# POWER TRANSMISSION EVALUATION OF LOUDOUN COUNTY, VIRGINIA

## Due Diligence Report

September 2024

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Prepared for:

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**Attachment 3**

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# EXECUTIVE SUMMARY

Loudoun County, located in Northern Virginia, has the highest concentration of data centers in the world. Due to the rapid expansion of the data center industry, the area has experienced increased demand for additional power to serve these facilities. This report provides an overview of the existing and proposed high-voltage electric grid and infrastructure within Loudoun County and assesses how well currently planned transmission projects (including upgrades of existing infrastructure and proposed new transmission infrastructure projects) will adequately meet the electrical demand associated with the development and the future growth of the data center industry within the County.

Kimley-Horn, using data provided by the County, reviewed current data center applications within Loudoun to determine if future electrical load growth for data centers is aligned with utility and the Regional Transmission Organization (RTO) projections. Typically, a data center developer will work to secure electrical interconnect before submitting permit applications to a County. That said, in August 2024 Kimley-Horn reviewed one hundred and forty-eight (148) parcels in Loudoun County with a current data center application, as provided by the County. Seventy-two (72) of the one hundred and forty-eight (148) parcels have active site plan applications which depict eighty-four (84) proposed data center buildings. The other seventy-six (76) parcels have not yet submitted a site plan that shows the data center building(s). It is estimated that these parcels will have approximately thirty-three (33) additional data center buildings sited assuming the same building footprint to parcel size ratio as those with site plans. Assuming 70 megawatts (MW) of electricity is needed per data center building based on the average disclosed size within the applications reviewed by Kimley-Horn, the future load for the one hundred and seventeen (117) buildings would be approximately 8,190 MW. If approved, these data centers would become operational at varying rates pending construction schedules and the availability of electricity.

To balance and plan for increasing electrical load growth, the RTO, Pennsylvania-New Jersey-Maryland Interconnection (PJM), which coordinates the movement of wholesale electricity in the region within which Loudoun County falls, has developed a Regional Transmission Expansion Plan (RTEP) that is updated on an annual basis. The 2022 and 2023 RTEPs have identified significant transmission system upgrades needed throughout the region and within the County to meet the projected system needs through 2028. Specifically, the 2022 RTEP projected that through 2028, there is expected to be an approximate growth of 5,700 megawatts (MW) of power demand to serve data centers in the Dominion Territory, which includes northern Virginia and Loudoun County. A subsequent analysis of power demand by Dominion completed in 2024 forecasted an approximate load growth of 8,346 MW by 2028.

PJM-approved projects for electrical infrastructure are summarized in this report. However, based on Kimley-Horn's review of the data (both data center applications and approved transmission projects), if all data center applications in the County with active site plans are constructed, additional electrical infrastructure upgrades and new transmission infrastructure beyond what is currently identified as PJM's approved projects would be needed.

Kimley-Horn recommends that the County proactively develop planning and policy measures to minimize the potential impacts on County resources and communities caused by future transmission infrastructure development. These recommendations include the following:

- Develop constraints/exclusion mapping and identify preferred transmission corridors for future projects to minimize impacts on County resources and communities.

- Develop a future scenario plan for the data center buildout in Loudoun County. The plan will be coordinated closely with electrical providers to align the development of transmission corridors with approved and planned data center growth, power needs, redundancy, and reliability. Kimley-Horn recommends that the plan focus on siting data centers near preferred transmission corridors to minimize additional electric infrastructure build-out.
- Amend the County Comprehensive Plan to include electric transmission corridors to be utilized by power providers.
    - Develop potential language to support:
    - Collocation of proposed transmission lines with existing infrastructure
    - Underground power transmission within existing overhead transmission line easements.
    - Underground power transmission for greenfield routes
    - Advanced reconductoring of existing transmission lines
    - Existing transmission line capacity upgrades
    - Behind the meter and other innovative solutions to meet usage needs

These recommendations will allow the County to be more proactive in the approach of siting powerlines and ultimately limit the impacts on the community by new overhead transmission lines in high-conflict areas.

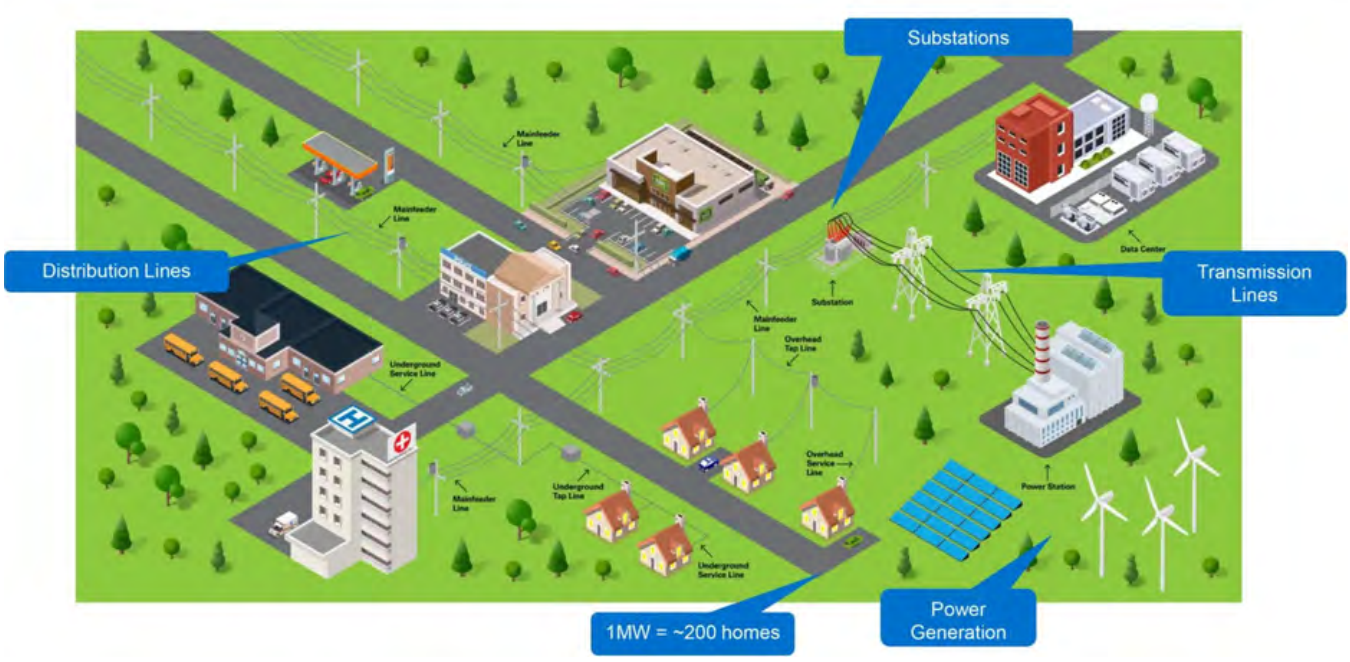
# 1. INTRODUCTION

Loudoun County (County) is located in Northern Virginia, which has experienced unprecedented data center growth in the last two decades and is considered the largest data center market in the world (NVTC 2020).

## 1.1 Data Center Energy Needs

The Electric Power Research Institute (EPRI) estimates that data centers could grow to consume up to 9% of U.S. electricity generation annually by 2030, up from 4% of total load in 2023. At a national level, data centers are critical to supporting America's economic growth by powering businesses and enabling continued leadership in innovation (DOE 2024). Data center electricity demand has specific characteristics. Data centers can impact regional grids given the steep increases in load size, may be geographically constrained due to latency requirements, and often require utility-provided power sources to operate continuously. In a typical data center, servers alone can account for 50% to 70% of the total power consumption. This is because they are the most numerous and active components, running 24/7 to meet the demands of users and applications.

Electricity is transmitted through distribution lines to data centers. With the assistance of transformers, the voltage may be further reduced before it enters the facility. Ideally, data centers are typically sited as close to transmission infrastructure as possible, and available interconnection to a transmission system is the most critical component of data center development.




*Source:* Dominion Energy Virtual Open House *Recorded July 30, 2024 (6:41)*

Data centers vary in size from consuming 1MW to over 100MW. Hyper-scale data centers can demand as much as 1 GW of power. There is speculation that electricity consumption by data centers will continue to grow due to a number of factors, including the adoption of 5G wireless networks, cloud-based services, and the increasing demand for artificial intelligence; however, coupled with this growth is rapidly advancing energy efficiency and controls technology. For purposes of this report, Kimley-Horn assumed that an average of 70MW of electricity is needed per data center building, based on the average disclosed size within the data center applications submitted to Loudoun County and reviewed Kimley-Horn.

## 1.2 Transmission Regulation

### 1.2.1 Electric Utilities in Loudoun County

Loudoun County's transmission is served primarily by the public electric utility provider Dominion Virginia Power (Dominion). Additionally, both public and privately owned transmission developers, including NextEra Energy and FirstEnergy, have legal ability to develop transmission in Virginia.

A typical 500 kilovolt (kV) transmission line can carry 1,000 to 1,500 MW of power, which is enough to power about 1–1.5 million homes or 14-20 data centers, assuming they are in the 70MW/data center size range.

#### 1.2.1.1 Dominion Virginia Power

Virginia Electric and Power Company currently serves approximately 2.7 million electric customers located in approximately 30,000 square miles of Virginia and North Carolina. The Company is a subsidiary of Dominion Energy, Inc. ("Dominion Energy"). Roughly 80% of Dominion's data center clients are located in Loudoun County (Dominion Energy 2023). Dominion Energy served data centers in the County with 2,518MW and has forecasted that the number will be 8,346MW (an increase of 231%) by 2028 (Dominion Energy Virtual Open House *Recorded July 30, 2024* [5:03]).

### 1.2.2 Regional Transmission Organization

The sale and movement (transmission) of electricity in Virginia is coordinated and planned by the Regional Transmission Organization (RTO) known as the Pennsylvania-New Jersey-Maryland Interconnection (PJM). PJM is responsible for managing the power grid and planning for future grid needs in Virginia. PJM manages and approves the need for new transmission and PJM approval is the first formal step in the transmission siting process. Additional information on PJM and its role in Loudoun County projects is included in Section 1.3.

### 1.2.3 Virginia State Corporation Commission

Following PJM approval, the State Corporation Commission (SCC) must approve any proposed high-voltage transmission lines prior to construction. Loudoun County has no formal role in the approval process, but serves as a "referral agency" for any proposals within the County.

The process by which the SCC handles an application to build a transmission line is governed by laws enacted by the General Assembly of Virginia. The SCC's ultimate decision is based on the application of Virginia law to the facts developed in the case. The SCC validates the need for a proposed line and approves the route and structures.

The SCC, in conjunction with the Department of Environmental Quality (DEQ), issues a Certificate of Public Convenience and Necessity (CPCN) for the construction and operation of transmission lines and facilities above 115 kV.

### 1.2.4 Virginia House Bill No 862

A Virginia House bill passed in the 2024 session to amend and reenact §§ 56-597 and 56-599 of the Code of Virginia, relating to electric utilities; integrated resource plans; grid-enhancing technologies and advanced conductors. This HB is known as Virginia House Bill No 862; Electric utilities; integrated resource plans, grid-enhancing technologies and advanced conductors.

The HB, as proposed, would require an electric utility to include in an integrated resource plan (i) a comprehensive assessment of the potential application of grid-enhancing technologies and advanced conductors, as those terms are defined in the bill, in a manner that ensures grid reliability and safeguards the cybersecurity and physical security of the electric distribution grid and (ii) if applicable, a detailed explanation of why such technologies or conductors are not included in such plan.

Key elements of the bill include increasing noticing requirements to counties and municipalities within which a proposed line would be build and providing digital geographic information system (GIS) maps provided by the public utility showing the location of the proposed route.

## 1.3 Transmission Planning

Loudoun County is located within the PJM Interconnection, a regional transmission organization which received RTO status from the Federal Energy Regulatory Commission in December 2002. PJM is authorized by the federal government to manage the reliability of the electric transmission system and the operation of the wholesale electricity market in a defined control area.

To plan for the region's electrical load growth, PJM, which coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia – including Loudoun County- updated their Regional Transmission Expansion Plan (RTEP) to better address data center growth in 2022 and 2023. The RTEP identified significant transmission system upgrades throughout the region and within the County to meet the projected system needs through 2028. As indicated by PJM the factors necessitating the need for the transmission development include the following:

- Data center load growth currently forecasted by 2027/2028 by Dominion Energy and other utility providers
- Approximately 11,100 MW of announced of fossil fuel generator deactivations in Maryland and Virginia
- Replacement generation located in Ohio, Pennsylvania and Maryland is coming from proposed transmission lines outside the region.

In December 2023, the PJM's Interconnection Board approved a selection of the proposed transmission system upgrades identified in the RTEP (PJM's Reliability Analysis Report 2022 RTEP Window 3 dated December 8, 2023). The overall system upgrades are planned to be developed by several entities broken up into smaller projects. The entities responsible for the project developments within the County include Dominion Energy, NextEra Energy, and FirstEnergy.

The planned RTEP projects sited in Loudoun County are in various stages of design and permitting with several of the Dominion Energy projects already filed with the SCC. The SCC has regulatory authority over all electric utilities and requires that all transmission lines and/or facilities above 115 kV be certified by the SCC.

The project(s) being developed by NextEra Energy and FirstEnergy (referred to as "NextEra Proposed 500kV Woodside to Aspen Transmission Line") has been preliminarily identified as National Interest Electric Transmission Corridor (NIETC) by the Department of Energy (DOE). A NIETC is an area of the country where DOE has determined lack of adequate transmission harms consumers, and that the development of new transmission would advance important national interests in that area. If the NextEra and FirstEnergy project(s) receive NIETC designation, it would allow the Federal Energy Regulatory Commission (FERC) to issue permits for the siting of transmission lines within the NIETC under certain circumstances.

As a result of the planned projects, Kimley-Horn has been tasked with providing consulting support to the County. The scope of services includes three phases of work. The first phase is to perform due diligence which is documented in this report and includes the following tasks:

**1. Existing Transmission and Substation Mapping**
Gathering and reviewing data on existing powerlines and associated facilities located within the County limits. Performing field reconnaissance to verify the location and electrical capacity of existing electric powerlines and submitting data to the County according to their standards to update their records.

**2. Proposed Electric Grid Expansion Mapping**
Review the Virginia SCC website of planned projects within the County and digitize proposed project transmission lines and substations. Review and digitize proposed substations approved by the County through Commission Permits.

**3. Future Proposed Electric Grid Expansion Review**
Review publicly available documentation of future grid expansions not yet filed with the SCC.

**4. Due Diligence Report**
The due diligence report is to include findings and mapping from tasks 1-3. Additionally, the report will describe the existing electric grid in Loudoun County, the purpose and need of the future expansions and to the extent possible, a determination to which these expansions will provide sufficient power for data center build-out.

# 2. EXISTING ELECTRIC TRANSMISSION AND SUBSTATION DATA

Kimley-Horn utilized two data sources to review and map the existing electric transmission and substations within Loudoun County. Additionally, Kimley-Horn performed two site visits to field verify discrepancies between the source data. The existing electric transmission and substation data is planned to be utilized by the County and available on their online viewer called WebLogis. The following subsections further describe the data gathered and processed.

## 2.1 Data Source No. 1: HIFLD Open Data

The first data source Kimley-Horn utilized to collect and map existing transmission and substations was HIFLD Open Data (https://hifld-geoplatform.hub.arcgis.com). HIFLD Open Data is managed by the U.S. Department of Homeland Security Geospatial Management Office (GMO) and provides publicly available data for critical infrastructure within the U.S. The data was acquired on 05/30/2024 and is considered current through that date.

## 2.2 Data Source No.2: PJM System Map

The second data source Kimley-Horn utilized to collect and map existing transmission and substations was PJM's System Map (https://www.pjm.com/library/maps). PJM's System Map includes the location of substations, transmission lines, and transmission zones within the PJM footprint. The data was acquired on 05/09/2024 and can be considered current through that date.

## 2.3 Comparison of HIFLD, PJM, and County Data

After reviewing and comparing the PJM and HIFLD Open Data; the HIFLD Open Data appeared to be more accurate. The PJM data appears to provide high-level system mapping for modeling purposes and is less spatially accurate. More often, the HIFLD Open Data follows transmission line locations and right-of-way scarring visible through aerial imagery. For mapping purposes, Kimley-Horn utilized HIFLD Open Data and made necessary adjustments based on field visit results.

In addition, the County provided a zipped geodatabase on 5/24/2024 with the following layers for Kimley-Horn's use:

- Existing substation parcels
- Existing data center parcels
- Data center buildings

Kimley Horn compared the County's substation parcel dataset against the HIFLD data and found that the HIFLD data was more complete. The County can update the substation parcel data set by intersecting the County substation parcels with the substations provided by Kimley-Horn.

Refer to Figure 1 below for the refined HIFLD Open Data mapping. The full-size map is included as Appendix 1. As shown, the existing high-voltage and extra-high voltage (HV/EHV) electric transmission infrastructure within Loudoun County consists primarily of 500-kV and 230-kV transmission lines and substations. The backbone of the transmission system in Loudoun are the 500-kV lines that run north-south through the County. There are two (2) 500-kV circuits that enter the county from the south and one (1) 500-kV circuit that enters from the north. The power is then stepped down and transmitted via 230-kV transmission lines throughout the County. The primary 230-kV transmission lines are located proximate to portions of the Washington and Old Dominion (W&OD) Trail, the Broad Run, Route 50, and through Data Center Alley adjoining Waxpool Road. Based on the HIFLD Open Data, there are currently approximately 37 miles of 500-kV transmission lines and 125 miles of 200-kV transmission lines within Loudoun County.

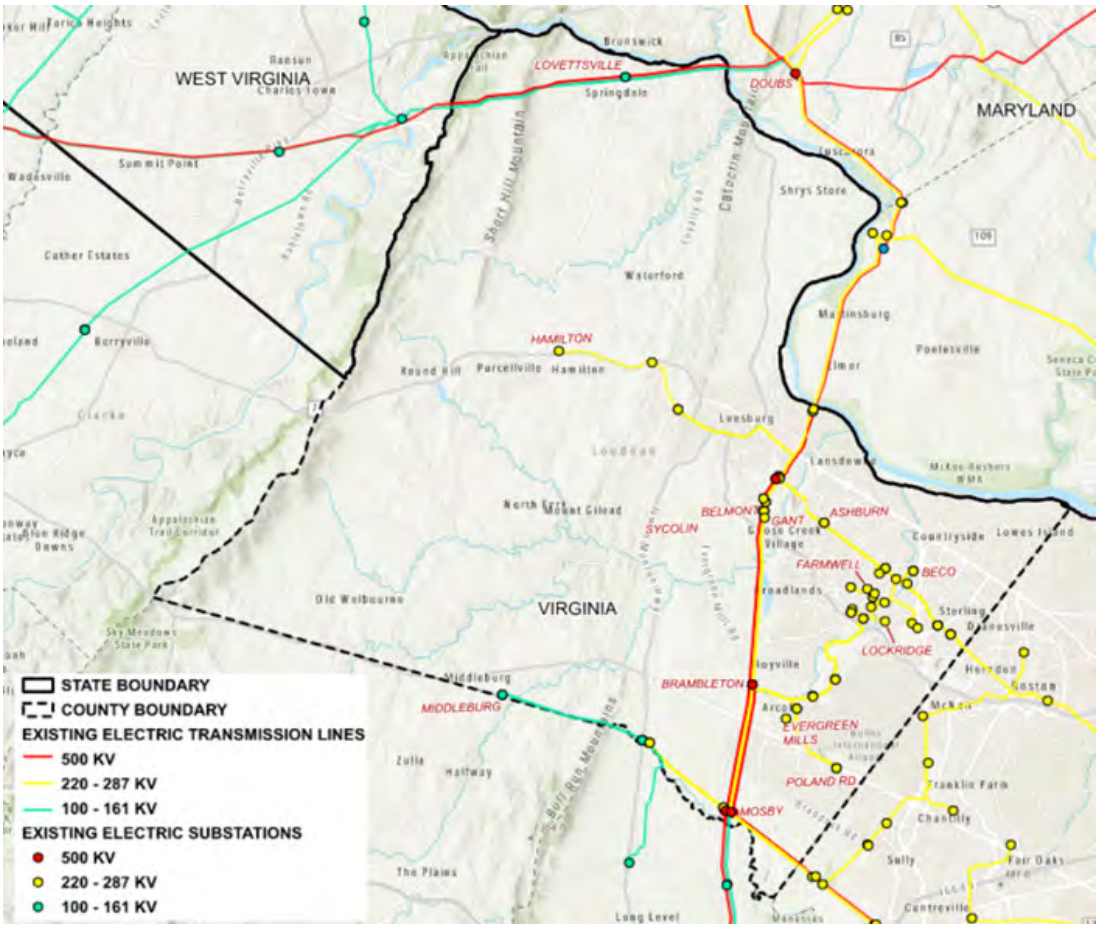



Figure 1: Existing Electric Transmission & Substations (HIFLD Modified

Although Kimley-Horn's assessment didn't include power generation facilities, it should be noted that both HIFLD Open Data and PJM data sets include one power generation facility within Loudoun County. Panda Stonewall Power is a natural gas-fueled generation station with a maximum operating capacity of approximately 800MW, located east of the Town of Leesburg.

## 2.4 Field Verification: Photo Location Map and Log

Kimley-Horn performed site visits to field verify the GIS data on April 17th and May 29th, 2024.

Refer to Appendix 2 for a photo location map and photo log from the site visits.

# 3. PROPOSED ELECTRIC GRID CAPACITY INCREASES

Kimley-Horn reviewed both PJM RTEP W3 as well as the Virginia SCC websites to document the proposed electric grid expansions within Loudoun County. PJM has selected a series of projects to meet the needs of the PJM system through 2028. There were total of 72 proposals submitted to PJM through the 2022 RTEP W3 process from 10 different entities. Refer to Figure 2 below for an overview of the major proposals selected by PJM.


*Source: PJM "Reliability Analysis Update" dated 12/5/2023*

Figure 2: Major Proposals Selected in 2022 RTEP Window 3

As shown, the proposal is a system wide need with only a portion of the planned upgrades sited in Loudoun County. Loudoun County is located within the Dominion zone of the PJM footprint (see Figure 3 below).

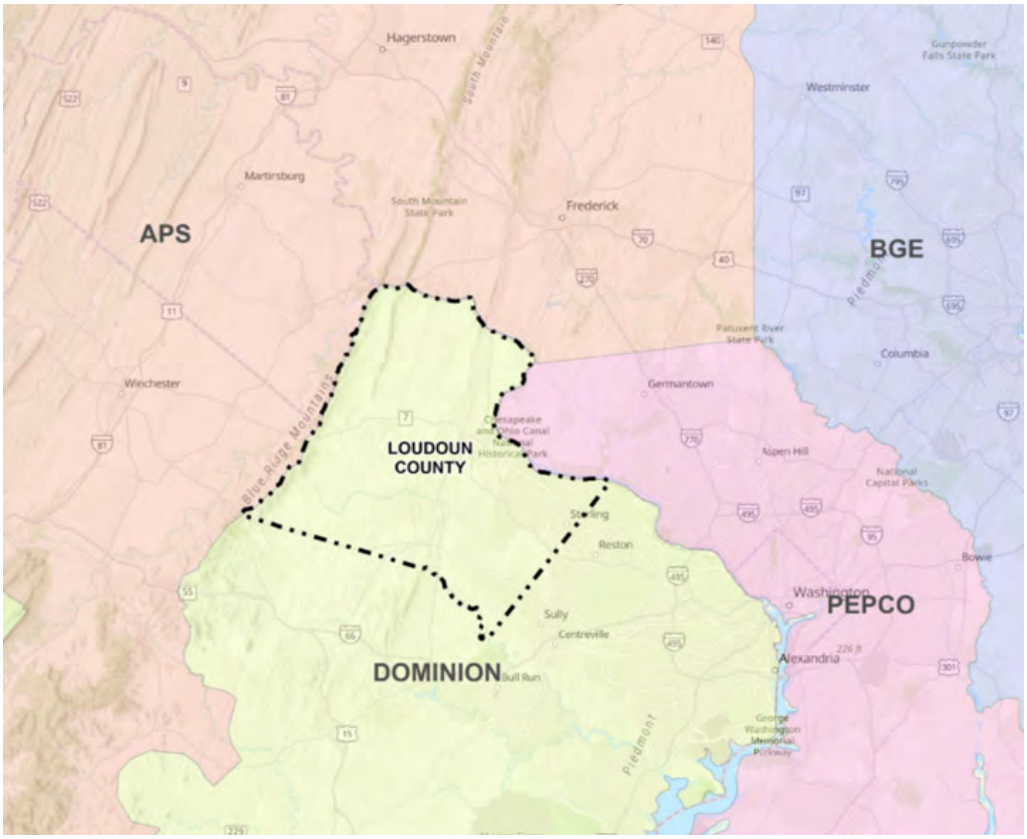



Figure 3: PJM Zones

Among the proposals PJM selected, several 230kV and 500kV projects located within Loudoun County. Kimley-Horn is serving as a consultant to support Loudoun County in the review of the following approved and active projects:

- Dominion Energy Virginia's Proposed 500-230kV Aspen to Golden Transmission Line ("500-230kV Aspen to Golden")
- Dominion Energy Virginia's Proposed 230kV Apollo to Twin Creeks Transmission Line, and Twin Creeks, Sycolin Road, Starlight, Lunar, and Apollo Substations ("230kV Apollo to Twin Creeks")
- Dominion Energy Virginia's Approved 500-230kV Wishing Star Substation, 500-230kV Mars to Wishing Star Line, 500-230kV Mars Substation, and 230kV Mars Loop ("500-230kV Mars to Wishing Star")
- Dominion Energy Virginia's Proposed 500-230kV Golden to Mars Transmission Line ("500-230kV Golden to Mars")
- NextEra's Proposed 500kV Woodside to Aspen Transmission Line ("500kV Woodside to Aspen")

These projects are further detailed in the subsections below.

## 3.1 Virginia State Corporation Commission

Transmission facilities above 115kV being proposed in the state of Virginia typically require the issuance of a CPCN from the Virginia SCC. Project proposal documents for such cases are available on the SCC's online portal.

On 5/14/24, Kimley-Horn reviewed the list of current proposed electric transmission line projects available on the SCC's online portal under Northern Virginia. Refer to Appendix 3 for the full list of Northern Virginia projects available on 5/14/2024. Kimley-Horn digitized the projects on this list located within Loudoun County, summarized in Table 1 below. Refer to Appendix 4 for an overview map. Note: the maximum (zoomed in) scale range for this data is 1:5,000.

**Table 1: Virginia SCC Projects in Loudoun County**

| SCC Case No. | Project Name | SCC Status[1] | SCC Disposition[1] |
|---|---|---|---|
| PUR-2019-00128 | Loudoun-Ox 230 kV Transmission Line Partial Rebuild | Closed | Approved |
| PUR-2019-00191 | Evergreen Mills 230 kV Line Loop and Switching Station Project | Closed | Approved |
| PUR-2019-00215 | Lockridge 230 kV Line Loop and Lockridge Substation Project | Closed | Approved |
| PUR-2021-00100 | Beaumeade-Belmont 230 kV Transmission Line #227 Reconductor & Partial Rebuild | Closed | Canceled |
| PUR-2021-00276 | Doubs-Goose Creek 500 kV Transmission Line #514 Partial Rebuild | Closed | Decision Rendered |
| PUR-2021-00280 | DTC 230 kV Line Loop and DTC Substation | Closed | Granted |
| PUR-2022-00012 | Aviator 230 kV Line Loop and Aviator Substation | Closed | Approved |
| PUR-2022-00027 | Farmwell-Nimbus 230 kV Line | Closed | Approved |
| PUR-2022-00183 | 500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop | Closed | Decision Rendered |
| PUR-2022-00197 | 230 kV Altair Loop and Altair Switching Station | Closed | Decision Rendered |
| PUR-2024-00032 | 500-230kV Aspen Substation, 500 kV Aspen-Goose Creek Line #5002, 500 kV and 230 kV Aspen-Golden Lines #5001 and #2333, 500-230 kV Golden Substation, and Lines #2081/#2150 Loop | Active | - |
| PUR-2024-00044 | 230 kV Apollo-Twin Creek Lines and Twin Creeks, Sycolin Creek, Starlight, Lunar, and Apollo Substations | Active | - |

*Footnotes: 1. SCC Status and SCC Disposition sourced from Virginia SCC's website on 6/28/2024.*

Among the projects listed above, the County requested Kimley-Horn focus on the following 3 projects proposed or under construction by Dominion Energy Virginia:

- 500-230kV Mars to Wishing Star (PUR-2022-00183)
- 500-230kV Aspen to Golden (PUR-2024-00032)
- 230kV Apollo to Twin Creeks (PUR-2024-00044)

Refer to Figure 4 for an overview map of the referenced projects.

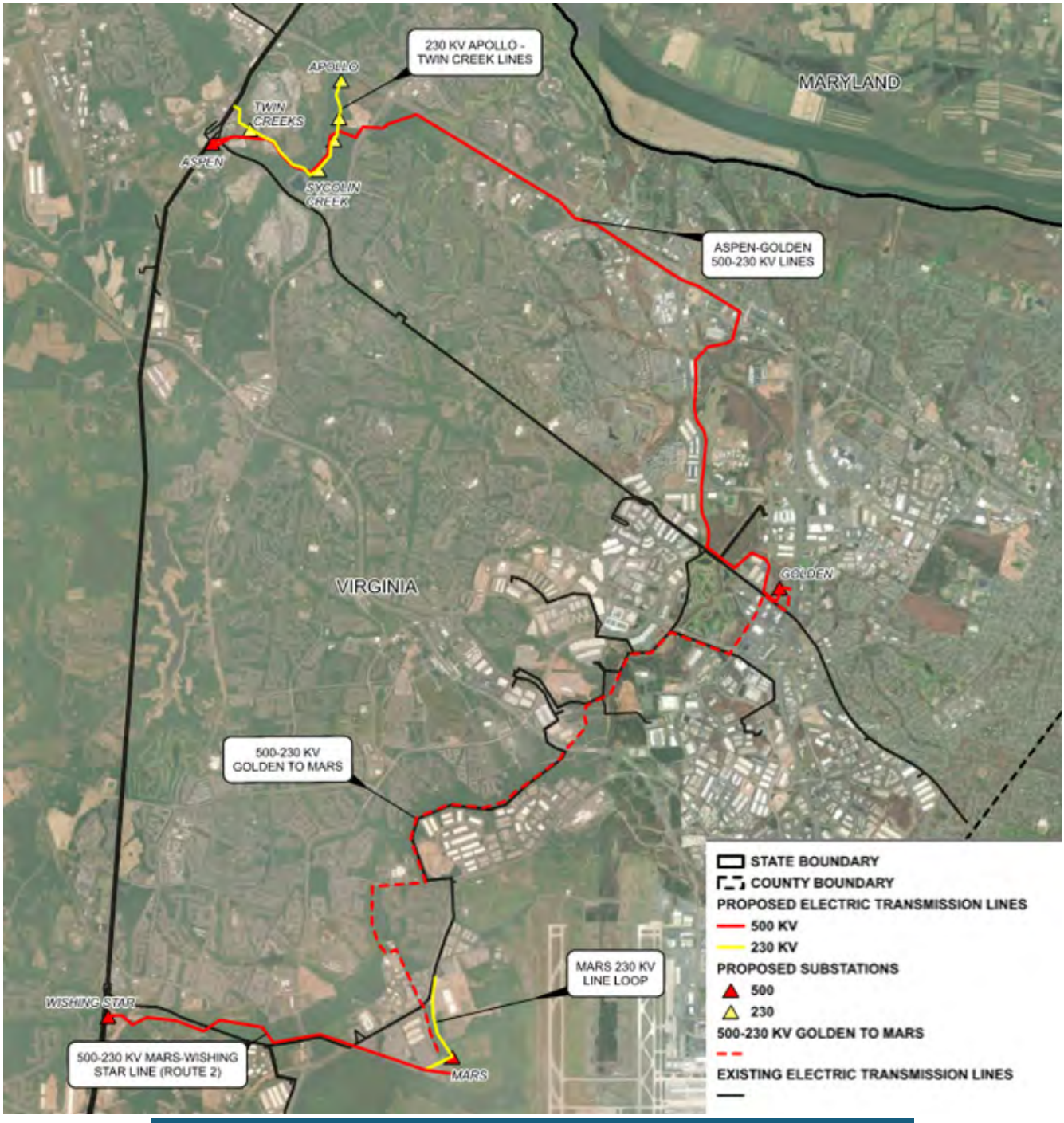


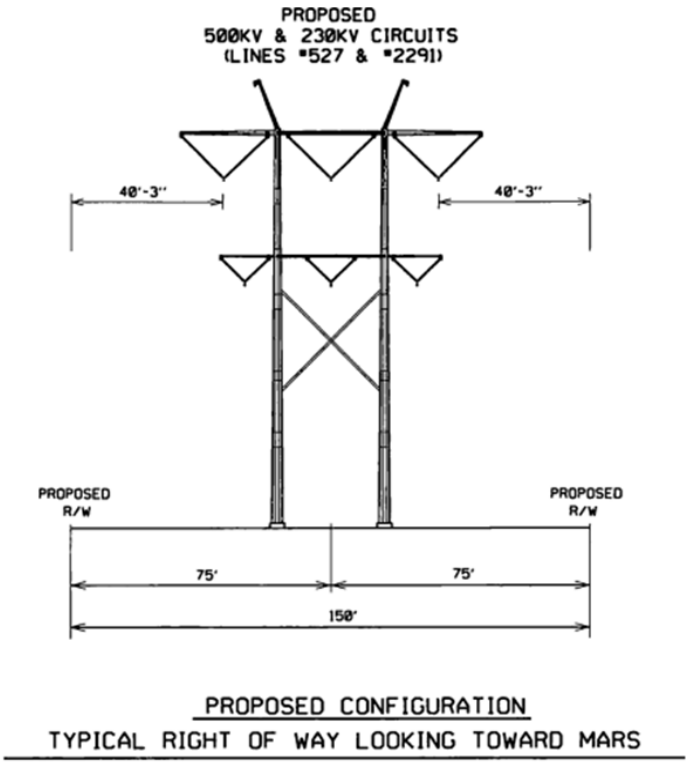

Figure 4: Overview Map

A high-level description of each of these projects is provided in the subsections below.

### 3.1.1 500-230KV Mars to Wishing Star (PUR-2022-00183)

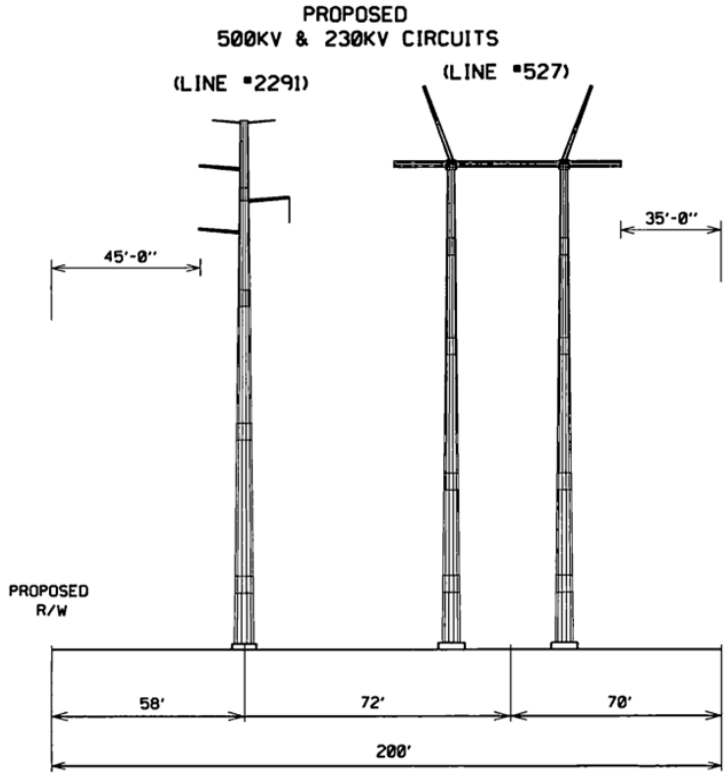
The 500-230kV Mars to Wishing Star Project was approved by the SCC on April 5, 2023 and consists of the following:

- Two new 500-230kV substations
  - » Wishing Star Substation
    - › Within existing Dominion-owned right-of-way and property obtained by Dominion (approximately 41 acres)
    - › Cut-in of Dominion's existing overhead 500kV Brambleton-Mosby Lines to feed the substation
  - » Mars Substation
    - › Within property obtained by Dominion (approximately 22 acres)
- Mars-Wishing Star Lines
  - » Approximately 3.55 miles of overhead 500kV single circuit transmission line with 230kV single circuit transmission line underneath
  - » New right-of-way, predominantly 150-feet wide (for 2.67 miles of the total 3.55 miles)
  - » Three segments will require additional right-of-way
  - » Primarily dulled galvanized steel double circuit three-pole or two-pole H frame structures
  - » Summer transfer capabilities of the 500kV and 230kV lines are 4,357 MVA and 1,573 MVA, respectively
  - » Refer to Figure 5 and Figure 6 below for the preliminary right-of-way configurations and tower arrangements included in the SCC filing. Based on Kimley-Horn's experience, the tower configurations shown are likely ~120' to 150' and ~85' to 120' in height, respectively.
- Mars 230kV Loop
  - » Approximately 0.57 mile
  - » From Mars Substation to cut in locations along Dominion's existing 230kV Cabin Run-Shellhorn Road Line and 230kV Poland Road-Shellhorn Road line
  - » Two new overhead 230kV double circuit lines
  - » New two pole double circuit structures to be installed within the existing right-of-way and Mars 230kV loop installed on the new 160-foot-wide right-of-way
  - » Supported by dulled galvanized steel double circuit monopoles and two-pole structures side-by-side
  - » Refer to Figure 7 below for the preliminary right-of-way configuration and tower arrangement included in the SCC filing. Based on Kimley-Horn's experience, this tower configuration is likely ~85' to 120' in height.
- Line protection upgrades at end substations and existing Brambleton, Cabin Run, Mosby, Shellhorn Road, Celestial, and Sojourner Substations.



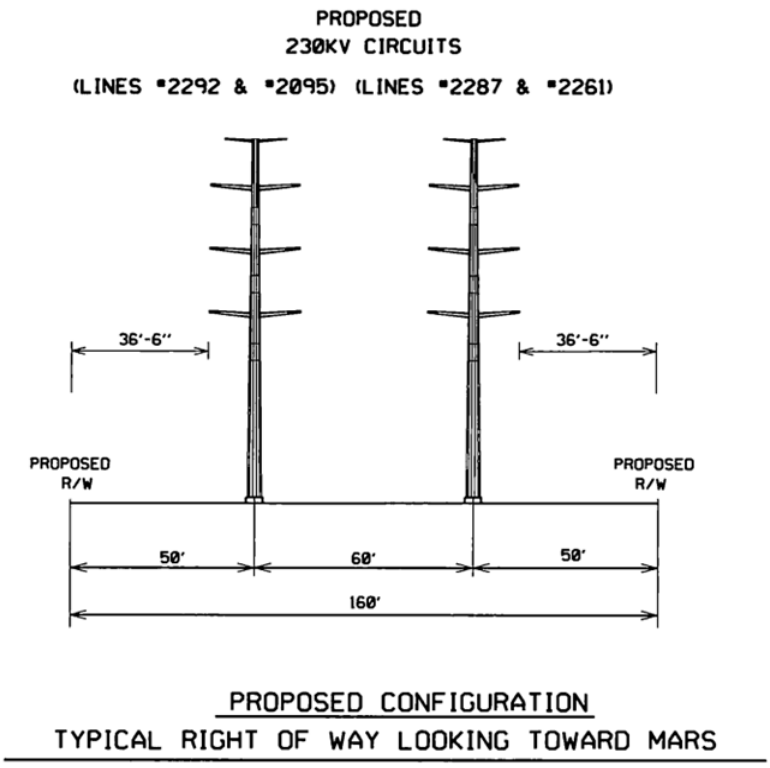

*Source: Virginia SCC (eFiling Case No. PUR-2022-00183 dated 10/27/2022)*

Figure 5: Mars-Wishing Star Line Preliminary Configuration (150-foot Right-of-Way)




*Source: Virginia SCC (eFiling Case No. PUR-2022-00183 dated 10/27/2022)*

Figure 6: Mars-Wishing Star Line Preliminary Configuration (200-foot Right-of-Way)




*Source: Virginia SCC (eFiling Case No. PUR-2022-00183 dated 10/27/2022)*

Figure 7: Mars 230kV Loop Preliminary Configuration

According to the SCC filing, there is an immediate need for the Mars to Wishing Star Project to maintain and improve service to customers in the Eastern Loudoun Load Area, inclusive of the Data Center Alley (DCA).

The estimated cost of the Mars to Wishing Star Project is approximately $715.7 million, including transmission and substation work. The in-service target date is December 31, 2025.

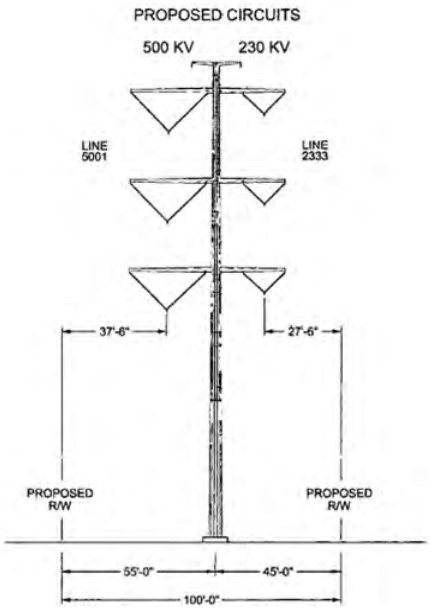
### 3.1.2 500-230KV Aspen to Golden (PUR-2024-00032)

The 500-230kV Aspen to Golden Project is an active project and is scheduled for an SCC Evidentiary Hearing September 2025. The proposed project consists of the following:

- Two new 500-230kV substations
  - » Aspen Substation
    - › Constructed entirely on property owned by Dominion
  - » Golden Substation
    - › New property
- Cut-in of Dominion's existing overhead 500kV Brambleton-Goose Creek Line to feed the proposed Aspen Substation

- 0.2 mile of 500 kV single circuit transmission line from the proposed Aspen substation to the existing Goose Creek substation
  - » Within property owned by Dominion or existing right-of-way
  - » One 500 kV single circuit monopole structure
  - » Three-phase triple-bundled 1351.5 Aluminum Conductor Steel Reinforced conductors
  - » 4,357 MVA summer transfer capability
- Upgrades at the existing 500kV Goose Creek Substation
- 9.4-mile line from Aspen to Golden (500kV AC overhead with 230kV underneath)
  - » New right-of-way
  - » Right-of-way will vary between 100 and 150 feet wide
  - » 500kV line will consist of three-phase triple-bundled 1351.5 ACSR conductors; 4,357 MVA summer transfer capability
  - » 230kV line will consist of three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/ Trapezoidal Wire/High Strength (ACSS/TW/HS) type conductor; 1,573 MVA summer transfer capability
- Loop-in/loop-out Dominion's existing 230kV overhead Paragon Park-Sterling Park Lines to Golden Substation
  - » Three-phase twin-bundled 768.2 ACSS/TW/HS type conductor
  - » 1,573 MVA summer transfer capability

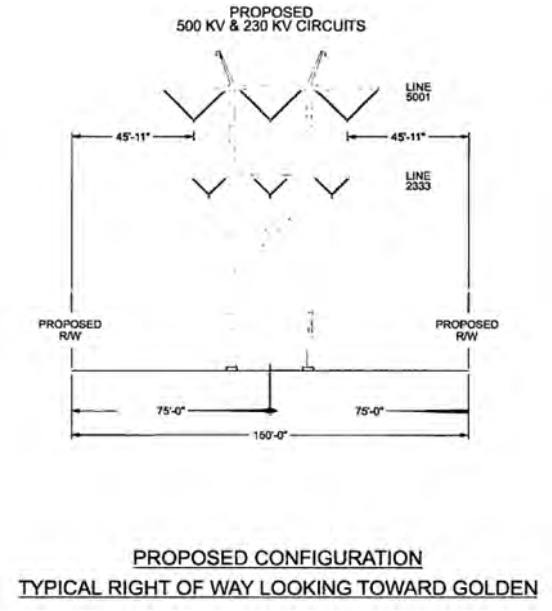
Refer to Figure 8 and Figure 9 below for the preliminary right-of-way configurations included in the SCC filing for the proposed Aspen to Golden lines. Based on Kimley-Horn's experience, these tower configurations are likely ~130 to 160' and ~120' to 150' in height, respectively.




PROPOSED CONFIGURATION
TYPICAL RIGHT OF WAY LOOKING TOWARD GOLDEN

*Source: Virginia SCC (eFiling Case No. PUR-2024-00032 dated 3/7/2024)*

Figure 8: Aspen to Golden Preliminary Configuration (100-foot Right-of-Way)




*Source: Virginia SCC (eFiling Case No. PUR-2024-00032 dated 3/7/2024)*

Figure 9: Aspen to Golden Preliminary Configuration (150-foot Right-of-Way)

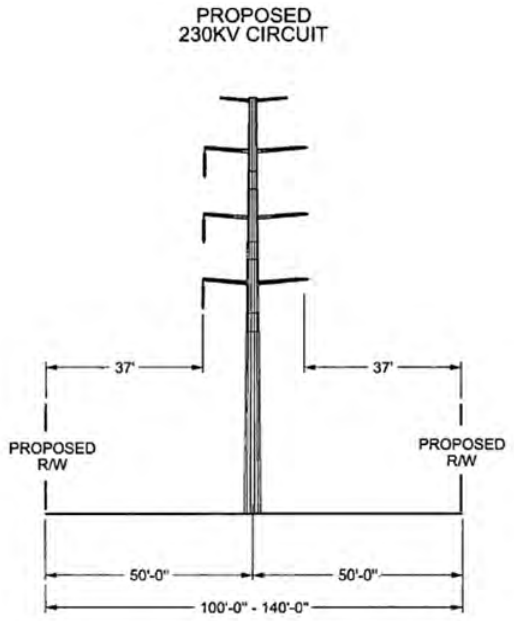
According to the documents filed with the SCC, the project cost is anticipated to be approximately $1 billion.

### 3.1.3 230KV Apollo to Twin Creeks (PUR-2024-00044)

The 230kV Apollo to Twin Creeks Project is an active project and is scheduled for an SCC Evidentiary Hearing September 2025. The proposed project consists of the following:

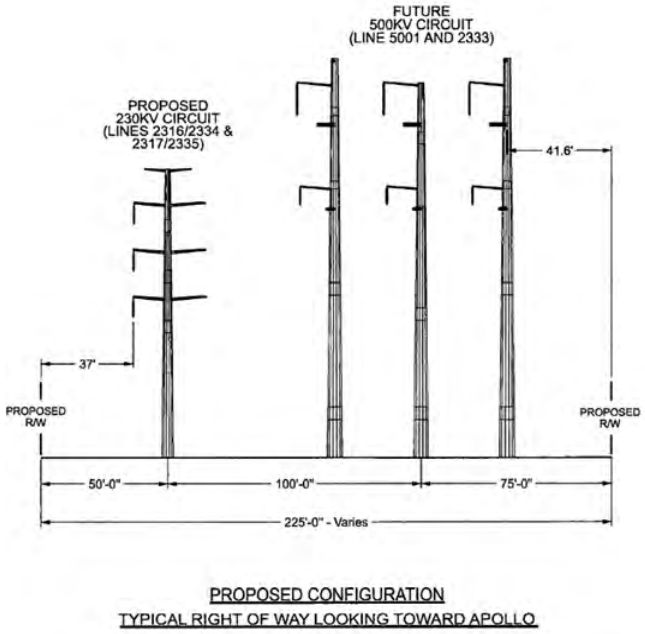
- Approximately 1.9 miles of new double circuit overhead 230kV transmission line
  - » Predominantly 100-foot-wide right-of-way
  - » Double circuit dulled galvanized steel monopoles
  - » 768.2 ACSS/TW/HS type conductor
  - » 1,573 MVA summer transfer capability
- Five new 230-34.5kV substations
  - » Twin Creeks Substation (4.7 acres)
  - » Sycolin Creek Substation (4.7 acres)
  - » Starlight Substation (4.5 acres)
  - » Lunar Substation (4.0 acres)
  - » Apollo Substation (5.0 acres)

Refer to Figure 10 below for the preliminary right-of-way configuration included in the SCC filing for the proposed 230kV Apollo-Twin Creeks line. For approximately 0.9 miles of the proposed routing, the Apollo-Twin Creeks line would be collocated with the proposed Aspen-Golden lines. Refer to Figure 11 below for the preliminary collocated right-of-way configuration included in the SCC filing.




*Source: Virginia SCC (eFiling Case No. PUR-2024-00044 dated 3/27/2024)*

Figure 10: Apollo-Twin Creeks Preliminary Configuration




*Source: Virginia SCC (eFiling Case No. PUR-2024-00044 dated 3/27/2024)*

Figure 11: Collocated 230kV Twin Creeks and Aspen-Golden Lines Preliminary Configuration

The SCC filing indicates that three customers located within the eastern Leesburg area in Loudoun County have requested service from Dominion to three new data center campuses. The filing notes that this project is needed to serve these customers along with the emerging load in the area (approximately 1,372 MW).

According to the SCC filing, Dominion is targeting an in-service date of September 30, 2028 for the proposed project, with a total estimated cost of $280.7 million.

It should be noted that on May 8th, the SCC combined this filing with Case No. PUR-2024-00032 (500-230kV Aspen to Golden, as described in the subsection above).

### 3.1.4 Summary of Dominion's Proposed Reliability Project

The projects listed below proposed or under construction by Dominion make up a transmission loop to supply power to the future load (e.g., data centers) within Loudoun County. The loop is the primary backbone of the transmission grid.

- 500-230kV Mars to Wishing Star (PUR-2022-00183)
- 500-230kV Aspen to Golden (PUR-2024-00032)
- 230kV Apollo to Twin Creeks (PUR-2024-00044)
- 500-230kV Golden to Mars (Not yet filed with SCC)

Based on our review of the SCC filings and publicly available information for the Dominion projects, the 500kV lines have a summer transfer capability of 4,357 MVA (or MW). The 230kV lines have a summer transfer capability of 1,573 MVA (or MW). Adding these together, you get a total summer transfer capability of 5,920 MVA (or MW). This value has slightly more capacity than PJM's projection of 5,700 MW. If data centers are built out to exceed this limit, it can be expected that additional transmission line projects will be required to meet the excess demand.

## 3.2 LandMARC

Loudoun County's online land management system (LandMARC) allows users to access public records related to permits and plans filed with the County. Kimley-Horn reviewed the list of plans that resulted from searching 'substation', filtering by 'Plan', and sorting by 'Apply Date' in descending order. Kimley-Horn utilized this list to digitize proposed substation plans from 2020 through April 2024, as summarized in Table 2 below. Refer to Appendix 5 for an overview map.

**Table 2: Substations Digitized from LandMARC (January 2020 to April 2024)**

| Substation | Reference LandMARC Plan Number |
|---|---|
| NOVEC Northstar Substation | CMPT-2021-0012 |
| DTC Substation | CMPT-2022-0001 |
| NOVEC Southfork Substation | EPLAN-2023-0109 |
| Pebble Creek Substation | EPLAN-2023-0112 |
| Brambleton Business Campus Substation | EPLAN-2023-0116 |
| Pacific Corporate Park | EPLAN-2023-0135 |
| Stratus Substation | LEGI-2023-0071 |
| Arcola Grove | LEGI-2023-0090 |
| Ocean Court Substation | LEGI-2023-0111 |
| Autoworld Substation | PMTG-2023-0142 |

| Substation | Reference LandMARC Plan Number |
|---|---|
| Tuscarora Landbay 3 Substation | PMTG-2024-0033 |
| Celtic Substation | PMTG-2024-0080 |
| GSP Sterling Substation | PRAP-2023-0049 |
| Corscale VA2 Building 1 | STPL-2022-0012 |
| Prentice Substation | STPL-2023-0017 |

*Footnotes: 1. SCC Status and SCC Disposition sourced from Virginia SCC's website on 6/28/2024.*

## 3.3 Combined Proposed Electric Transmission Lines And Substations

Kimley-Horn combined the data digitized based on Virginia SCC and LandMARC. Refer to Appendix 6 for the combined existing electric transmission lines and substations overview map.

## 3.4 Proposed Projects (Pending Application with Virginia SCC)

Two of the proposals selected by PJM during the 2022 RTEP W3 in Loudoun County have not yet been filed with the Virginia SCC. These projects are further detailed in the subsections below.

- Dominion's 500-230kV Golden to Mars
- NextEra's 500kV Woodside to Aspen

### 3.4.1 500-230kV Golden to Mars

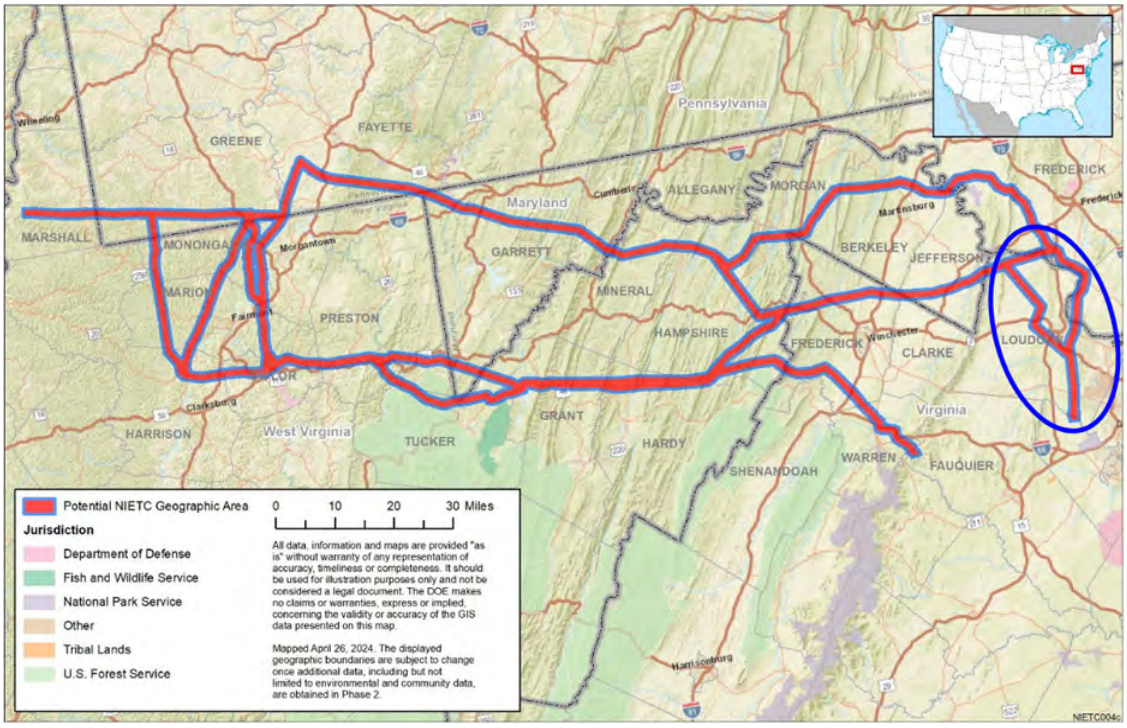
Dominion is still in the planning phase of the proposed 500-230kV Golden to Mars Project and is considering several route alternatives that include overhead and underground options. Refer to Figure 12 below for an overview map of the current route alternatives under consideration.


*Source: https://www.dominionenergy.com/projects-and-facilities/electric-projects/power-line-projects/nova*

Figure 12: Dominion 500-230kV Golden to Mars Route Alternatives

### 3.4.2 NextEra 500 kV Woodside to Aspen

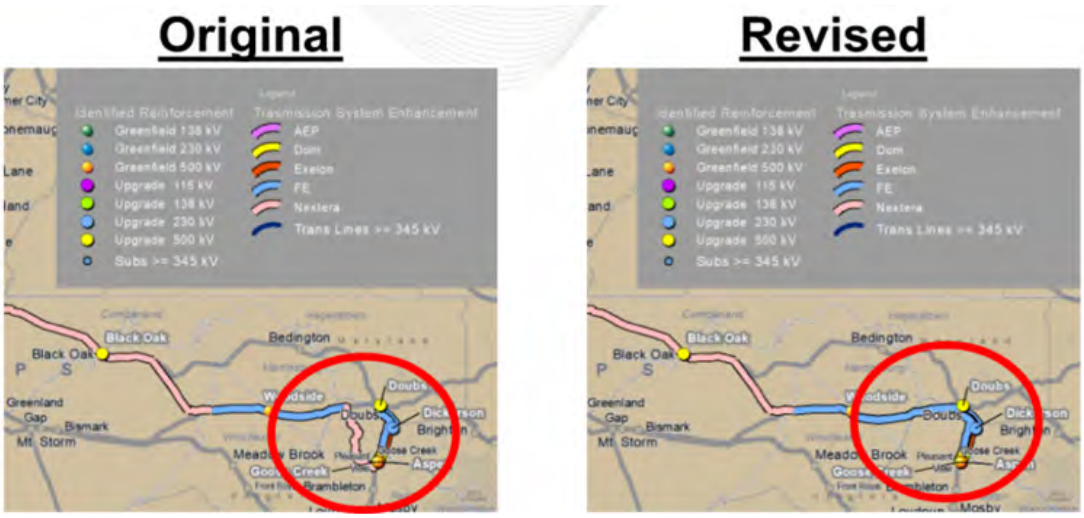
One of the proposals selected by PJM during the 2022 RTEP W3 is NextEra's 500kV overhead transmission line that would connect their planned Woodside Substation to Dominion's Aspen Substation. NextEra also applied for an NIETC designation with the DOE. Refer to Figure 13 below for the potential NIETC corridors under consideration by the DOE into Loudoun County.




*Source: U.S. Department of Energy Grid Deployment Office "Initiation of Phase 2 of National Interest Electric Transmission Corridor (NIETC) Designation Process: Preliminary List of Potential NIETCs" dated 5/8/2024*

Figure 13: Potential NIETC Buffer through Western Loudoun County

The original NextEra 500kV Woodside to Aspen proposal selected by PJM was for the greenfield route through western Loudoun. In July 2024, the PJM provided a planning update that revised the selected line to follow an alternate route within existing transmission line rights-of-way to Doubs substation and terminating at Goose Creek substation. Refer to Figure 14 below. PJM stated that this revision is the result of a "successful collaboration between NextEra and the incumbent Transmission Owners to determine the most feasible route and minimize area impact for the new Woodside to Aspen 500 kV line segment."




*Source: PJM "Planning Update" dated July 29, 2024*

Figure 14: PJM Modification to NextEra 500kV Woodside to Aspen

As part of Kimley-Horn's mapping effort, we have not mapped this route as it has not yet been filed with the SCC and the exact location is unknown.

# 4. POWER FOR DATA CENTER BUILD-OUT

Based on preliminary discussions with the County, there is a need to understand how the planned transmission projects from the PJM Regional Transmission Expansion Project will meet the current and proposed electric load within the County. To address this question, Kimley-Horn reviewed publicly available documentation to understand the intent of the PJM RTEP planned projects. Additionally, Kimley-Horn also reviewed Loudoun County records on data centers to better understand the buildout between 1990 and 2023 as it relates to electric load growth. While Kimley-Horn's analysis focused on data center load growth, it should be noted that increases in residential and building developments also contribute to increased electric loads.

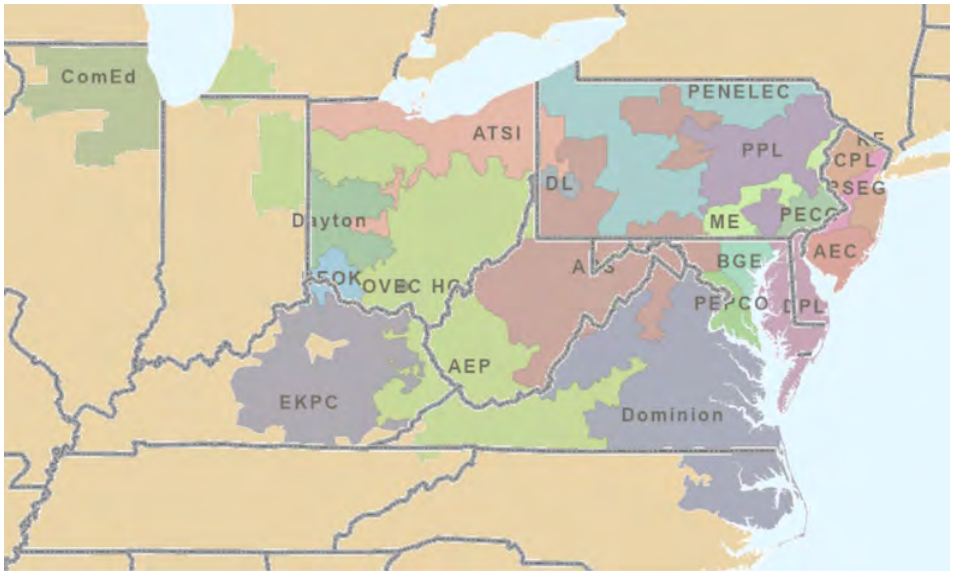
## 4.1 PJM – 2022 RTEP

To maintain system reliability, PJM's Regional Transmission Expansion Plan identifies future needs and transmission system upgrades required throughout the existing system. PJM's regular planning cycles allow utilities to submit their project proposals in response to the future needs identified by PJM. In 2022, PJM opened the 2022 RTEP Window 3 (W3) to address the growing demand from planned data centers in Virginia and Maryland and the announced fossil-fuel generation retirements within the PJM footprint. PJM's PowerPoint titled, "Reliability Analysis Update" dated December 5, 2023, notes that there is "unprecedented data center load growth (~7,500 MW) forecast by 2027-2028 in Dominion (Northern Virginia) and APS (Doubs) zones" and "11,100 MW deactivation announced."

Additionally, PJM issued a report titled, "Reliability Analysis Report – 2022 Window 3" dated December 8, 2023 (https://www.pjm.com/committees-and-groups/committees/teac), which documents the recorded and forecasted summer zonal loads through 2028. As shown in Table 3, it is projected that there will be approximately 5,700 MW of additional data center load in the Dominion zone by 2028. The forecasts were developed based on PJM consultations with the Transmission and Distribution Owners in the area. Refer to Figure 15 for an overview map of the transmission zones within the PJM territory. As shown, the Dominion zone covers the southeast region of the PJM territory.

**Table 3: PJM Window 3 - 2027/28 Case Summer Zonal Load for Dominion and FirstEnergy**

| | Summer Zonal Load (MW) |
|---|---|
| **Study Case** | **Dominion/NOVEC** |
| 2022 Peak | 20,424 (forecast)/21,156 (actual) |
| 2027 RTEP | 23,681 |
| 2027 Baseline | 26,393 |
| 2027 High Load Growth | 28,893 |
| 2028 RTEP (2023 Load Forecast) | 28,705 |
| Data Center Component Load (modeling in cases) | ~5,700 |




*Source: https://www.pjm.com/library/maps*

Figure 15: Transmission Zones within PJM Territory

PJM has also requested and received updated near and long-term forecast input from Dominion and other utility providers for data center load growth projections up to and including 2038 which is estimated at between 4.2% and 5.5% annual load growth. Much of the replacement generation from the deactivations will come from that area east of Peach Bottom Substation and west of Doubs Substation. Refer to Figure 16: Peach Bottom and Doubs Substations below for the location of the Peach Bottom and Doubs Substations as it relates to the Dominion territory.

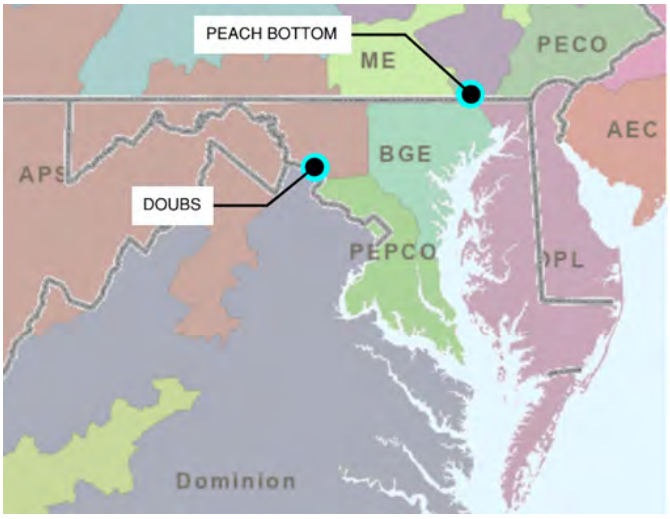



Figure 16: Peach Bottom and Doubs Substations

## 4.2 Data Center Growth in Loudoun County 1990 - 2023

### 4.2.1 Data Center History in Loudoun County

Kimley-Horn reviewed the County's GIS records for existing data centers provided in May 2024 to better understand the data center growth in the area over the past several decades. The GIS data included information on the location of the data centers permitted within the County and the date of initial building permit.

Kimley-Horn reviewed the dataset and graphed the existing data centers that had a date recorded for the initial building permit through the end of December 2023 (162 data center buildings). The data shows that Loudoun County has experienced rapid data center growth over the past 30 years. The first data center was installed in Loudoun County in 1997. Between 1997 and 2023, on average there were approximately 6 data centers permitted per year within the County. Between 2014 and 2023, the County average increased to approximately 14 data centers permitted per year.

Figure 17 shows existing data centers within Loudoun County through 2023. Refer to Appendix 7 for a full-size map.

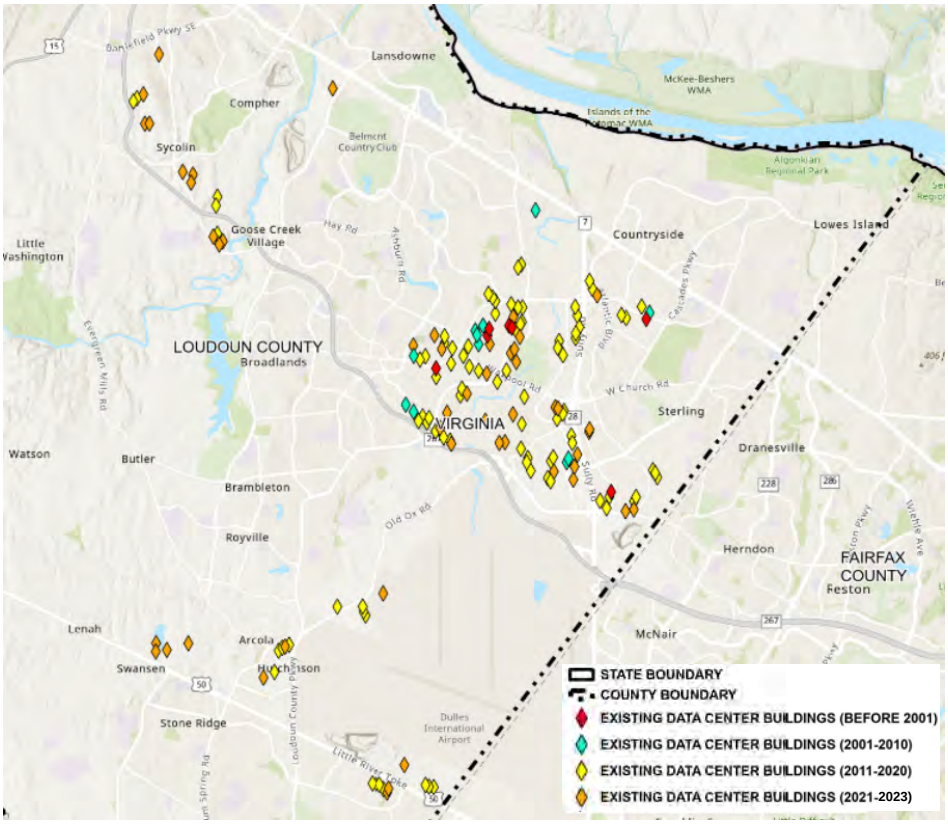



Figure 17: Data Centers in Loudoun County through 2023

As shown in Figure 18, the data centers permitted were broken into periods to illustrate the growth over time. This high concentration of data centers in Loudoun County is now often referred to as "data center alley." Figure 18 below shows a chart of the data centers permitted per year between 1997 and 2023.

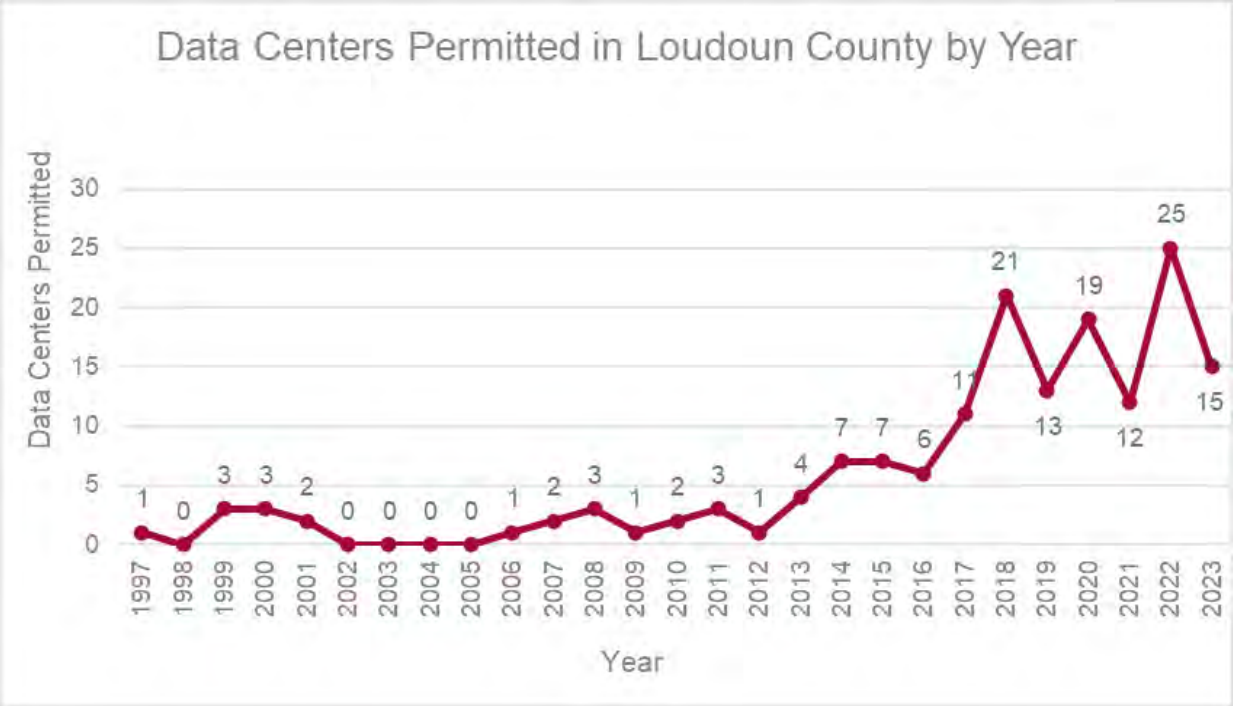



Figure 18: Data Centers Permitted in Loudoun County Per Year (1997-2023)

Utilizing the same data, a line of trend line was applied to statistically determine a forecasted growth rate through 2028. Refer to Figure 19 for the chart showing the trendline of forecasted data centers through 2028.

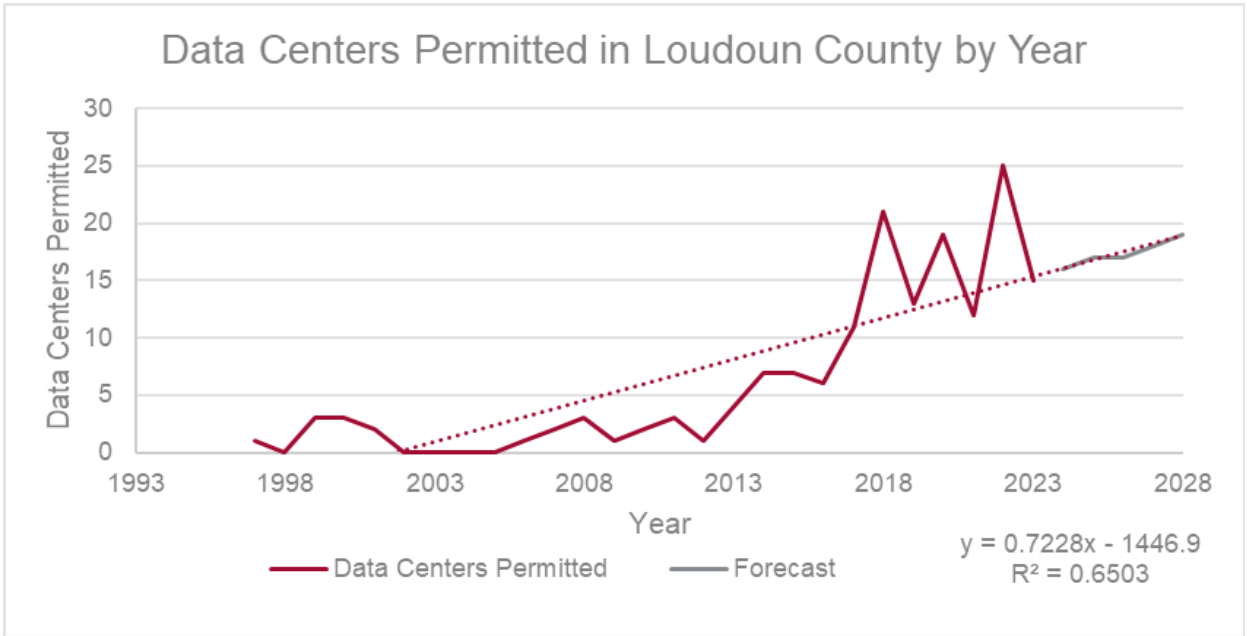



Figure 19: Forecasted Data Centers in Loudoun County per Year (through 2028)

Based on the line of best fit, it is estimated that on average there may be approximately 17 data centers permitted a year through 2028 for a total of 85 additional data centers (over 5 years). It should be noted that this is just a statistical representation and does not consider data center developers' plans, utility company input, or available land and resources.

### 4.2.2 Proposed Data Centers in Loudoun ("Pipeline Data Centers")

To determine if our preliminary data center growth projections are reasonable, Kimley-Horn conducted a more detailed analysis with the County's support. In July 2024, the County provided Kimley-Horn with a GIS layer that tracks data center applications to the County by parcel or property. This data set is referred to as the "Pipeline Data Center Parcel" layer and is intended to track data center applications on a parcel basis within Loudoun County. The applications that are tracked and submitted by a data center developer include the following:

**Legislative Applications**

- Legislative Land Development Application (LEGI)
- Zoning Map Amendment (ZMAP / ZRTD)
- Zoning Concept Plan Amendment (ZCPA)

**Administrative Applications (Site Plans)**

- Modified Process Site Plan (STMP)
- Site Plan (STPL)
- Engineering Plan (EPLAN)
- Site Plan Amendment (SPAM)

At the time of analysis in August 2024, there were 148 parcels within the pipeline dataset indicating developer interest in data center development on these lots. Of the 148 parcels, nearly half of them (i.e. 72 parcels) have submitted a site plan for the County's review. The parcels with an active site plan application are further along in the design and permitting process. The other 76 parcels in the pipeline dataset have not yet submitted a site plan showing the proposed data center building. Refer to Table 4 below for a summary table of the pipeline data center parcels.

**Table 4: Pipeline Data Center Parcels**

| | Pipeline Parcels with No Site Plan | Pipeline Parcels with Site Plan | Total |
|---|---|---|---|
| **Parcel Count** | 76 | 72 | 148 |
| **Total Acreage** | 713 | 1,828 | 2,541 |

The pipeline data center parcel layer by itself is only an indicator of the future buildout. It does not indicate how many future data centers may be built on any tract of land. Therefore, an effort was undertaken to digitize and georeference each of the proposed data center buildings that have a site plan. This was accomplished by utilizing the County's publicly available LandMARC system which houses current Loudoun County applications.

At the time of this writing, there are a total of 84 proposed pipeline data centers with a site plan filed with the County. The 84 proposed data centers are planned to be sited on 1,828 acres of land. The total approximate building footprint and gross floor area (GFA) are 13,586,800 SF and 29,616,077 SF, respectively. Refer to Appendix 8, for a table showing each proposed building by lot with additional information inclusive of application ID, parcel size, building size, proposed lot coverage, and floor area ratio (FAR).

The characteristics of the proposed 84 data centers are summarized in Table 5 below.

**Table 5: Pipeline Data Center Statistics**

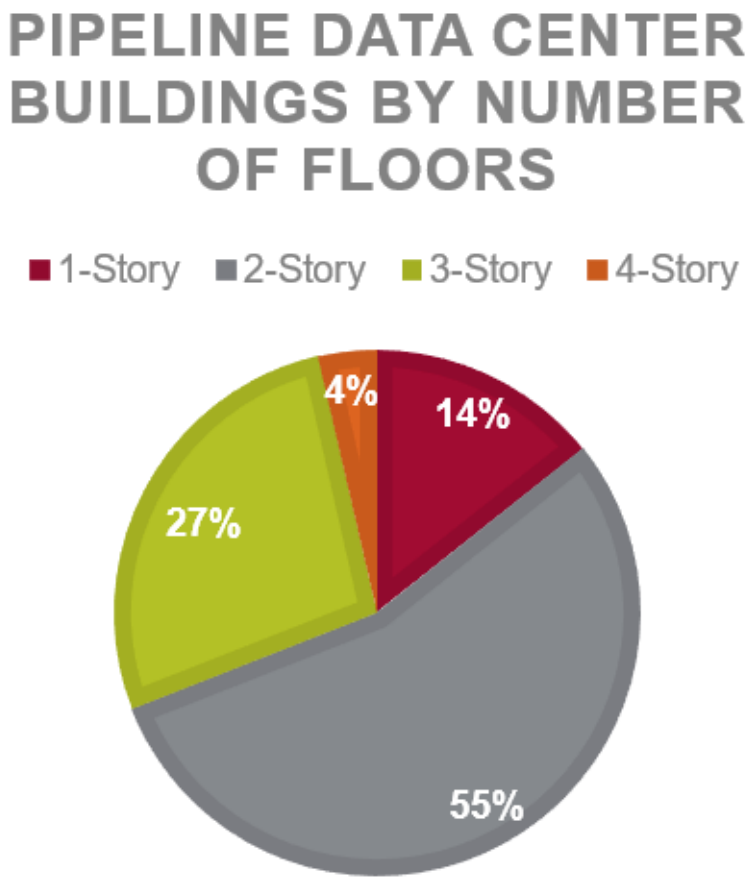
| | Maximum | Minimum | Average |
|---|---|---|---|
| **Building Height (FT)** | 100 | 19 | 64 |
| **Building Footprint (SF)** | 405,611 | 7,080 | 161,748 |
| **Gross Floor Area (SF)** | 1,216,875 | 14,160 | 352,572 |
| **Parcel Area per Building (AC)** | 54 | 6 | 21 |
| **Building to Lot Coverage** | 36% | 5% | 17% |
| **Floor Area Ratio** | 0.95 | 0.12 | 0.37 |

To determine the approximate quantity of data center buildings that will be developed on the pipeline parcels that don't have site plans, ratios from the site plan parcels are applied to the parcel acreage of the pipeline parcels with no site plan. For example, there are 713 acres of pipeline data center parcels with no site plan. Multiplying the 713 acres by the average floor area ratio of 0.37 results in 263.8 acres or 11,491,563 SF of gross floor area. Then dividing the gross floor area of 11,491,563 by the average gross floor area per data center building (i.e. 352,572 SF) results in approximately 33 data center buildings for the pipeline parcels with no site plan. Refer to Appendix 9 for a table of the pipeline data center parcels that don't have site plans. The table contains application IDs, parcel numbers, and parcel areas.

Based on actual land applications and developer plans, our projections estimate that there are approximately 117 data center buildings in the pipeline. Data center developers are applying for site plans and seeking legislative approvals for data center buildings at a faster rate than historical trends.

Additionally, when comparing the pipeline data center parcels that have site plans against ones that don't, certain trends are becoming evident. For example, teardowns of existing structures are becoming more common as key land near electrical infrastructure is becoming developed. Therefore, the parcels later in the data center development pipeline (i.e. without site plans) are more often finding land that requires redevelopment rather than greenfield sites. Statistically 30% of parcels with a site plan require redevelopment while 59% of parcels without a site plan require redevelopment.

Another trend that is becoming apparent is that the data center developers are building vertically to maximize the use of space as more confined parcels are being developed or redeveloped. The pipeline parcels with site plans are on average building a single data center building on 22 acres of land. The pipeline parcels without a site plan (i.e. later development stage) are on average building a single data center building on 9 acres of land. The natural progression is to build vertically. Refer to the pie chart below which shows that the majority of pipeline data centers are multi floor structures.




For additional information regarding the location of proposed data center buildings and the proposed transmission lines in the County, refer to Appendix 10. As shown, additional 500kV and 230kV transmission lines and substations are being sited throughout Loudoun to support the growth of the proposed data centers and the associated increased electrical demand.

### 4.2.3 Load Growth Projections in Loudoun County

Based on PJM's forecast, a summer peak load of 5,700 MW is anticipated for data centers in the Dominion/NOVEC territory in 2028. If it is assumed that the 117 data centers derived from the pipeline parcels will be constructed by 2028, it is uncertain whether the future forecast can accommodate the projected load growth in Loudoun County. It depends largely on how much power each of the data centers draws. One applicant specified on their application the power requirements of the future data center buildings. Application EPLAN-2024-0036 indicated that two 1-story buildings will require 67 MW, one 2-story will require 68 MW and another 2-story will require 109 MW. It should be noted that this application is dated 2024 and is one of the more recent developments. The power usage from application EPLAN-2024-0036 is in line with representing current trends for electrical demands for large data centers greater than 100,000 SF building footprint (https://dgtlinfra.com/data-center-power/). As indicated in the referenced article, a typical large 'hyperscale' data center building (>100,000 SF) typically requires 20-100+ MW of power.

If each of the 117 pipeline data centers utilized approximately 70 MW of power, that would result in approximately 8,190 MW. This would be greater than the 5,700 MW that was forecasted by the PJM resulting in the 2022 RTEP not meeting the needs of the area. The discrepancy between the Kimley-Horn projections and what was included in the PJM 2022 RTEP may have to do with available data at the time and trends in the data

center industry towards greater usage of electricity. Dominion forecasted an approximate load growth of 8,346 MW by 2028 in their analysis completed in 2024, which is more aligned with Kimley-Horn's forecasted projection for data center load growth. It is likely that Dominion is in the process of planning for the additional data center load growth with additional transmission projects to deliver power to Northern Virginia and the County.

It should also be noted that data center developers may not have requested power for areas where they are in the early stages of site plan approval or are the subject of an active legislative case before the County. In this case, the electric utility may not know that the developer is planning to interconnect until later in the process. At any rate, it should be expected that future transmission line expansion projects within the County will be needed to meet the local needs to serve data center uses. Additionally, when considering projections of data center energy demands through 2028, it is clear that current planned transmission infrastructure may not be sufficient for meeting future demand loads.

# 5. NEXT STEPS

Kimley-Horn recommends that the County proactively develop planning and policy measures to minimize the potential impacts on County resources and communities caused by future transmission infrastructure development. These recommendations include the following:

Develop constraints/exclusion mapping and identify preferred transmission corridors for future projects to minimize impacts on County resources and communities.

Develop a future scenario plan for the data center buildout in Loudoun County. The plan will be coordinated closely with electrical providers to align the development of transmission corridors with approved and planned data center growth, power needs, redundancy, and reliability. Kimley-Horn recommends that the plan focus on siting data centers near preferred transmission corridors to minimize additional electric infrastructure build-out..

Amend the County Comprehensive Plan to include electric transmission corridors to be utilized by power providers.

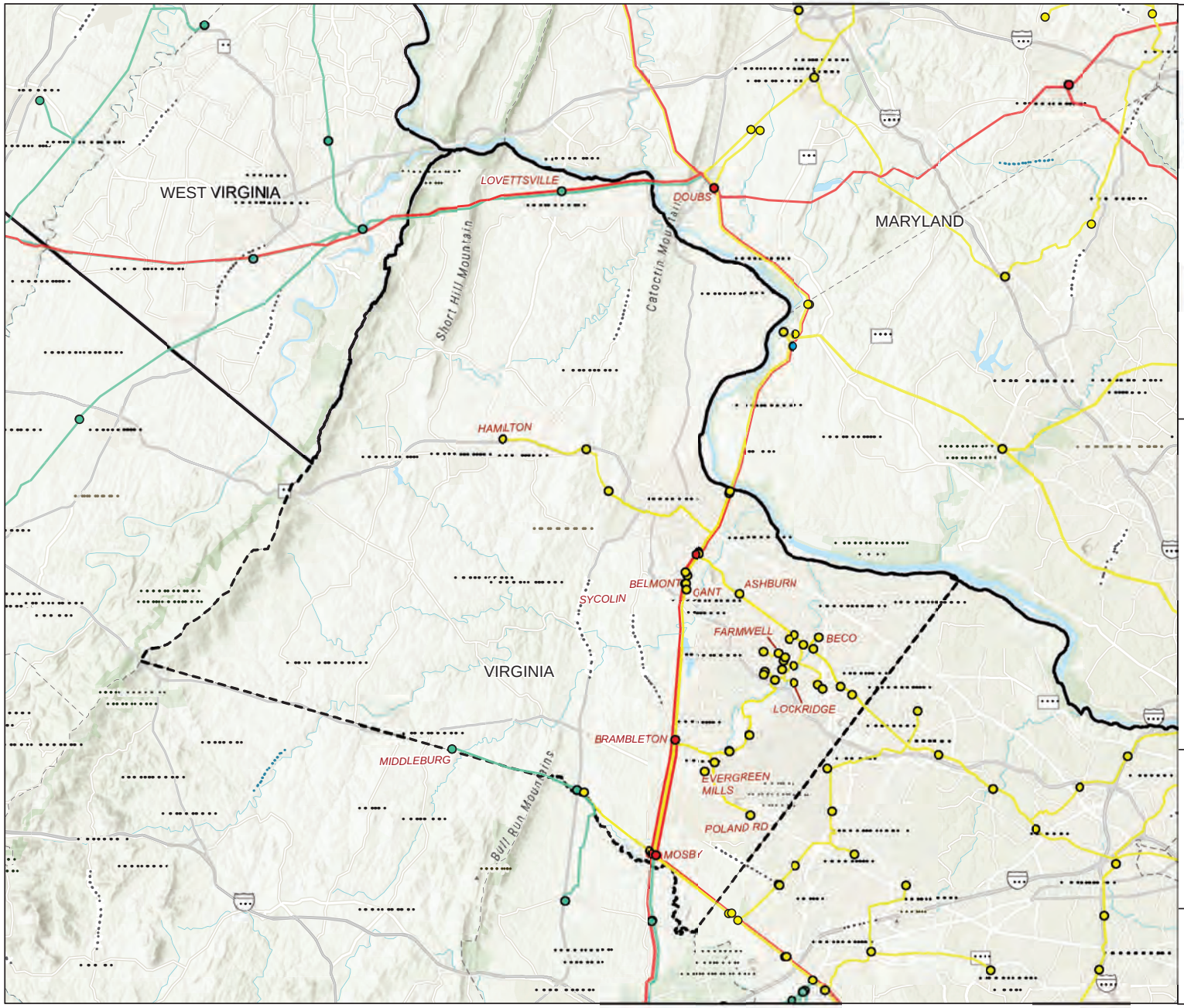
Develop potential language to support:

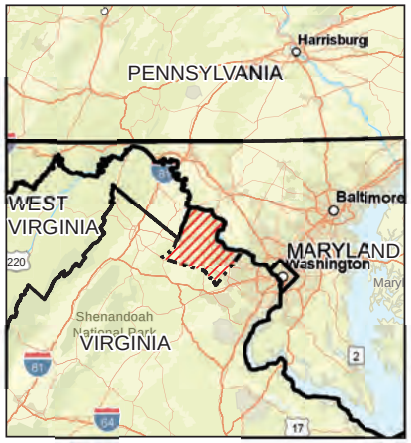
- Collocation of proposed transmission lines with existing infrastructure
- Underground power transmission within existing overhead transmission line easements.
- Underground power transmission for greenfield routes.
- Advanced reconductoring of existing transmission lines
- Existing transmission line capacity upgrades
- Behind the meter and other innovative solutions to meet usage needs.

These recommendations will allow the County to be more proactive in the approach of siting powerlines and ultimately limit the impacts on the community by new overhead transmission lines in high-conflict areas.

## Appendix 1:

# EXISTING ELECTRIC TRANSMISSION AND SUBSTATIONS (HIFLD)




= LOUDOUN COUNTY

**LOCATION MAP**

**STATE BOUNDARY**

**COUNTY BOUNDARY**

**EXISTING ELECTRIC TRANSMISSION LINES**

- 500 KV
- 220 - 287 KV
- 100 - 161 KV

**EXISTING ELECTRIC SUBSTATIONS**

- 500 KV
- 220 - 287 KV
- 100 - 161 KV

NOTES:

1. EXISTING DATA COLLECTION REFERENCED FROM HIFLD OPEN DATA (HTTPS://HIFLD-GEOPLATFORM.HUB.ARCGIS.COM)

2. DATA GATHERED FOR THIS EFFORT WAS COLLECTED ON 5/30/2024

0 4 8 Miles

1 IN = 4 MILES

**LOUDOUN COUNTY, VIRGINIA**

**EXISTING ELECTRIC TRANSMISSION & SUBSTATIONS FROM HIFLD OPEN DATA AS OF MAY 2024**

Kimley»Horn

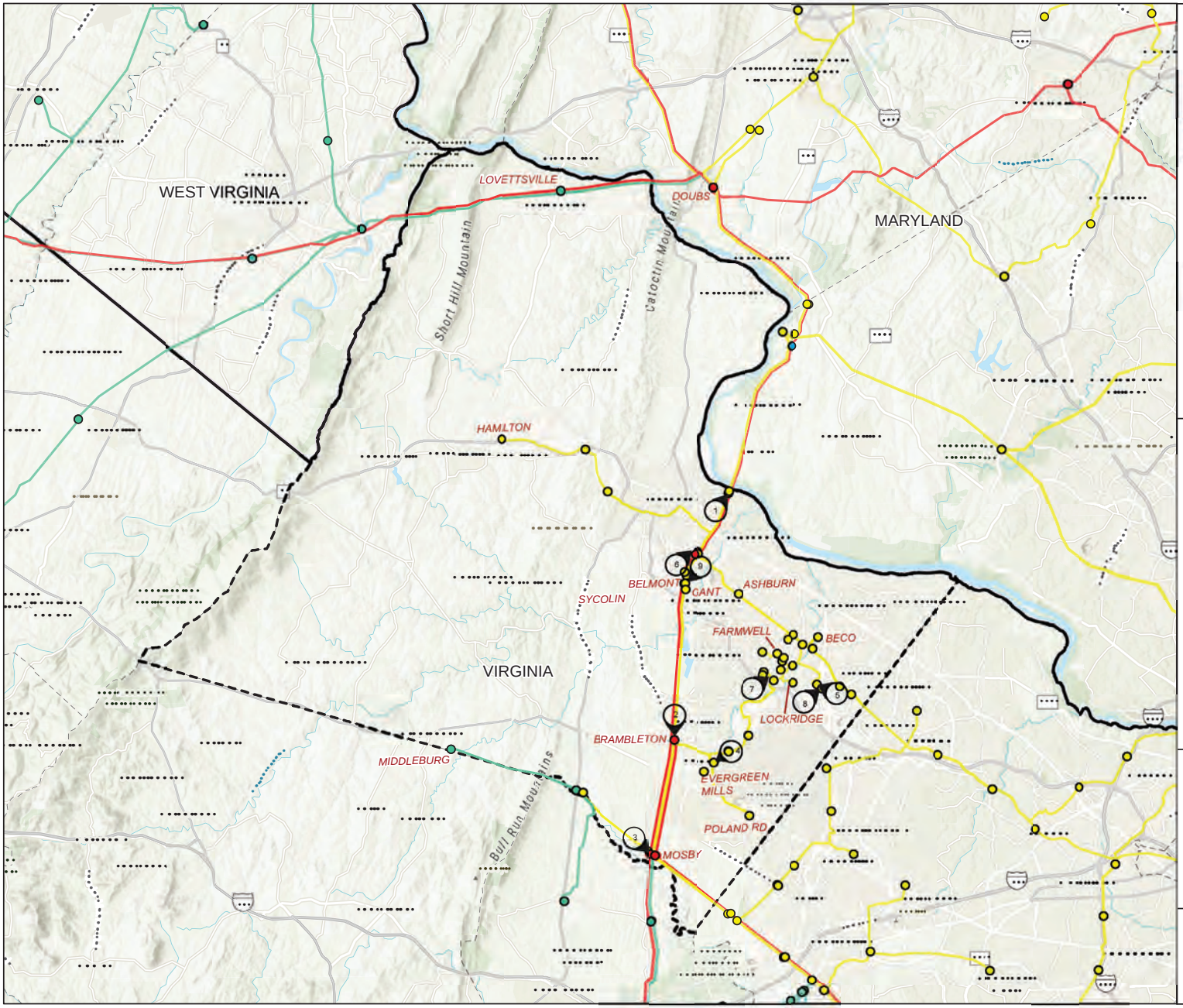
N

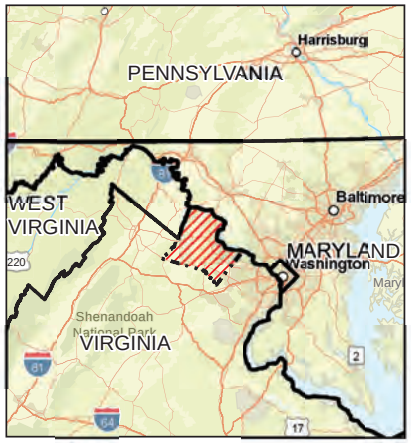
**DATE: 09-2024**

**FIGURE: 1**

## Appendix 2:

# FIELD VERIFICATION PHOTO LOCATION MAP AND LOG




= LOUDOUN COUNTY

**LOCATION MAP**

- STATE BOUNDARY
- COUNTY BOUNDARY
- PHOTO ORIENTATION

**EXISTING ELECTRIC TRANSMISSION LINES**

- 500 KV
- 220 - 287 KV
- 100 - 161 KV

**EXISTING ELECTRIC SUBSTATIONS**

- 500 KV
- 220 - 287 KV
- 100 - 161 KV

NOTES:

1. EXISTING DATA COLLECTION REFERENCED FROM HIFLD OPEN DATA (HTTPS://HIFLD-GEOPLATFORM.HUB.ARCGIS.COM)

2. DATA GATHERED FOR THIS EFFORT WAS COLLECTED ON 5/30/2024

3. PHOTOS WERE COLLECTED ON 04/17/2024 & 05/29/2024

0 4 8 Miles

1 IN = 4 MILES

# LOUDOUN COUNTY, VIRGINIA

## FIELD VERIFICATION PHOTO LOCATION MAP

Kimley»Horn

N

DATE: 09-2024

FIGURE: 1

Kimley»Horn
19775 Belmont Executive Plaza
Suite 250
Ashburn, VA 20147

# Loudoun County Power Study
## Photograph Sheet

KHA Job No.: 110062272
KHA Rep.: Carmine Parascandola
Date: April 17, 2024
Page: 1 of 5

Photo No. 1

Remarks: View of Existing 500kV and 230kV Transmission Lines along Proposed 500kV Line #514 Doubs-Goose Creek Partial Rebuild
Location: Near Edwards Ferry Rd
Orientation: Northeast

Photo No. 2

Remarks: View of Existing 500kV and 230kV Transmission Lines towards Brambleton Substation

Location: Near Evergreen Mills Rd
Orientation: South

Kimley»Horn
19775 Belmont Executive Plaza
Suite 250
Ashburn, VA 20147

# Loudoun County Power Study
## Photograph Sheet

KHA Job No.: 110062272
KHA Rep.: Carmine Parascandola
Date: April 17, 2024
Page: 2 of 5

Photo No. 3

Remarks: View of Existing Loudoun Substation

Location: Near Auburn Farm Rd, Aldie VA
Orientation: Southeast

Photo No. 4

Remarks: View of Existing Yardley Ridge Substation

Location: Loudoun County Pkwy, Sterling, VA
Orientation: Southwest

Kimley»Horn
19775 Belmont Executive Plaza
Suite 250
Ashburn, VA 20147

# Loudoun County Power Study
## Photograph Sheet

KHA Job No.: 110062272
KHA Rep.: Carmine Parascandola
Date: April 17, 2024


Photo No. 5

Remarks: View of Existing Pacific Substation

Location: Near Pacific Blvd, Sterling, VA
Orientation: Northwest

Photo No. 6

Remarks: View towards Existing Goose Creek Substation

Location: North of United Drive, Leesburg, VA
Orientation: Northeast

Kimley»Horn
19775 Belmont Executive Plaza
Suite 250
Ashburn, VA 20147

# Loudoun County Power Study
## Photograph Sheet

KHA Job No.: 110062272
KHA Rep.: Carmine Parascandola
Date: April 17, 2024
Page: 4 of 5

Photo No. 7

Remarks: View towards new-build Data Center and Existing 230kV Transmission Lines

Location: Loudoun County Pkway/Shellhorn Rd Intersection, Ashburn, VA
Orientation: Northeast

Photo No. 8


Remarks: View towards Existing Global Plaza Substation

Location: Relocation Dr
Orientation: Northeast

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19775 Belmont Executive Plaza
Suite 250
Ashburn, VA 20147

# Loudoun County Power Study
## Photograph Sheet

KHA Job No.: 110062272
KHA Rep.: Carmine Parascandola
Date: April 17, 2024
Page: 5 of 5

Photo No. 9

Remarks: View of Existing 500kV and 230kV Transmission Lines along Beaumade-Belmont 230kV Reconductor & Partial Rebuild
Location: Shreve Dr
Orientation: Southwest

## Appendix 3:

# VIRGINIA SCC - NORTHERN VIRGINIA RECENT TRANSMISSION LINE PROJECT LIST (AS OF 5/14/2024)

‹ Electricity

Transmission Line Projects

# Transmission Line Projects

Construction and operation of transmission lines and/or facilities above 115 kV in Virginia usually require the issuance of a Certificate of Public Convenience and Necessity (CPCN) from the State Corporation Commission. Staff guidelines on transmission projects that require a CPCN, and Guidelines of Minimum Requirements for Transmission Line Applications, are available among our guidance documents.

Information for all cases before the Commission is made available through the SCC's DocketSearch portal. Public comments related to Commission cases are accepted for a limited time. Cases for which comments are currently being accepted are listed on the Public Comments/Notices page.

## Recent transmission line cases sorted by region:

### NORTHERN VIRGINIA

- Dominion Energy Virginia
  - PUR-2024-00035 Stafford County and the City of Fredericksburg – Fredericksburg-Aquia Harbour Lines #29, #2104, and #2157 Partial Rebuild
    - Fredericksburg-Aquia Harbour Project Map
  - PUR-2024-00044 Loudoun County – 230 kV Apollo-Twin Creek Lines and Twin Creeks, Sycolin Creek, Starlight, Lunar, and Apollo Substations
    - Apollo-Twin Creeks Project Map
  - PUR-2024-00032 Loudoun County – 500-230 kV Aspen Substation, 500 kV Aspen-Goose Creek Line #5002, 500 kV and 230 kV Aspen-Golden Lines #5001 and #2333, 500-230 kV Golden Substation, and Lines #2081/#2150 Loop
    - Aspen-Golden Project Map
  - PUR-2024-00021 Prince William County – Daves Store 230kV Line Extension
    - Daves Store Project Map
  - PUR-2023-00049 Cities of Manassas and Manassas Park, Counties of Prince William and Fairfax – Clifton-Winters Branch (Line #2011) 230 kV Partial Rebuild
    - Clifton-Winters Branch Project Map
  - PUR-2023-00029 Prince William County – Possum Point 2nd Transformer and 230 kV Tie Line
    - Possum Point Project Map
  - PUR-2022-00198 Culpeper County – Cirrus - Keyser 230 kV Loop and Related Projects
    - Cirrus - Keyser 230 kV Project Map
  - PUR-2022-00197 Loudoun County – 230 kV Altair Loop and Altair Switching Station
    - Altair Project Map
  - PUR-2022-00183 Loudoun County – 500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop
    - Mars-Wishing Star Project Map
  - PUR-2022-00123 Fauquier and Prince William Counties – Line #183 (Bristers-Minnieville) Partial Rebuild
    - Line #183 Project Map
  - PUR-2022-00027 Loudoun County – Farmwell-Nimbus 230 kV Line
    - Nimbus 230 kV Line Project Map
  - PUR-2022-00012 Loudoun County – Aviator 230 kV Line Loop and Aviator Substation
    - Aviator 230 kV Line Loop Project Map
  - PUR-2021-00291 City of Manassas and Prince William County – Line #2011 230kV Line Extension from Cannon Branch to Winters Branch
    - Cannon Branch to Winters Branch Project Map
  - PUR-2021-00280 Loudoun County – DCT 230 kV Line Loop and DCT Substation
    - DCT 230 kV Line Loop Project Map

- PUR-2021-00276 Loudoun County – Doubs-Goose Creek 500 kV Transmission Line #514 Partial Rebuild
  - Doubs-Goose Creek Project Map
- PUR-2021-00100 Loudoun County – Beaumeade-Belmont 230 kV Transmission Line #227 Reconductor & Partial Rebuild
  - Beaumeade-Belmont Project Map
- PUR-2020-00198 - Fairfax County – Tysons-Spring Hill 230kV Underground Transmission Line & Substation Project
  - Tysons-Spring Hill Project Map
- PUR-2020-00080 Counties of Fauquier, Stafford and Spotsylvania - Bristers to Ladysmith 500KV Rebuild
  - Bristers-Ladysmith Project Map
- PUR-2019-00215 Loudoun County - Lockridge 230 kV Line Loop and Lockridge Substation Project
  - Lockridge Loop and Substation Project Map
- PUR-2019-00191 Loudoun County - Evergreen Mills 230 kV Line Loop and Switching Station Project
  - Evergreen Mills Loop and Switching Station Project Map
- PUR-2019-00128 Fairfax, Loudoun, and Prince William Counties – Loudoun-Ox 230 kV Transmission Line Partial Rebuild
  - Loudoun-Ox Partial Rebuild Project Map
- PUR-2019-00040 Arlington County and the City of Alexandria – Potomac Yards Undergrounding and Glebe GIS Conversion
  - Glebe-Potomac Rebuild and Undergrounding Project Map
- PUR-2017-00143 Fairfax County - Idylwood-Tysons 230kV Transmission Line and Tysons Substation Rebuild Project
  - Idylwood-Tysons Project Map
- PUR-2017-00002 Fairfax County - Idylwood Substation Rebuild and Rearrangement of 230kV Transmission Lines
  - Idylwood Map
- PUE-2015-00107 Prince William and Loudoun Counties - Haymarket 230kV Transmission Line & Substation Project
  - Haymarket Project Map

- Non-Utility Projects
  - PUR-2017-00162 Spotsylvania County - Pleinmont Solar generating facility and associated transmission
    - Pleinmont Solar Overview Map

EASTERN VIRGINIA

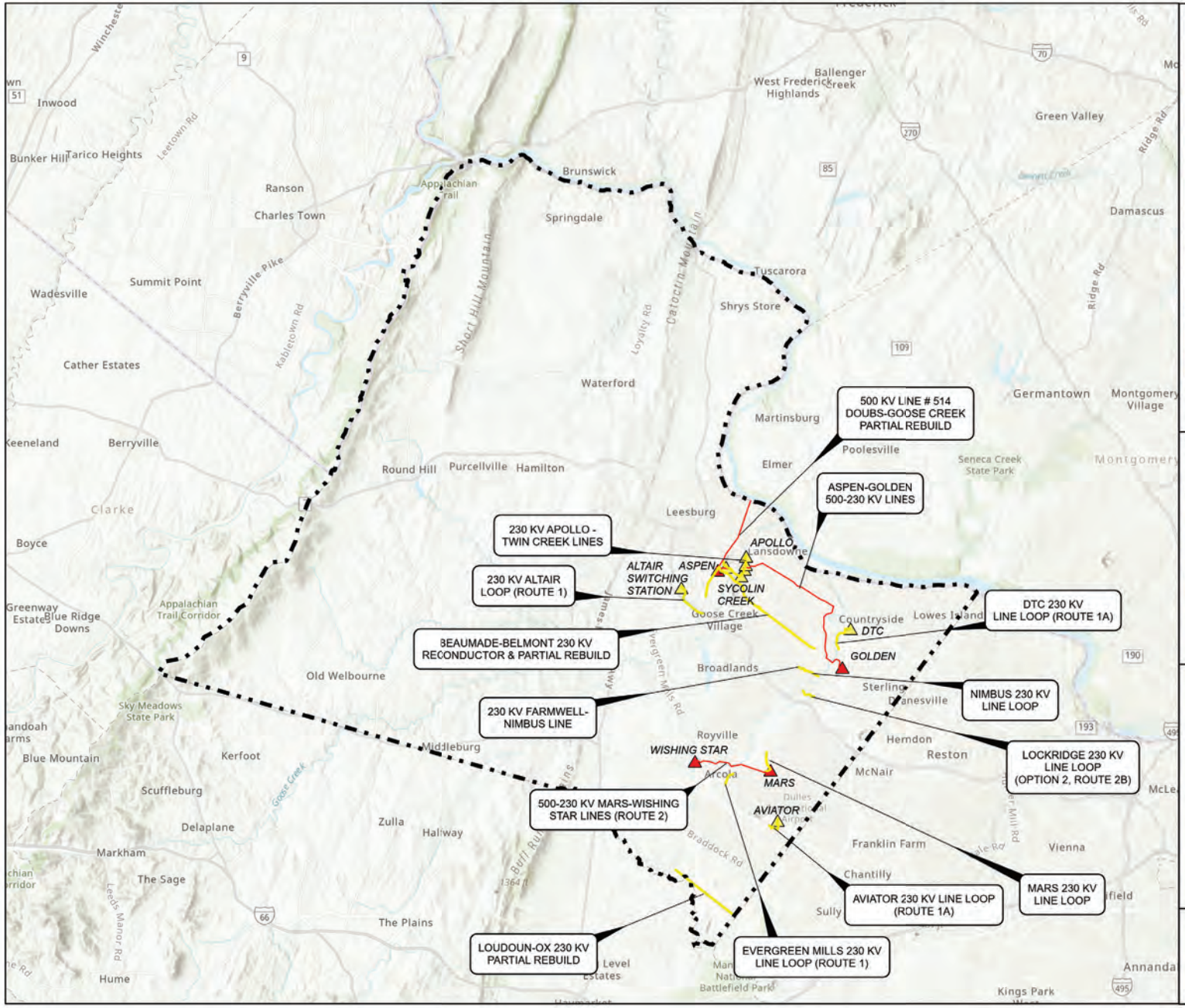
SOUTHERN VIRGINIA

WESTERN VIRGINIA

CENTRAL VIRGINIA

## Appendix 4:

# PROPOSED ELECTRIC TRANSMISSION AND SUBSTATIONS (SCC)




= LOUDOUN COUNTY LOCATION MAP

STATE BOUNDARY

COUNTY BOUNDARY

**PROPOSED ELECTRIC TRANSMISSION LINES**

- 500 KV
- 230 KV
- UNKNOWN

**PROPOSED SUBSTATIONS**

- 500
- 230
- UNKNOWN

NOTES:

1. PROPOSED DATA SHOWN DIGITIZED BASED ON RECORDS AVAILABLE ON VIRGINIA SCC PORTAL

2. DATA GATHERED FOR THIS EFFORT WAS COLLECTED ON 04/01/2024

Sources: County of Loudoun, VGIN, Esri, TomTorr, Garmin, FAO, NOAA, USGS, EPA, NPS, USFWS, Esri, NASA, NGA, USGS, County of Loudoun, VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS. USDA, USFWS

0 2 4 Miles

1 IN = 4 MILES

LOUDOUN COUNTY, VIRGINIA

PROPOSED ELECTRIC TRANSMISSION & SUBSTATIONS FROM SCC FILINGS (AS OF MAY 2024)

Kimley»Horn

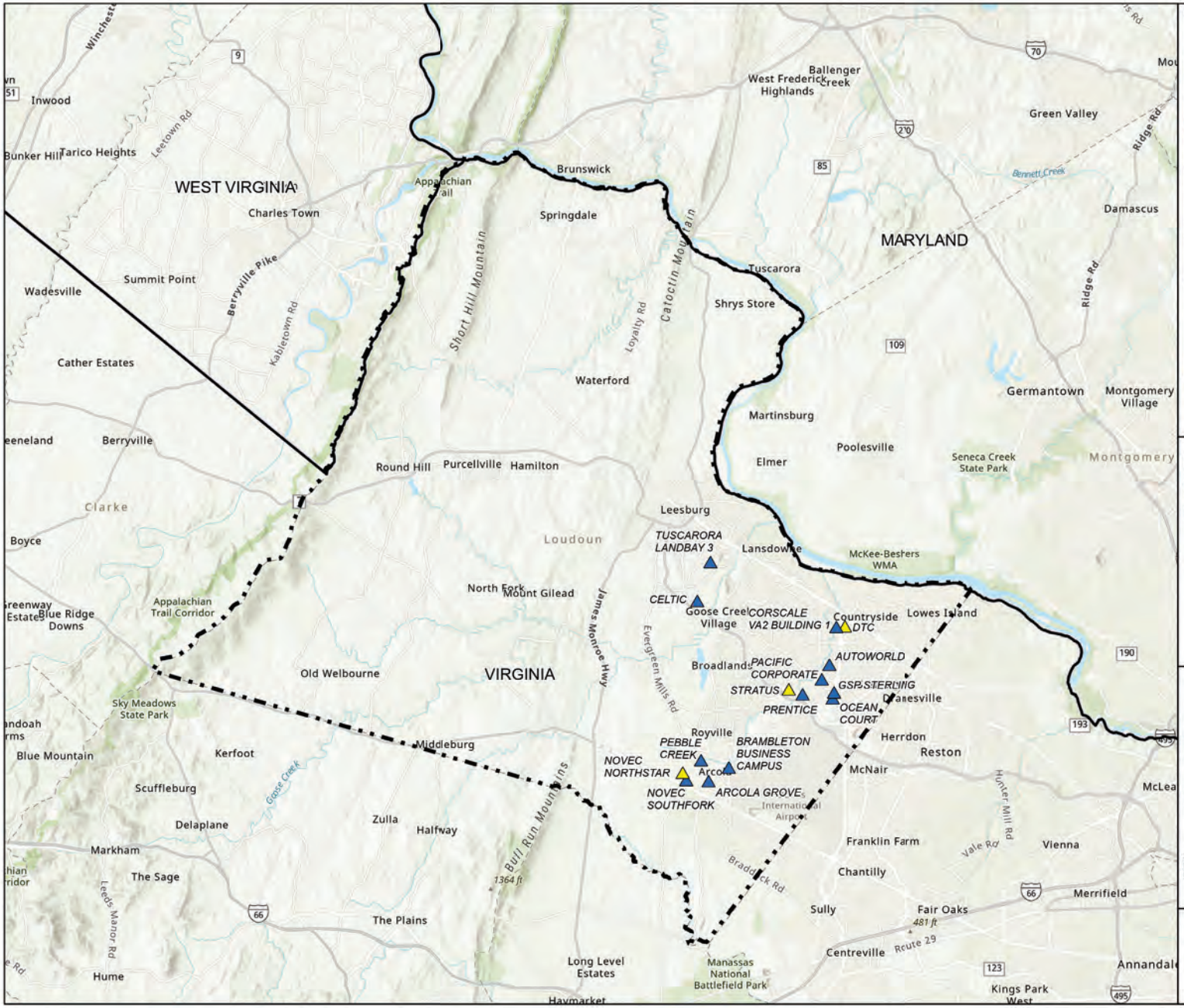
N

DATE: 05-2024

FIGURE: 3

## Appendix 5:

# PROPOSED ELECTRIC SUBSTATIONS (LandMARC)





= LOUDOUN COUNTY

**LOCATION MAP**

STATE BOUNDARY

COUNTY BOUNDARY

**PROPOSED ELECTRIC SUBSTATIONS**

- 230 KV
- UNKNOWN

NOTES:

1. EXISTING DATA COLLECTION REFERENCED FROM LOUDOUN COUNTY LANDMARC WEBSITE

2. DATA GATHERED FOR THIS EFFORT WAS COLLECTED ON 05/01/2024

Sources: Esri, NASA, NGA, USGS, County of Loudoun, Jefferson County GIS Office, VGIN, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, NPS, USFWS, County of Loudoun, VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS

0 2 4 Miles

1 IN = 4 MILES

**LOUDOUN COUNTY, VIRGINIA**

**PROPOSED ELECTRIC SUBSTATIONS FROM LANDMARC (AS OF MAY 2024)**

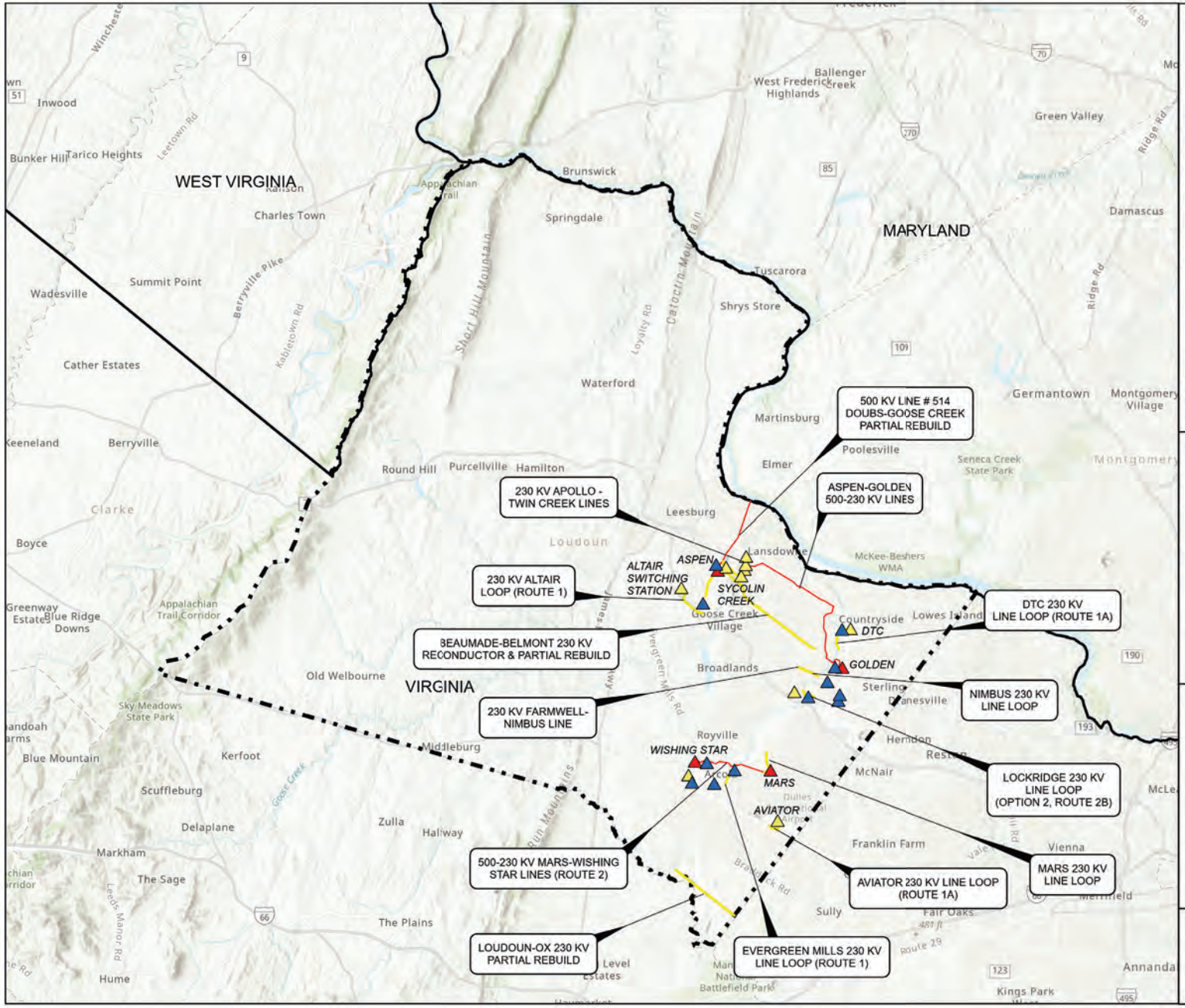
Kimley»Horn

DATE: 05-2024

FIGURE: 4

## Appendix 6:

# PROPOSED ELECTRIC TRANSMISSION AND SUBSTATIONS (COMBINED)




= LOUDOUN COUNTY LOCATION MAP

STATE BOUNDARY

COUNTY BOUNDARY

**PROPOSED ELECTRIC TRANSMISSION LINES**

- 500 KV
- 230 KV

**PROPOSED SUBSTATIONS**

- 500 KV
- 230 KV
- UNKNOWN

NOTES:

1. PROPOSED DATA SHOWN DIGITIZED BASED ON RECORDS AVAILABLE FROM VIRGINIA SCC PORTAL & LOUDOUN COUNTY LANDMARC WEBSITE

2. DATA GATHERED FOR THIS EFFORT WAS COLLECTED ON 04/01/2024 & 05/01/2024

Sources: County of Loudoun, VGIN, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, NPS, USFWS, Esri, NASA, NGA, USGS, County of Loudoun, VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS

0 2 4 Miles

1 IN = 4 MILES

# LOUDOUN COUNTY, VIRGINIA

PROPOSED ELECTRIC TRANSMISSION & SUBSTATIONS FROM SCC FILLINGS & LANDMARC (AS OF MAY 2024)

Kimley»Horn

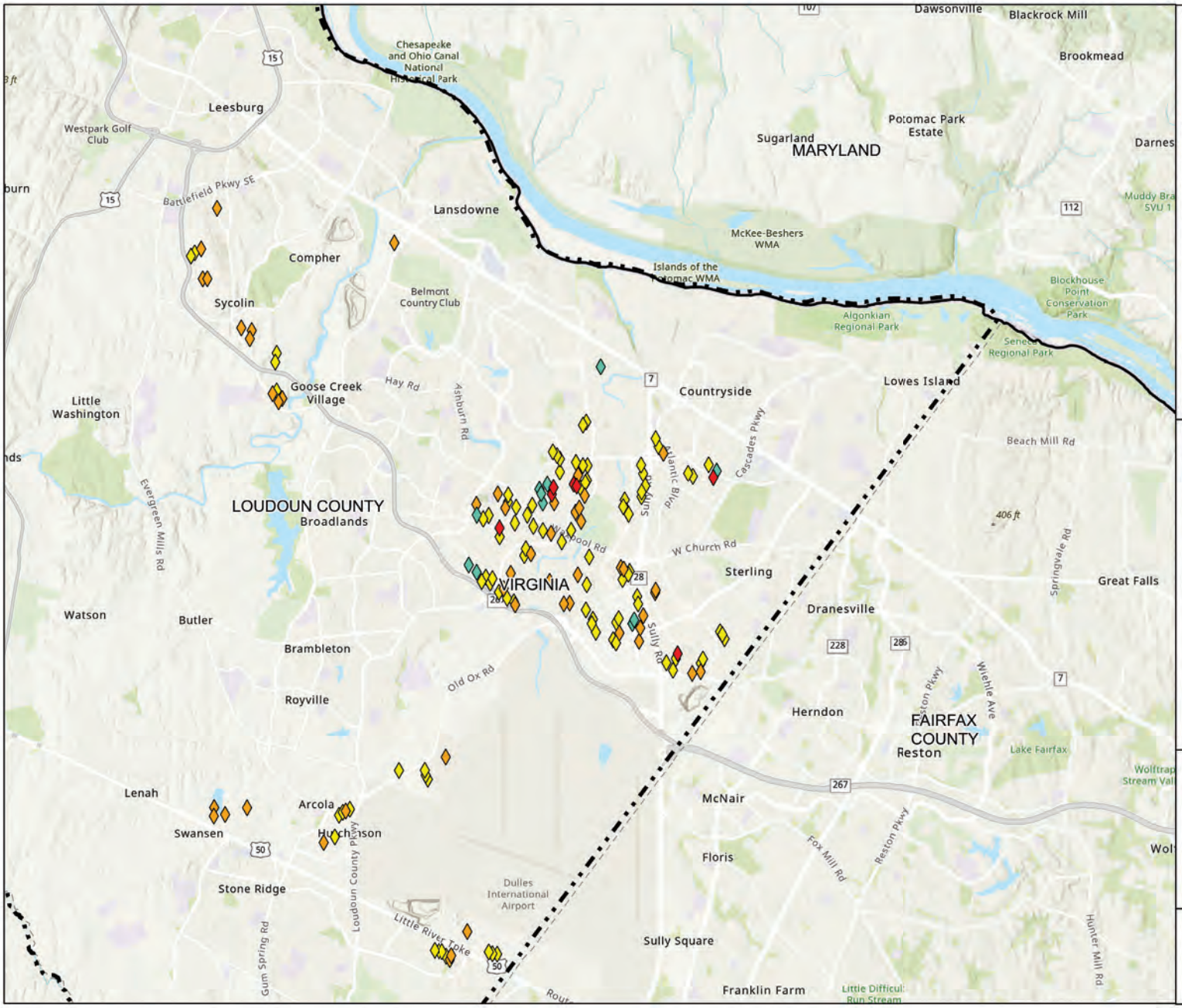
N

DATE: 06-2024

FIGURE: 5

## Appendix 7:

# DATA CENTERS IN LOUDOUN COUNTY THROUGH 2023





= LOUDOUN COUNTY

**LOCATION MAP**

- STATE BOUNDARY
- COUNTY BOUNDARY
- EXISTING DATA CENTER BUILDINGS (BEFORE 2001)
- EXISTING DATA CENTER BUILDINGS (2001-2010)
- EXISTING DATA CENTER BUILDINGS (2011-2020)
- EXISTING DATA CENTER BUILDINGS (2021-2023)

NOTES:

1. EXISTING DATA CENTER LOCATION PROVIDED BY LOUDOUN COUNTY
2. DATES PROVIDED INDICATE INITIAL BUILDING PERMIT OF DATA CENTER

0 1.5 3 Miles

1 IN = 1.5 MILES

LOUDOUN COUNTY, VIRGINIA

EXISTING DATA CENTERS FROM LOUDOUN COUNTY AS OF MAY 2024

Kimley»Horn

N

DATE: 06-2024

FIGURE: 7

## Appendix 8:

# PIPELINE PARCELS WITH SITE PLAN

## Pipeline Data Center Parcels with a Site Plan

| Building No. | PA_MCPI[1] | Application ID[2] | Pipeline Parcel Area (Acres)[3] | Building GFA (SF)[4] | Building Footprint (SF) | Floors | Building Height (Ft) | Proposed Lot Coverage[5] | FAR[6] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 234382603000 | STPL-2023-0004 | 18.01 | 387,300 | 193,650 | 2-Story | 45 | 0.25 | 0.49 |
| 2 | 154199491000 | STPL-2023-0041 | | 289,700 | 144,921 | 2-Story | 55 | | |
| 3 | 154199491000 | STPL-2023-0041 | 57.55 | 257,700 | 128,850 | 2-Story | 55 | 0.16 | 0.33 |
| 4 | 154199491000 | STPL-2023-0041 | | 278,200 | 139,261 | 2-Story | 55 | | |
| 5 | 150151774000 | STPL-2020-0046 | | 233,784 | 116,892 | 2-Story | 59 | | |
| 6 | 150151774000 | STPL-2020-0046 | 37.61 | 233,784 | 116,892 | 2-Story | 59 | 0.21 | 0.43 |
| 7 | 150151774000 | STPL-2020-0046 | | 233,784 | 116,892 | 2-Story | 59 | | |
| 8 | 151494358000 | STPL-2022-0040 | | 181,755 | 181,755 | 1-Story | 45 | | |
| 9 | 151494358000 | STPL-2022-0040 | 59.43 | 177,325 | 177,325 | 1-Story | 45 | | |
| 10 | 151494358000 | STPL-2022-0040 | | 170,500 | 170,500 | 1-Story | 45 | | |
| | 151492686000 | STPL-2022-0040 | 0.56 | - | - | - | - | | |
| | 151491670000 | STPL-2022-0040 | 5.52 | - | - | - | - | 0.12 | 0.12 |
| | 151488568000 | STPL-2022-0040 | 5.00 | - | - | - | - | | |
| | 151483174000 | STPL-2022-0040 | 13.20 | - | - | - | - | | |
| | 151476655000 | STPL-2022-0040 | 7.02 | - | - | - | - | | |
| | 151472463000 | STPL-2022-0040 | 6.86 | - | - | - | - | | |
| 11 | 113372932000 | STMP-2022-0016 | 73.18 | 516,368 | 258,184 | 2-Story | 45.5 | 0.16 | 0.41 |
| 12 | 113372932000 | STMP-2022-0016 | | 776,052 | 258,684 | 3-Story | 65.6 | | |
| 13 | 083359224000 | STPL-2023-0025 | 107.92 | 386,400 | 128,800 | 3-Story | 80 | 0.05 | 0.16 |
| 14 | 083359224000 | STPL-2023-0025 | | 386,400 | 128,800 | 3-Story | 80 | | |
| 15 | 083287772000 | STPL-2023-0007 | 25.24 | 180,000 | 90,000 | 2-Story | 59 | 0.08 | 0.16 |
| 16 | 041398662000 | STPL-2022-0012 | 20.19 | 460,000 | 230,000 | 2-Story | 50 | 0.26 | 0.52 |
| 17 | 030300991000 | STPL-2023-0008 | 11.05 | 285,200 | 142,600 | 2-Story | 60 | | |
| 18 | 030306633000 | STPL-2022-0051 | 11.96 | 14,200 | 14,200 | 1-Story | 19 | 0.19 | 0.52 |
| 19 | 030306633000 | STPL-2022-0051 | | 254,139 | 84,713 | 3-Story | 93.16 | | |
| 20 | 020354412000 | STPL-2022-0053 | 3.13 | | | | | | |
| | 020253188000 | STPL-2022-0053 | 2.56 | | | | | | |
| | 030209386000 | STPL-2022-0053 | 2.22 | 313,000 | 105,200 | 3- Story | 100 | 0.20 | 0.60 |
| | 030309421000 | STPL-2022-0053 | 2.04 | | | | | | |
| | 020352829000 | STPL-2022-0053 | 2.06 | | | | | | |
| 21 | 030208833000 | STPL-2022-0052 | 5.84 | | | | | | |
| | 030207833000 | STPL-2022-0052 | 4.33 | 227,140 | 113,545 | 2-Story | 75 | 0.18 | 0.36 |
| | 030203058000 | STPL-2022-0052 | 4.15 | | | | | | |
| 22 | 030292034000 | STPL-2023-0035 | 9.94 | 413,100 | 137,700 | 3-Story | 60 | 0.32 | 0.95 |
| 23 | 030286764000 | STMP-2019-0009 | 10.02 | 212,960 | 101,040 | 2-Story | 60 | 0.23 | 0.49 |
| 24 | 030465708000 | EPLAN-2024-0058 | 9.82 | 305,593 | 152,797 | 2-Story | 45 | 0.36 | 0.71 |
| 25 | 030155049000 | EPLAN-2024-0081 | 9.35 | 244,400 | 122,200 | 2-Story | 100 | 0.30 | 0.60 |
| 26 | 042363888000 | EPLAN-2024-0077 | | 393,117 | 131,039 | 3-Story | 100 | | |
| 27 | 042363888000 | EPLAN-2024-0077 | 44.37 | 450,543 | 150,181 | 3-Story | 100 | 0.20 | 0.59 |
| 28 | 042363888000 | EPLAN-2024-0077 | | 287,301 | 95,767 | 3-Story | 100 | | |
| 29 | 043395471000 | STMP-2022-0024 | 50.00 | 1,216,875 | 405,611 | 3-Story | 100 | 0.19 | 0.56 |
| | 043372508000 | STMP-2022-0013 | 4.91 | - | - | - | - | | |
| | 043273683000 | STMP-2022-0013 | 2.28 | - | - | - | - | | |
| | 043274656000 | STMP-2022-0013 | 2.75 | - | - | - | - | | |
| | 043275406000 | STMP-2022-0013 | 1.20 | - | - | - | - | | |
| 30 | 043275891000 | STMP-2022-0013 | 2.45 | 264,000 | 138,364 | 2-Story | 68 | 0.16 | 0.30 |
| | 043178099000 | STMP-2022-0013 | 4.19 | - | - | - | - | | |
| | 043175778000 | STMP-2022-0013 | 5.64 | - | - | - | - | | |
| 31 | 043172630000 | STMP-2022-0013 | 14.03 | 264,000 | 138,364 | 2-Story | 68 | | |
| | 044470591000 | STMP-2022-0013 | 0.98 | - | - | - | - | | |
| | 043169304000 | STMP-2022-0013 | 1.41 | - | - | - | - | | |
| 32 | 044461959000 | EPLAN-2023-0116 | | 377,664 | 125,888 | 3-Story | 100 | | |
| 33 | 044461959000 | EPLAN-2023-0116 | 43.08 | 377,664 | 125,888 | 3-Story | 100 | 0.20 | 0.60 |
| 34 | 044461959000 | EPLAN-2023-0116 | | 377,664 | 125,888 | 3-Story | 100 | | |
| 35 | 045465016000 | EPLAN-2023-0087 | 7.65 | 259,772 | 85,591 | 3-Story | 74 | 0.26 | 0.78 |
| 36 | 045279612000 | EPLAN-2024-0082 | 10.18 | 68,634 | 34,317 | 2-Story | 60.67 | 0.08 | 0.15 |
| 37 | 063477734000 | STMP-2022-0020 | | 561,538 | 164,675 | 4-Story | 99.33 | | |
| 38 | 063477734000 | STMP-2022-0020 | 75.69 | 561,538 | 164,675 | 4-Story | 99.33 | 0.15 | 0.51 |
| 39 | 063477734000 | STMP-2022-0020 | | 561,538 | 164,675 | 4-Story | 99.33 | | |
| 40 | 089496246000 | STPL-2023-0001 | 79.16 | 769,144 | 256,806 | 3-Story | 78 | 0.15 | 0.45 |
| 41 | 089496246000 | STPL-2023-0001 | | 769,144 | 271,083 | 3-Story | 78 | | |
| 42 | 089481925000 | STPL-2014-0024 | 27.74 | 190,647 | 169,397 | 2-Story | 48 | 0.32 | 0.34 |
| 43 | 089481925000 | STPL-2014-0024 | | 225,562 | 213,662 | 2-Story | 48 | | |
| 44 | 122208248000 | STMP-2021-0008 | | 263,340 | 131,670 | 2-Story | 72 | | |
| 45 | 122208248000 | STMP-2021-0008 | | 228,410 | 114,205 | 2-Story | 72 | | |
| 46 | 122208248000 | STMP-2021-0008 | 55.19 | 263,340 | 131,670 | 2-Story | 72 | 0.12 | 0.24 |
| 47 | 122208248000 | STMP-2021-0008 | | 263,340 | 131,670 | 2-Story | 72 | | |
| 48 | 122208248000 | STMP-2021-0008 | | 14,160 | 7,080 | 1-Story | 22 | | |
| | 122202511000 | STMP-2021-0008 | 31.05 | - | - | - | - | | |
| | 091160171000 | STMP-2021-0008 | 10.63 | - | - | - | - | | |
| 49 | 092161968000 | EPLAN-2024-0060 | | 772,424 | 386,212 | 2-Story | 45 | | |
| 50 | 092161968000 | EPLAN-2024-0060 | 81.97 | 633,128 | 316,564 | 2-Story | 45 | | |
| 51 | 092161968000 | EPLAN-2024-0060 | | 510,750 | 255,375 | 2-Story | 45 | | |
| | 092192834000 | EPLAN-2024-0060 | 38.22 | - | - | - | - | 0.21 | 0.41 |
| 52 | 093185459000 | EPLAN-2024-0060 | | 754,304 | 377,152 | 2-Story | 45 | | |
| 53 | 093185459000 | EPLAN-2024-0060 | 130.85 | 630,919 | 315,460 | 2-Story | 45 | | |
| 54 | 093185459000 | EPLAN-2024-0060 | | 537,916 | 268,958 | 2-Story | 45 | | |
| 55 | 093185459000 | EPLAN-2024-0060 | | 665,108 | 332,554 | 2-Story | 45 | | |
| 56 | 124105978000 | EPLAN-2024-0036 | | 243,000 | 121,500 | 2-Story | 45 | | |
| 57 | 124105978000 | EPLAN-2024-0036 | 39.96 | 112,500 | 112,500 | 1-Story | 45 | 0.26 | 0.40 |
| 58 | 124105978000 | EPLAN-2024-0036 | | 112,500 | 112,500 | 1-Story | 45 | | |
| 59 | 124105978000 | EPLAN-2024-0036 | | 229,500 | 114,750 | 2-Story | 45 | | |
| 60 | 161397058000 | STPL-2023-0028 | 48.29 | 549,184 | 274,592 | 2-Story | 60 | 0.19 | 0.45 |
| 61 | 161397058000 | STPL-2023-0028 | | 387,000 | 129,000 | 3-Story | 60 | | |
| 62 | 161269137000 | STPL-2023-0029 | 50.68 | 681,100 | 227,033 | 3-Story | 60 | 0.20 | 0.59 |
| 63 | 161269137000 | STPL-2023-0029 | | 614,930 | 204,977 | 3-Story | 60 | | |
| 64 | 161264481000 | STMP-2022-0018 | 59.20 | 441,702 | 147,234 | 3-Story | 100 | | |
| 65 | 161264481000 | STMP-2022-0018 | | 441,702 | 147,234 | 3-Story | 100 | 0.15 | 0.46 |
| 66 | 161253540000 | STMP-2022-0018 | 15.35 | 441,702 | 147,234 | 3-Story | 100 | | |
| 67 | 202206213000 | STMP-2022-0018 | 12.86 | 441,702 | 147,234 | 3-Story | 100 | | |
| 68 | 202188046000 | EPLAN-2023-0130 | 10.06 | 310,000 | 155,000 | 2-Story | 55 | | |
| | 202291015000 | EPLAN-2023-0130 | 13.07 | - | - | - | - | | |
| | 202190181000 | EPLAN-2023-0130 | 1.70 | - | - | - | - | | |
| | 202192262000 | EPLAN-2023-0130 | 2.49 | - | - | - | - | 0.28 | 0.57 |
| 69 | 202177155000 | EPLAN-2023-0104 | | 310,000 | 155,000 | 2-Story | 55 | | |
| 70 | 202177155000 | EPLAN-2023-0104 | 29.13 | 310,000 | 155,000 | 2-Story | 55 | | |
| 71 | 202177155000 | EPLAN-2023-0104 | | 310,000 | 155,000 | 2-Story | 55 | | |
| 72 | 202177155000 | EPLAN-2023-0104 | | 155,000 | 77,500 | 2-Story | 55 | | |
| 73 | 203295737000 | EPLAN-2023-0115 | 21.21 | 184,080 | 92,040 | 2-Story | 55 | 0.10 | 0.20 |
| 74 | 203279200000 | STPL-2021-0049 | | 14,387 | 14,387 | 1-Story | 30 | | |
| 75 | 203279200000 | STPL-2021-0049 | 38.36 | 235,320 | 117,660 | 2-Story | 60 | 0.16 | 0.31 |
| 76 | 203279200000 | STPL-2021-0049 | | 268,620 | 134,310 | 2-Story | 60 | | |
| 77 | 203371445000 | STMP-2022-0026 | 34.12 | 289,000 | 144,500 | 2-Story | 55 | 0.10 | 0.19 |
| 78 | 203172023000 | STMP-2020-0002 | 51.79 | 263,786 | 131,893 | 2-Story | 60 | 0.06 | 0.12 |
| 79 | 204481974000 | STPL-2018-0019 | 16.44 | 105,534 | 105,534 | 1-Story | 45 | 0.24 | 0.24 |
| 80 | 204481974000 | STPL-2018-0019 | | 135,800 | 135,800 | 1-Story | 45 | | |
| | 204476876000 | STPL-2018-0019 | 4.86 | - | - | - | - | | |
| | 204482535000 | STPL-2018-0019 | 1.79 | - | - | - | - | | |
| 81 | 162176713000 | EPLAN-2023-0111 | 56.42 | 288,880 | 288,880 | 1-Story | 42 | 0.24 | 0.24 |
| 82 | 162176713000 | EPLAN-2023-0111 | | 288,880 | 288,880 | 1-Story | 42 | | |
| 83 | 096183926000 | EPLAN-2024-0025 | 68.85 | 259,000 | 131,893 | 2-Story | 71 | 0.09 | 0.17 |
| 84 | 096183926000 | EPLAN-2024-0025 | | 259,000 | 131,893 | 2-Story | 71 | | |
| | | **TOTALS** | **1,828** | **29,616,077** | **13,586,800** | N/A | N/A | **0.17** | **0.37** |

Notes
1. Table includes Pipeline Data Centers that have a site plan application submitted to Loudoun County.

Footnotes
1. Column indicates the parcel identification number.
2. Loudoun County site plan application number searchable in Loudoun County's LandMARC system.
3. Pipeline Parcel Area is the acreage that is being included in the data center application.
4. Building Gross Floor Area as included in the referenced application.
5. Proposed Lot Coverage in this instance is being computed as the building footprint divided by Pipeline Parcel Area in feet.
6. Floor Area Ratio in this instance is being computed as Building Gross Floor Area (GFA) divided by Pipeline Parcel Area in feet.

## Appendix 9:

# PIPELINE PARCELS WITH NO SITE PLAN

## Pipeline Data Center Parcels with No Site Plan

| Parcel | PA_MCPI[1] | Application ID[2] | Pipeline Parcel Area (Acres)[3] |
|---|---|---|---|
| 1 | 203499224000 | LEGI-2023-0070 | 1.48 |
| 2 | 203498021000 | LEGI-2023-0070 | 1.48 |
| 3 | 203496816000 | LEGI-2023-0070 | 1.51 |
| 4 | 203495711000 | LEGI-2023-0070 | 1.53 |
| 5 | 203494606000 | LEGI-2023-0070 | 1.53 |
| 6 | 203393598000 | LEGI-2023-0070 | 1.55 |
| 7 | 203392395000 | LEGI-2023-0070 | 1.59 |
| 8 | 203391290000 | LEGI-2023-0070 | 1.62 |
| 9 | 203390184000 | LEGI-2023-0070 | 1.62 |
| 10 | 203388980000 | LEGI-2023-0070 | 1.60 |
| 11 | 203387775000 | LEGI-2023-0070 | 1.57 |
| 12 | 203386670000 | LEGI-2023-0070 | 1.54 |
| 13 | 203385465000 | LEGI-2023-0070 | 1.52 |
| 14 | 203384261000 | LEGI-2023-0070 | 1.50 |
| 15 | 203383156000 | LEGI-2023-0070 | 1.47 |
| 16 | 203381952000 | LEGI-2023-0070 | 1.43 |
| 17 | 203380747000 | LEGI-2023-0070 | 1.38 |
| 18 | 203379642000 | LEGI-2023-0070 | 1.34 |
| 19 | 203378437000 | LEGI-2023-0070 | 1.31 |
| 20 | 203390320000 | ZMAP-2019-0015 | 19.90 |
| 21 | 202193290000 | LEGI-2024-0026 | 4.47 |
| 22 | 203107367000 | ZMAP-2023-0005 | 3.98 |
| 23 | 203109057000 | ZMAP-2023-0005 | 4.51 |
| 24 | 162151929000 | ZMAP-2023-0005 | 10.37 |
| 25 | 162154753000 | ZMAP-2020-0010 | 4.71 |
| 26 | 097409598000 | ZMAP-2021-0018 | 18.05 |
| 27 | 045269479000 | LEGI-2024-0002 | 9.39 |
| 28 | 045274849000 | LEGI-2024-0002 | 7.80 |
| 29 | 046368231000 | SPAM-2018-0039 | 11.51 |
| 30 | 046278993000 | LEGI-2024-0039 | 16.27 |
| 31 | 046275921000 | LEGI-2024-0039 | 16.09 |
| 32 | 035457494000 | ZMAP-2022-0001 | 16.62 |
| 33 | 034160552000 | ZMAP-2022-0001 | 12.48 |
| 34 | 034372453000 | ZRTD-2021-0006 | 9.61 |
| 35 | 046486267000 | LEGI-2024-0021 | 19.04 |
| 36 | 045185843000 | LEGI-2024-0004 | 10.58 |
| 37 | 033190248000 | ZRTD-2022-0002 | 13.24 |
| 38 | 033196950000 | LEGI-2024-0003 | 3.28 |
| 39 | 033195081000 | LEGI-2024-0003 | 3.68 |
| 40 | 033292608000 | LEGI-2024-0003 | 5.92 |
| 41 | 033179880000 | LEGI-2024-0003 | 16.08 |
| 42 | 033290948000 | LEGI-2024-0003 | 13.34 |
| 43 | 033385603000 | LEGI-2024-0032 | 1.48 |
| 44 | 033281834000 | LEGI-2024-0032 | 4.28 |
| 45 | 033281967000 | LEGI-2024-0032 | 2.63 |
| 46 | 033383406000 | LEGI-2024-0032 | 1.82 |
| 47 | 033381105000 | LEGI-2024-0032 | 1.68 |
| 48 | 033274247000 | LEGI-2024-0032 | 6.40 |
| 49 | 045352429000 | LEGI-2024-0030 | 2.01 |
| 50 | 044175589000 | ZRTD-2023-0001 | 9.80 |
| 51 | 061394321000 | EPLAN-2024-0062 | 13.12 |
| 52 | 061373570000 | STMP-2021-0015 | 8.67 |
| 53 | 113163850000 | ZMAP-2022-0021 | 28.82 |
| 54 | 114466446000 | ZMAP-2022-0021 | 8.77 |
| 55 | 114362774000 | ZMAP-2022-0021 | 26.32 |
| 56 | 114362774000 | ZMAP-2022-0021 | 8.91 |
| 57 | 114355868000 | ZMAP-2022-0021 | 28.31 |
| 58 | 113158924000 | ZMAP-2022-0021 | 2.91 |
| 59 | 113158924000 | ZMAP-2022-0021 | 7.09 |
| 60 | 151400958000 | LEGI-2024-0037 | 17.52 |
| 61 | 150469176000 | EPLAN-2024-0059 | 38.25 |
| 62 | 150468682000 | EPLAN-2024-0059 | 18.85 |
| 63 | 151160598000 | LEGI-2023-0060 | 73.46 |
| 64 | 152361675000 | LEGI-2023-0060 | 13.56 |
| 65 | 152361675000 | LEGI-2023-0060 | 13.56 |
| 66 | 193467168000 | ZMAP-2023-0002 | 8.04 |
| 67 | 192169020000 | ZMAP-2023-0002 | 2.80 |
| 68 | 192163918000 | ZMAP-2023-0002 | 3.38 |
| 69 | 193462583000 | ZMAP-2023-0002 | 3.84 |
| 70 | 193463445000 | ZMAP-2023-0002 | 2.00 |
| 71 | 193461044000 | ZMAP-2023-0002 | 2.10 |
| 72 | 236387331000 | ZMAP-2022-0022 | 11.68 |
| 73 | 089309997000 | ZCPA-2023-0005 | 16.16 |
| 74 | 034479040000 | ZRTD-2022-0002 | 2.43 |
| 75 | 150469176000 | EPLAN-2024-0059 | 38.25 |
| 76 | 151160598000 | LEGI-2023-0060 | 4.59 |
| | | **TOTAL** | **712.98** |

Notes

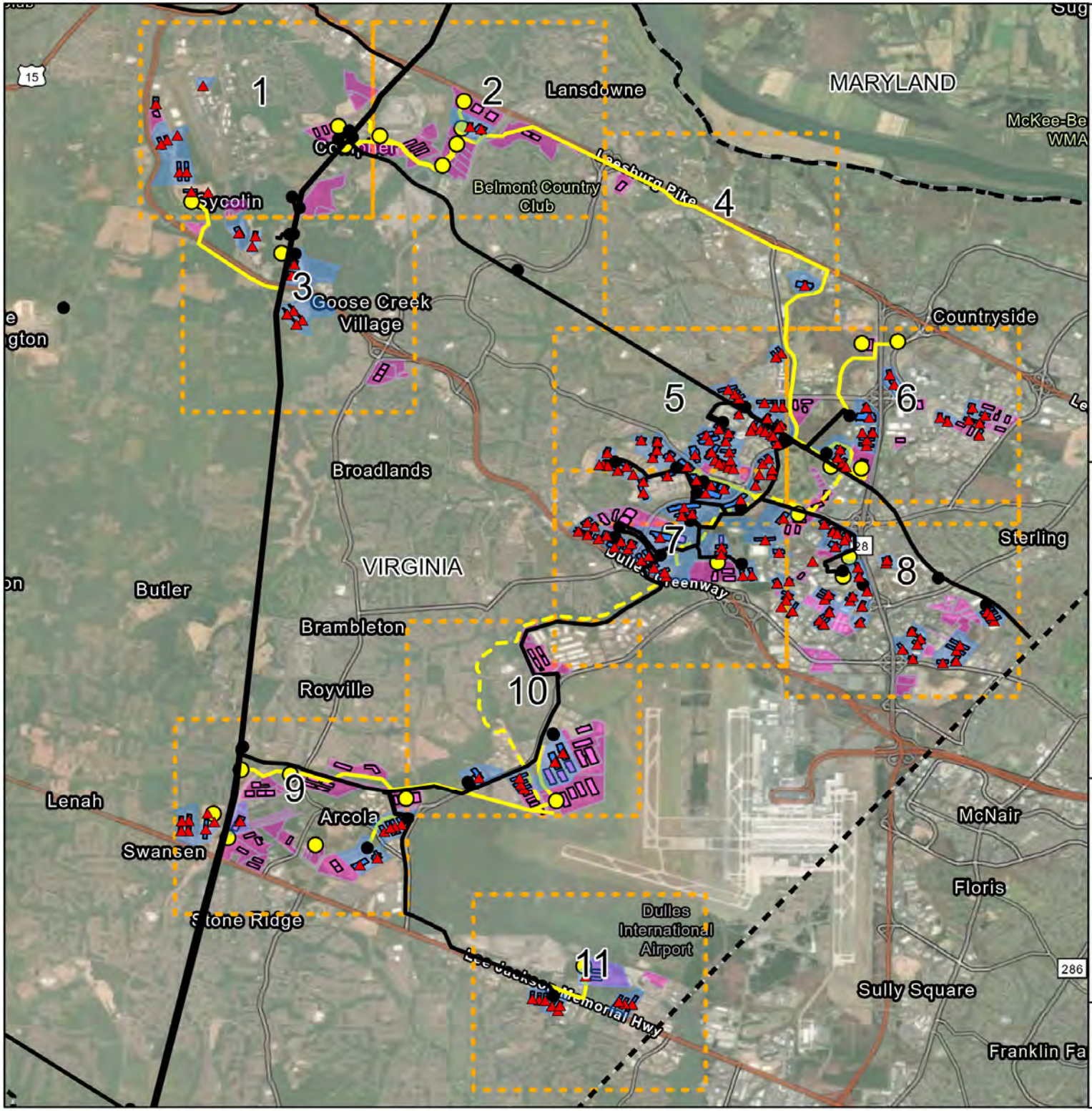
1. Table includes Pipeline Data Centers that have an application submitted to Loudoun County, but don't currently have a site plan.

Footnotes

1. Column indicates the parcel identification number.
2. Loudoun County site plan application number searchable in Loudoun County's LandMARC system.
3. Pipeline Parcel Area is the acreage that is being included in the data center application.

## Appendix 10:

# EXISTING & PROPOSED DATA CENTERS AND EXISTING & PROPOSED TRANSMISSION





= LOUDOUN COUNTY

LOCATION MAP

- STATE BOUNDARY
- COUNTY BOUNDARY
- SHEET INDEX

EXISTING

- EXISTING DATA CENTER
- EXISTING SUBSTATION
- EXISTING TRANSMISSION LINE
- EXISTING DATA CENTER BUILDING
- EXISTING DATA CENTER PARCEL

PROPOSED

- PROPOSED SUBSTATION
- PROPOSED TRANSMISSION LINE (SCC)
- PROPOSED TRANSMISSION LINE (NOT YET FILED WITH SCC)
- PROPOSED DATA CENTER BUILDING
- PROPOSED DATA CENTER PARCEL

NOTES:

1. EXISTING & PROPOSED DATA CENTER PARCELS PROVIDED BY LOUDOUN COUNTY ON 07/30/024. EXISTING & PROPOSED DATA CENTER BUILDINGS DIGITIZED BY KIMLEY-HORN UTILIZING AERIAL IMAGERY ON 08/14/2024.

Miles

0 1.75 3.5

1 IN =1.75 MILES

LOUDOUN COUNTY, VIRGINIA

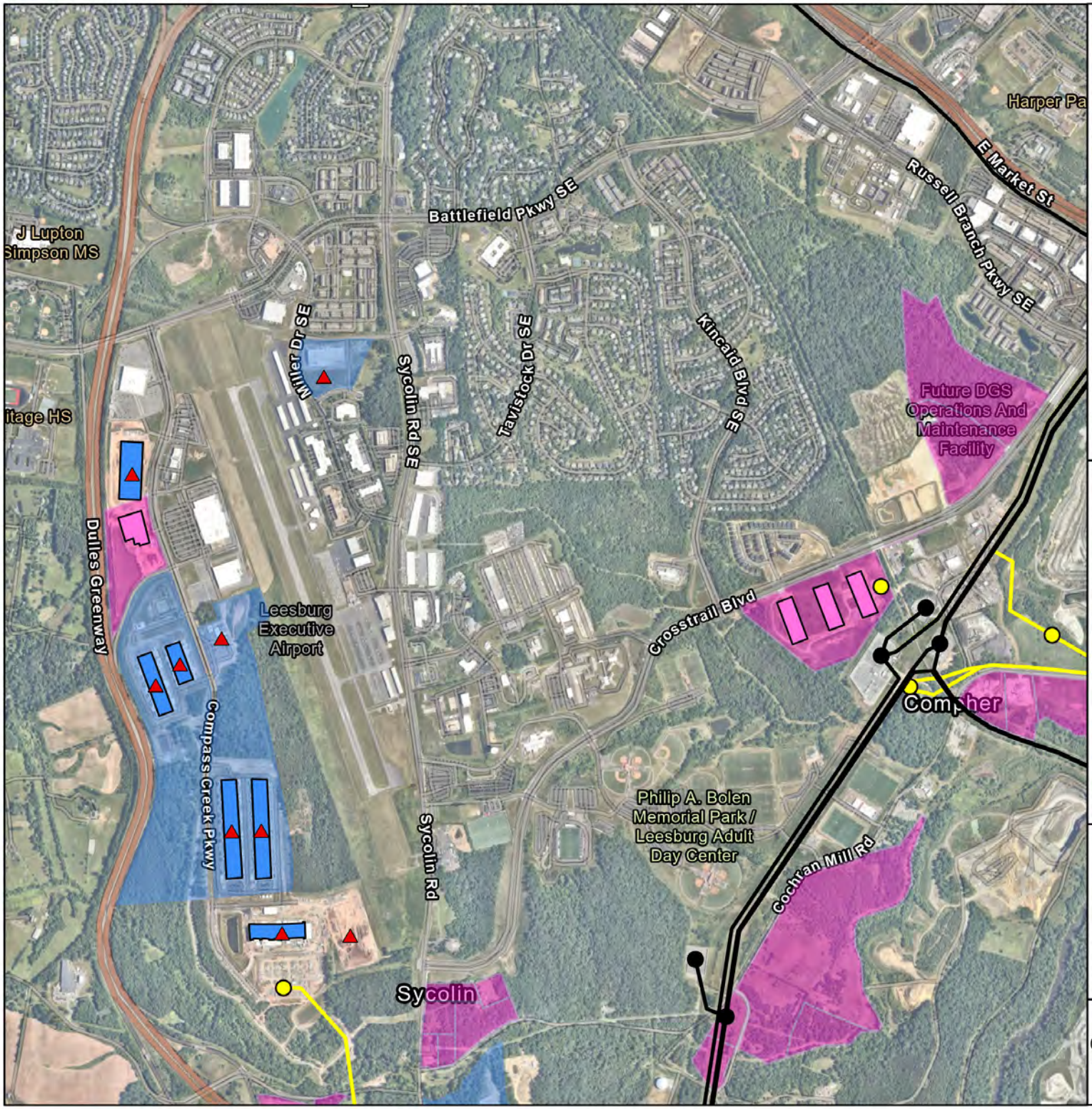
EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

INDEX





## LOCATION MAP

- STATE BOUNDARY
- COUNTY BOUNDARY

**EXISTING**

- EXISTING DATA CENTER
- EXISTING SUBSTATION
- EXISTING TRANSMISSION LINE
- EXISTING DATA CENTER BUILDING
- EXISTING DATA CENTER PARCEL

**PROPOSED**

- PROPOSED SUBSTATION
- PROPOSED TRANSMISSION LINE (SCC)
- PROPOSED TRANSMISSION LINE (NOT YET FILED WITH SCC)
- PROPOSED DATA CENTER PARCEL
- PROPOSED DATA CENTER BUILDING

NOTES:

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Feet
0 1,750 3,500
1 IN = 1,750 FEET

LOUDOUN COUNTY, VIRGINIA

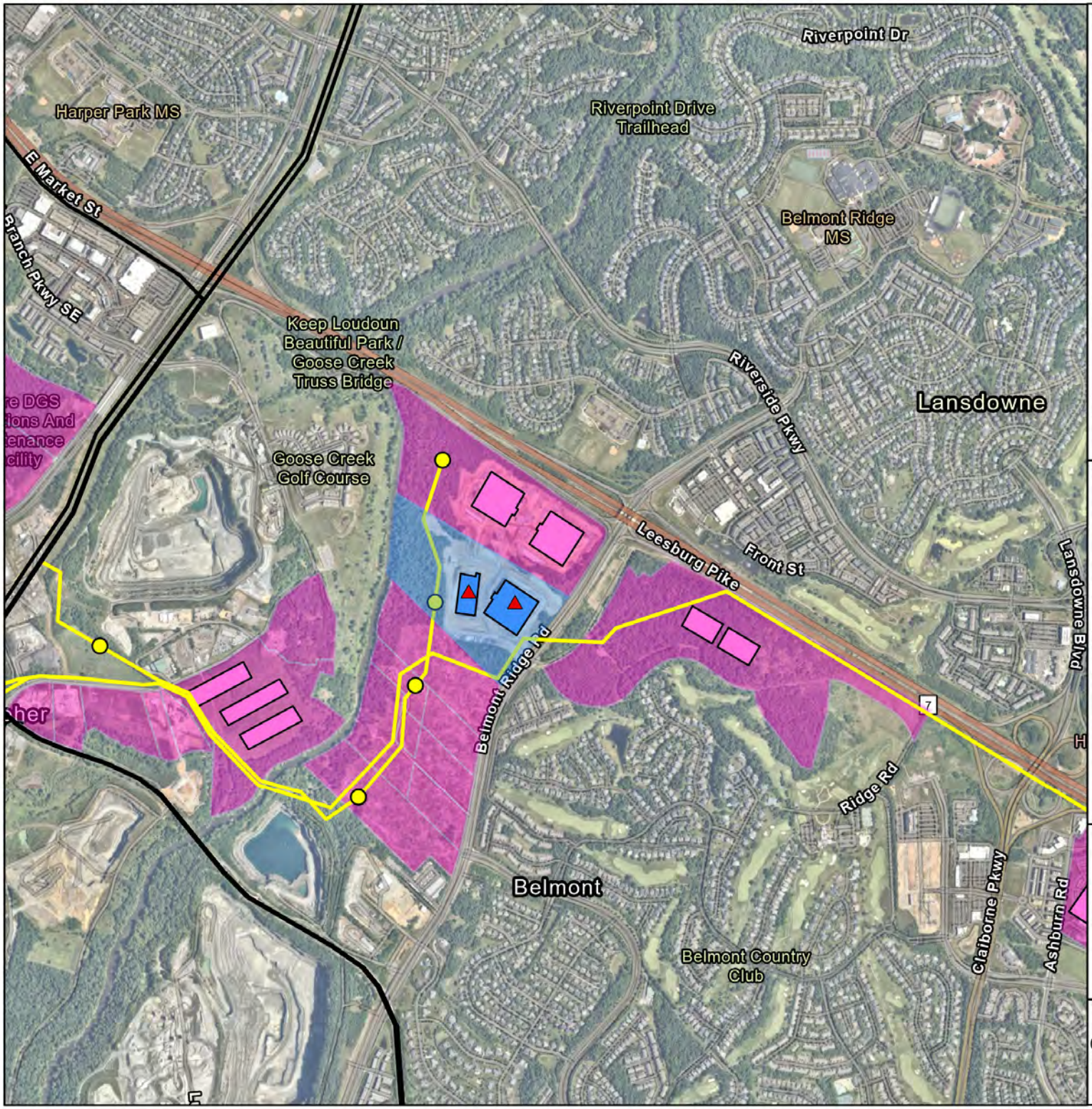
EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

SHEET 1





LOCATION MAP

- STATE BOUNDARY
- COUNTY BOUNDARY

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- EXISTING DATA CENTER
- EXISTING SUBSTATION
- EXISTING TRANSMISSION LINE
- EXISTING DATA CENTER BUILDING
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0 1,750 3,500
1 IN = 1,750 FEET

LOUDOUN COUNTY, VIRGINIA

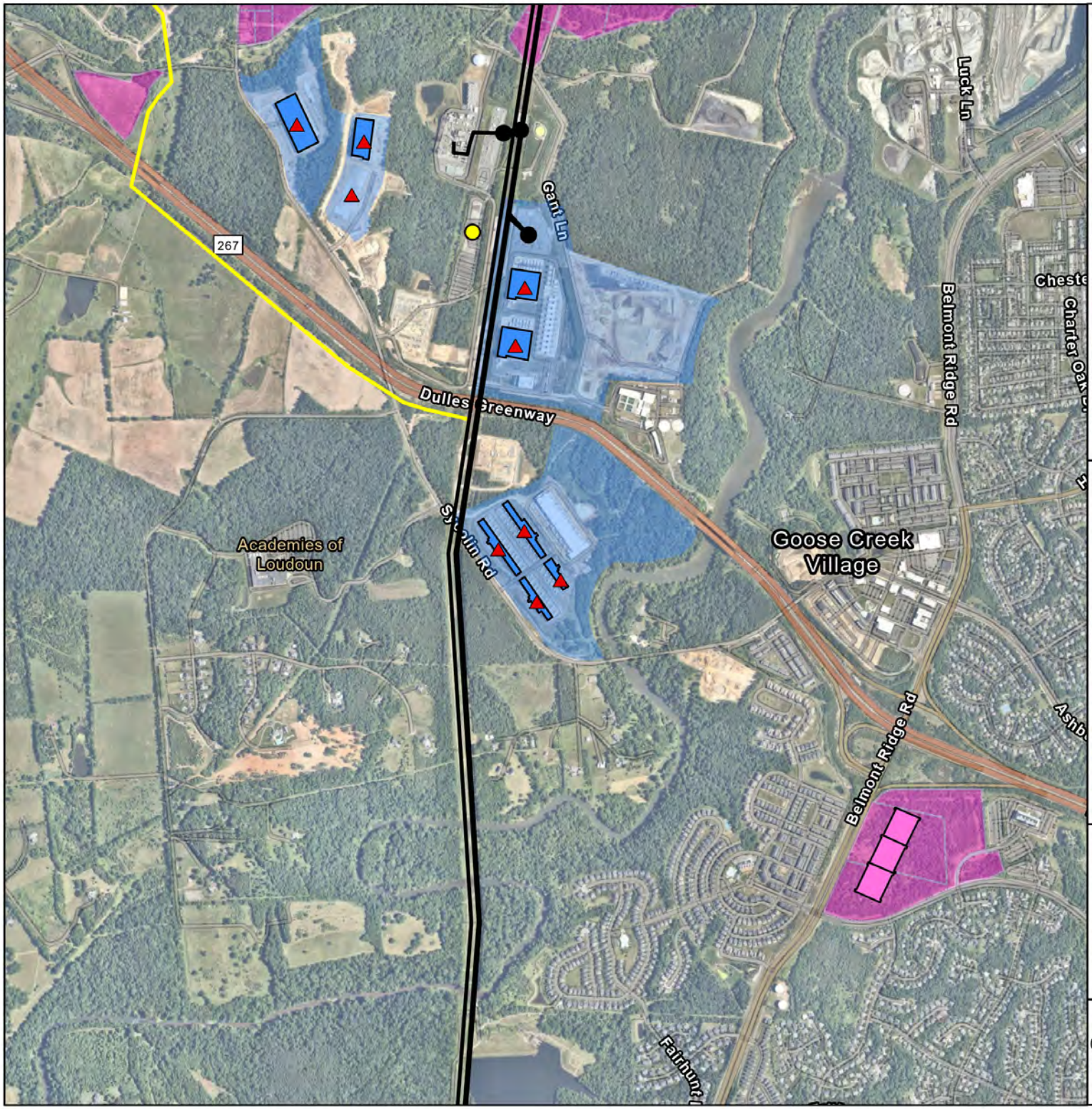
EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

SHEET 2





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Feet
0 1,750 3,500
1 IN = 1,750 FEET

LOUDOUN COUNTY, VIRGINIA

EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

SHEET 3



LOCATION MAP

- STATE BOUNDARY
- COUNTY BOUNDARY

EXISTING

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Feet
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1 IN = 1,750 FEET

LOUDOUN COUNTY, VIRGINIA

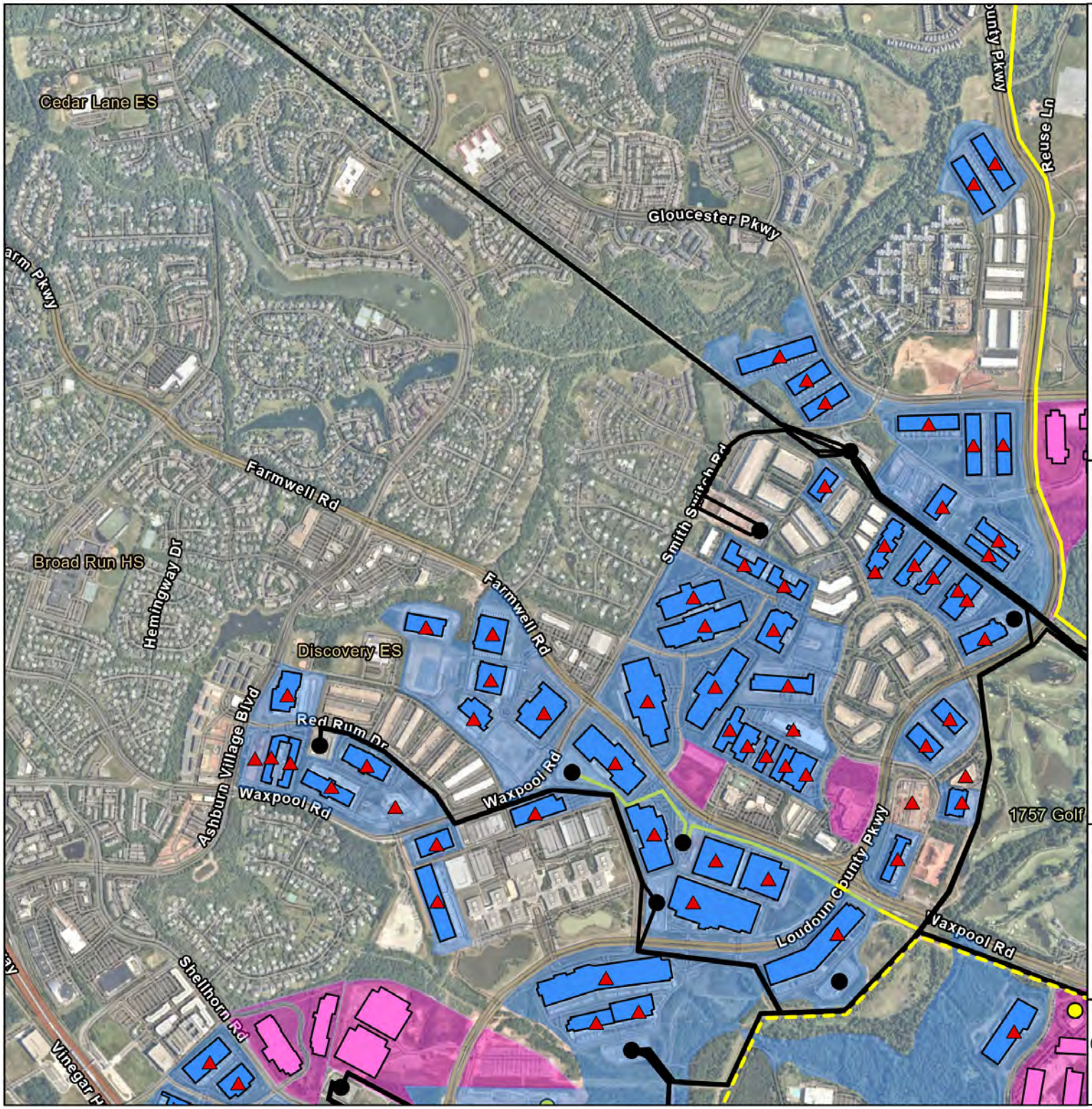
EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

SHEET 4





## LOCATION MAP

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1 IN = 1,750 FEET

LOUDOUN COUNTY, VIRGINIA

EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

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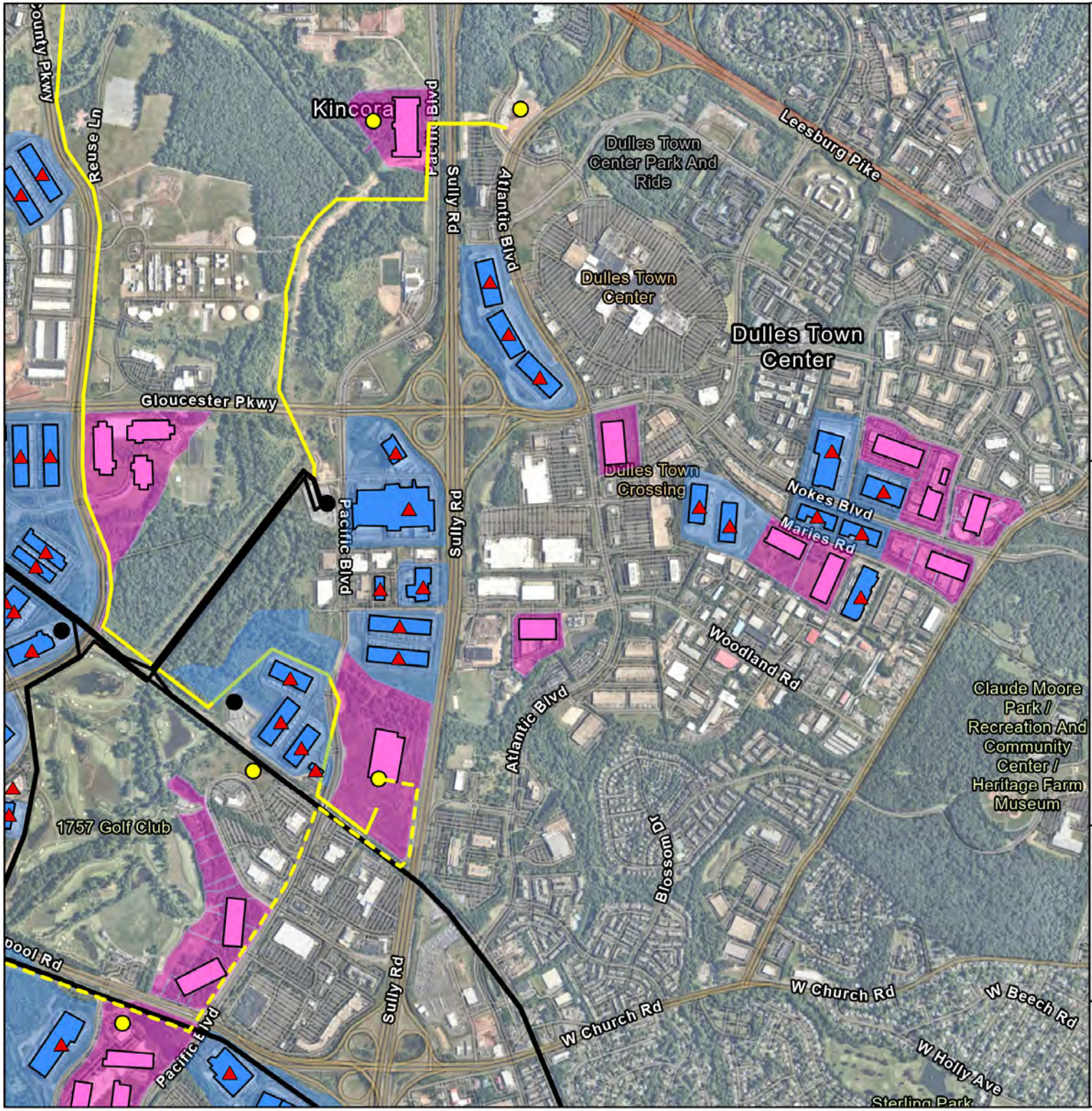
DATE: 09-2024

SHEET 5





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LOUDOUN COUNTY, VIRGINIA

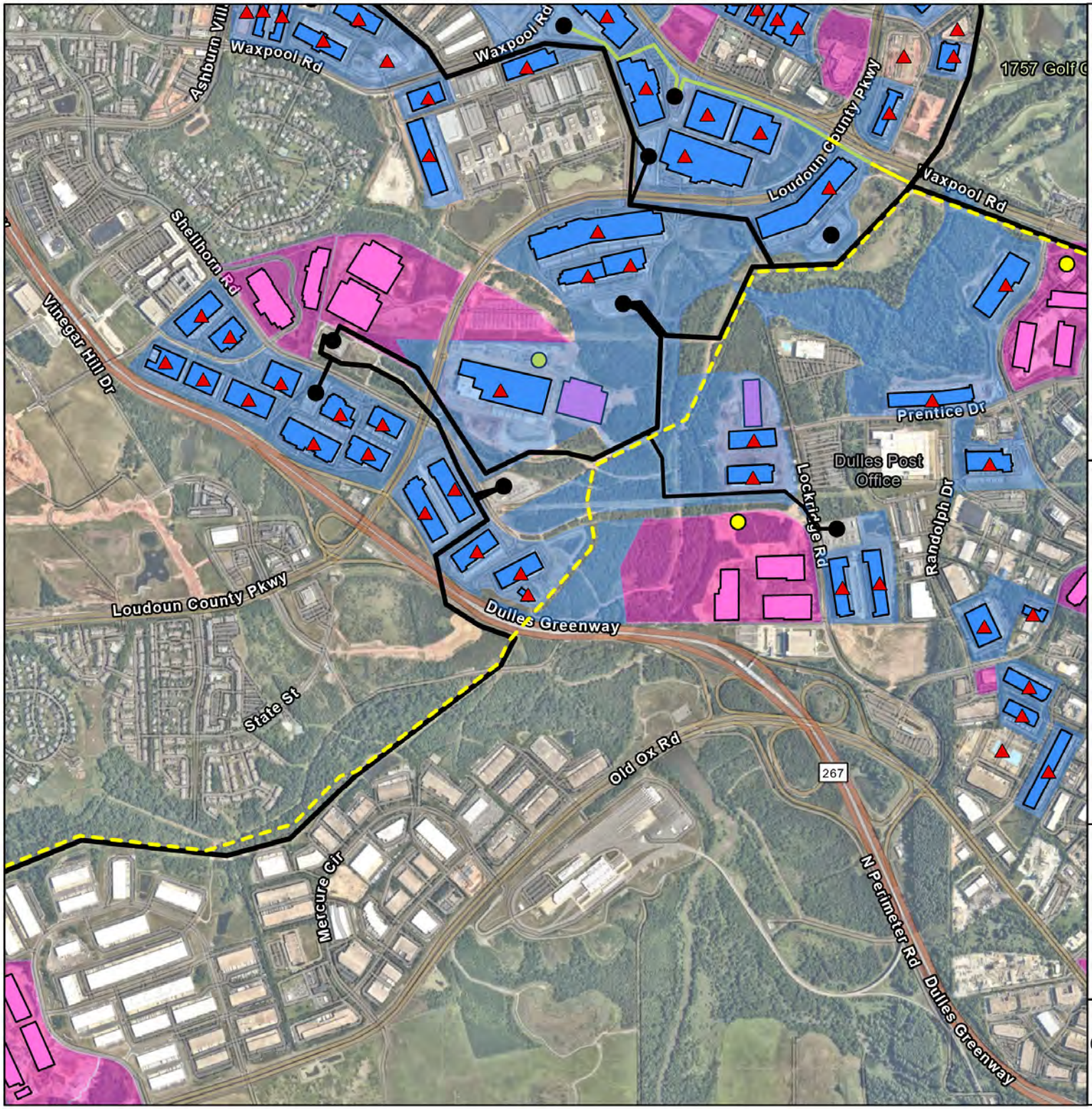
EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

SHEET 6





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Feet
0 1,750 3,500
1 IN = 1,750 FEET

LOUDOUN COUNTY, VIRGINIA

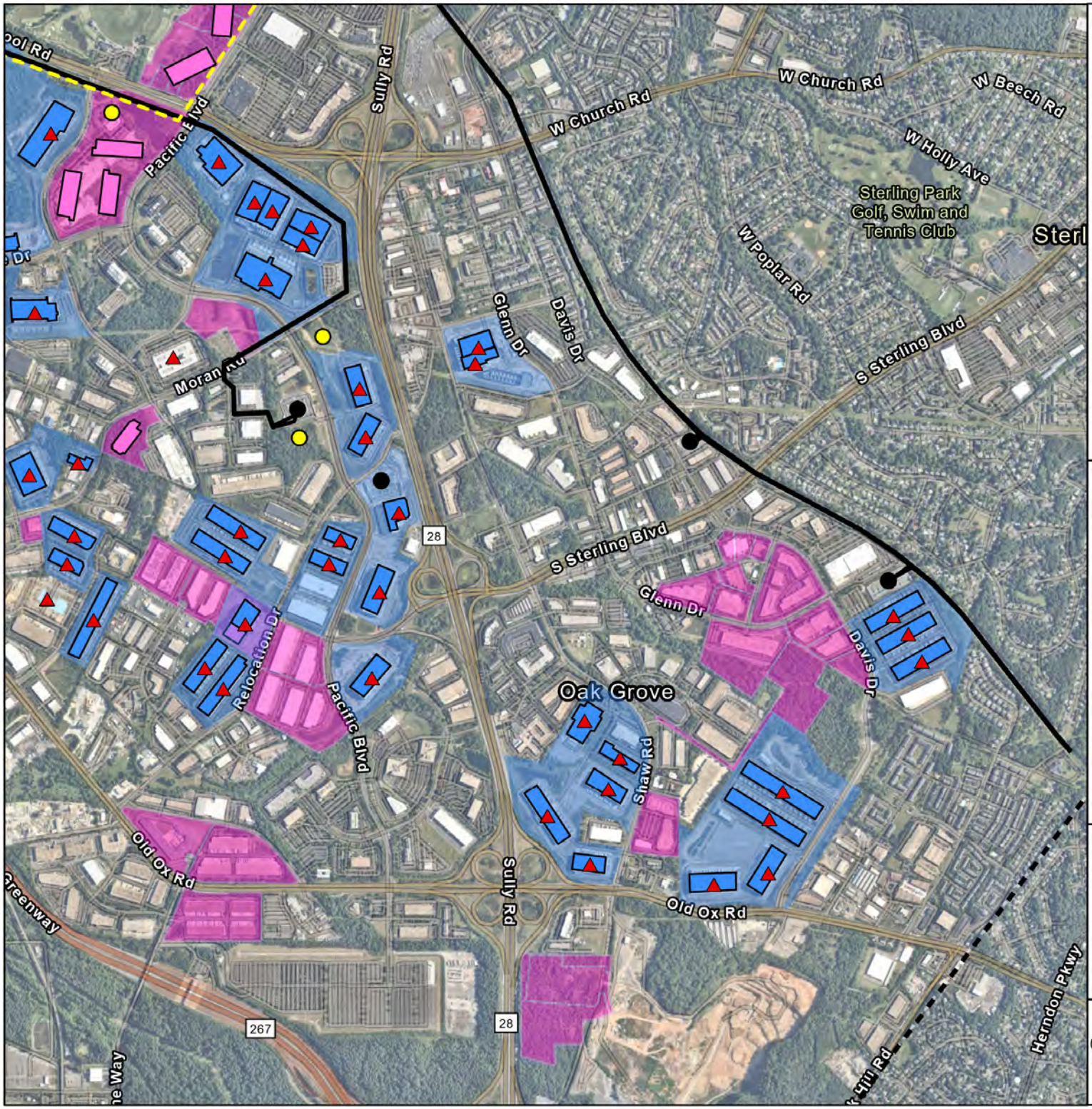
EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

SHEET 7





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Feet
0 1,750 3,500
1 IN = 1,750 FEET

LOUDOUN COUNTY, VIRGINIA

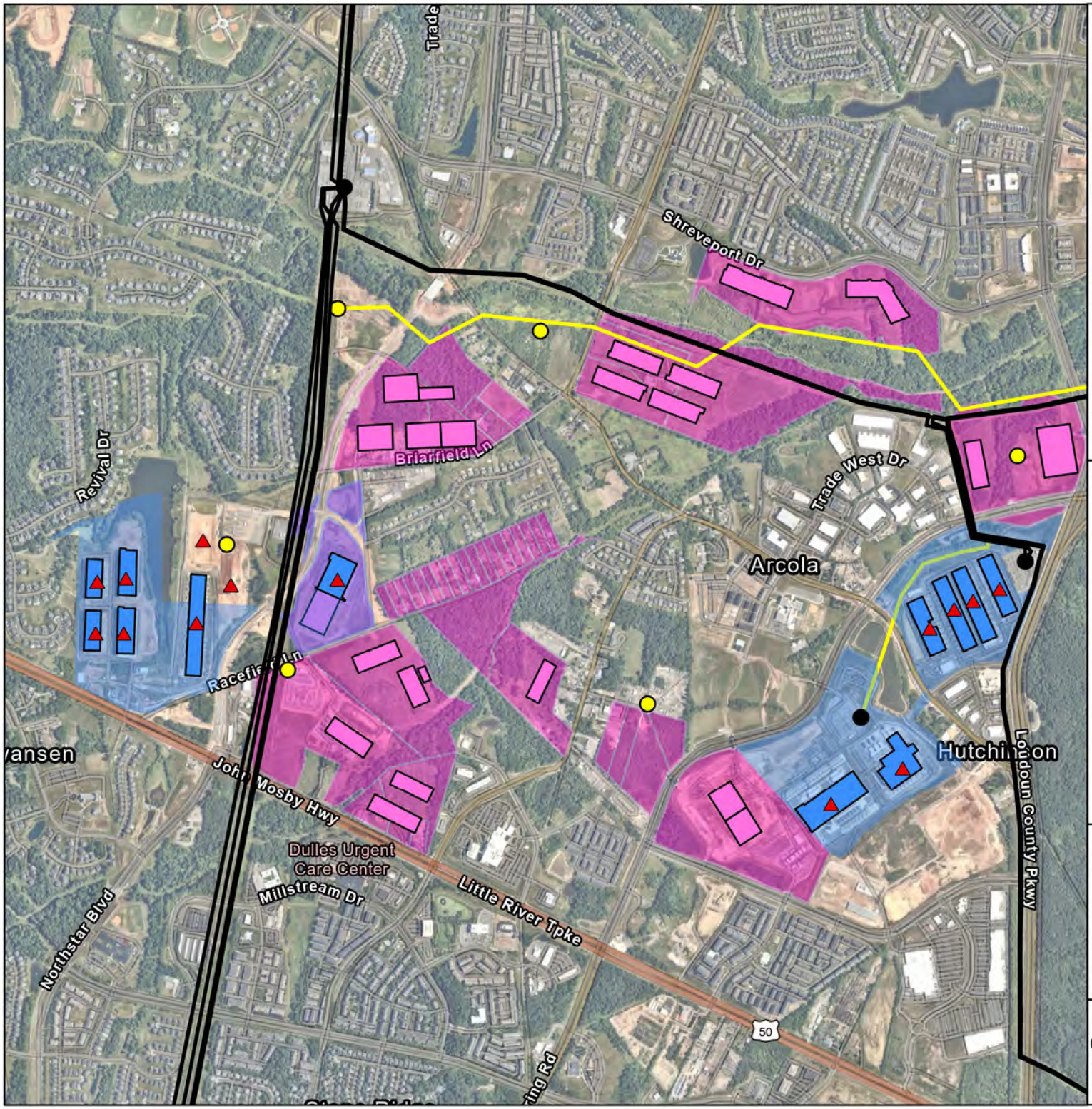
EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

SHEET 8





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Feet
0 1,750 3,500
1 IN = 1,750 FEET

LOUDOUN COUNTY, VIRGINIA

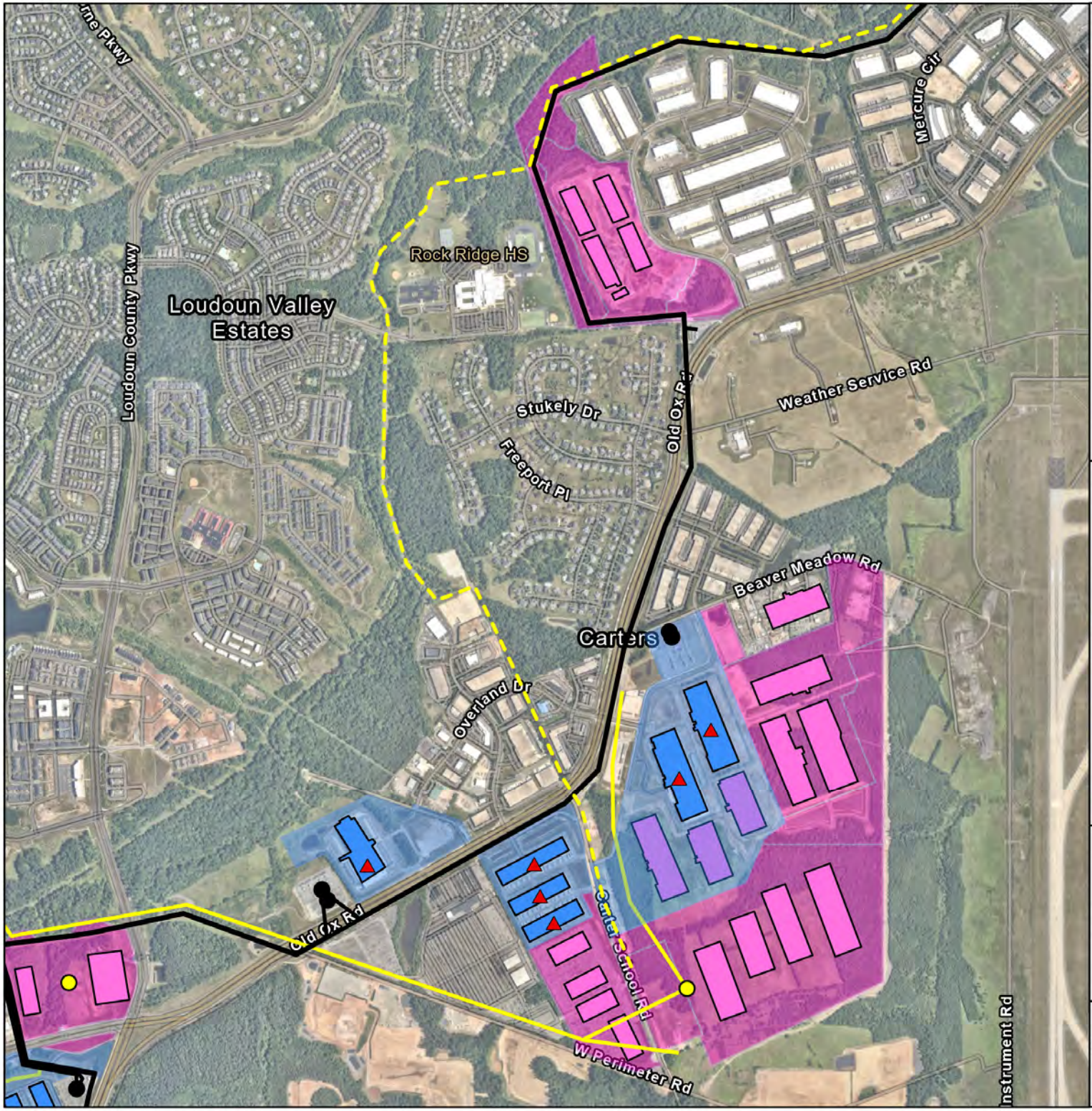
EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

SHEET 9





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LOUDOUN COUNTY, VIRGINIA

EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

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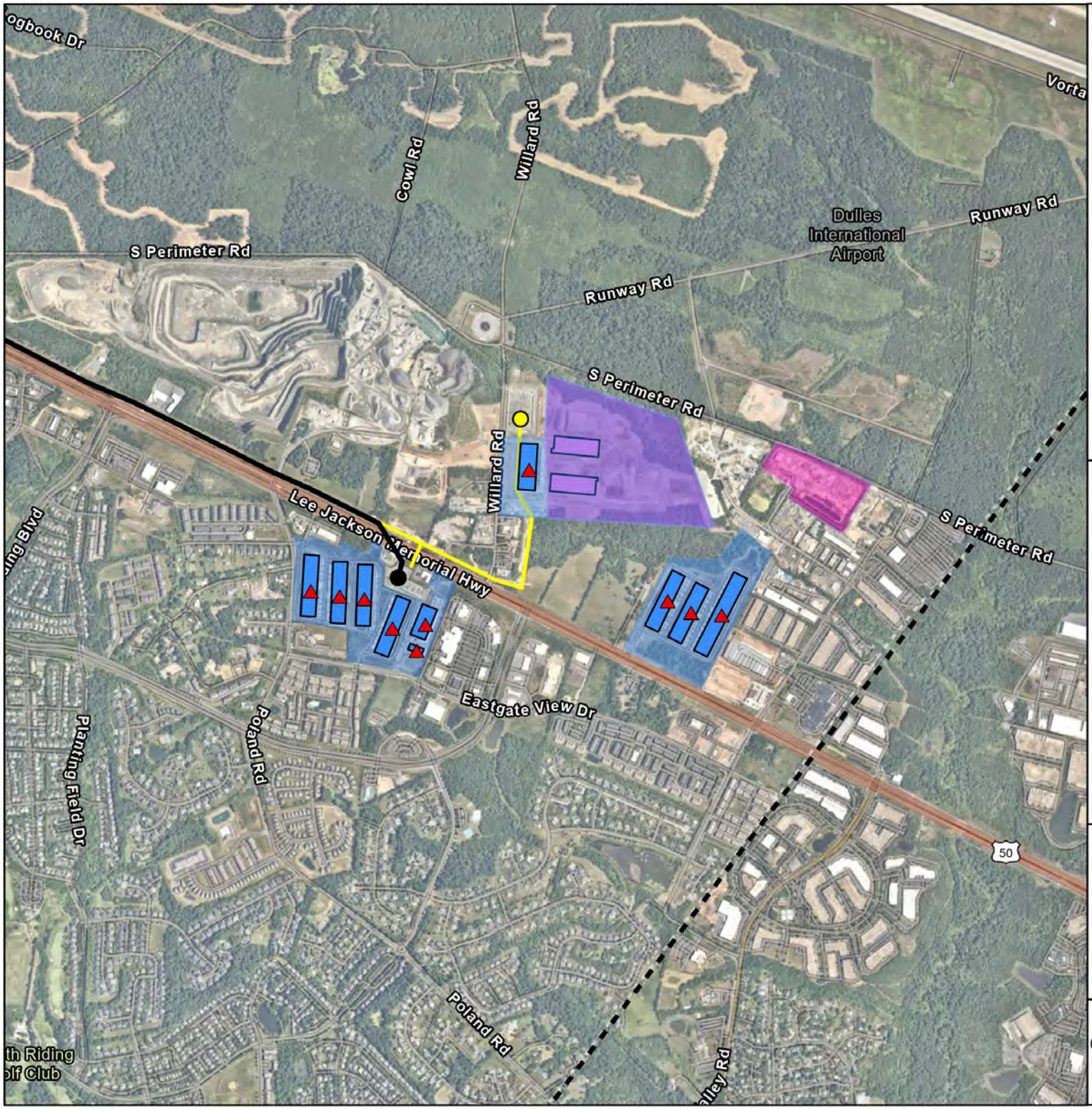
DATE: 09-2024

SHEET 10





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0 1,750 3,500
1 IN = 1,750 FEET

LOUDOUN COUNTY, VIRGINIA

EXISTING & PROPOSED DATA CENTERS

Kimley»Horn

N

DATE: 09-2024

SHEET 11