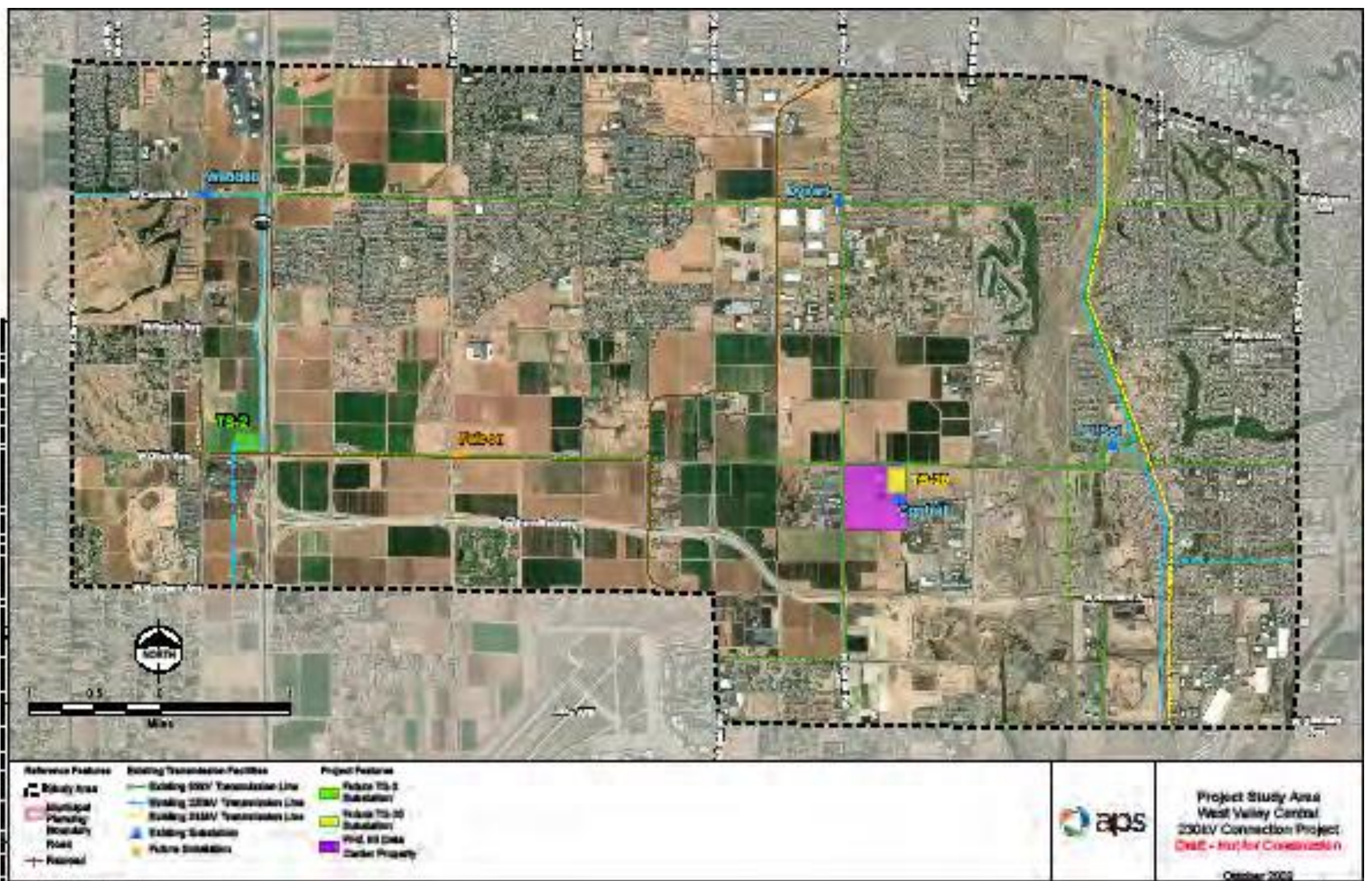


# PROJECT OVERVIEW AND NEED

## Project Description and Need

We are in the early stages of a public siting process to identify appropriate routes for new 230kV power lines that best meet the needs of the customer, the community, and regulatory agencies. These power lines will connect the new Contrail Substation (located on the customer's property on the southeast corner of Olive Avenue and Dysart Road) to existing 230kV transmission facilities. Specifically, these new lines will need to connect the Contrail Substation approximately two miles to the east into the existing 230kV transmission line or directly into the El Sol Substation, and approximately 5 miles west into the planned TS-2 Substation.



We are continuing the planning process and are conducting agency and public outreach prior to identifying preferred powerline routes.

Following the identification of preferred powerline routes, we will apply for a Certificate of Environmental Compatibility (CEC) with the Arizona Corporation Commission (ACC) for a transmission line route corridor.

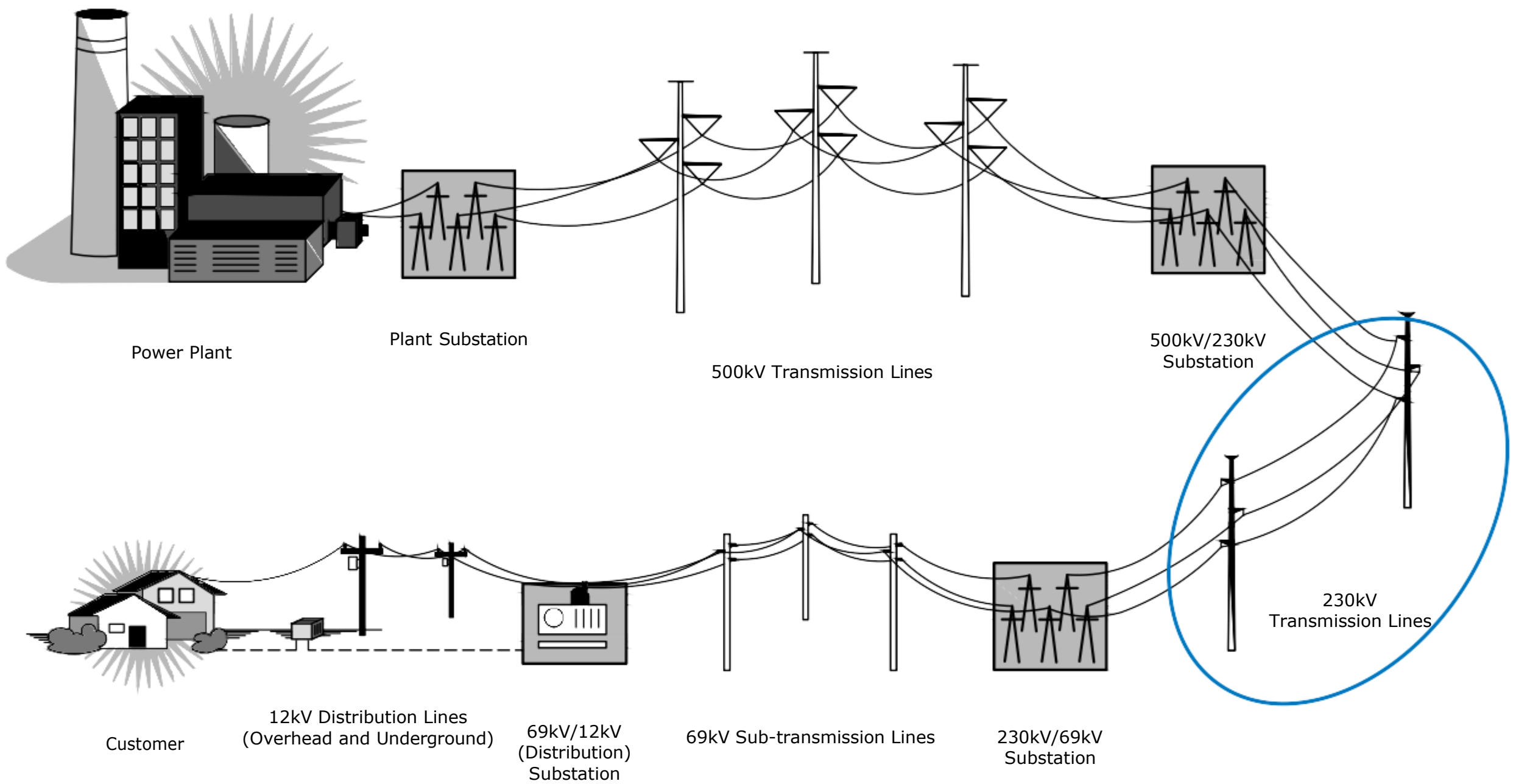


# ENERGY 101

## From the Power Plant to the Customer

In today's world, electricity is manufactured in many ways, from large-scale remote power plants all the way to local small-scale renewable energy sources. However, the bulk of electricity, no matter where it is generated, travels over long distances through a system of transmission and distribution lines that carry the electricity to where it is needed, and substations that convert the voltage to an amount usable by a specific customer. This diagram gives an approximation of the path that electricity takes between where it is manufactured and a typical customer.

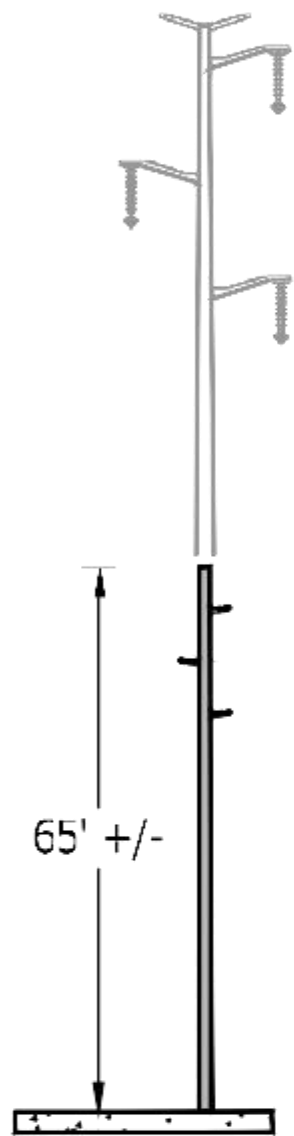
This project primarily consists of siting new 230kV power lines shown circled in blue on the diagrams below.



# PROJECT FEATURES DIAGRAM

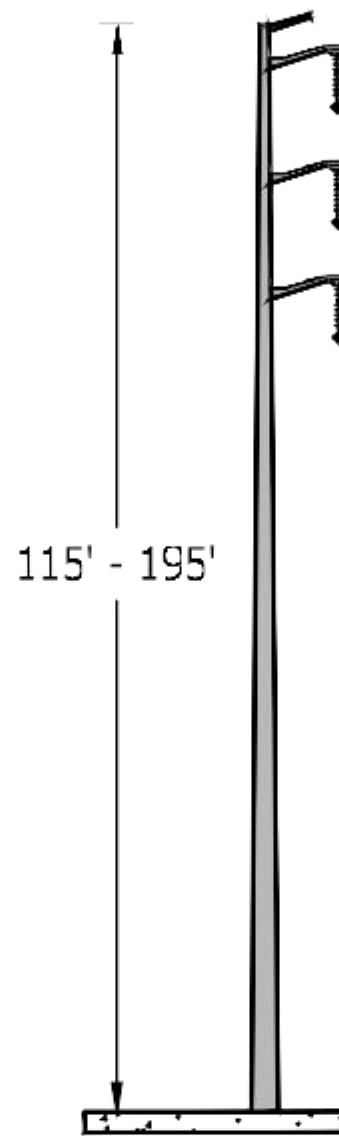
## Project Features

Steel monopole (single pole) structures are typically used for new 230kV transmission lines, but may include a variety of structure types, ranging in height from approximately 115 feet to 195 feet tall depending on routing, terrain and crossing of existing structures, including elevated roads and other power lines. The typical rights-of-way or easements will be approximately 120 feet wide (60 feet each side of the structure). Any opportunity to utilize existing 69kV power line routes for the new 230kV structures will be considered.\*

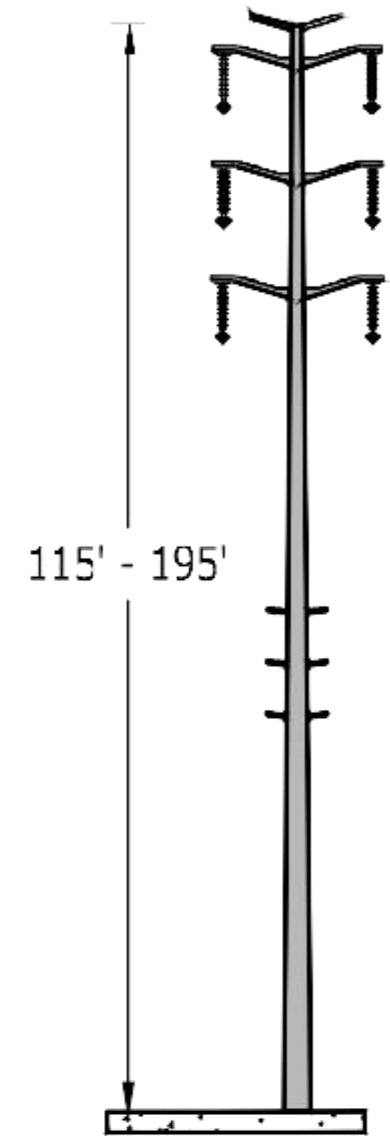


Typical Existing 69kV Single Circuit Monopole Structure

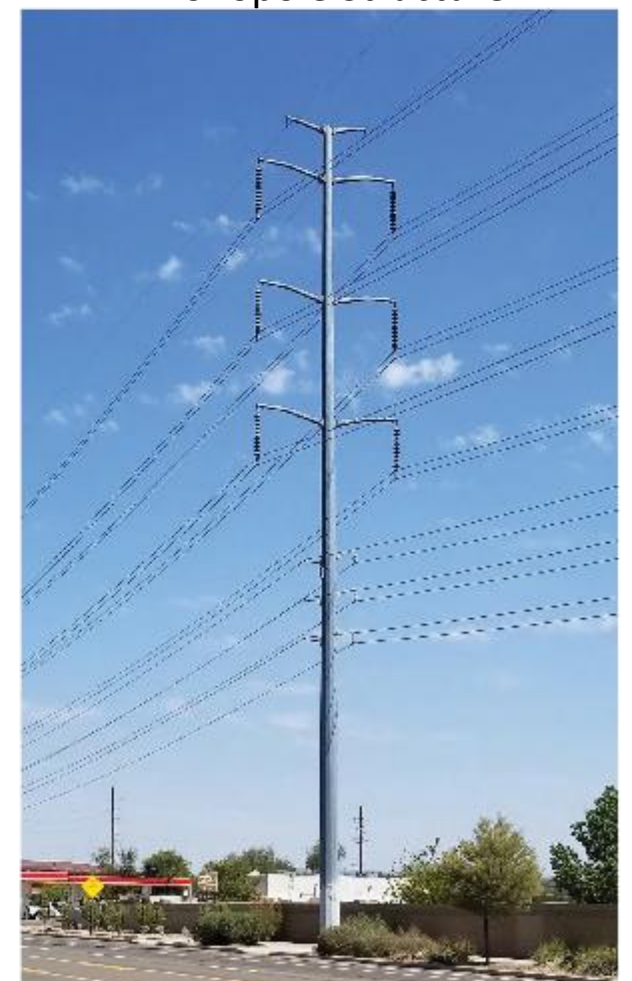
\*Opportunity to rebuild to 230kV



Typical 230kV Single Circuit Monopole Structure



Typical 230kV Double Circuit with 69kV Double Circuit Underbuild Monopole Structure





# PLANNING PROCESS

## Steps in Planning Process

Identify Opportunities and Constraints	Identify features within the identified study area that could serve as potential sites or routes for the new project.
Communications and Outreach	Address public and agency concerns, hold briefings with elected officials, send letters to interested parties and agencies, and give presentations to homeowner groups.
Identify Potential Transmission Line Links	Identify reasonable paths for the project route. These various segments, which are referred to as "links," can be connected to form different alternative routes to be evaluated during the next steps of the siting process.
Gather Public Comment	Present the project to the public through a newsletter and an open house. At the open house, we present displays showing the project purpose and need, share design considerations and provide opportunities for public comment.
Screen Links	Evaluate the various routing links and/or sites identified earlier based on public input and environmental considerations including biological resources, existing and potential land use, visual and scenic quality, and archaeological resources.
Refine Routes Between Termination Points	Refine links to a reasonable set of alternative routes and/or sites for comparison and presentation to agencies and the public.
Gather Public Comment	Present the alternative routes and/or sites to agencies and the public in a second newsletter and a second open house. We will consider the public comments gathered through the public outreach efforts during the final route comparison.
Identify and Rank Route Alternatives	The alternative routes carried forward from earlier in the process will go through a final evaluation. This evaluation includes engineering feasibility, regulatory approvals, public comment, cost, land acquisition and environmental concerns.
Select Preferred Routes	The final preferred routes and/or site identification will be selected based on siting criteria.
CEC Application	Submit Certificate of Environmental Compatibility (CEC) Application and Publish Notice of CEC Hearing.
Line Siting Committee Hearing	Line Siting Committee holds Evidentiary Hearing on CEC Application.
ACC Hearings	Arizona Corporation Commission (ACC) makes decision on CEC Application at an ACC Open Meeting.

# PLANNING PROCESS

## Preliminary Transmission Siting Criteria

Multiple studies have been conducted to help us identify areas that better lend themselves to accommodate this transmission line (opportunities), and locations that would be less accommodating for the transmission line (constraints).

The criteria shown in the Opportunities and Constraints chart helps us identify route opportunities for the construction, operation and maintenance of the new 230kV power lines, and minimize impacts of the line to residences or other sensitive areas. For example, an arterial roadway would be considered a high-ranking opportunity to locate the new power line. However, that same arterial road would rank lower in a residential community (an area of high constraint) than it would within a commercial zone (an area of moderate constraint).

The criteria used in identifying locations of opportunity and constraints include the following:

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Constraints	Sensitivity Level
Residential Low Density	High
Residential Medium Density	High
Residential High Density	High
Subdivision Under Construction	High
Schools/Educational Facilities	High
Parks, Trails, and Designated Scenic Roads	High
Recreational (golf course, race, track, paintball park, etc.)	Moderate
Open Space/Greenbelt	Moderate
Commercial	Moderate
Public/Quasi-public	Moderate
Transportation (Roadways)	Moderate
Agriculture/Corral/Stocktank	Low
Construction Laydown Area/Nursery	Low
Industrial/Mining	Low
Canal	Low
Utility Facilities (substations, pump stations, water treatment, comm., flood control, etc.)	Low

# PLANNING PROCESS

## Preliminary Transmission Siting Criteria, continued

Planned Land Use and Visual Resources Constraints	
Constraints	Sensitivity Level
Residential - Final Plat	High
Residential - Preliminary Plat	Moderate
Residential - General Plan	Moderate
Commercial - Final Plat	Moderate
Commercial - Preliminary Plat	Low
Commercial - General Plan	Low
Commercial, Resort/Hotel - General Plan	Moderate
Commercial, Mixed Use - General Plan	Low
School/Education Facilities - Final Plat	High
School/Education Facilities - General Plan	Moderate
Industrial - General Plan	Low
Transportation (Roadways) - Final Plat	Moderate
Transportation (Roadways) - Preliminary Plat	Low
Transportation (Roadways) - General Plan	Low
Recreational Trail - General Plan	Moderate
Park/Golf Course - Final Plat	Moderate
Park/Golf Course - General Plan	Low
Open Space - Final Plat	Moderate
Open Space - Preliminary Plat	Low
Open Space - General Plan	Low
Preserve - General Plan	Moderate
Public/Quasi-Public - General Plan	Low

Opportunities	
Opportunities	Opportunity Level
Overhead Transmission Line Corridors	High
Overhead 12kV Distribution Line (suitable for co-location)	High
Canal	High
Highways (State Route)	High
Arterial Roadways (with Jurisdictional Franchise Agreement)	High
Arterial Roadways (without Jurisdictional Franchise Agreement)	High
Utility Facilities (substations, pump stations, water treatment, comm., flood control, etc.)	Moderate

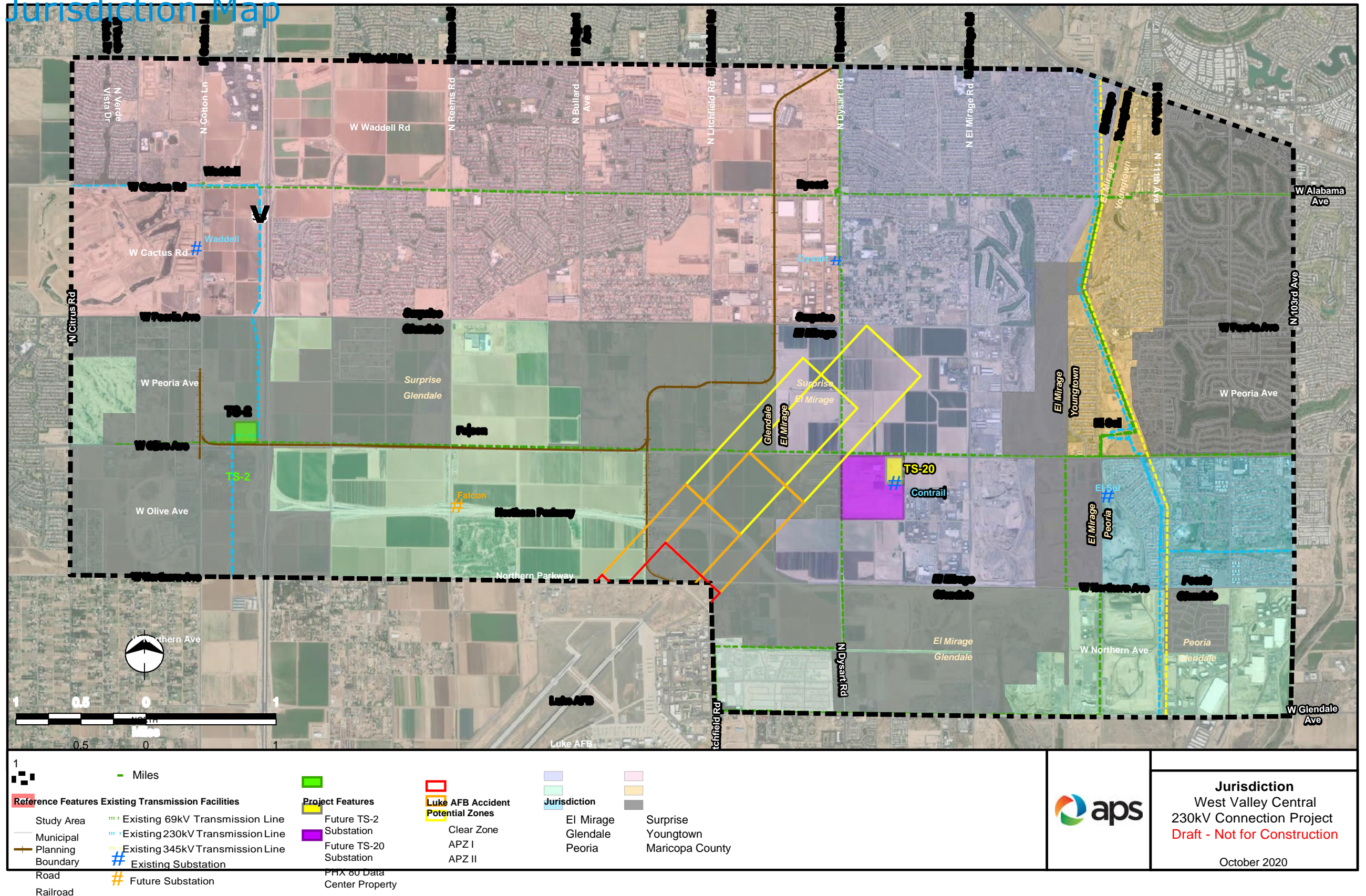


# PLANNING PROCESS

## Opportunities and Constraints Analysis

In order to determine the criteria locations, we first identified the landowners, jurisdictions and agencies within the project Study Area to determine existing and planned land use and jurisdictional planning guidelines. The following map shows the jurisdiction boundaries, as well as the existing transmission lines within the study area.

Jurisdiction Map



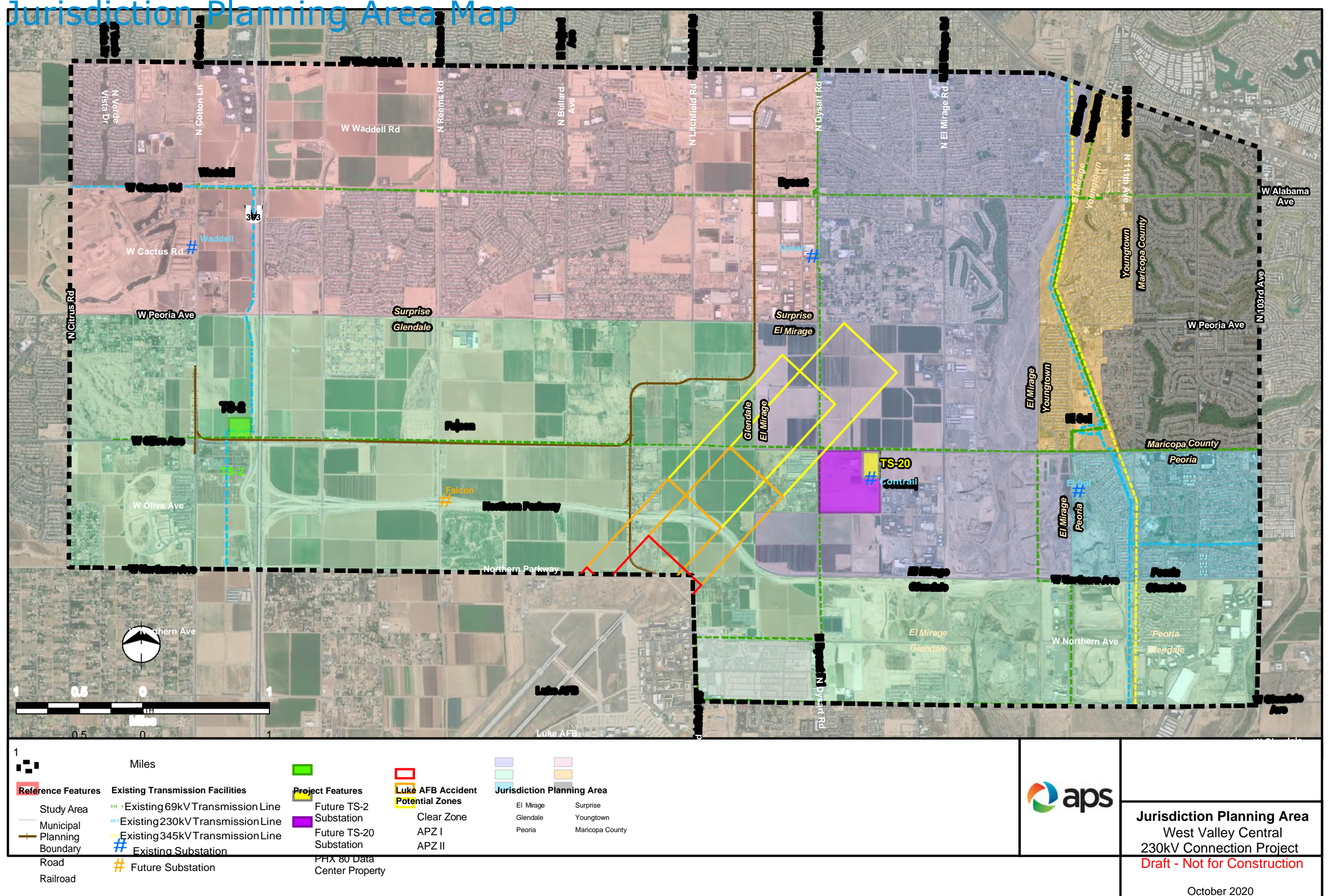


# PLANNING PROCESS

## Opportunities and Constraints Analysis

Cities and towns in the metropolitan area typically have long term plans that consider potential expansion of their current jurisdictional boundaries. These broader jurisdictional planning areas are reflected in officially adopted General Plans or Comprehensive Plans and identify desired future land use plans including residential, commercial, industrial, recreations, educational, etc. uses that are to be considered for development within the community. These jurisdictional planning areas are important to consider when planning new electrical infrastructure such as the proposed 230kV power lines.

Jurisdiction Planning Area Map



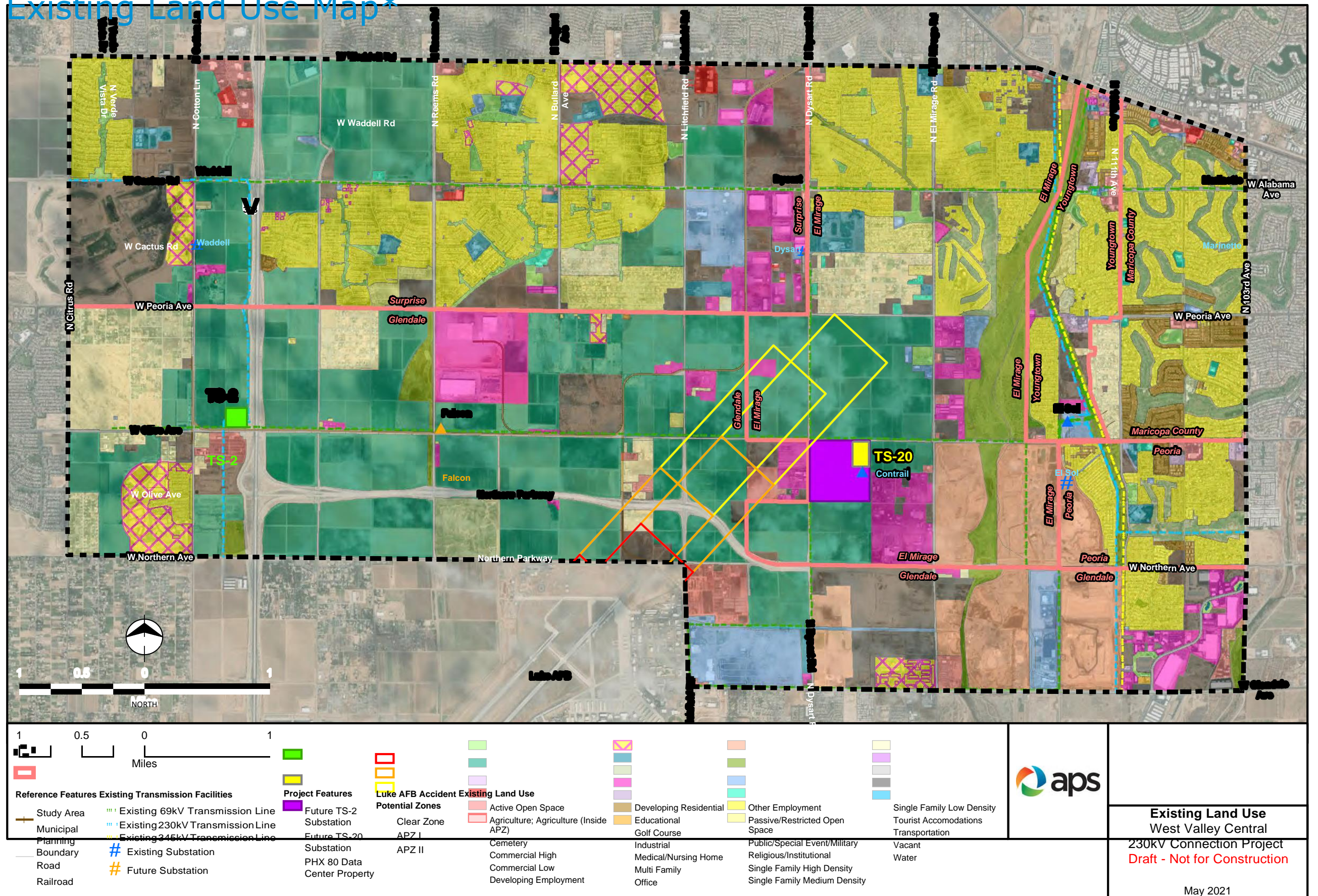


# PLANNING PROCESS

## Opportunities and Constraints Analysis

Land use information provided to us by the various agencies and jurisdictions allowed us to create the Existing Land Use map below to help us further determine current areas of opportunities and constraints.

Existing Land Use Map\*



\*Updated May 2021

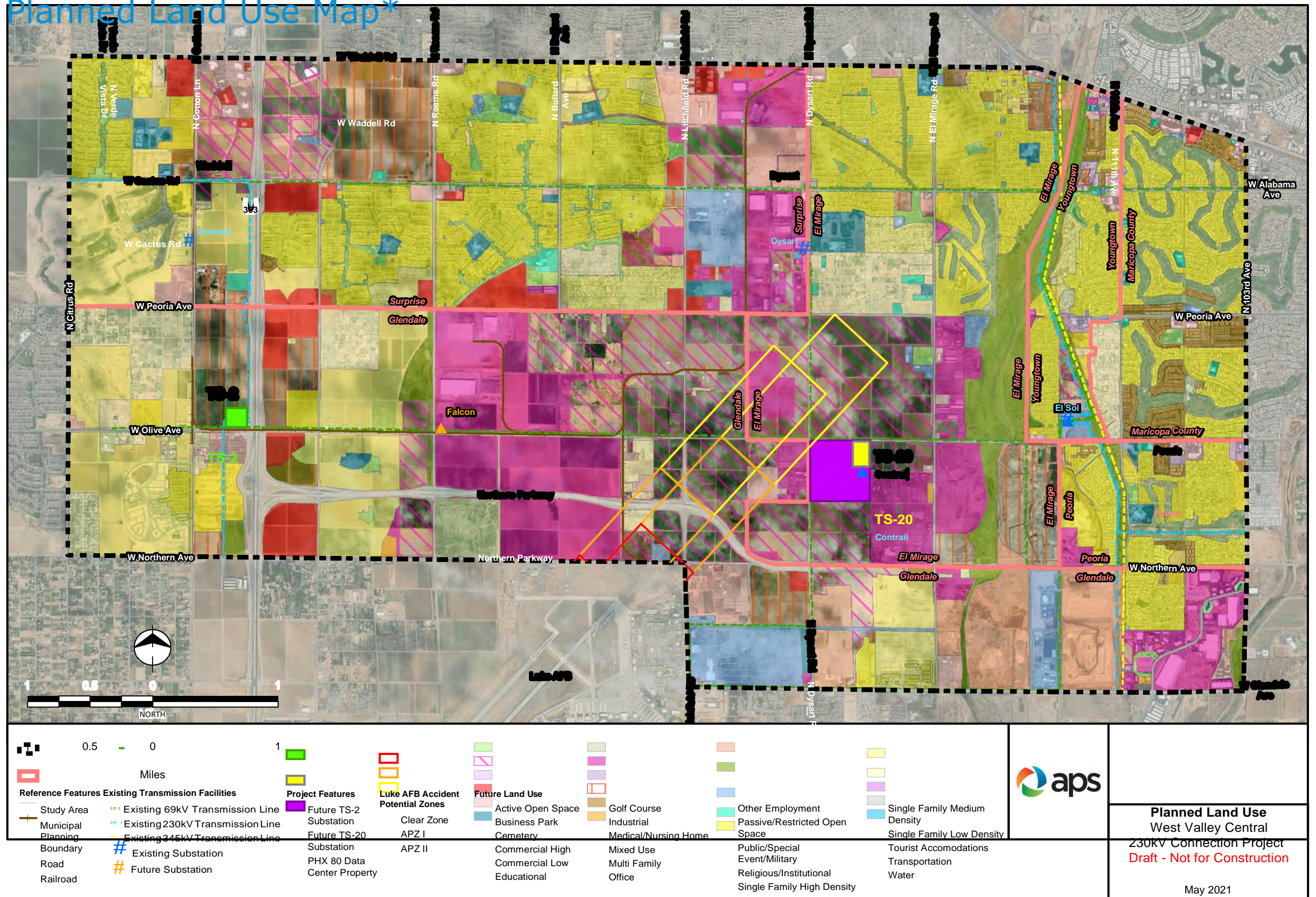


# PLANNING PROCESS

## Opportunities and Constraints Analysis

Information regarding planned land use was also provided to help us determine the best locations for our facilities as shown in the Planned Land Use map below.

Planned Land Use Map\*



\*Updated May 2021

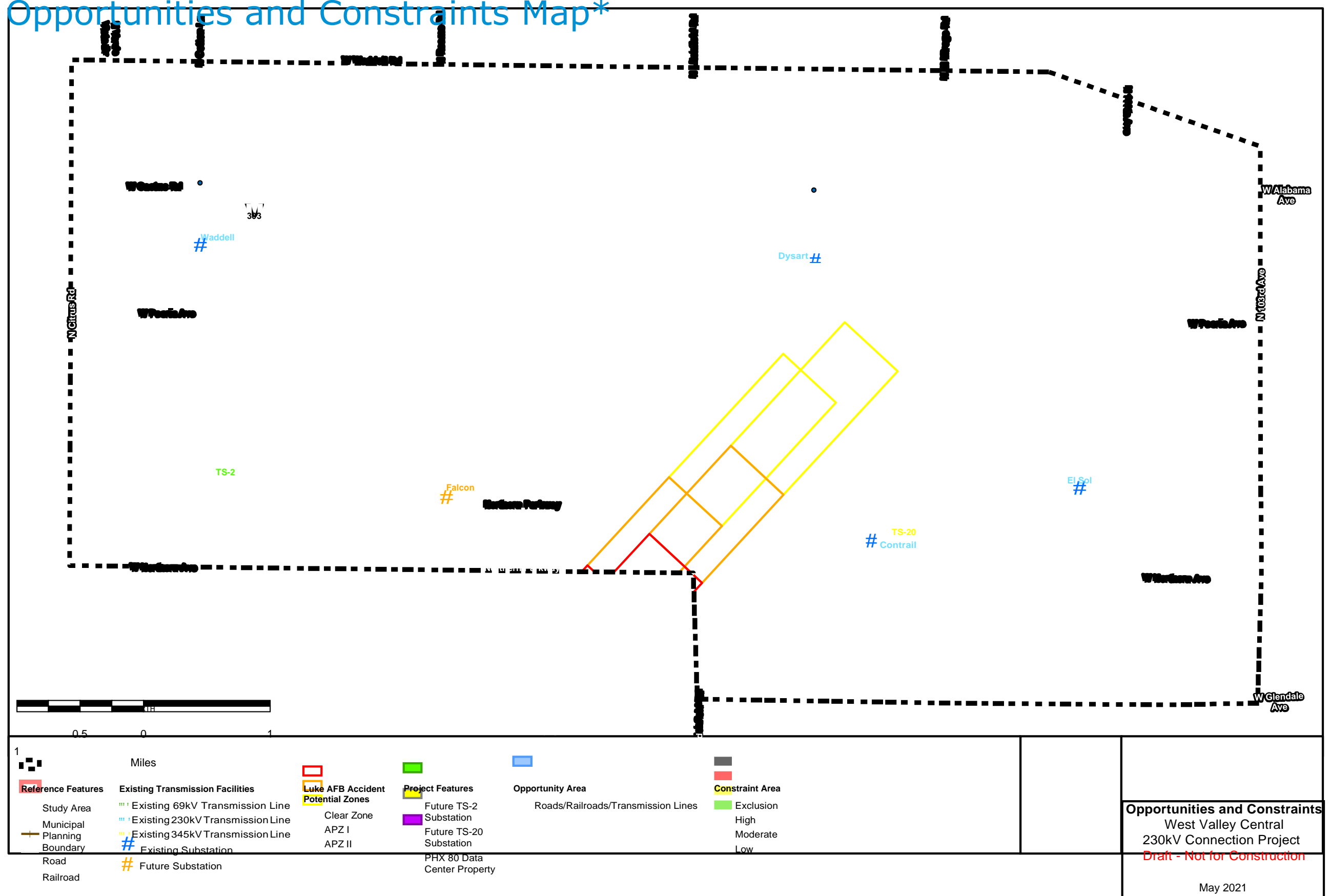


# ALTERNATIVE ROUTES

## Project Alternatives

Existing and planned land use and visual resources data was used to identify areas that are most suitable for construction of the proposed 230kV power lines. The map below illustrates a composite of all the opportunities and constraints within the project study area. Opportunity areas including following existing power lines and major roadways are shown in blue. Areas with low sensitivity including industrial or undeveloped areas are shown in green, areas with moderate sensitivity such as commercial areas or business parks are shown in yellow, and areas with high sensitivity such as residential areas are shown in red.

Opportunities and Constraints Map\*



\*Updated May 2021

This initial analysis helped determine:

- locations that minimize impacts to sensitive resource areas (existing residences, schools, etc.)
- locations that maximize the use of existing siting opportunities (existing power lines, roads, canals, etc.)

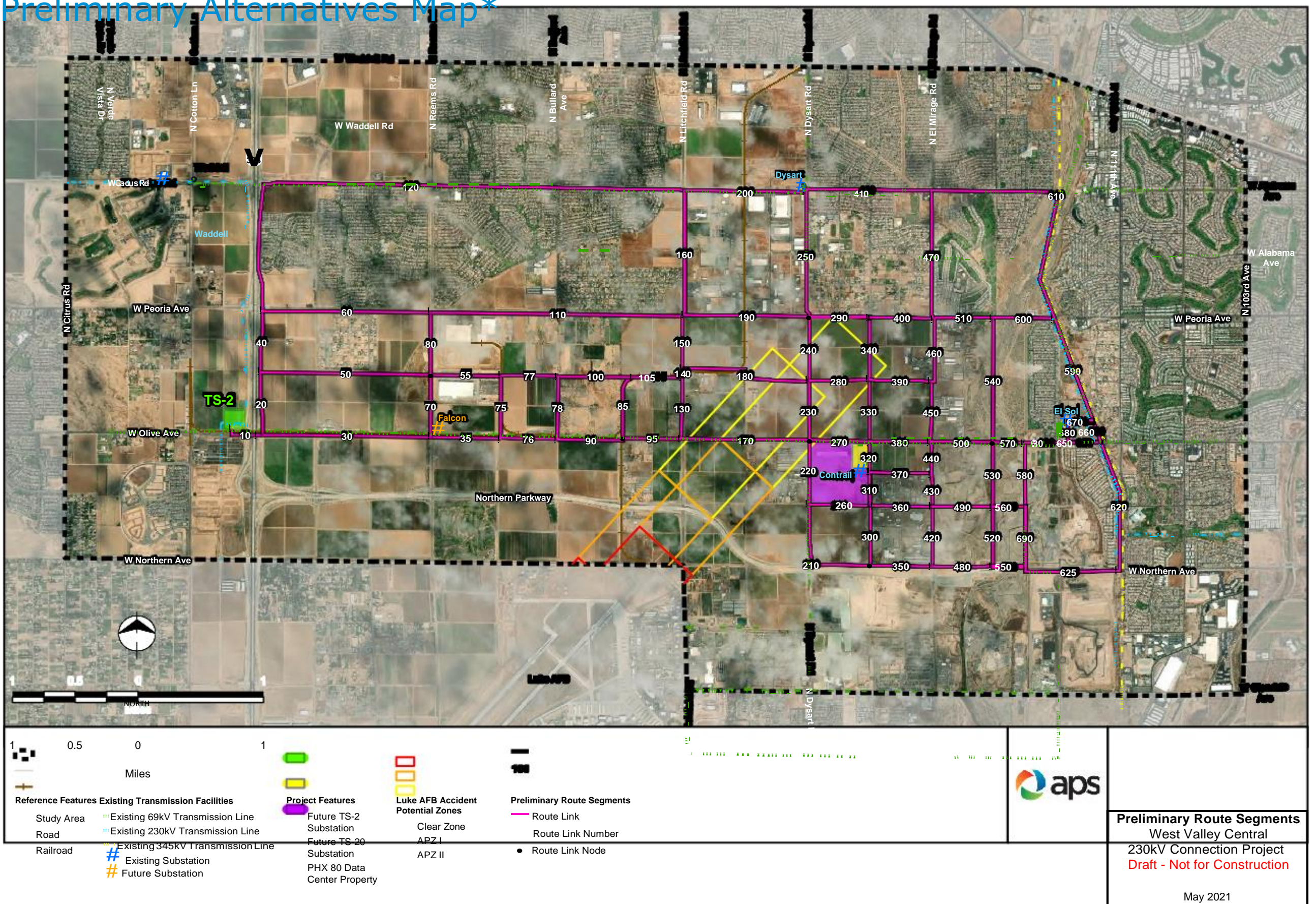


# ALTERNATIVE ROUTES

## Transmission Line Siting Considerations

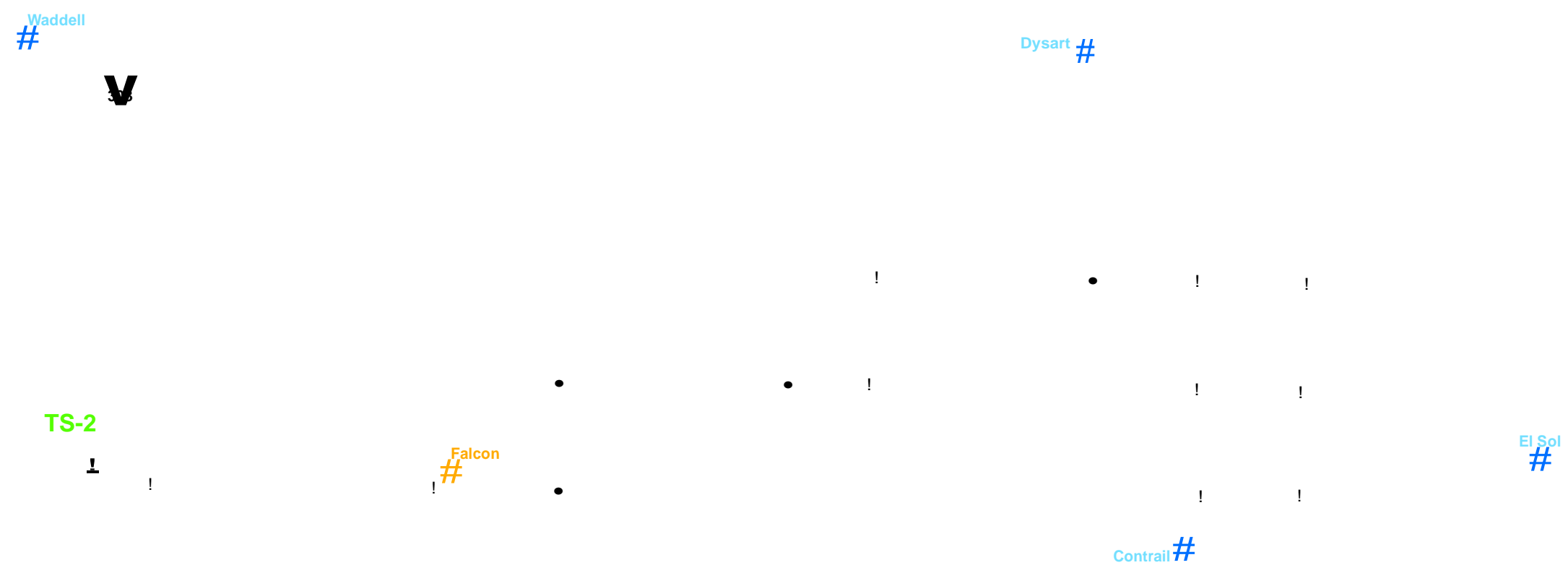
The opportunity alignments along existing power lines and major roadways were evaluated with respect to the constraints associated with the underlying existing and planned land uses to identify preliminary alternatives for routing the proposed power lines. Additional siting considerations including constructability, engineering, and other technical factors were also evaluated. This map shows several preliminary alternative links that could be used to create routes that will connect the substations needed to serve customers. Some of the preliminary alternative links may be eliminated or new links may be added based upon further studies and comments received by the agencies and public as the planning process progresses.

Preliminary Alternatives Map\*



\*Updated May 2021





**Reference Features**

Study Area Road

Railroad

**Existing Transmission Facilities**

- Existing 69kV Transmission Line
- Existing 230kV Transmission Line



- Existing 345kV Transmission Line
- Existing Substation
- Future Substation

- Project Features**
- Future TS-2 Substation
  - Future TS-20 Substation
  - PHX 80 Data Center Property

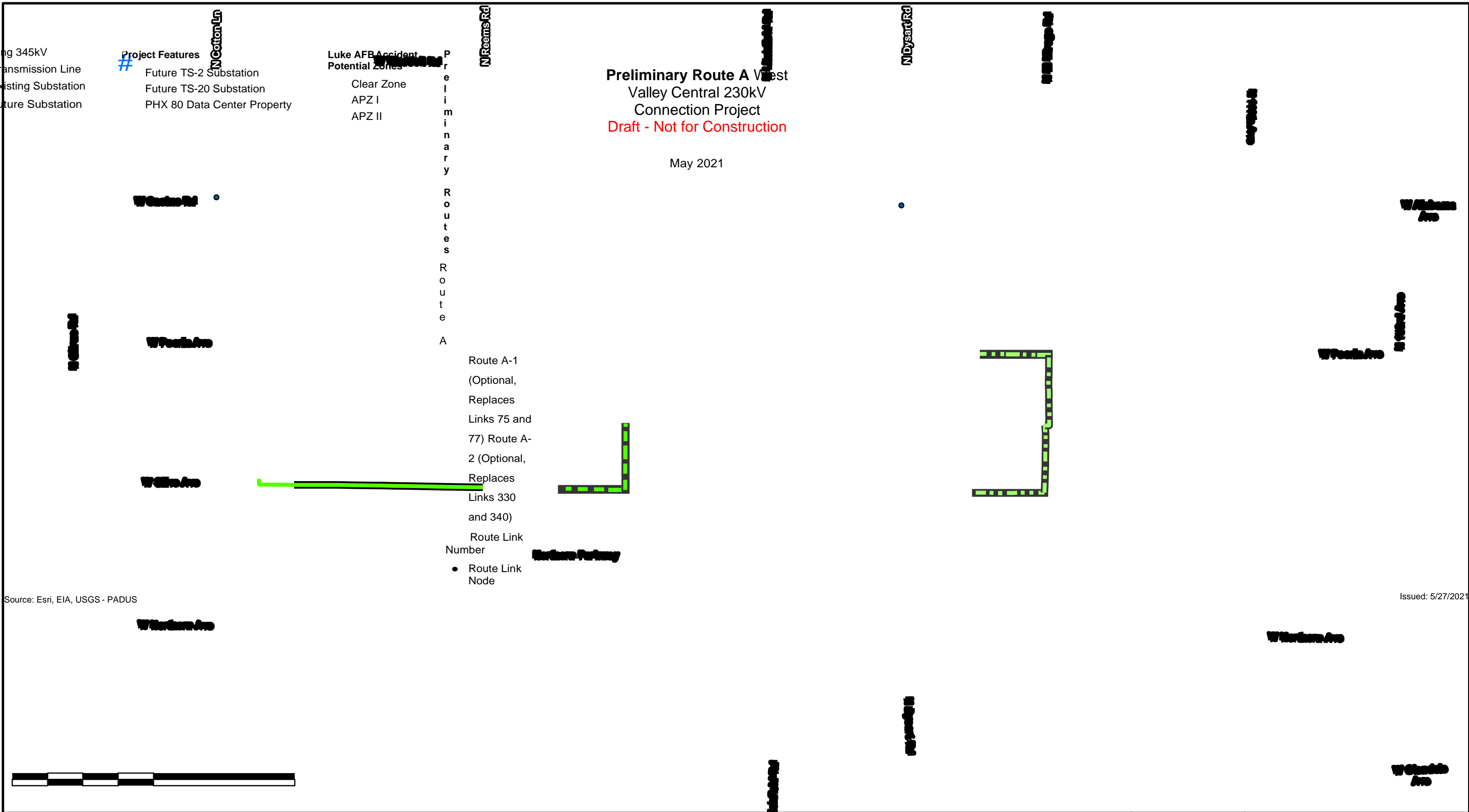
- Luke AFB Accident Potential Zones**
- Clear Zone
  - APZ I
  - APZ II

**Preliminary Route A West Valley Central 230kV Connection Project**  
**Draft - Not for Construction**

May 2021

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- Route A-1 (Optional, Replaces Links 75 and 77)
- Route A-2 (Optional, Replaces Links 330 and 340)
- Route Link Number
- Route Link Node

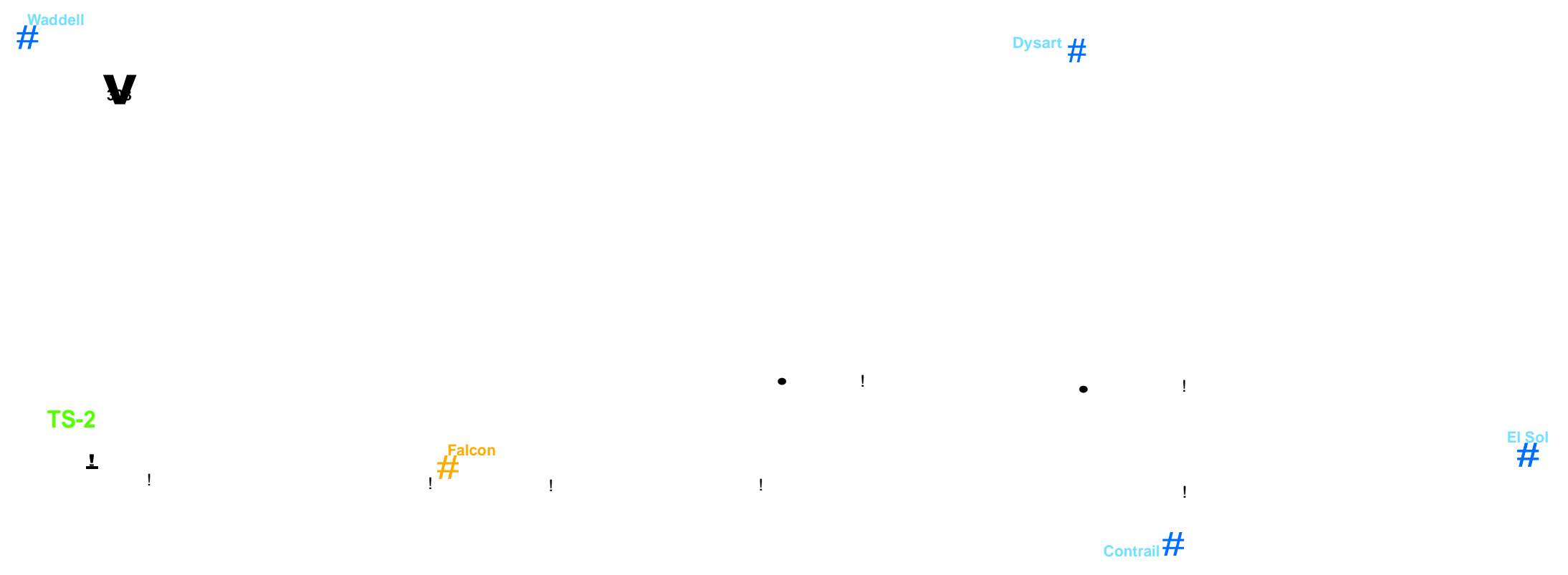


Source: Esri, EIA, USGS - PADUS

Issued: 5/27/2021

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**Reference Features**

Study Area Road

Railroad

**Existing Transmission Facilities**

- Existing 69kV Transmission Line
- Existing 230kV Transmission Line



- Existing 345kV Transmission Line
- Existing Substation
- Future Substation

- Project Features**
- Future TS-2 Substation
  - Future TS-20 Substation
  - PHX 80 Data Center Property

- Luke AFB Accident Potential Zones**
- Clear Zone
  - APZ I
  - APZ II

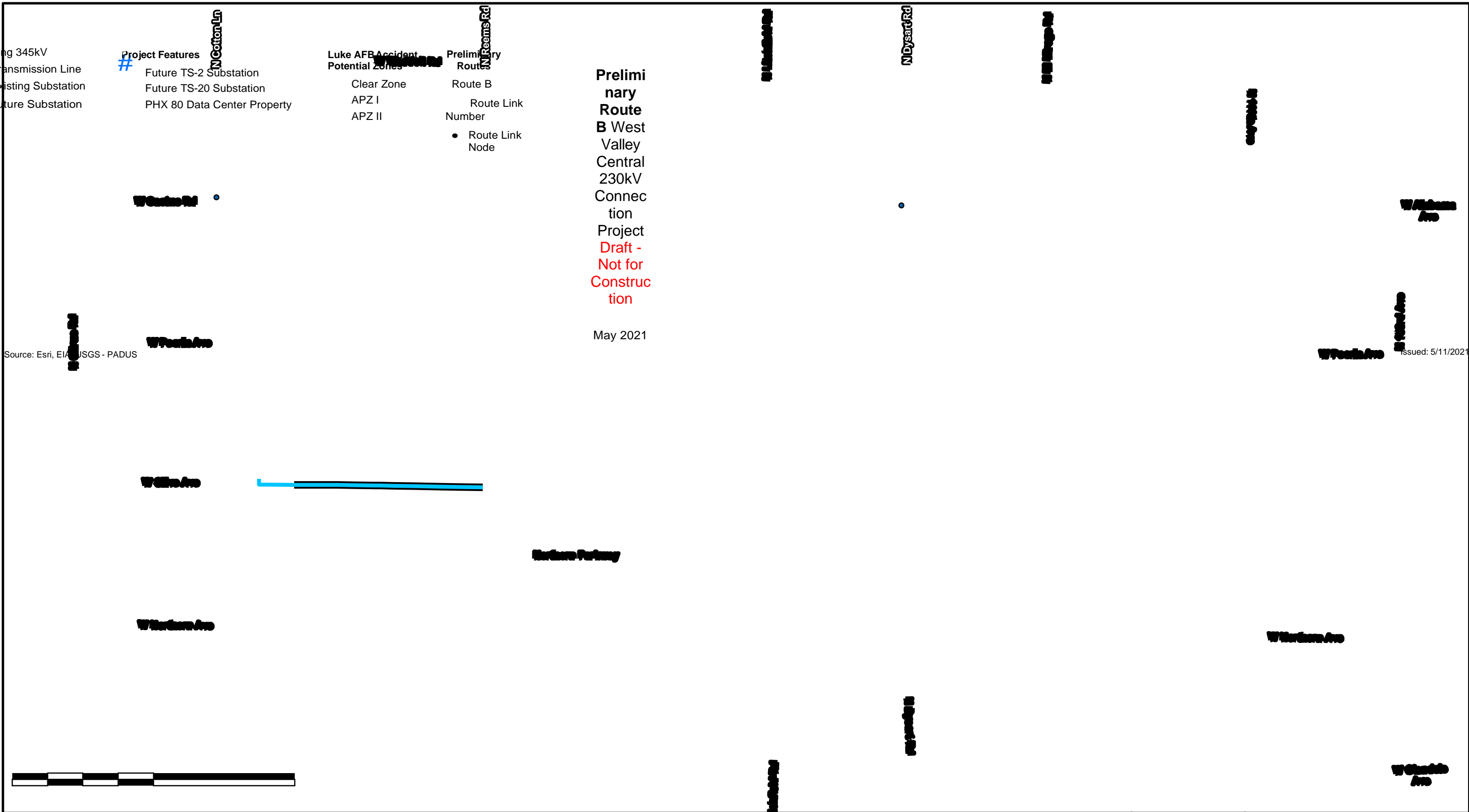
- Preliminary Route B**
- Route Link Number
  - Route Link Node

**Preliminary Route B West Valley Central 230kV Connection Project**  
 Draft - Not for Construction

May 2021

Source: Esri, EIA USGS - PADUS

Issued: 5/11/2021



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Waddell #



TS-2



Falcon #



Dysart #



Conrail #



El Sol #

NORTH

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Miles

Reference Features

Study Area Road

Railroad

Existing Transmission Facilities

- Existing 69kV Transmission Line
- Existing 230kV Transmission Line



- Existing 345kV Transmission Line
- Existing Substation
- Future Substation

- Project Features**
- Future TS-2 Substation
  - Future TS-20 Substation
  - PHX 80 Data Center Property

- Luke AFB Accident Potential Zones**
- Clear Zone
  - APZ I
  - APZ II

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**Preliminary Route C West  
Valley Central 230kV  
Connection Project**  
Draft - Not for Construction

May 2021

Route C-1  
(Optional,  
Replaces  
Links 330  
and 340)

- Route Link Number
- Route Link Node

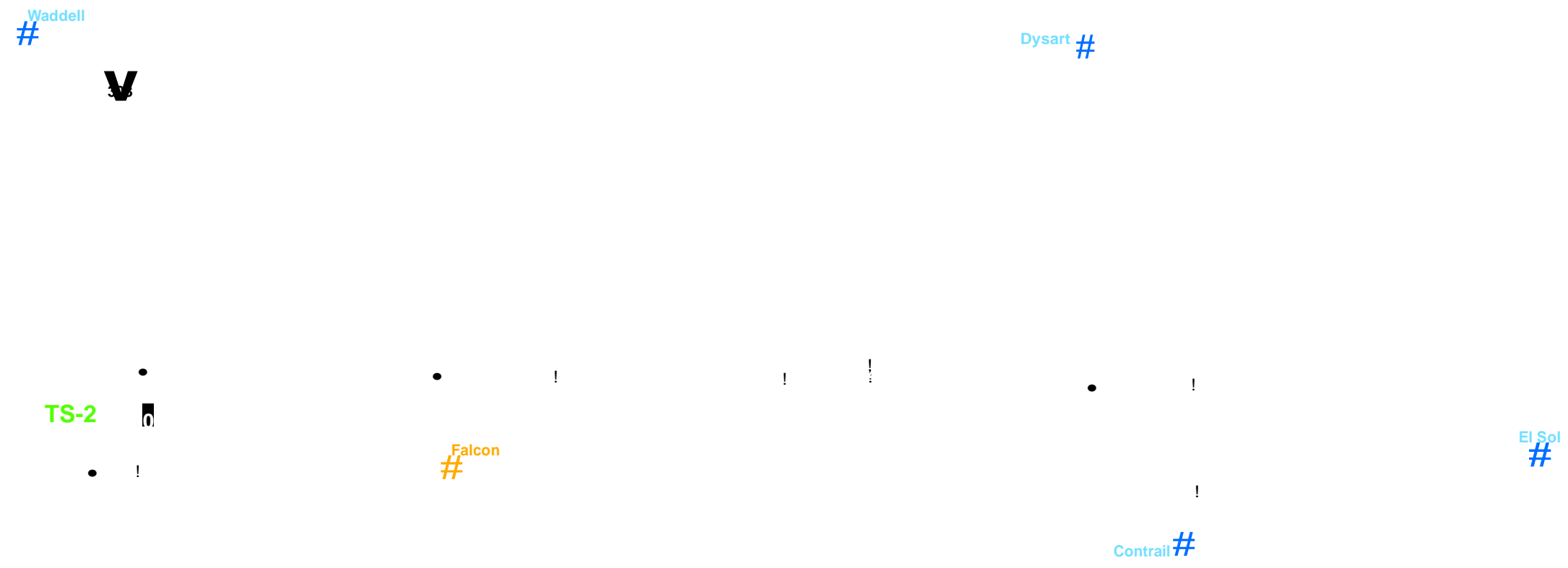
Source: Esri, EIA, USGS - PADUS

Issued: 5/11/2021



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**Reference Features**

Study Area Road

Railroad

**Existing Transmission Facilities**

- Existing 69kV Transmission Line
- Existing 230kV Transmission Line



- Existing 345kV Transmission Line
- Existing Substation
- Future Substation

- Project Features**
- Future TS-2 Substation
  - Future TS-20 Substation
  - PHX 80 Data Center Property

- Luke AFB Accident Potential Zones**
- Clear Zone
  - APZ I
  - APZ II

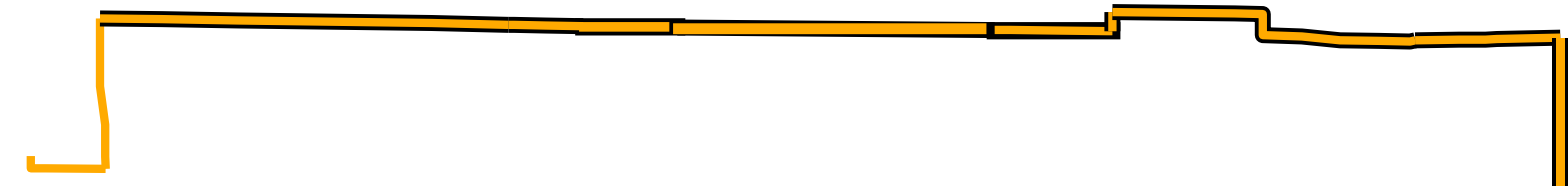
- Preliminary Route**
- Route D
  - Route Link Number
  - Route Link Node

**Preliminary Route D West Valley Central 230kV Connection Project**  
 Draft - Not for Construction

May 2021

Source: Esri, EIA USGS - PADUS

Issued: 5/11/2021



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Waddell #



Dysart #

TS-2

Falcon #

Conrail #

EJ Sol #

NORTH

1 0.5 0 1

Miles

Reference Features

Study Area Road

Railroad

Existing Transmission Facilities

Existing 69kV Transmission Line  
Existing 230kV Transmission Line



- Existing 345kV Transmission Line
- Existing Substation
- Future Substation

- Project Features**
- Future TS-2 Substation
  - Future TS-20 Substation
  - PHX 80 Data Center Property

- Luke AFB Accident Potential Zones**
- Clear Zone
  - APZ I
  - APZ II

- Preliminary Route E**
- Route Link Number
  - Route Link Node

**Preliminary Route E West Valley Central 230kV Connection Project**  
 Draft - Not for Construction

May 2021

Source: Esri, EIA USGS - PADUS

Issued: 5/11/2021



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NORTH

1 0.5 0 1

Miles

Reference Features

Study Area Road

Railroad

Existing Transmission Facilities

Existing 69kV Transmission Line  
Existing 230kV Transmission Line



- Existing 345kV Transmission Line
- Existing Substation
- # Future Substation

- # Project Features
  - Future TS-2 Substation
  - Future TS-20 Substation
  - PHX 80 Data Center Property

- Luke AFB Accident Potential Zones
  - Clear Zone
  - APZ I
  - APZ II

- Preliminary Route
  - Route Link Number
  - Route Link Node

**Preliminary Route F West Valley Central 230kV Connection Project**  
**Draft - Not for Construction**

May 2021

Source: Esri, EI/USGS - PADUS

Issued: 5/11/2021



Waddell #

303

TS-2

Falcon #

Dysart #

Conrail #

El Sol #

NORTH

1 0.5 0 1

Miles

Reference Features

Study Area Road

Railroad

Existing Transmission Facilities

Existing 69kV Transmission Line  
Existing 230kV Transmission Line

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- Existing 345kV Transmission Line
- Existing Substation
- Future Substation

- Project Features
- Future TS-2 Substation
  - Future TS-20 Substation
  - PHX 80 Data Center Property

- Luke AFB Accident Potential Zones
- Clear Zone
  - APZ I
  - APZ II

- Preliminary Route G
- Route Link Number
  - Route Link Node

**Preliminary Route G West Valley Central 230kV Connection Project**  
Draft - Not for Construction

May 2021

Source: Esri, EIA USGS - PADUS

Issued: 5/11/2021



Waddell #

303

Dysart #

TS-2

Falcon #

Contrail #

El Sol #

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Miles

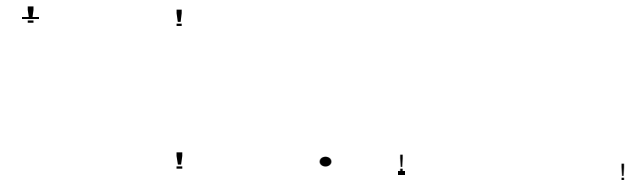
Reference Features

Study Area Road

Railroad

Existing Transmission Facilities

Existing 69kV Transmission Line  
Existing 230kV Transmission Line





- Existing 345kV Transmission Line
- Existing Substation
- Future Substation

- Project Features**
- Future TS-2 Substation
  - Future TS-20 Substation
  - PHX 80 Data Center Property

- Luke AFB Accident Potential Zones**
- Clear Zone
  - APZ I
  - APZ II

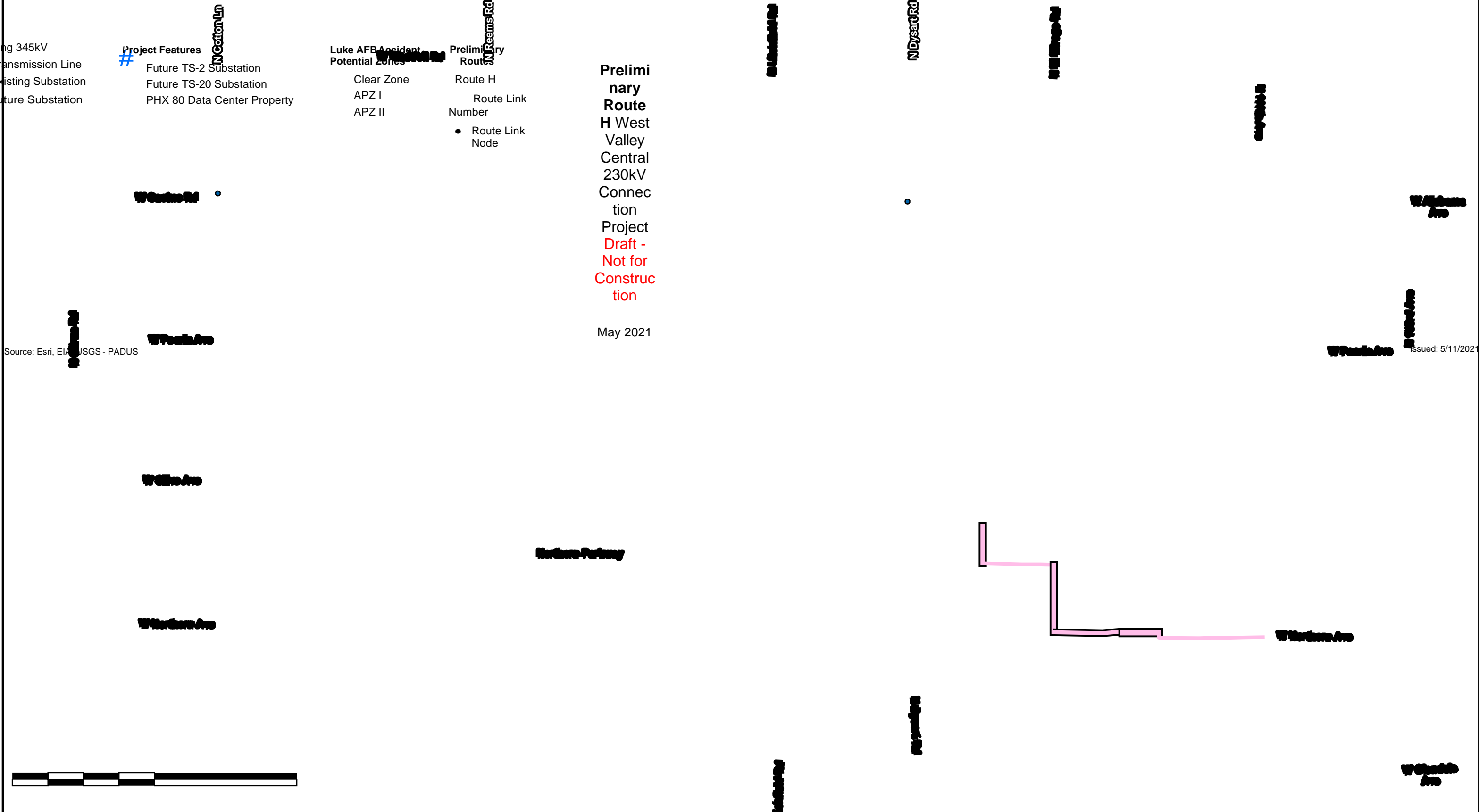
- Preliminary Route**
- Route H
  - Route Link Number
  - Route Link Node

**Preliminary Route H West Valley Central 230kV Connection Project**  
**Draft - Not for Construction**

May 2021

Source: Esri, EA, USGS - PADUS

Issued: 5/11/2021



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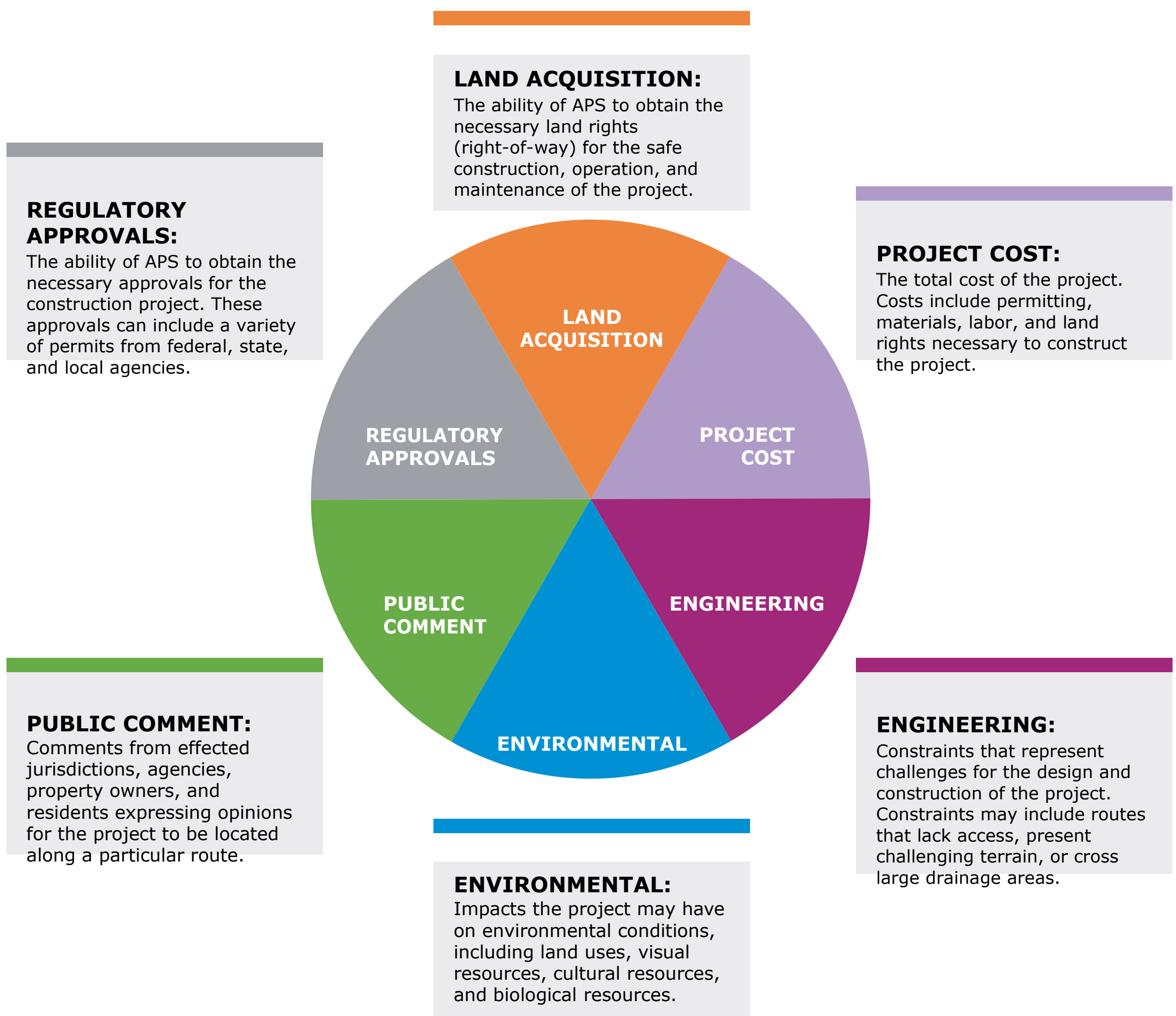
# SITING CONSIDERATIONS

## Transmission Line Routing Criteria

When siting new electrical facilities, APS strives to:

- Minimize impacts to sensitive resource areas, including residential developments, airports, etc.; and
- Maximize use of siting opportunities, including locating near existing linear features and/or compatible land uses such as transmission lines, powerlines, roads, canals, substations, etc.

Numerous considerations enter into the siting of electrical facilities, as identified below.





# TECHNICAL CONSIDERATIONS

## Electric and Magnetic Field (EMF) Data

<b>Electric Field</b>
Fields created by voltage on the transmission line that can cause an electric charge to build up on insulated objects near the line. This can create nuisance shocks (much like walking across carpet and touching a door handle) to individuals touching grounded objects near the line.
The standard for maximum electrical field value outside of the powerline right-of-way is 5.0kV/m. the value calculated for this project is less than 0.5kV/m.

<b>Magnetic Field</b>
Fields that are created by ALL devices that use, carry, or generate electricity. Magnetic fields drop off dramatically as distance from the source increases. To date, no federal or Arizona state standards have been established for magnetic field levels.
We recognize the public concern for magnetic fields and will include these considerations in the final design of this project. A typical value for the magnetic field at the edge of this 230kV right-of-way is approximately 45mG.

We continue to monitor U.S. and international studies regarding EMF, and offer free in-home measurements of EMF levels to all APS customers.

Typical magnetic fields measured at various distances from common electrical appliances				
All measurements are in milligauss (mG)				
Appliances	6 inches	12 inches	24 inches	48 inches
Microwave Oven	100 - 300	1 - 200	1 - 30	* - 20
Hair Dryer	1 - 700	* - 70	* - 10	* - 1
Electric Range	20 - 200	* - 30	* - 9	* - 6
Video Display Terminal (PC with color monitors)	7 - 20	2 - 6	1 - 3	*

Source: EMF In Your environment, epa.com  
Note: The asterisk (\*) indicates measurement same as background fields.

To learn more about EMFs please visit the websites below, which contain information from independent parties.

- The National Institute of Environmental Health Sciences  
[niehs.nih.gov/health/topics/agents/emf/](http://niehs.nih.gov/health/topics/agents/emf/)
- World Health Organization  
[who.int/peh-emf/en/](http://who.int/peh-emf/en/)

# TECHNICAL CONSIDERATIONS

## Noise and Interference

Transmission line noise can be described as humming or crackling. Audible noise from the power lines is created by:

- Corona discharge along the line
- Frequency and voltage level of the line

Corona is defined as the breakdown of air into charged electrical particles. The amount of corona for a transmission line is a function of several things including:

- Engineering design
- Voltage
- Phase spacing and geometry
- Weather conditions

Effects of corona can include:

- Audible noise
- Radio and TV interference

Suggested noise levels:

- Electric Power Research Institute (EPRI) studies show that customer complaints are registered at 52.5 decibels, A-weighted (dB(A))
- The Environmental Protection Agency (EPA) has concluded that day/night (Ldn) sound levels below 55.0 dB(A) will not cause interference or annoyance with outdoor activities.

Noise levels on a typical extra-high voltage transmission line are expected to be less than the suggested levels.

### Noise

High voltage transmission lines can emit audible noise. The noise is often times described as a "humming" or "crackling" sound. The audible noise, from a transmission line, is most affected by weather and the surrounding conditions.

### Communications

High voltage transmission lines have been known to cause interference with radio and television transmissions. Typical values for similar projects show some AM radio stations may occur within 200 feet of the line. However, interference to FM radio, digital, satellite, or cable communications is not expected.



# AGENCY AND PUBLIC OUTREACH

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## Agency Outreach Timeline

- Luke Air Force Base – July 2020 and May 2021
- City of Glendale – August 2020 and May 2021
- City of El Mirage – August 2020 and May 2021
- City of Peoria – August 2020 and May 2021
- City of Surprise – August 2020 and May 2021
- Town of Youngtown – August 2020 and May 2021
- Maricopa County – September 2020 and May 2021
- Maricopa County Department of Transportation – September 2020 and May 2021
- Maricopa County Flood Control District – September 2020 and May 2021

## Public Outreach

- Project website, [apswestvalleycentral.com](http://apswestvalleycentral.com)
- APS power line siting website, [aps.com/westvalleycentral](http://aps.com/westvalleycentral)
- Project hotline, 623-241-5935
- Project email, [contactus@apswestvalleycentral.com](mailto:contactus@apswestvalleycentral.com)
- Project newsletters
- Virtual open house experience, [apswestvalleycentral.com/open-house](http://apswestvalleycentral.com/open-house)
- Live virtual town hall event, [rb.gy/guwy02](https://rb.gy/guwy02)

*\*outreach is ongoing throughout the process*