that will interconnect both the Kino and UA North 138 kV Substations to TEP’s existing infrastructure. This looped system adds redundancy by serving both UA North and Kino from two directions
- UA North Substation will alleviate demand placed on existing 46 kV circuits, providing contingency support in and around the study area, allowing TEP greater flexibility to respond to outages
- UA North Substation will interconnect with TEP's 138 kV system, which provides greater service reliability and additional capacity to serve future energy needs.

Project Description

- A new, single circuit 138 kilovolt (kV) transmission line to interconnect;
  - Kino 138 kV Substation (existing)
  - UA North 138 kV Substation (planned)
  - DeMoss-Petrie 138 kV Substation (existing)

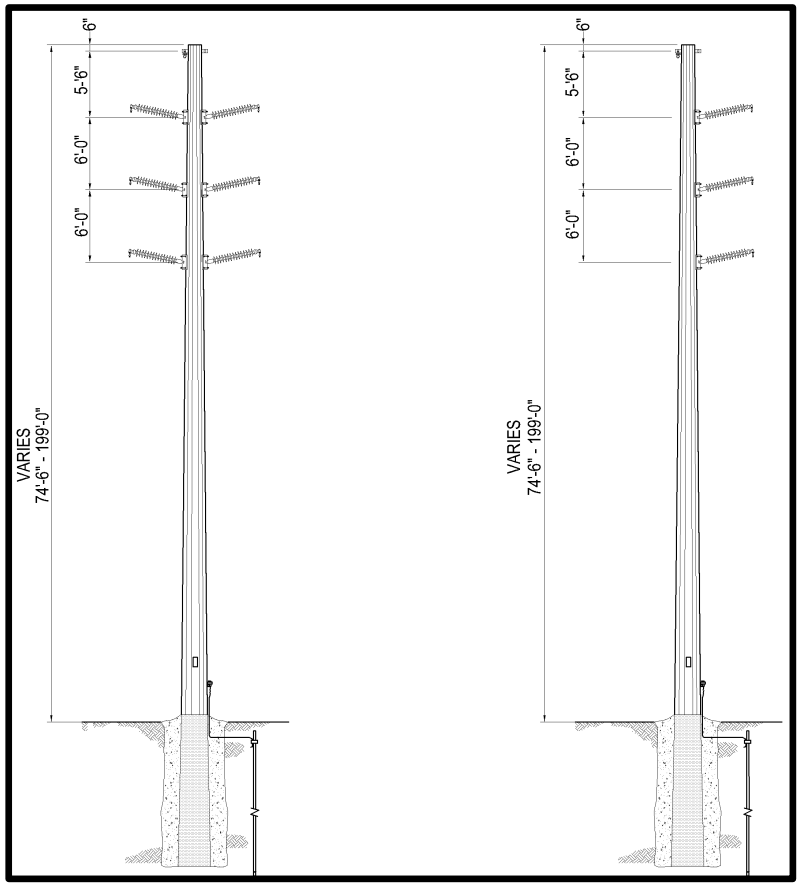
Project Description:

Study Area



Kino to DeMoss-Petrie Transmission Line Project

Project Features



Pole Characteristics

Type: Tubular weathering steel monopoles

Pole height: Typically 75-110 feet

Span length: 600-1,000 feet
(distance between poles)

Poles per mile: 5-9 Structures

Right of way width: Up to 100 feet

A typical weathering steel monopole supporting a 138 kilovolt transmission line

Questions?

Kino to DeMoss-Petrie Transmission Line Project

Outreach

- Local public official briefings:
  - Ongoing since September 2019
- Public outreach:
  - Open House Meetings held Oct. 22-23, 2019
  - Open House Meetings scheduled for March 17-18, 2020 canceled due to COVID-19 emergency
  - Project Update provided online April 2020
  - August Virtual Open House meeting
  - Future Open House meeting prior to ACC application filing
- Community Working Group:
  - Oct. 9, 2019
  - Dec. 4, 2019
  - Feb. 12, 2020

Stakeholder meetings:

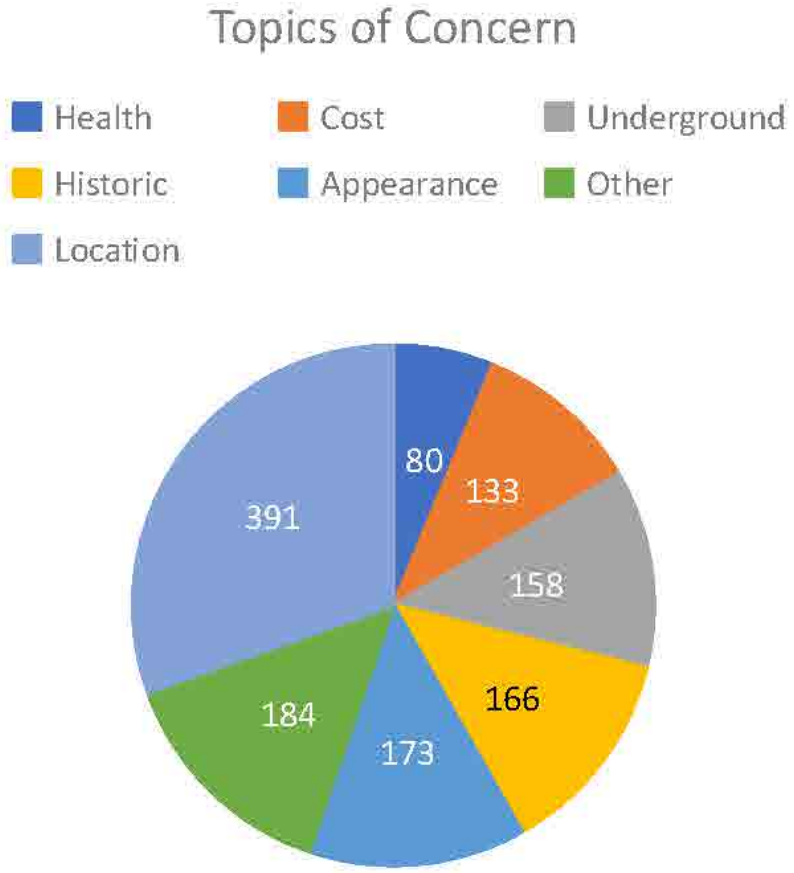
Oct. 9, 2019

Dec. 19, 2019

Comments

Comments:

- TEP received 489 comments as of as of July 20, 2020*
  - 85% responded to
  - 10% no response required
  - 5% unable to respond



*** Note: A commenter may have commented on multiple topics.**

Appearance:

- Undergrounding distribution
- Pole finish – silver/grey not rust
- Height/width of poles
- “Visual clutter”
- Create an industrial “feel”
- Unsightly
- Ruin skyline

Historic Properties:

- Built Environment Study in progress that will:
    - Compare and contrast potential impacts of each preliminary alternative route, including:
        - Visual
        - Individual historic properties
        - Historic Districts

- TEP is coordinating with the COT Historic Preservation Officer (HPO) on this study.
- The COT HPO will review the report for accuracy.
- Results of the study will be used by TEP in its analysis of the routes

Residential Use and Property Values:

- Routes will be compared and contrasted by percent of adjacency to residential use.
- Recent property value analysis by BLM for a 230kV project concluded:
- Conclusions from the research are mixed and findings range from no effects to negative effects.
- Research stresses that there is no way to predict whether or how a particular transmission line would impact property values, and conclusions have only been drawn after construction.
- Complete study can be accessed here:
- **https://eplanning.blm.gov/eplanning-ui/project/97103/510**

What are EMFs (Electro-Magnetic Fields)?

- **Electric Fields**: produced by voltage – the strength or 'pressure' with which an electric current flows

- **Magnetic Fields**: produced by current – the movement of electrons through a conductor

EMFs produced by power lines:

- Much weaker than those associated with other sources such as microwaves or radio waves
- Given the frequency, EMFs produced by power lines are considered “non-ionizing” because they are not known to damage DNA or cells directly
- Dissipate the further away from the line you move

Kino to DeMoss-Petrie Transmission Line Project

Comments

Typical Magnetic Field Levels				
	Distance from source			
	6"	1'	2'	3'
Digital Clock	1	-	-	-
Electric Oven	9	4	-	-
Hair dryer	300	1	-	-
Microwave Oven	200	4	10	2
Refrigerator	2	2	1	-
Video Display Terminal (PCs with color monitors)	14	5	2	-
Washing Machine	20	7	1	-
Source: National Institute of Environmental Health Sciences				

Typical Magnetic Field Levels from Overhead Power Lines (60 Hz)					
	Distance from source				
	0'	Right-of-Way Edge	100'	200'	300'
500 kV	86.7	29.4 at 65'	12.6	3.2	1.4
230 kV	57.5	19.5 at 50'	7.1	1.8	0.8
115 kV	29.7	6.5 at 50'	1.7	0.4	0.2
Source: National Institute of Environmental Health Sciences					

Transmission Line Undergrounding:

- TEP initiated an underground study that determined that the cost to underground is approximately 11 times greater than overhead construction:
    - Overhead construction: $1.5 million/1.5miles
    - Underground construction: **$16.4 million**/1.5 miles
- A copy of the underground study can be found at:
    - tep.com/wp-content/uploads/TEP-138-UG-Report-Rev.-0-signed.pdf

Kino to DeMoss-Petrie Transmission Line Project

Comments

- Residents and stakeholders have indicated a preference for some or all of the project to be installed underground. In response to comments related to undergrounding TEP hired a third-party consultant to determine the feasibility and cost of undergrounding the line
- TEP has not installed underground transmission facilities because the significant additional costs would be borne by all TEP customers
- The Arizona Legislature provides the ability for a municipality to accommodate underground utility installation through an improvement district. An underground district would have to be formed and managed by the City of Tucson to assess the extra undergrounding costs to property owners who would benefit. More information about this process can be found here:

  https://www.azleg.gov/ars/48/00620.htm

Cost:

- Banner and/or U of A should pay
- Those needing the power (large developers) should pay to underground, not the neighborhoods
- TEP can afford to bury the line
- How much will this cost the rate payers
- If bury and rate payers have to pay – all of Tucson benefits because this area is a "gem to all."

Alternatives to the 138 kV line:

- Use Solar instead:
  - Put solar at Banner and U of A instead
  - I have solar, I'm not driving the need
  - Why isn't there a solar component
- Have you considered building a number of smaller, decentralized energy production plants along the freeway or railroad tracks and feeding into the neighborhoods on smaller reconditioned smaller lines. I would also suggest that the university, hospital, large hotels, larger users be required to set up their own power plants to serve their needs and reduce the needs of the residential area. Consider natural gas fueled generation which you have so proudly installed at the main facility by the freeway as backup.

Location of Facilities:

- TEP received over 390 comments related to the location of facilities.

- Where a commenter specifically mentioned a link as preferable or not preferable;
  - 715 listed preferable link(s)
  - 538 listed not preferable link(s)
  - These comments were tallied (single “response” per person) and used in the link analysis as one category by which the links were compared with each other.

Questions?

Philosophy & Criteria

When developing a project TEP makes every effort to:

- Design routes that will utilize existing road rights-of-way and utility corridors in an effort to minimize disturbance to surrounding areas.

- Underground or retire existing distribution facilities where the proposed line is in the same alignment as existing infrastructure.

- Work with neighbors and other stakeholders to identify concerns and develop alternatives that are in the best interest of the community

Philosophy & Criteria

- TEP also analyzes specific criteria in developing and selecting alternative routes. These criteria include:
  - Total environment (fish, wildlife, plants)
  - Existing state, local government, and private development plans including residential use
  - Noise
  - Recreational impacts
  - Scenic areas, historic sites & structures, archaeological sites
  - Interference with communication facilities
  - Technical aspects
  - Cost
  - Other applicable federal and state laws

Geospatial Analysis

- TEP uses geospatial analysis and input from neighbors and other stakeholders to develop and analyze potential line route links and alternative routes

- Phase 1 analysis utilized a dataset with major road segments in the study area.
  - Many segments were ruled out based on prior knowledge of TEP's engineering team, as well as on-the-ground inspection.
  - All remaining road segments were given a default score of 3 and were then analyzed based on their proximity to the following resources:
    - Historic Neighborhoods
    - Sensitive Receptors
    - Residential Use

Geospatial Analysis

- Each link received a score of 1-3 for each resource, depending on its proximity to that resource
- This score was added to the base score of 3

- Phase 1 also included a composite score. The composite score is a combination of the following:
  - A combined score of the resources listed above
  - The proximity of the links to existing linear features, such as roads and existing overhead distribution and transmission lines.
  - Link segments that followed along existing roads and/or utilities received a higher ranking than those that did not.

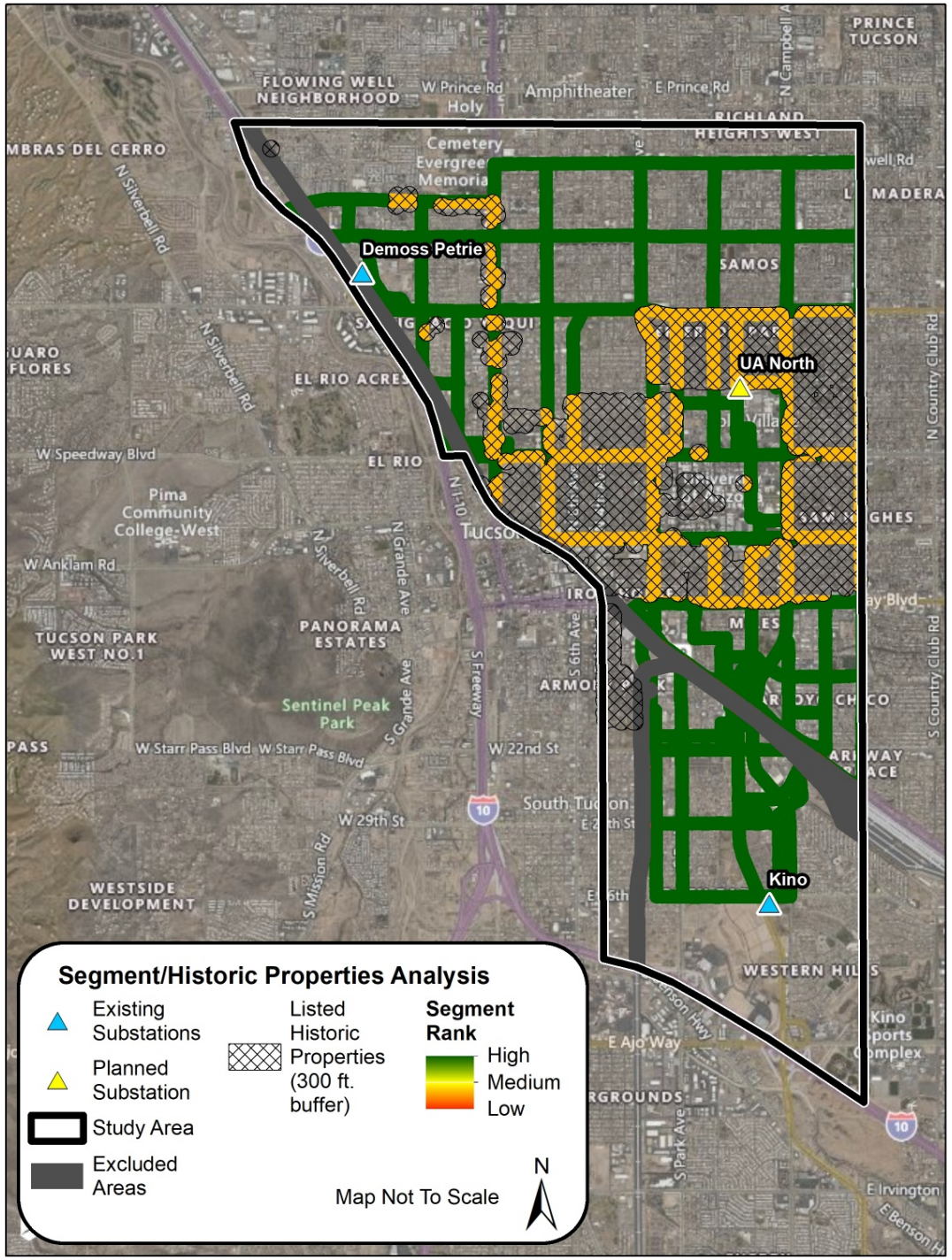
Geospatial Analysis

- Using this analysis, each potential line route link was provided a score. A higher score, indicates a better fit with TEP's design criteria. Higher scoring links are shown in green, lower scoring links are in yellow and the lowest orange to red

- Existing infrastructure, such as a road right-of-way or existing 46 kV sub-transmission will raise the "score" of a link

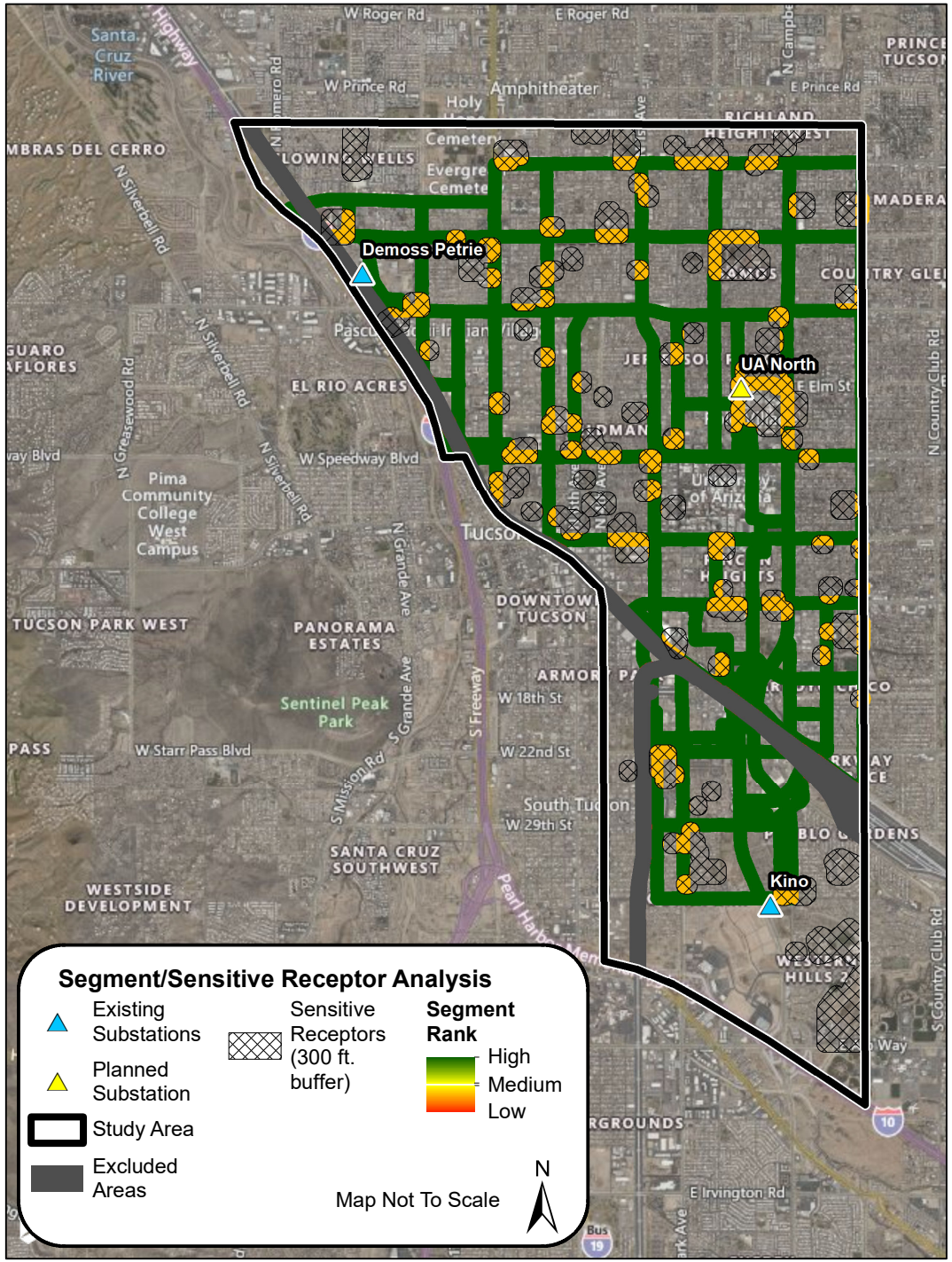
Phase 1 Analysis:

Historic Property Analysis



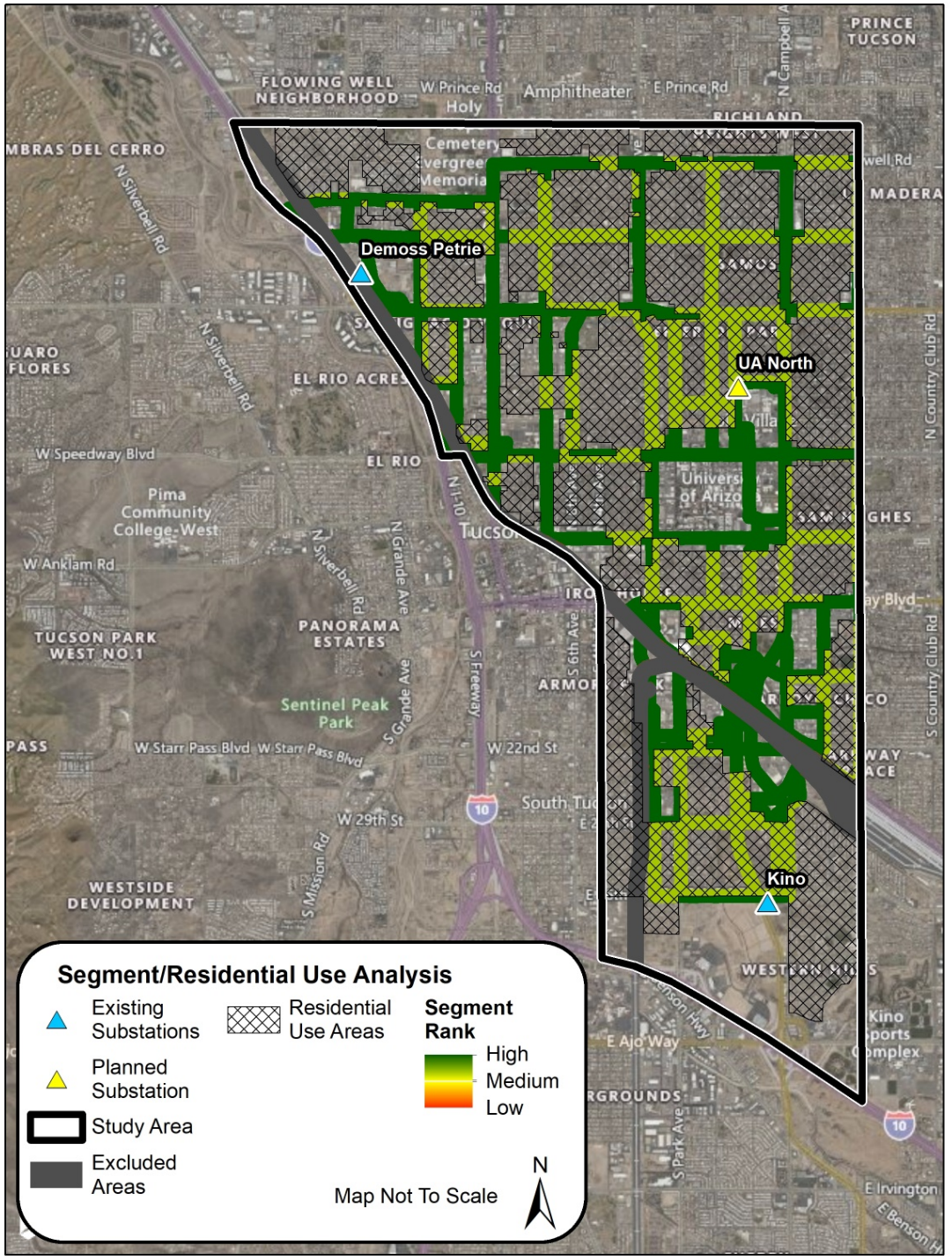
Phase 1 Analysis:

Sensitive Receptor Analysis



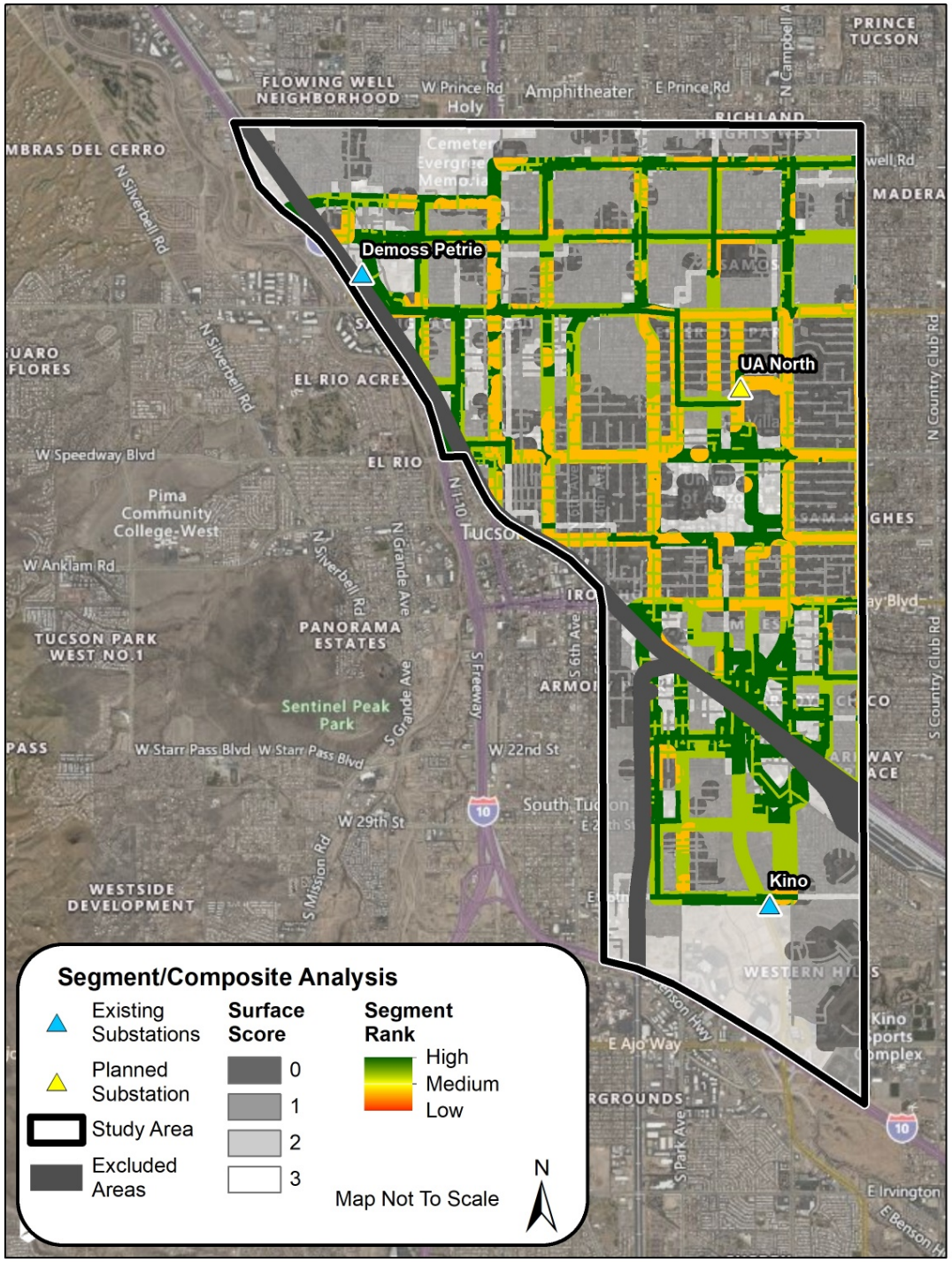
Phase 1 Analysis:

Residential Use Analysis



Phase 1 Analysis:

Composite Score Analysis



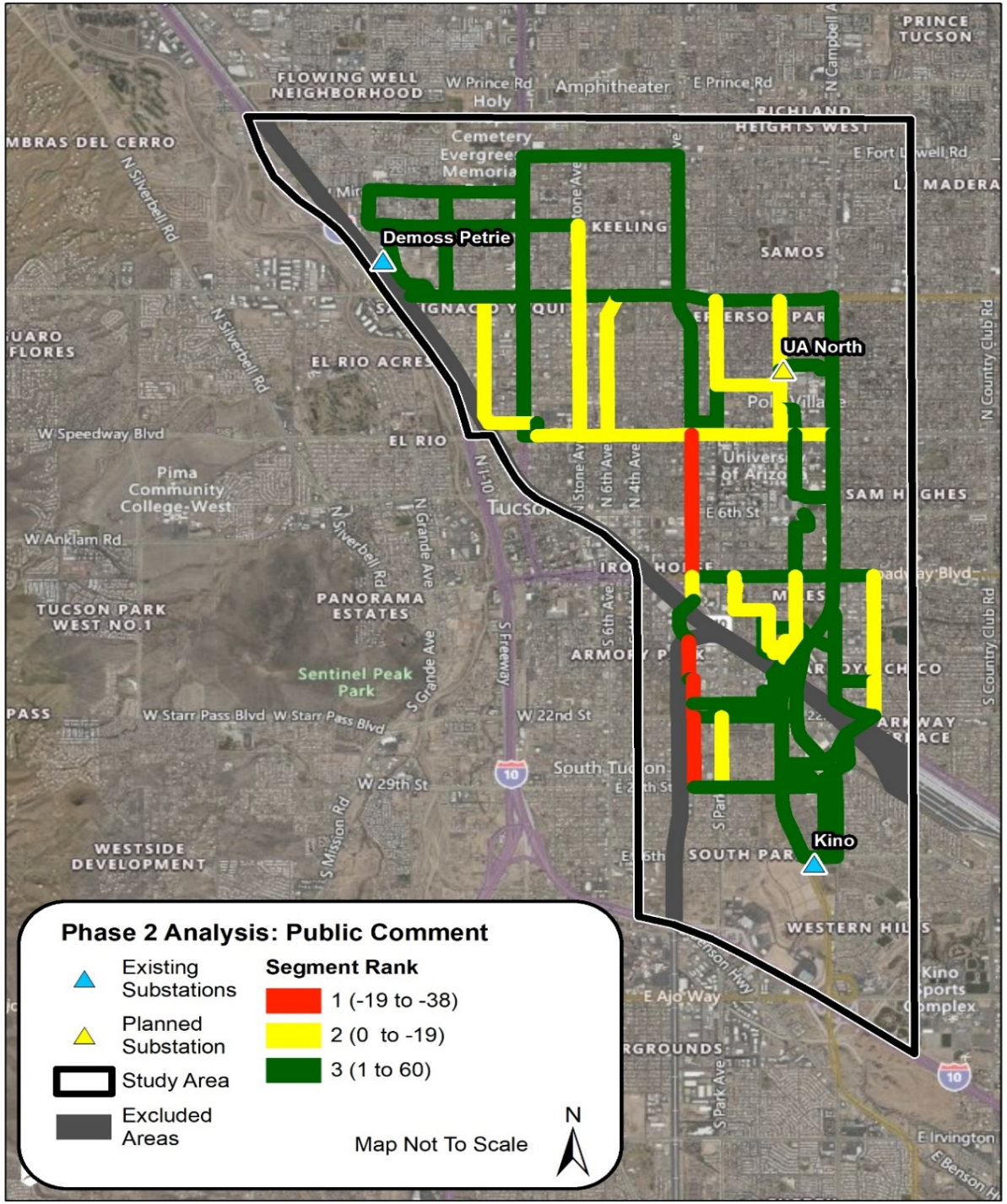
Geospatial Analysis

- Phase 2 of the analysis took place in June 2020, and took the following two additional factors into consideration:
  - Public, CWG, and stakeholder comments
  - Engineering constructability

- The phase 2 composite score is the sum of the customer comments score (range 1-3) and the constructability score (also range 1-3). For both analysis phases, the higher the score the more viable the link is.

Phase 2 Analysis:

Public Comment

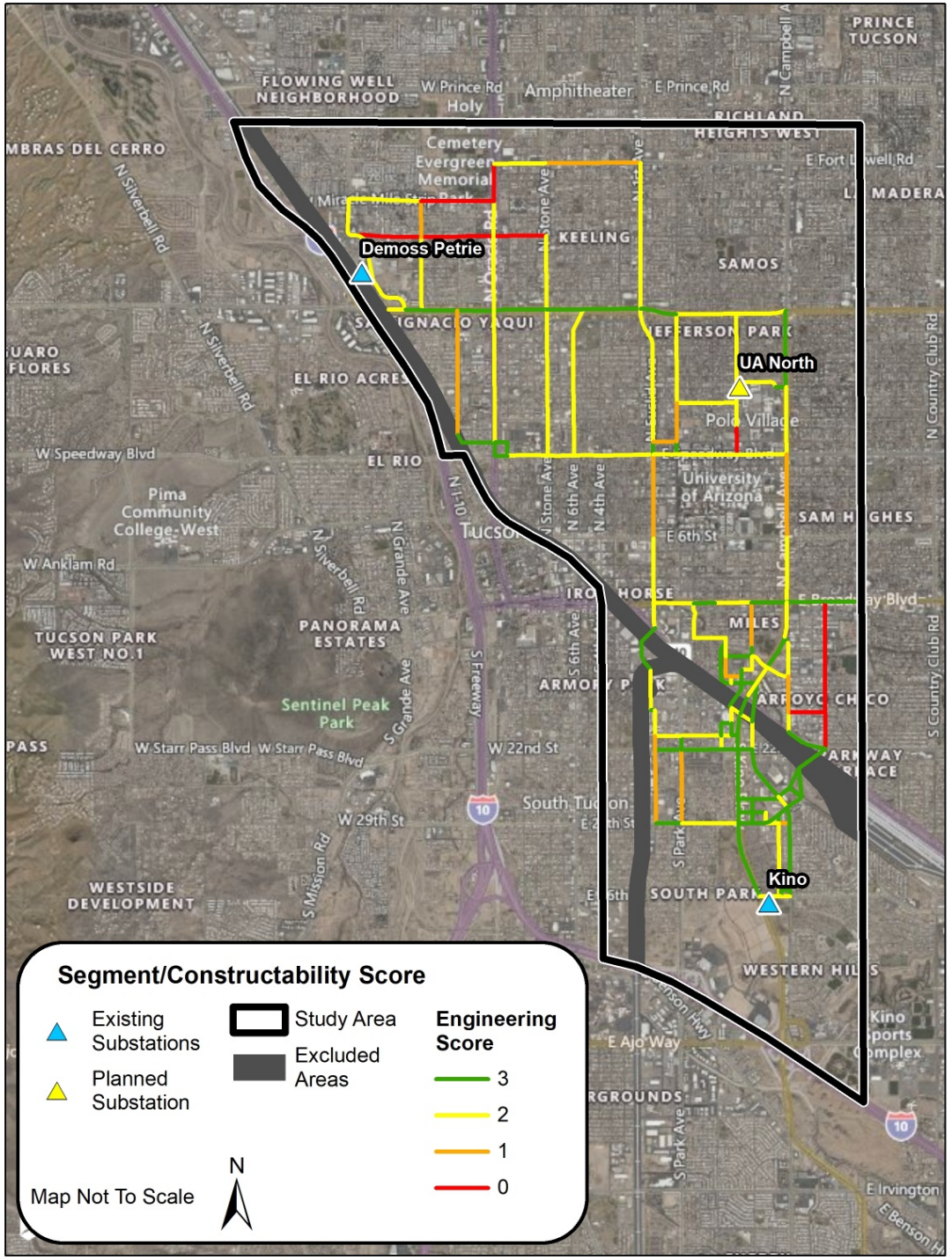


Constructability Analysis

- Looks at existing physical constraints such as:
  - Existing utilities in the road right of way
  - Existing utilities attached to structures that would need to be relocated
  - Sidewalks
  - Storm drains
  - Right of Way width
- Looks at reliability constraints
  - Will another line have to be taken out of service for construction of new line
- Scores each constraint and then provides an overall constructability score for each link

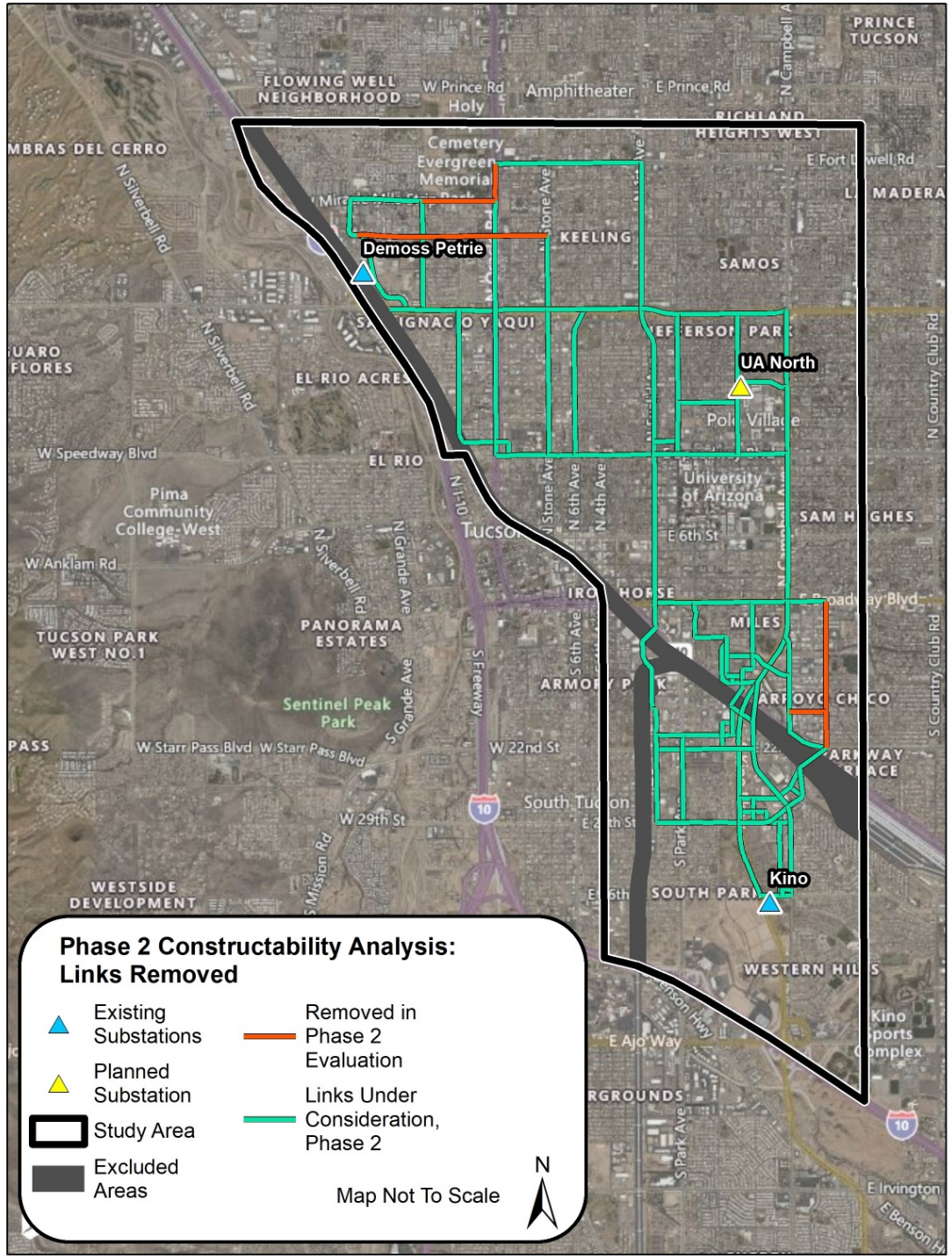
Phase 2 Analysis:

Constructability Score

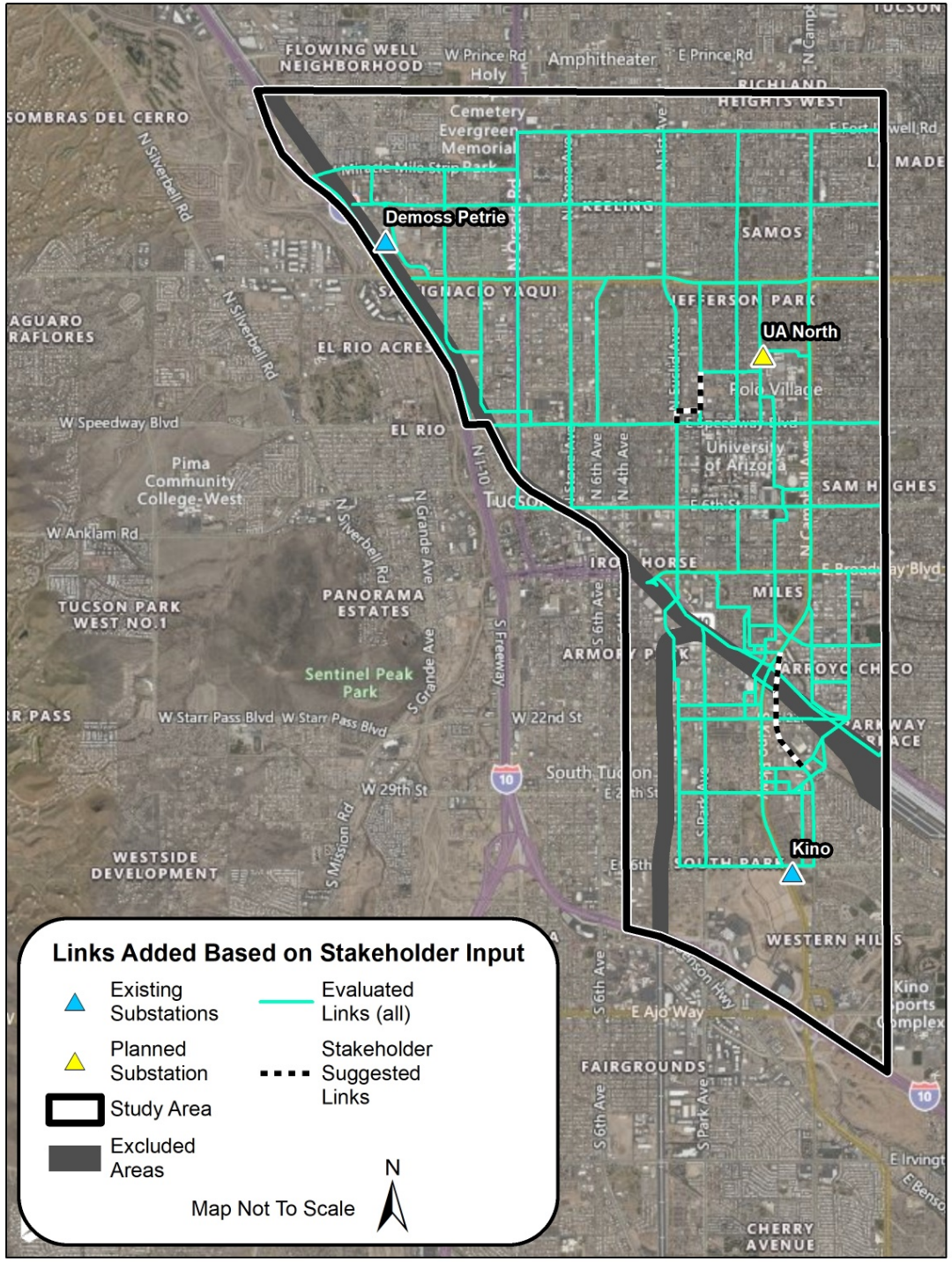


Phase 2 Analysis:

Constructability Analysis, Links Removed

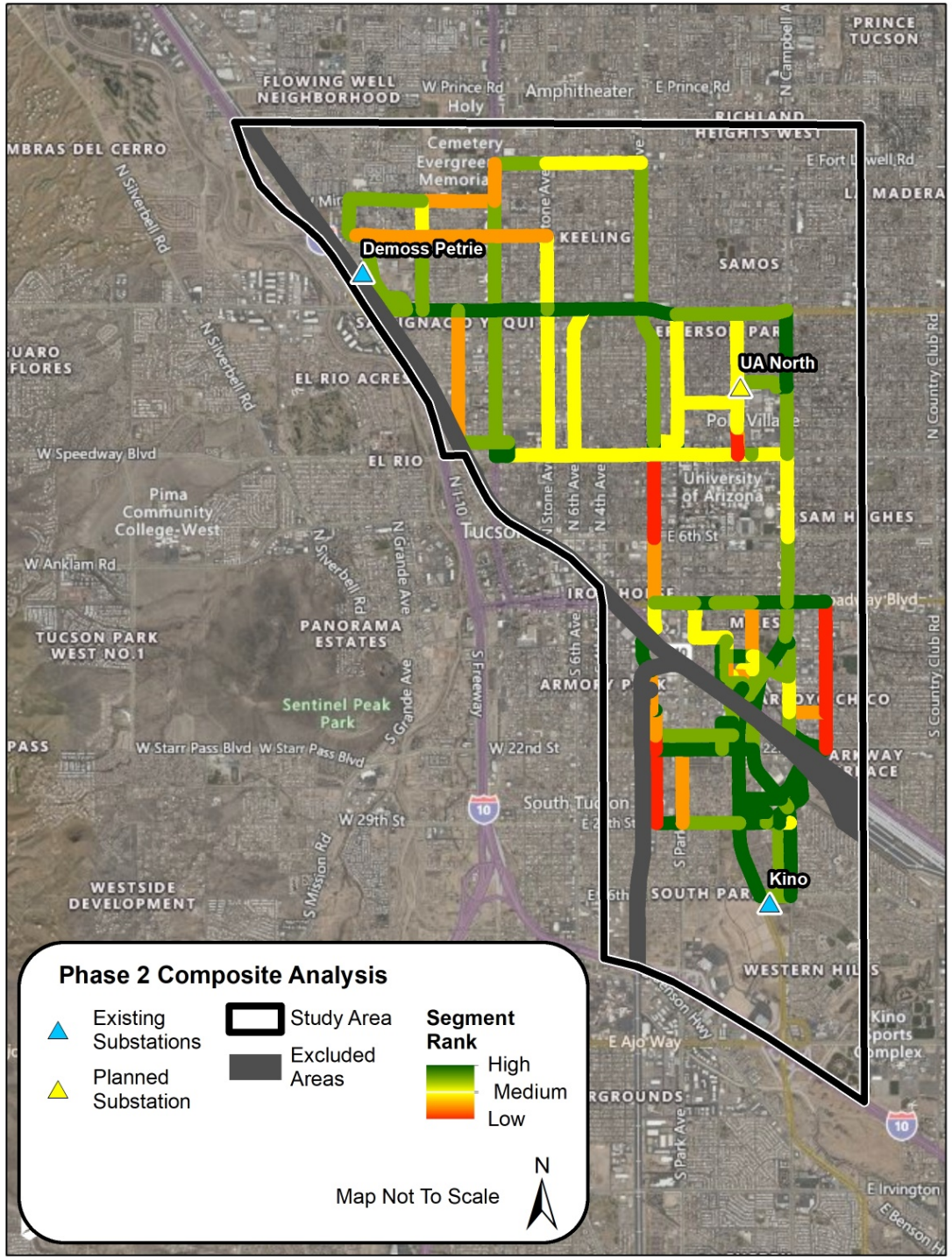


Stakeholder Input:
Links Added



Phase 2 Analysis:

Composite Analysis

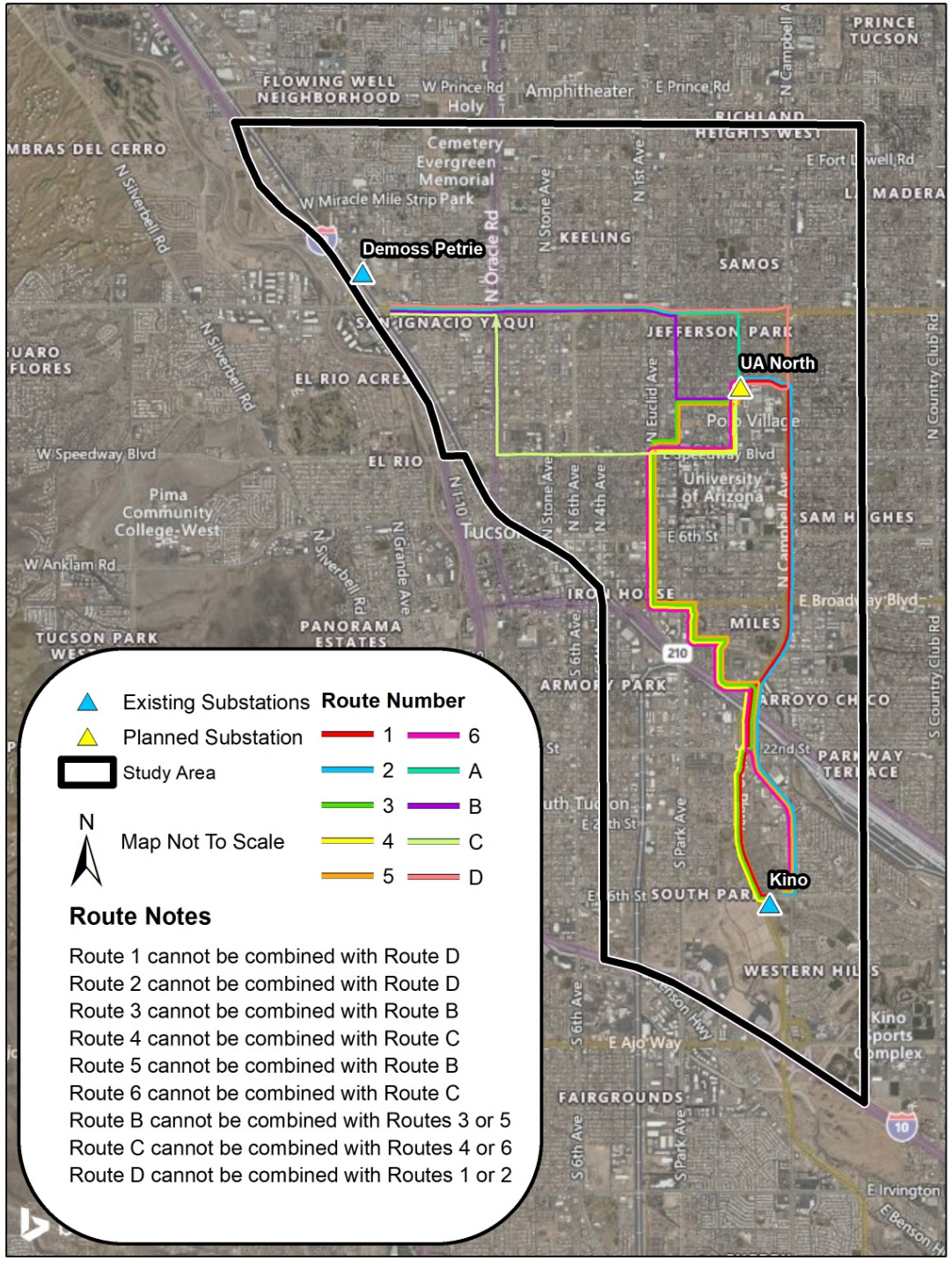


Questions?

Route Overview

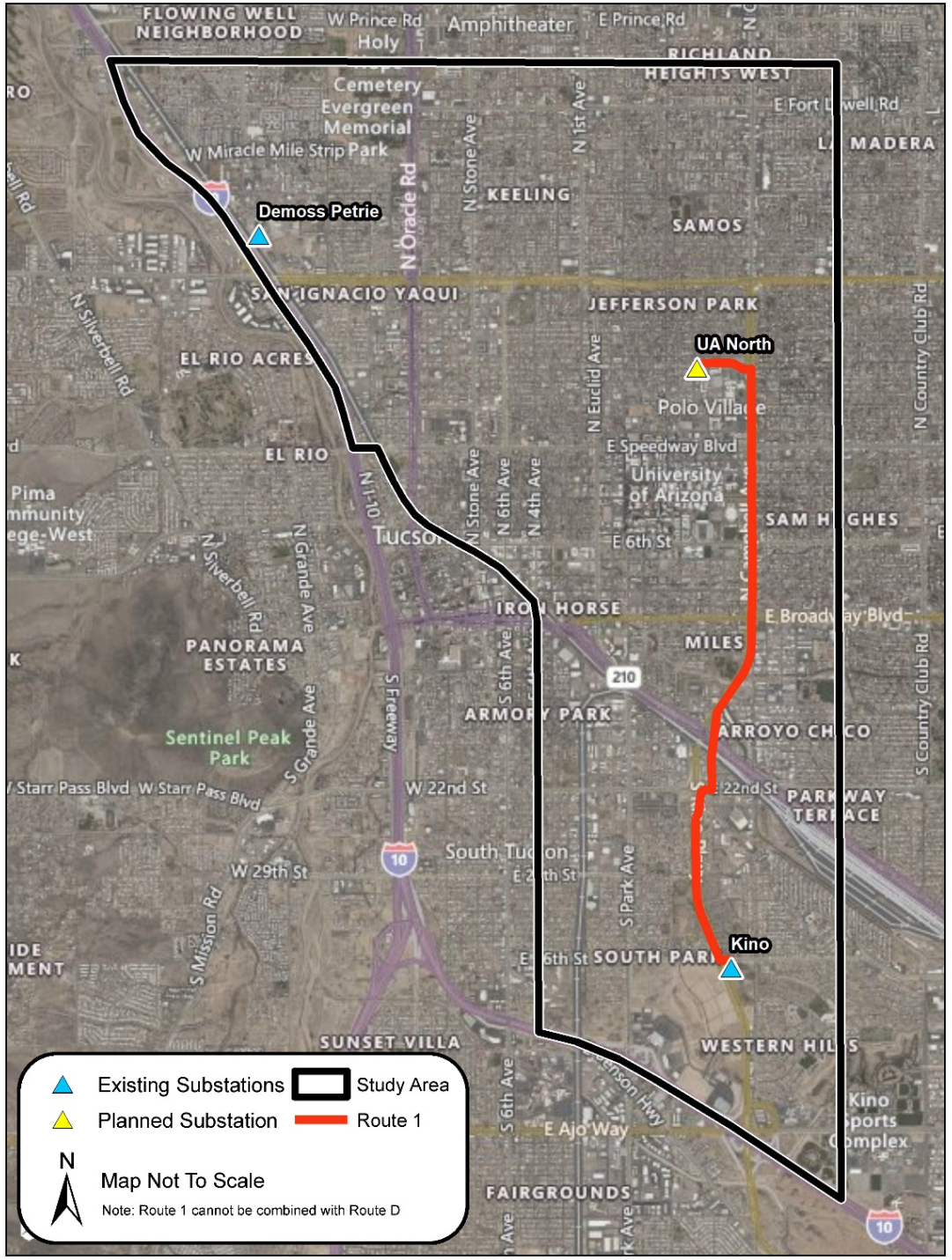
Preliminary Corridors

Corridors under consideration



Preliminary Corridors

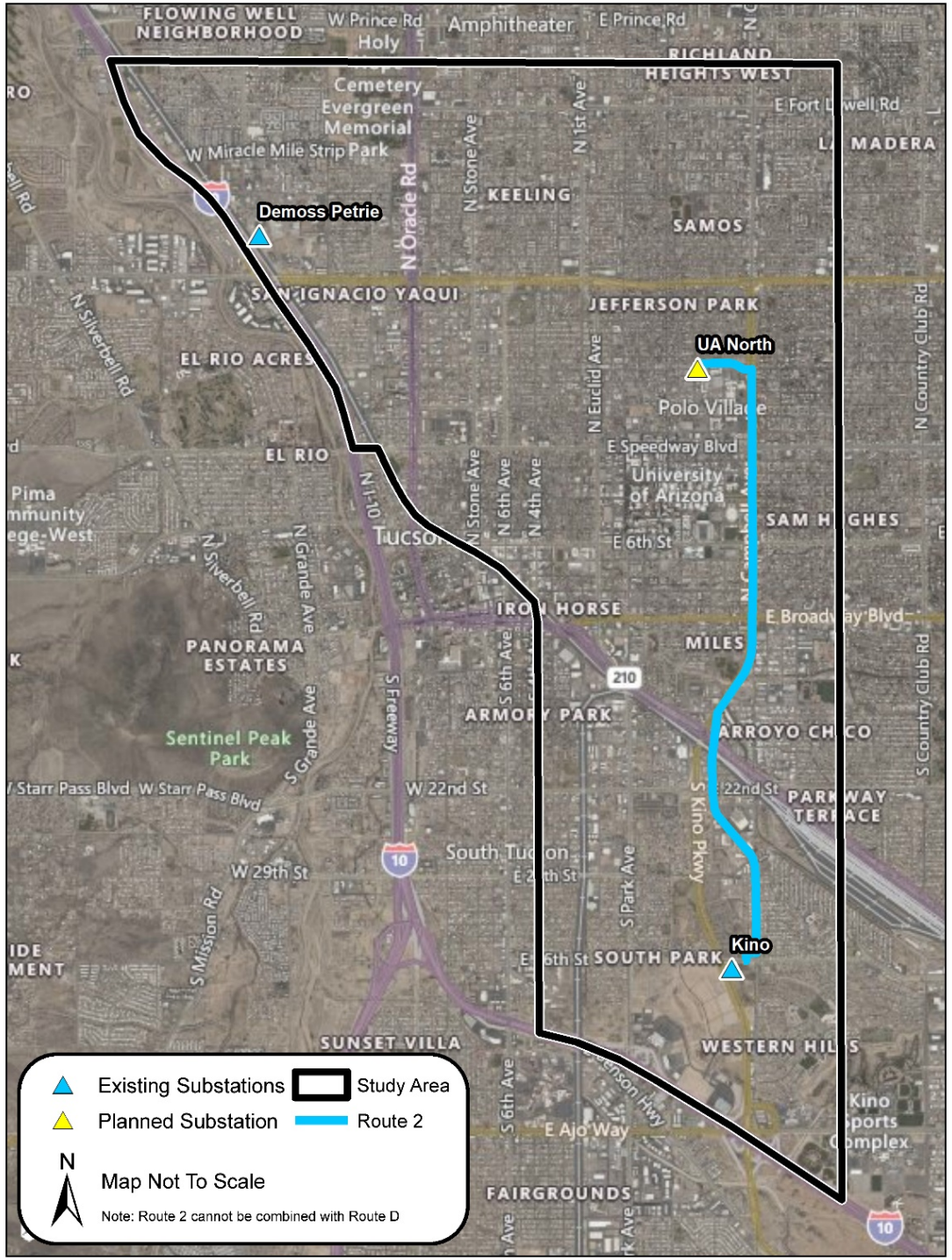
Corridor 1



Route 1
Corridor Overview

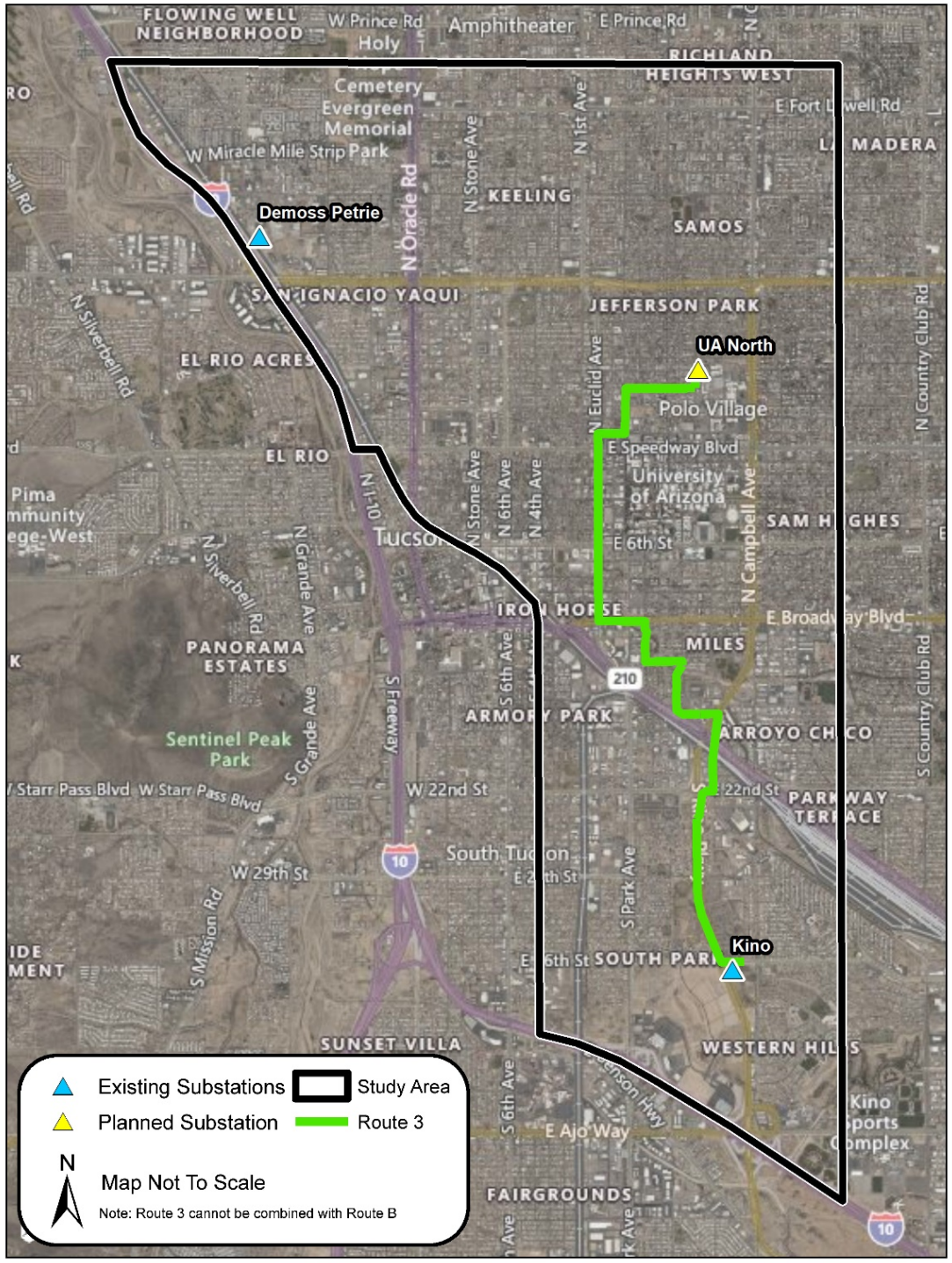
Preliminary Corridors

Corridor 2



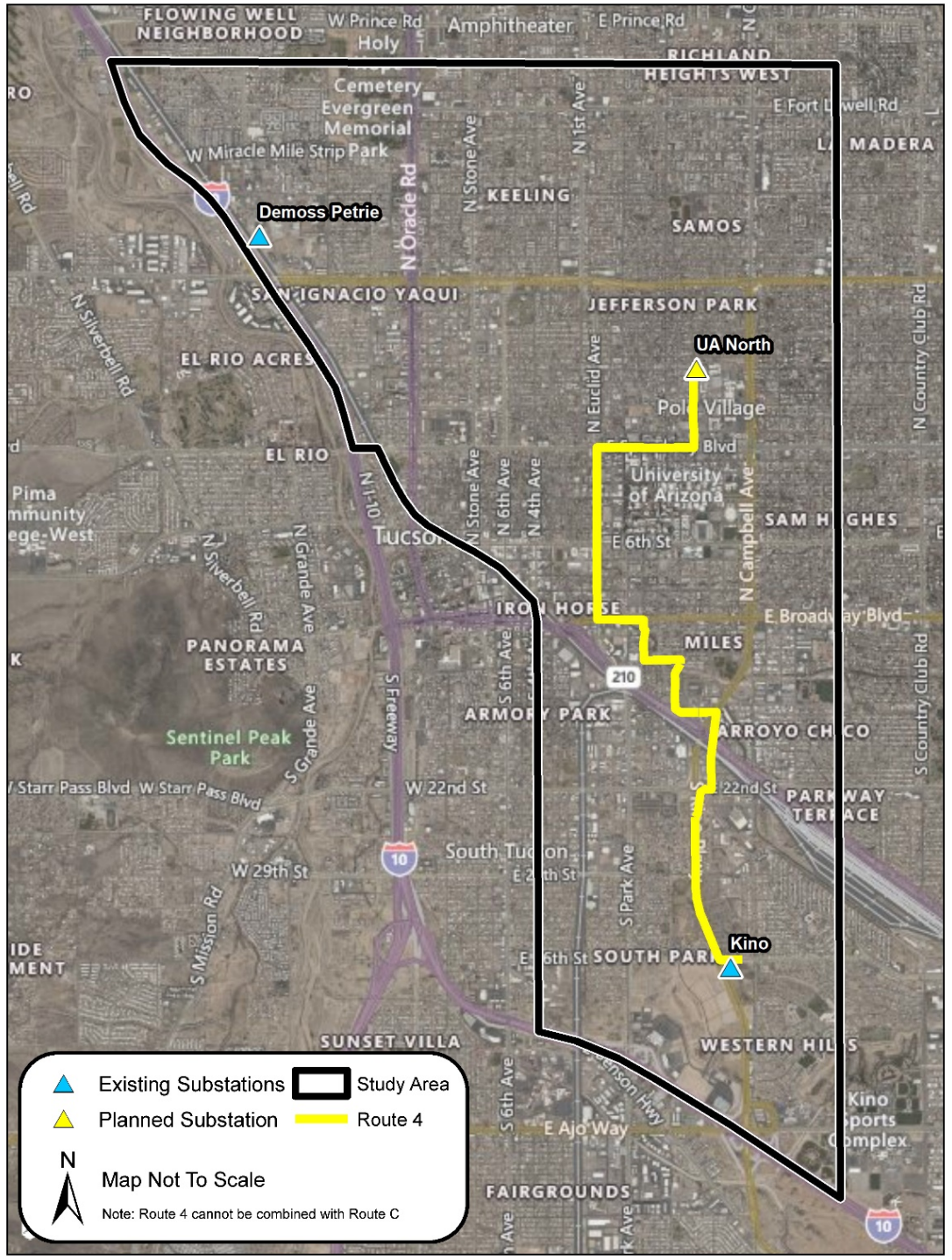
Preliminary Corridors

Corridor 3



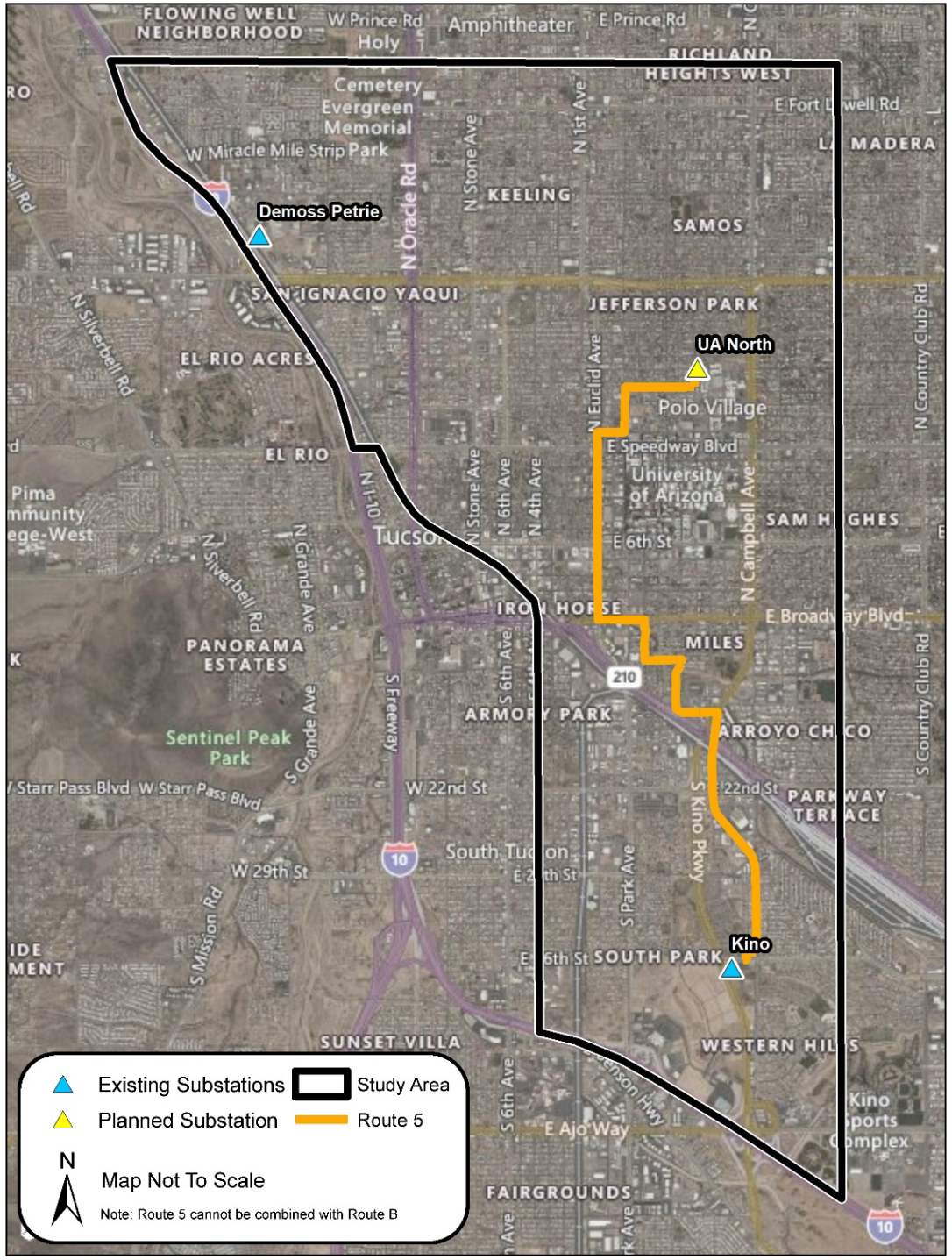
Preliminary Corridors

Corridor 4



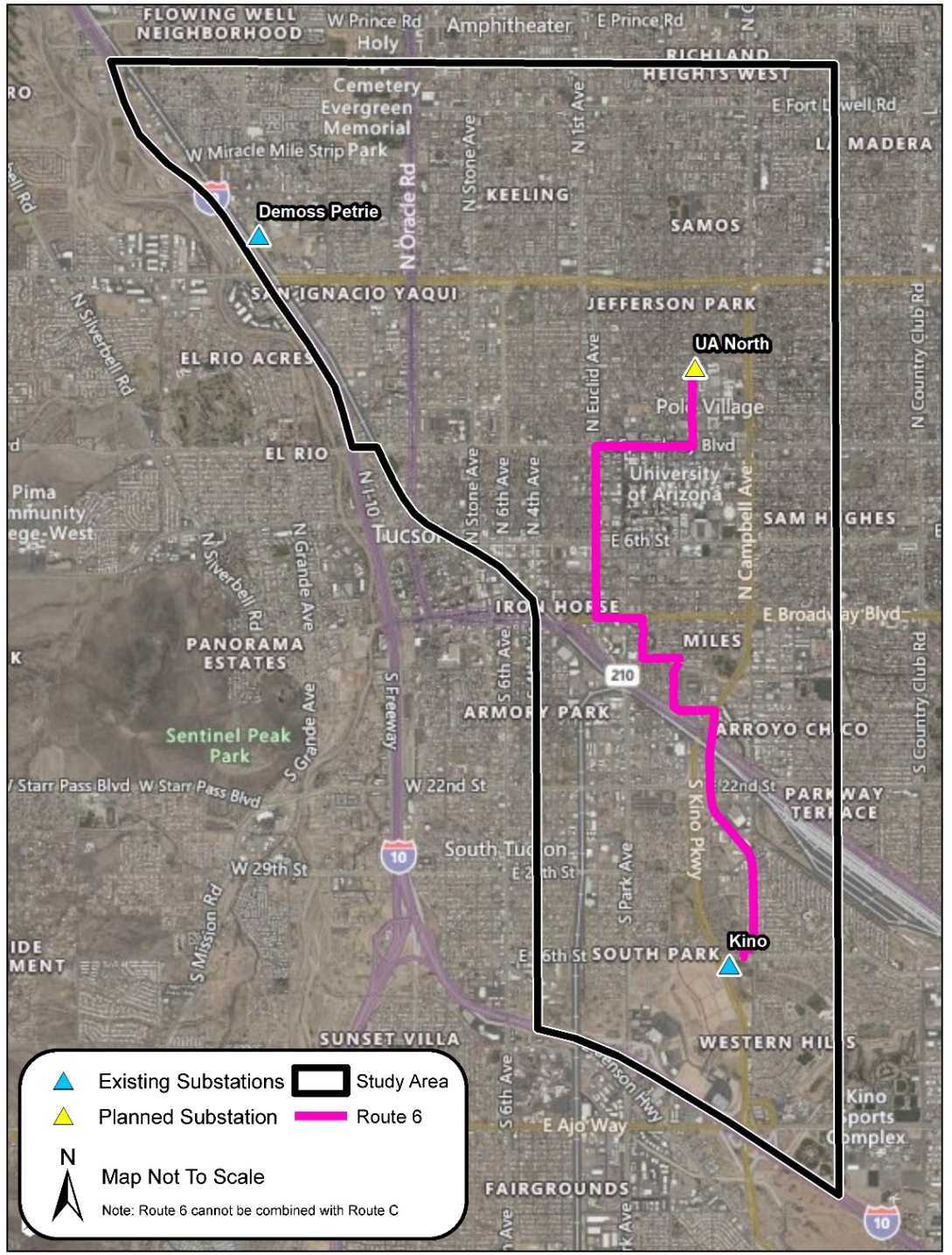
Preliminary Corridors

Corridor 5



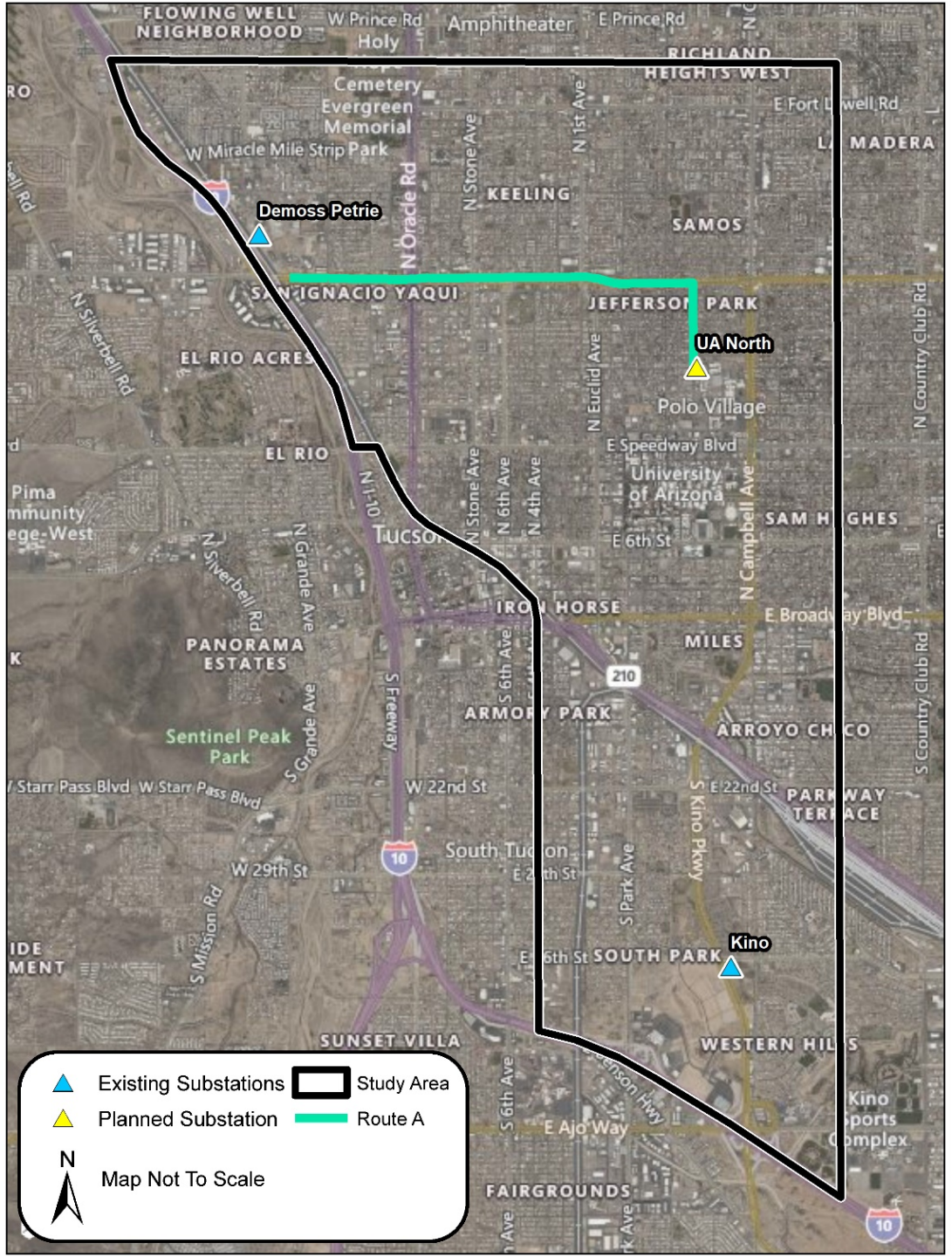
Preliminary Corridors

Corridor 6



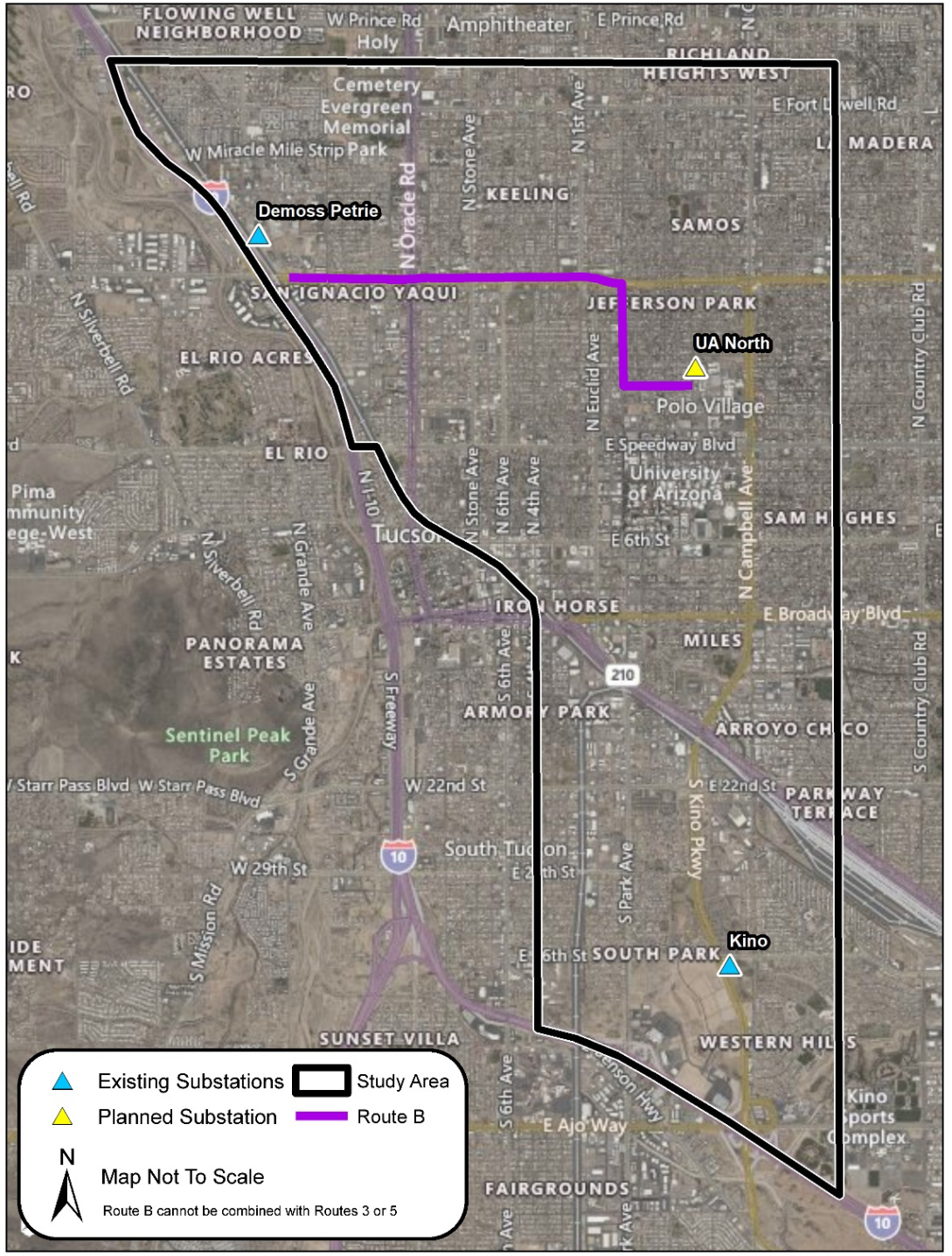
Preliminary Corridors

Corridor A



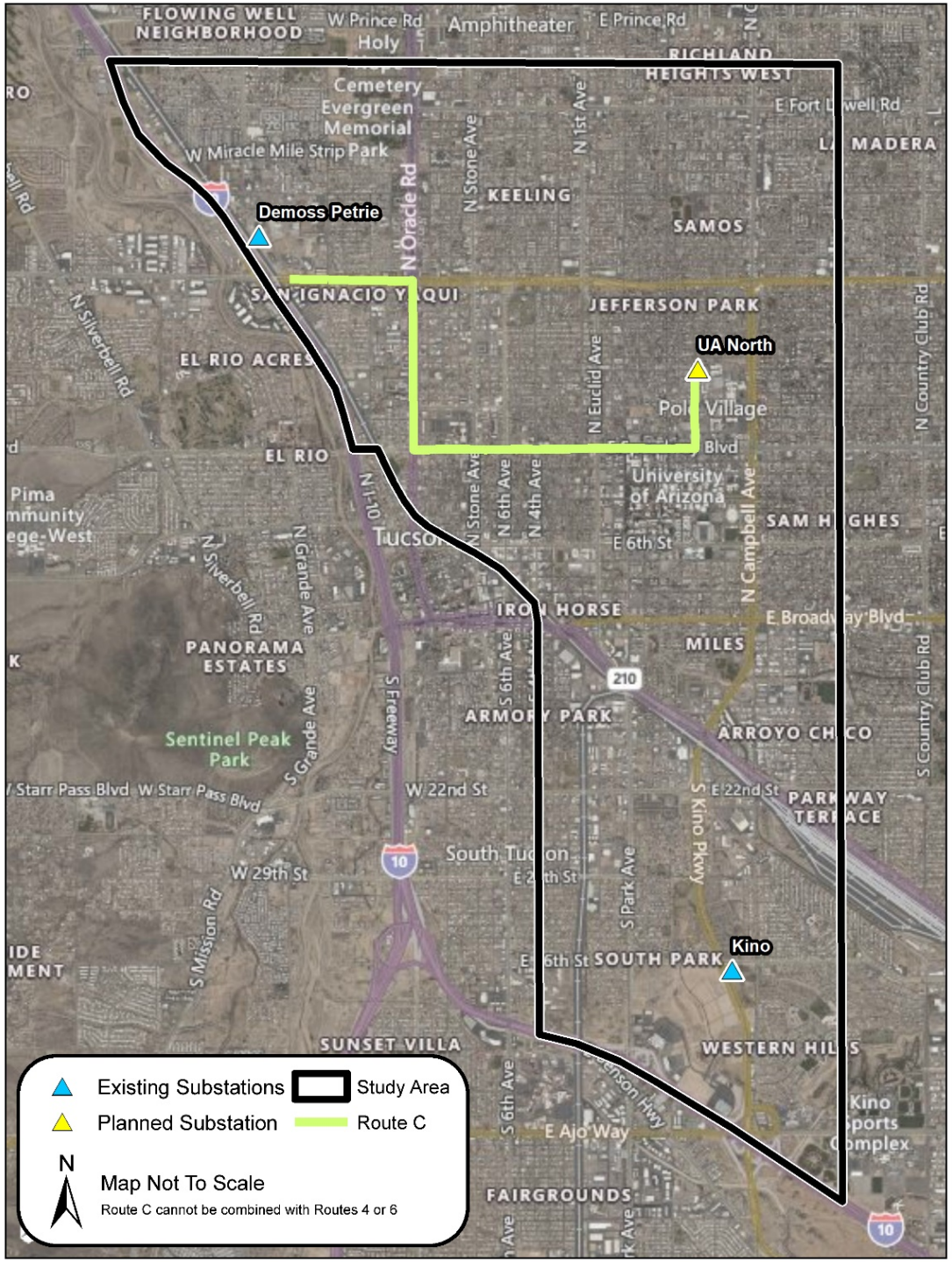
Preliminary Corridors

Corridor B



Preliminary Corridors

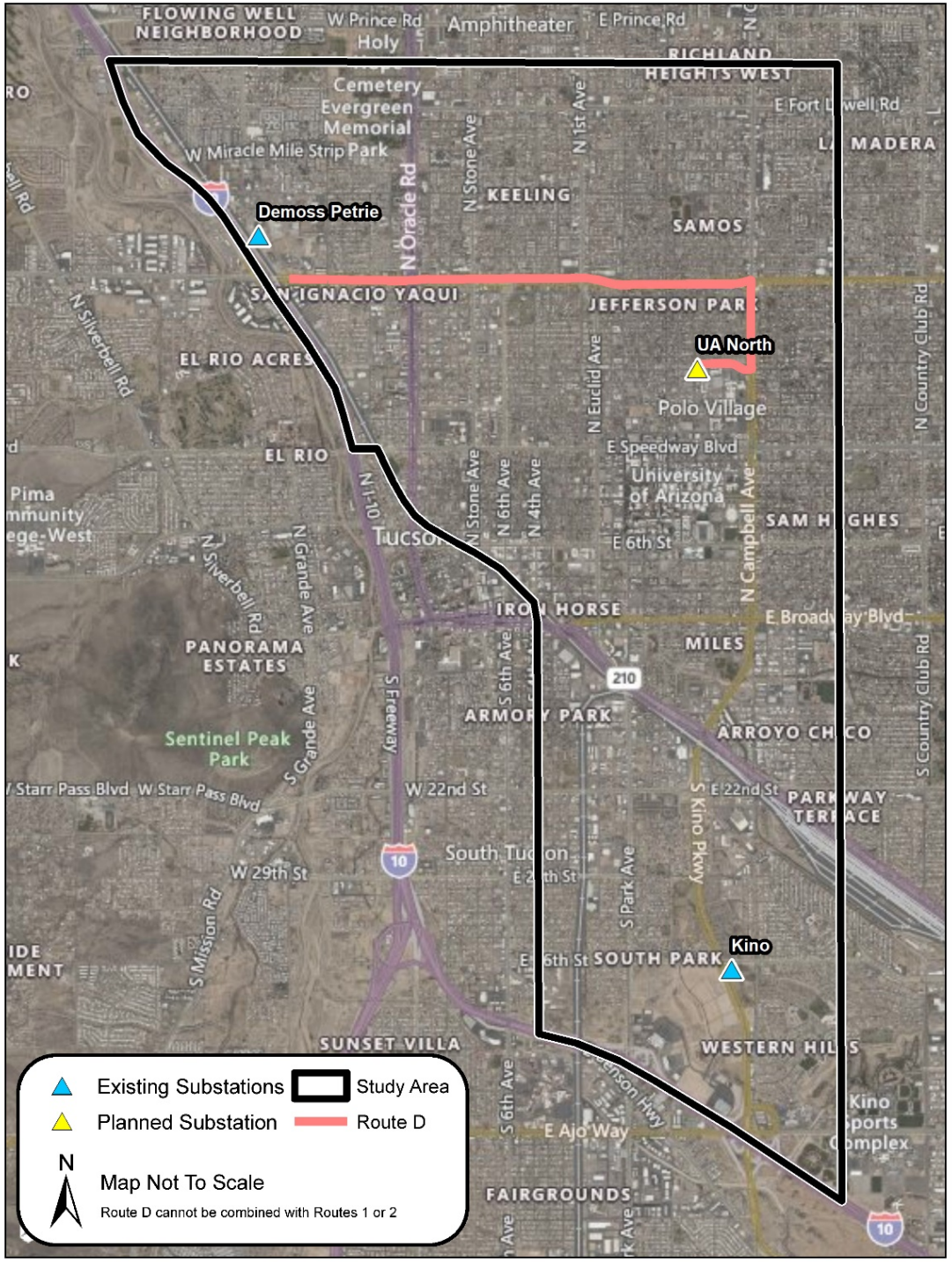
Corridor C



Route C
Corridor Overview

Preliminary Corridors

Corridor D

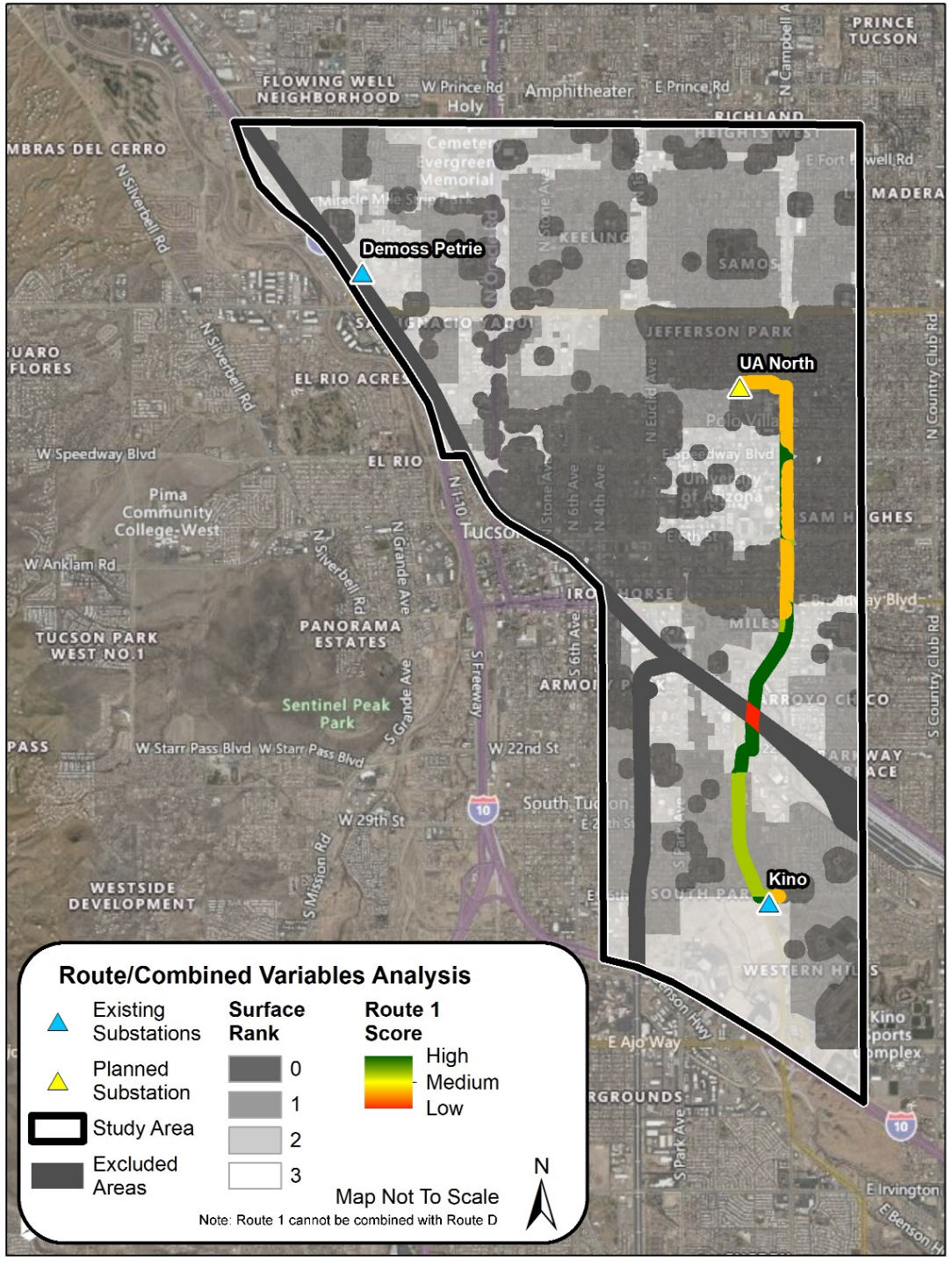


Preliminary Routes

- The Preliminary Routes were developed based on the influence of the following factors:
  - Historic properties
  - Sensitive receptors
  - Residential use
  - Public/stakeholder comment
  - Constructability
- Stakeholder and public comment are not included as the routes have not been commented on yet. This analysis will be updated in Phase 3 and provided prior to the next outreach.
- The positive influence of existing roads and TEP existing distribution and transmission lines was removed in order to present only the influence of the above variables on the route ranking.

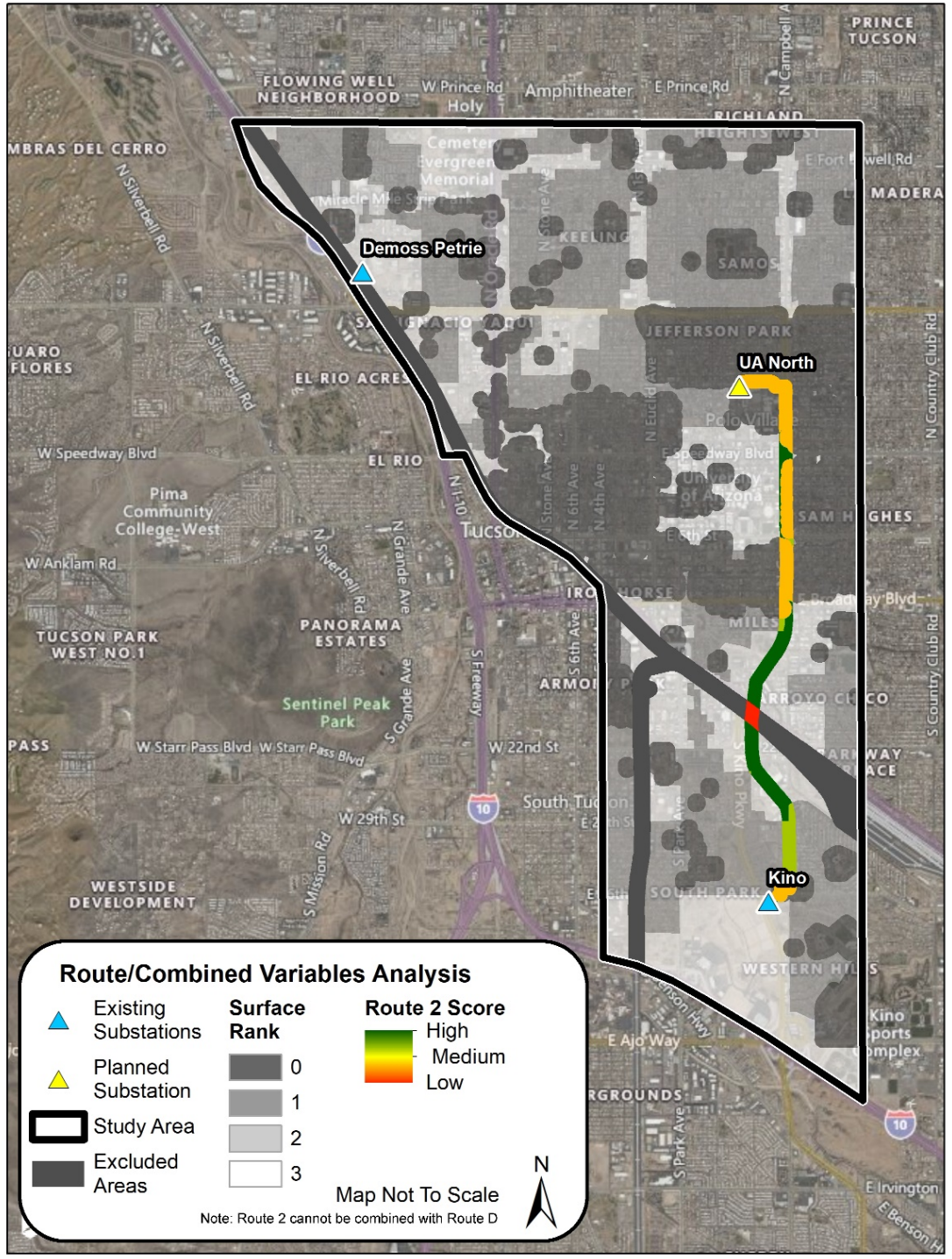
Combined Variables Analysis

Corridor 1



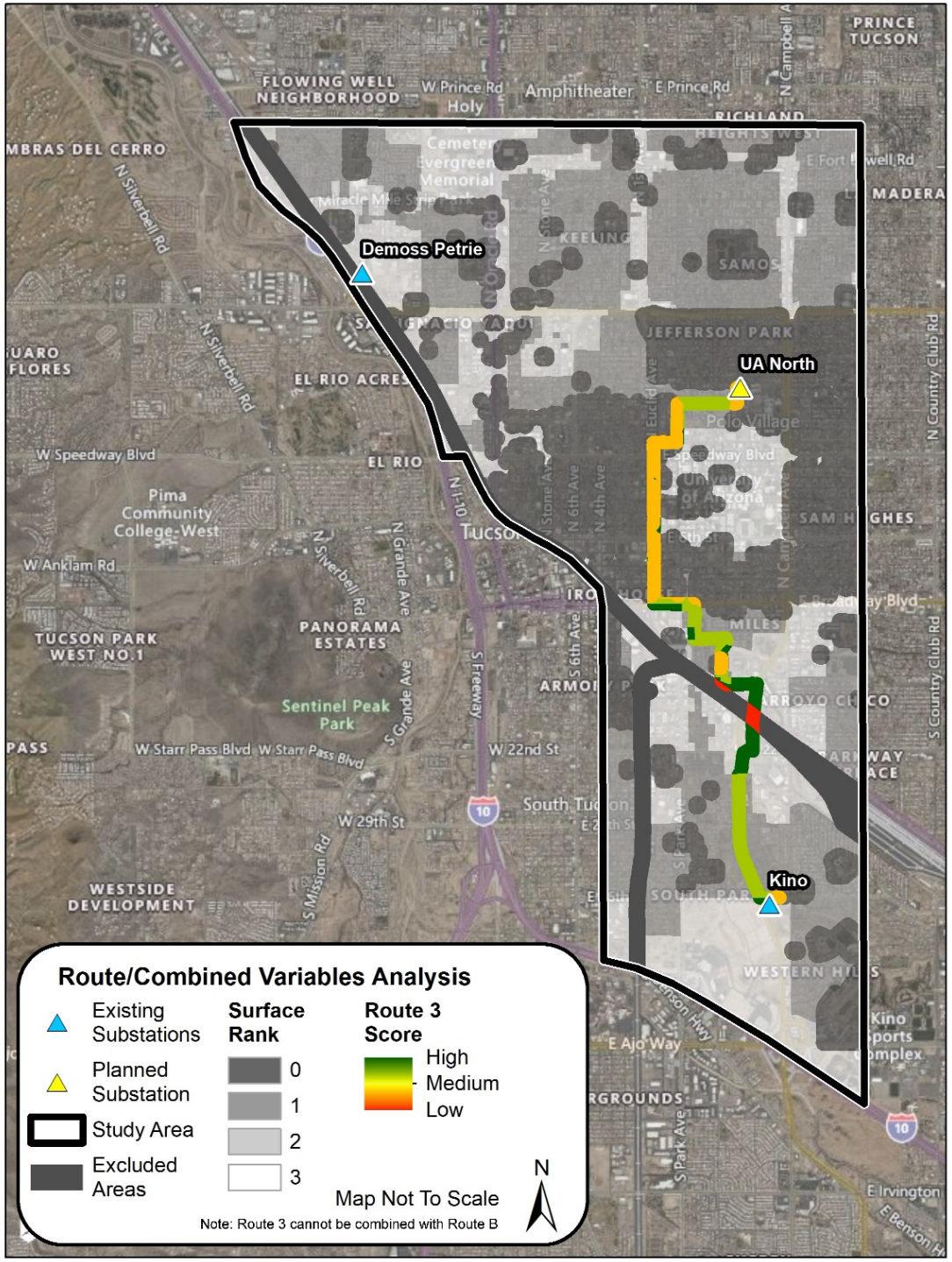
Combined Variables Analysis

Corridor 2



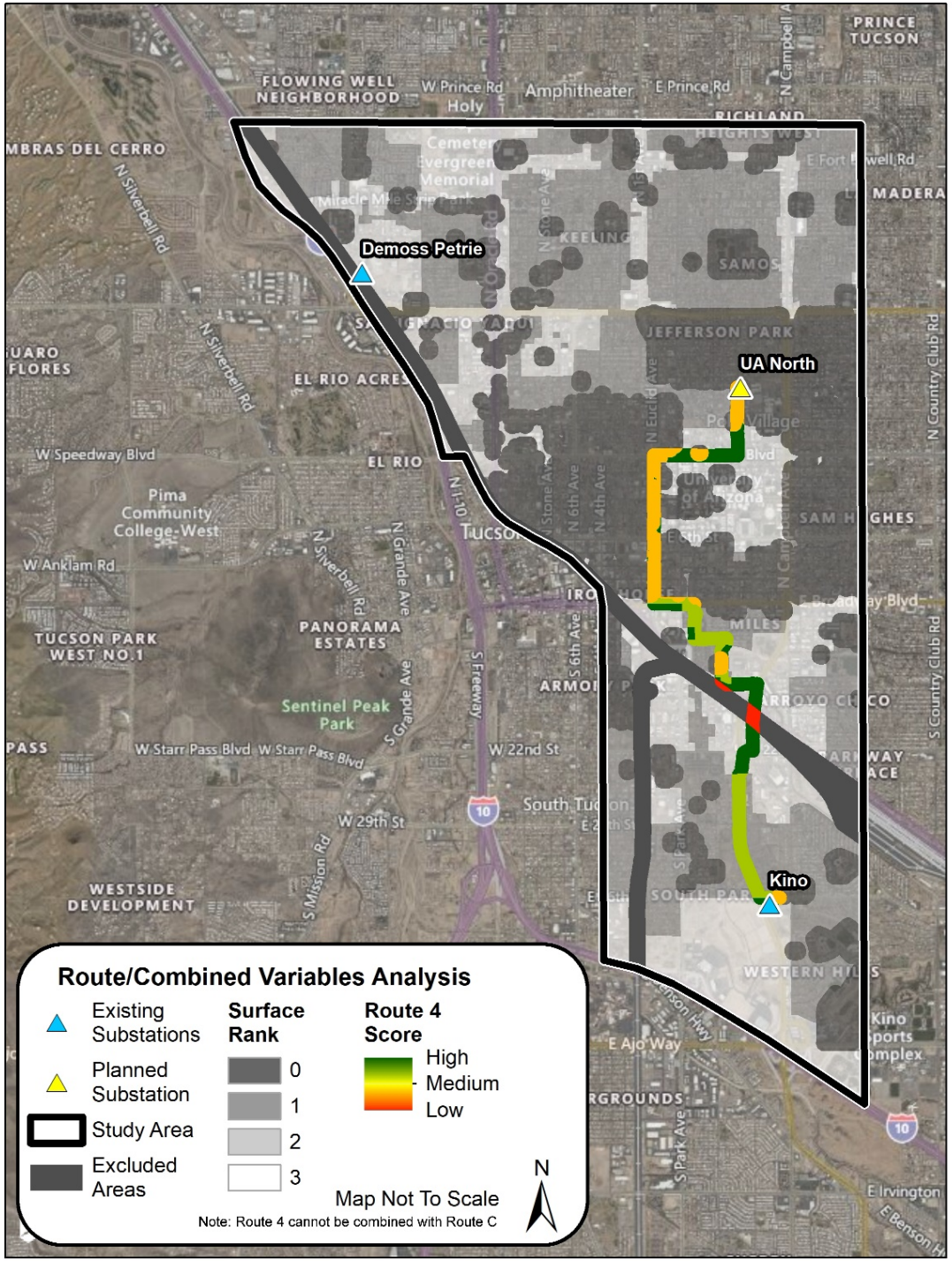
Combined Variables Analysis

Corridor 3



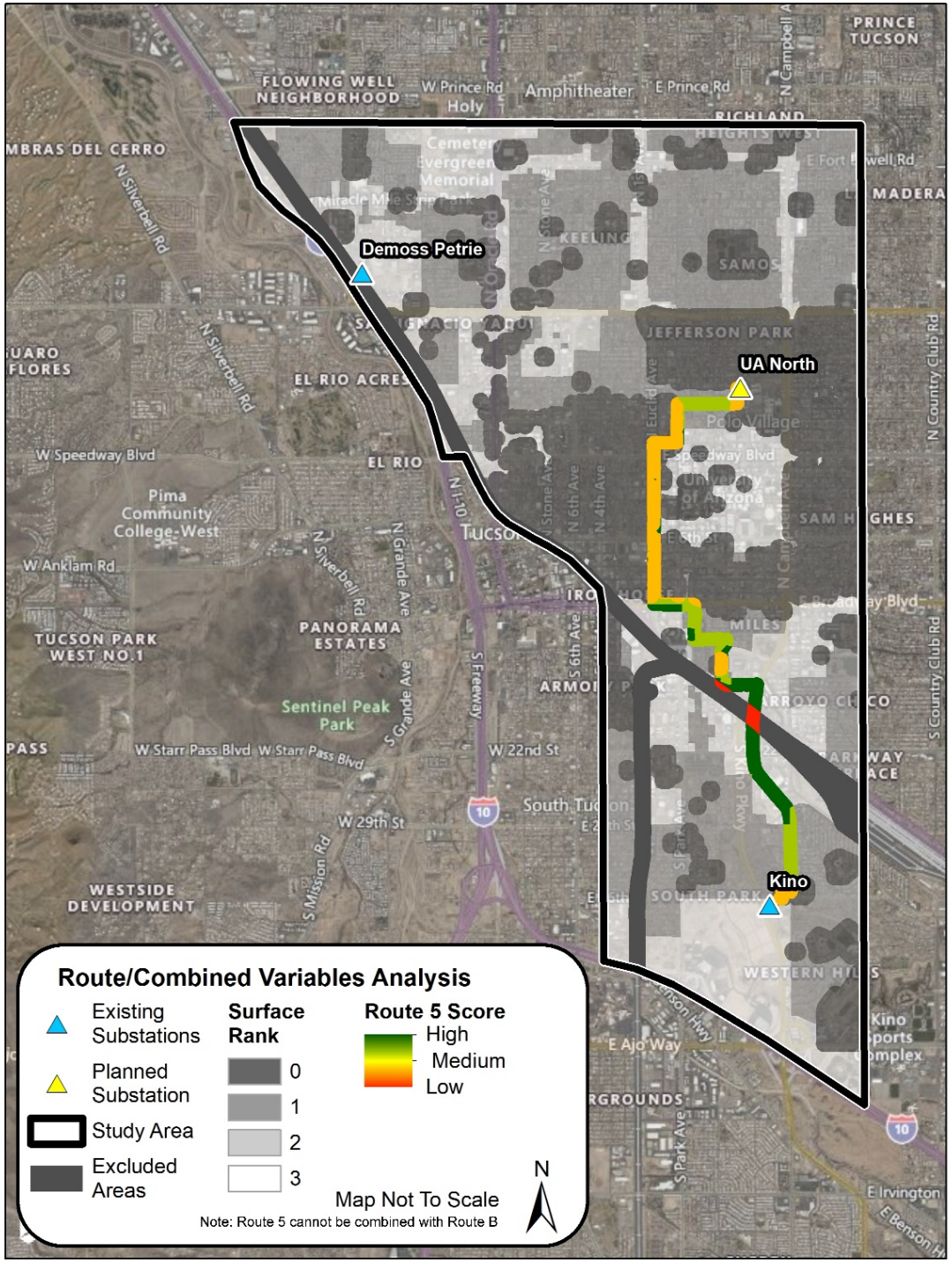
Combined Variables Analysis

Corridor 4



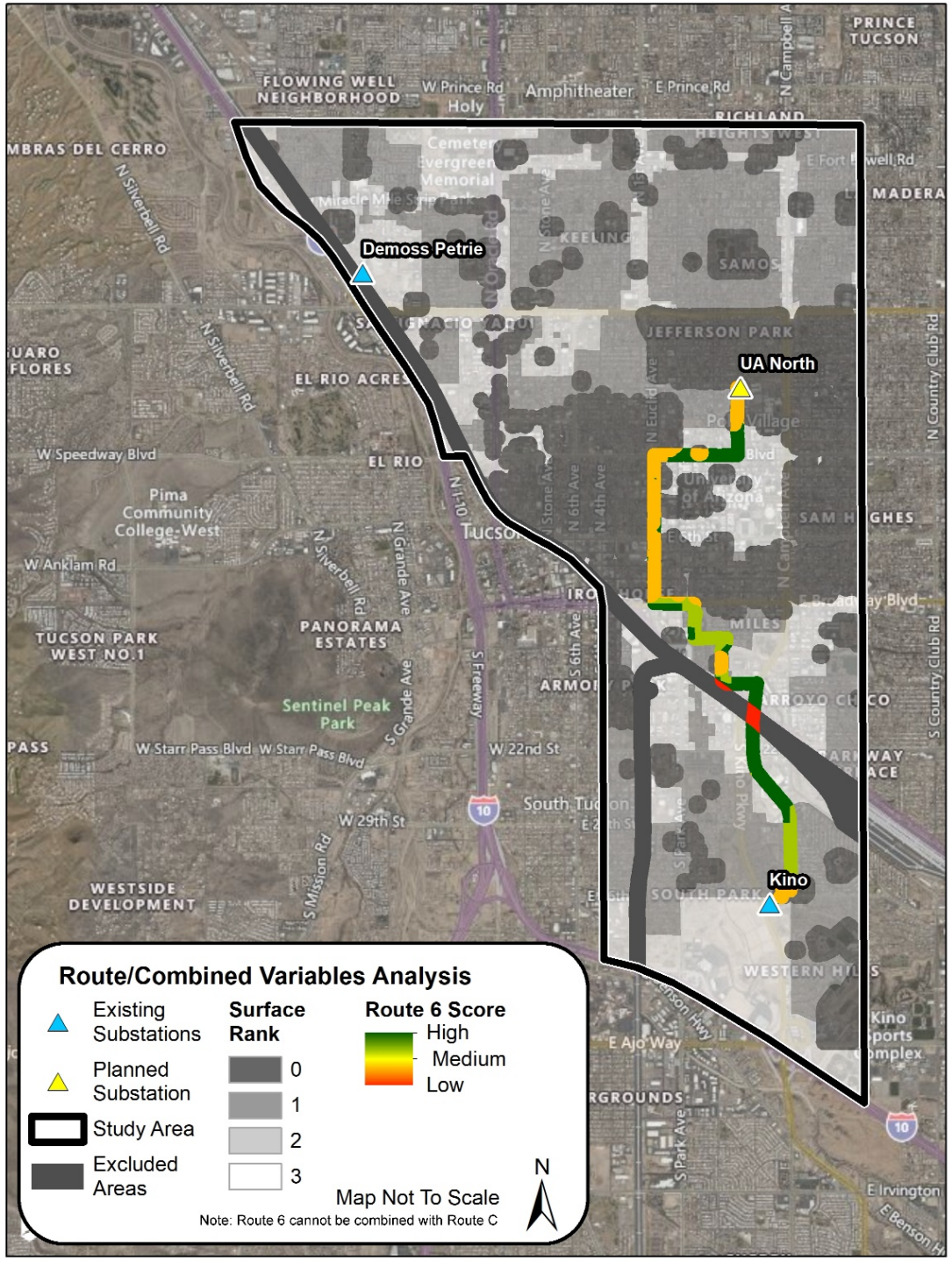
Combined Variables Analysis

Corridor 5



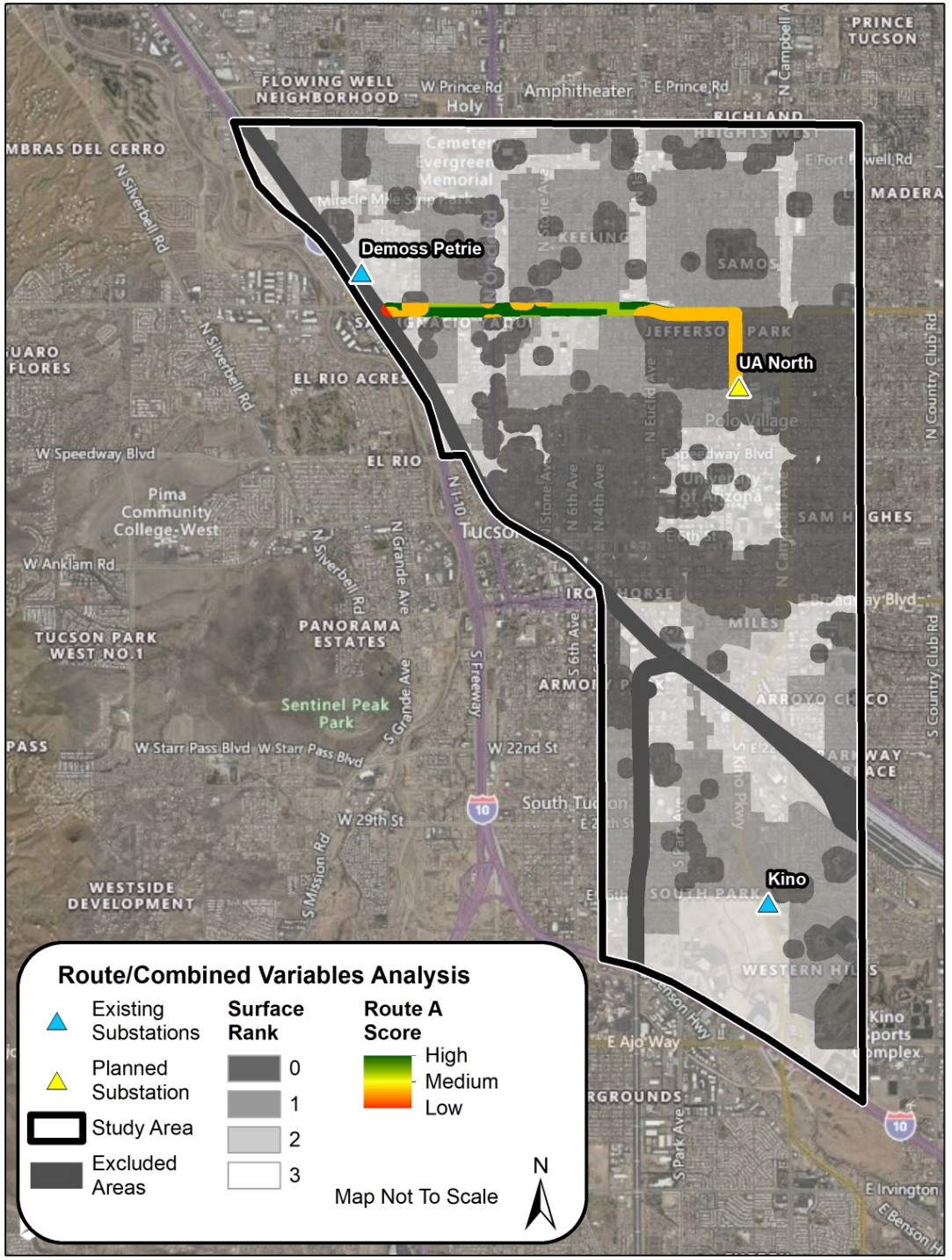
Combined Variables Analysis

Corridor 6



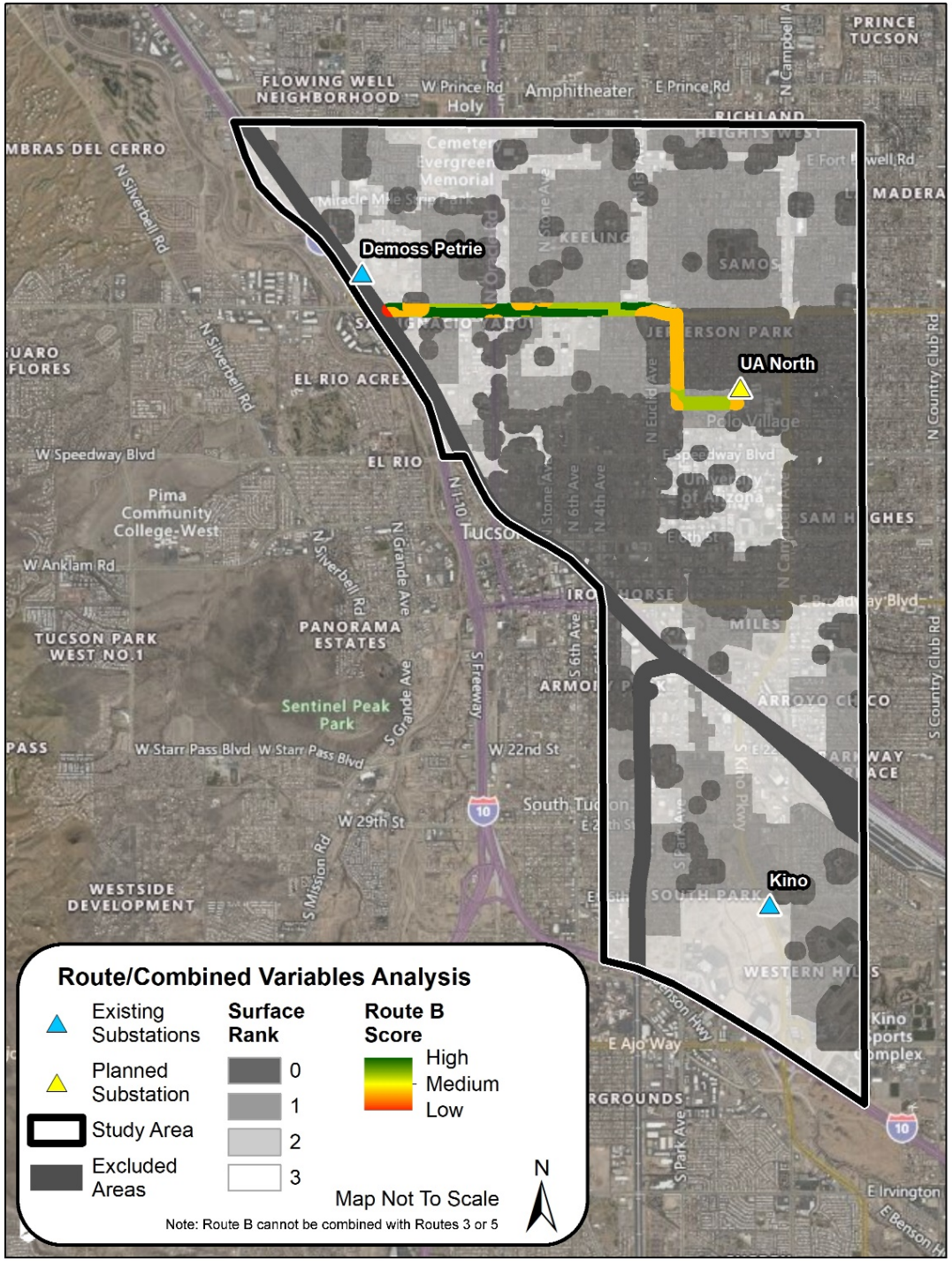
Combined Variables Analysis

Corridor A



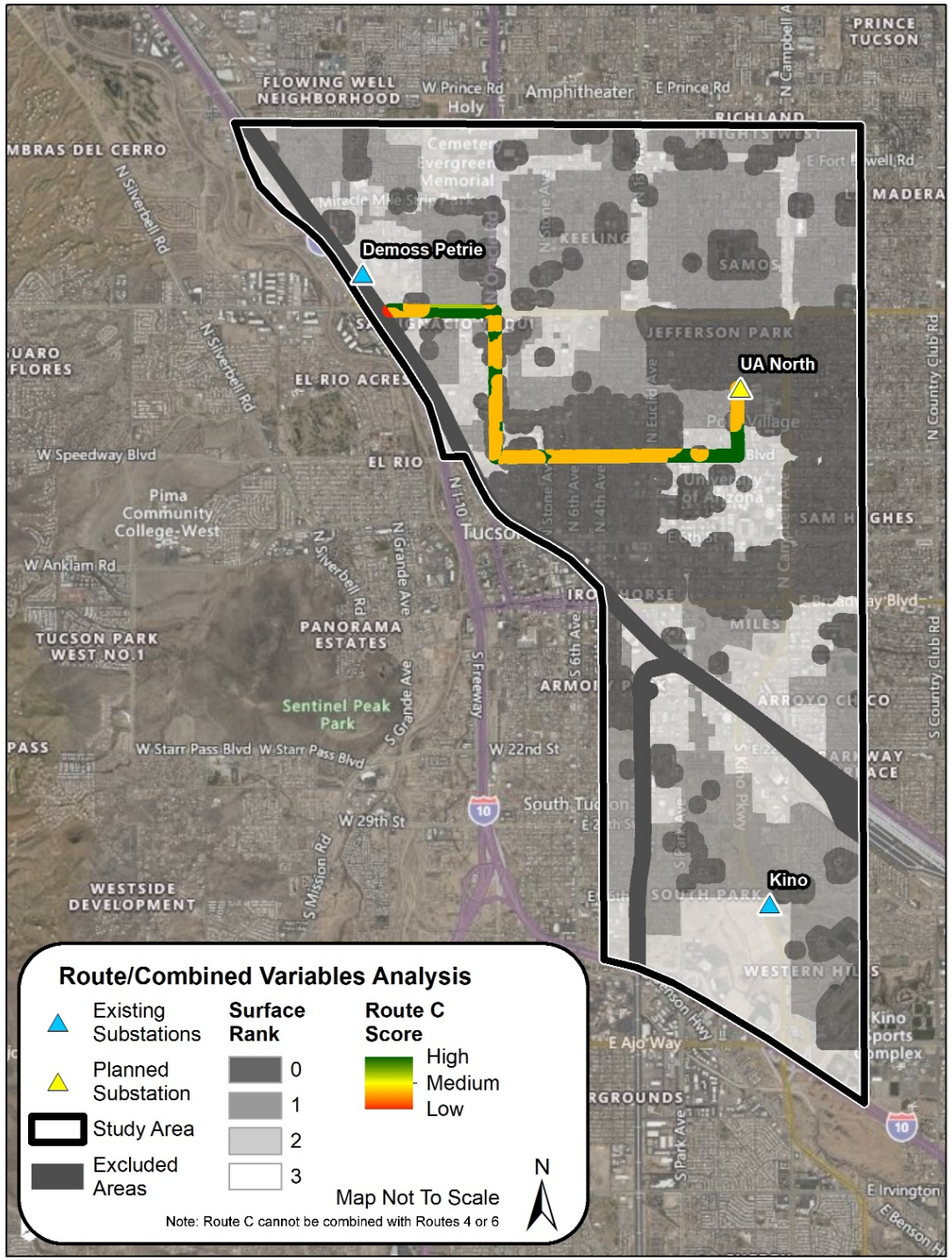
Combined Variables Analysis

Corridor B



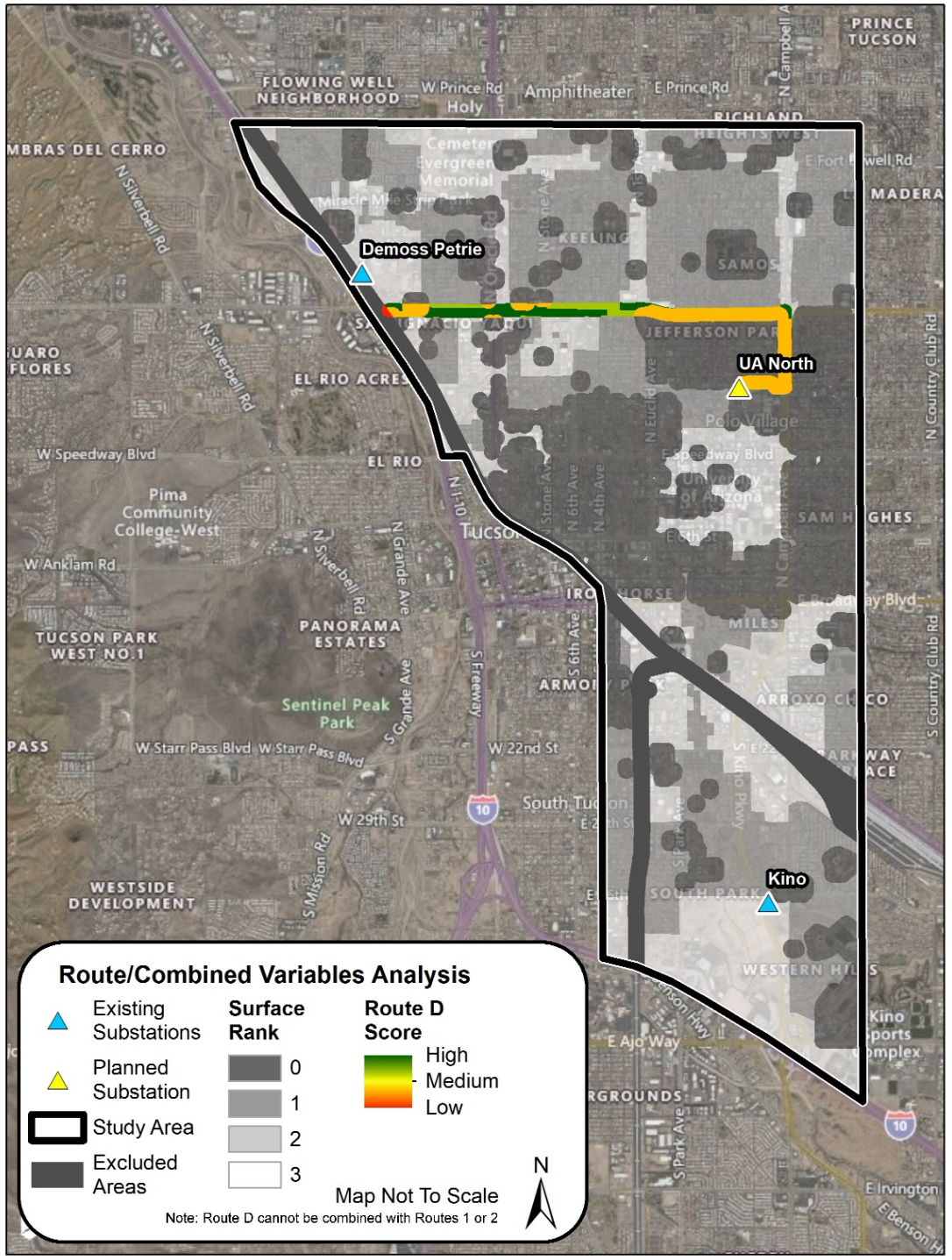
Combined Variables Analysis

Corridor C



Combined Variables Analysis

Corridor D



Kino to DeMoss-Petrie Transmission Line Project

Summary of Route Scores												
Preliminary Alternative Route	Length (miles)	% Historic Property	HP Rank (Scale 1-3)	% Sensitive Receptor	SR Rank (Scale 1-3)	% Residential Use	Res Use Rank (Scale 1-3)	Resource Rank Sum	Average Combined Resource Score	Average Constructability (Scale 1-3)	Total Sum	Total Avg. Score
1	4.01	36.90	2.00	22.49	3.00	47.10	2.00	7.00	2.33	2.25	4.58	2.29
2	4.00	37.50	2.00	27.20	2.00	39.80	2.00	6.00	2.00	2.35	4.35	2.18
3	5.00	31.70	2.00	17.70	3.00	58.60	1.00	6.00	2.00	2.34	4.34	2.17
4	5.01	26.40	2.00	17.00	3.00	46.60	2.00	7.00	2.33	2.29	4.62	2.31
5	4.93	32.10	2.00	21.50	3.00	52.70	1.00	6.00	2.00	2.30	4.30	2.15
6	4.95	26.80	2.00	20.80	3.00	40.70	2.00	7.00	2.33	2.24	4.57	2.29
A	2.87	40.30	2.00	17.40	3.00	44.50	2.00	7.00	2.33	2.63	4.96	2.48
B	2.97	28.60	2.00	14.10	3.00	48.00	2.00	7.00	2.33	2.70	5.03	2.52
C	3.82	54.60	1.00	33.80	2.00	20.60	3.00	6.00	2.00	2.18	4.18	2.09
D	3.56	49.90	2.00	26.10	2.00	47.80	2.00	6.00	2.00	2.64	4.64	2.32

* All factors being weighted equally

Kino to DeMoss-Petrie Transmission Line Project

Project Features

Pole Characteristics

Type: Tubular weathering steel monopoles

Pole height: Typically 75-110 feet

Span length: 600-1,000 feet
(distance between poles)

Poles per mile: 5-9 Structures

Right of way width: Up to 100 feet

Note: Example simulations

NOT FINAL ROUTES

Campbell Ave
Example Simulation for Kino - DMP 138 kV Transmission Line

Questions?

Kino to DeMoss-Petrie Transmission Line Project

Next Steps

- Continue to incorporate public, Community Working Group, & stakeholder comments/ data into geospatial analysis with a goal of narrowing down the number of routes.
- Conduct CWG Meeting # 5 September 2020
- Virtual Public Open House Meeting – September 2020
- Complete analysis and select *up to* three routes (including one preferred route) for incorporation into the CEC application
- File CEC application – November 2020
- ACC LSC Hearing – January 2021
- ACC Open Meeting – est. March 2021

Note: Future dates subject to change due to pandemic response

More Information

For more project information please visit the project webpage:

www.tep.com/kino-to-demoss-petrie/

Here, you can:

- Find a recorded version of this Virtual Open House presentation
- Find a PDF of this Virtual Open House presentation
- Find past newsletters, public meeting communications and Community Working Group (CWG) materials
- Read commonly asked questions & answers
- Read comments from the public and the CWG, and TEP's responses

Comment Deadline

Please submit all comments by Sunday, September 13, 2020

There will be future opportunities to comment on this project after TEP narrows down the number of routes and selects a preferred route.

How to submit comments after the meeting:

- Via voicemail at 1-833-523-0887
- Via email at KINO2DMP@tep.com
- Via comment form at: https://uns.wufoo.com/forms/z1eb494318gyjry/
- By U.S. Mail to: P.O. Box 711, ATTN: Kino-DMP, Mail Stop RC131, Tucson, AZ 85701-0711