



2018 Supplemental Projects

South

Dominion

Problem Statement:

- NOVEC is installing a 5th transformer at Brambleton DP and a normally-open 230kV bus-tie between the incoming feeds (from DVP's Brambleton 230kV Bus#1 and Bus#2).

Selected Solution:

- Install all required protective relaying, metering, and associated equipment to accommodate NOVEC's 5th transformer and their ability to move load between the feeds from Brambleton 230 kV Bus #1 and Bus #2. **(s1460)**

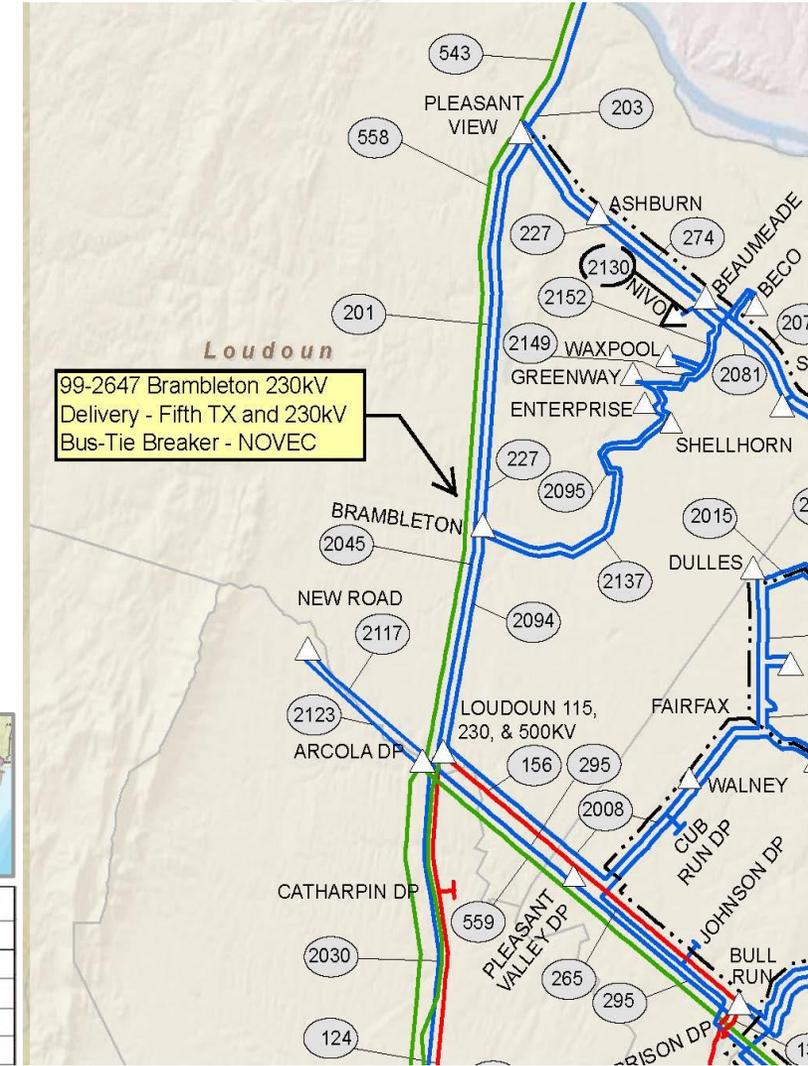
Estimated Project Cost: \$500 K

Projected In-service Date: 10/30/2018

Project Status: Engineering



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	69 KV.	AS NOTED





Dominion Transmission Zone: Supplemental National Welders Substation – Switch Replacement

Date Project Last Presented: 3/8/2018 TEAC

Problem Statement:

- National Welders substation 230kV Line #2049 switches have been identified for replacement based on age and operating issues.

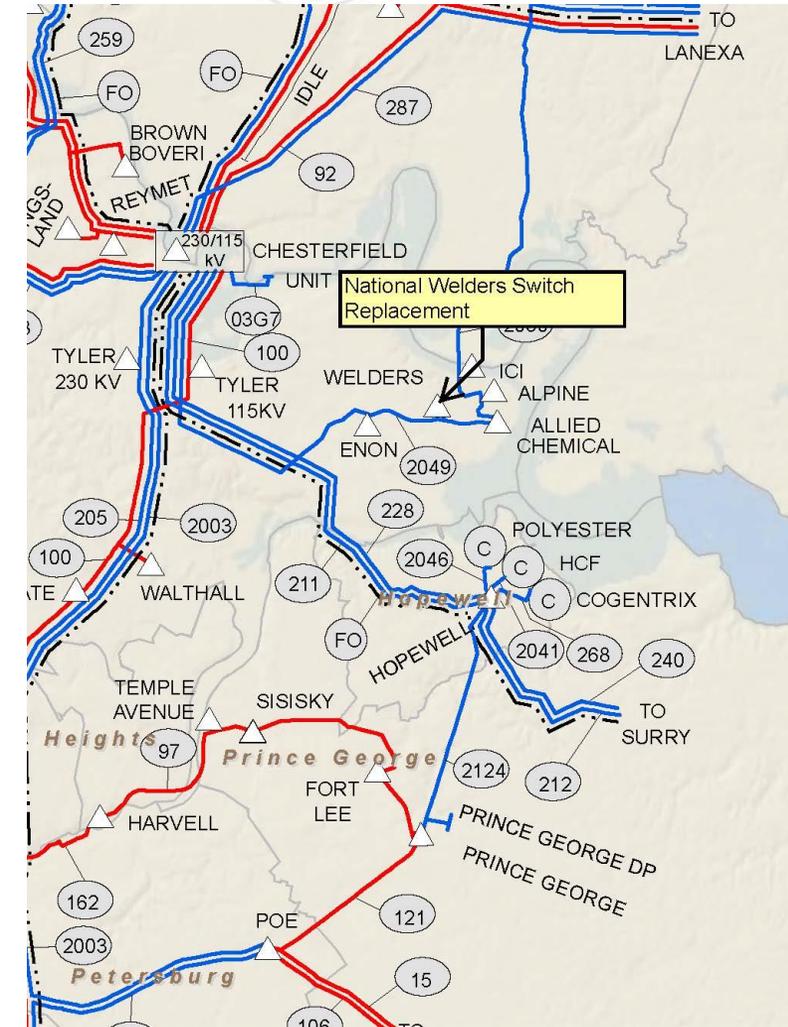
Selected Solution:

- Replace two 230kV Line #2049 2000A switches with 3000A switches. National Welders – Allied segment summer emergency ratings will be increased from 956MVA to 1047MVA. **(s1585)**

Estimated Project Cost: \$360 K

Projected In-service Date: 10/30/2018

Project Status: Engineering



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	69 KV.	AS NOTED

Date Project Last Presented: 3/8/2018 TEAC

Problem Statement:

- Dominion Distribution has identified the need to replace the existing 84MVA 115/34.5kV transformer #2 at Reeves Ave substation. The existing transformer’s proximity to the Elizabeth River causes environmental risks that should be addressed. The location also inhibits maintenance activities. To resolve these issues Dominion Distribution proposes to move the load to the 230 kV within the existing station and install a 84MVA 230/34.5kV transformer.

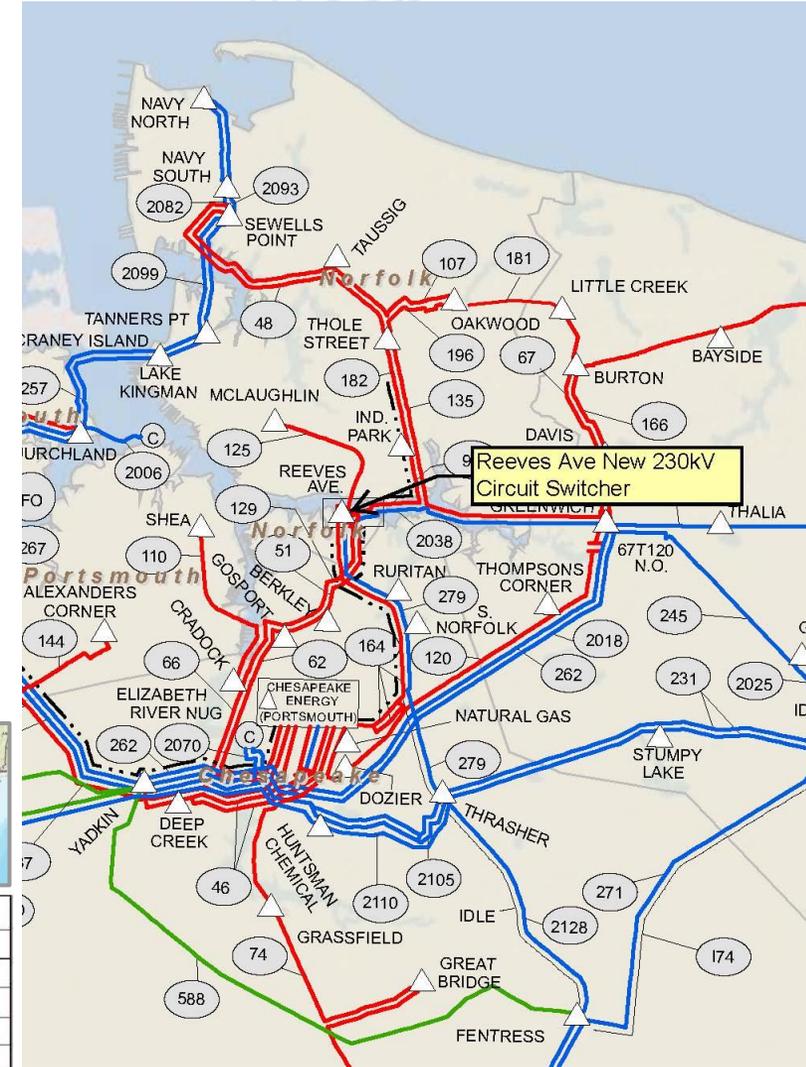
Selected Solution:

- Install a 230kV circuit switcher, high side switch and perform necessary bus work for the new transformer. **(s1586)**

Estimated Project Cost: \$500 K

Projected In-service Date: 09/30/2018

Project Status: Conceptual



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	69 KV.	AS NOTED



Dominion Transmission Zone: Supplemental Winter's Branch 230kV Delivery

Existing s1404 Scope Modification and Cost Increase

Date Project Last Presented: 10/12/2017 & 11/9/2017 TEAC

Original Problem Statement:

- Dominion Distribution has submitted a DP Request for a new substation to accommodate a new datacenter campus in Prince William County. Initial installation will include a 84MVA 230-34.5kV transformer.

Revised Problem Statement:

- Dominion Distribution has submitted an updated DP Request for a new substation to accommodate a new datacenter campus with two datacenter customers in Prince William County with total load in excess of 100MW. Initial installation will include two 84MVA 230-34.5kV transformers.

Original Solution:

- Interconnect the new substation by tapping the 230kV Line #2132 (Cloverhill – Cannon Branch) to the proposed Winter's Branch Substation. The new substation will be set up for an ultimate six-breaker 230kV ring bus to meet the future growing demands of the region. Install line switches, a 230kV circuit switcher, and high side switches and necessary bus work for the new transformer. (\$4.3 M)

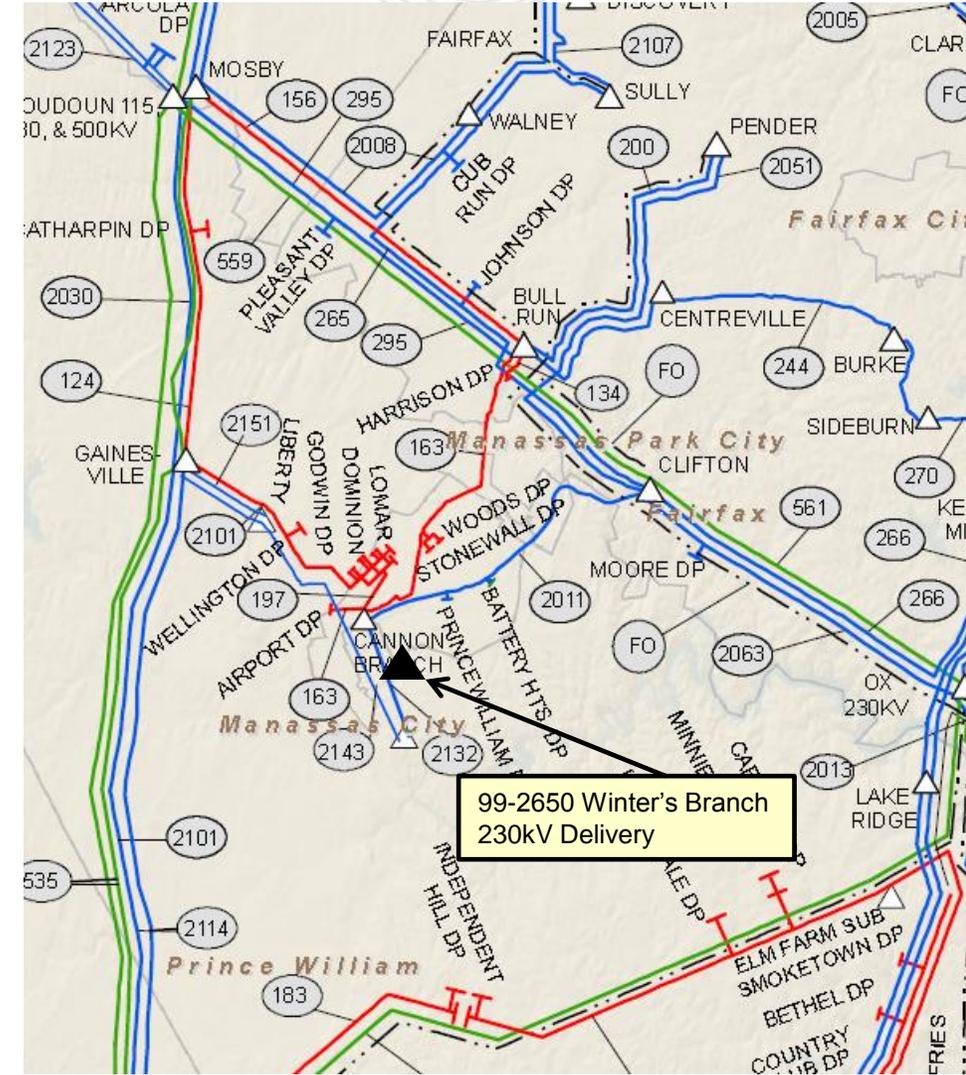
Revised Solution:

- Cut and loop the 230kV Line #2132 (Cloverhill – Cannon Branch) into the proposed Winter's Branch Substation. With total load greater than 100MW, the new substation will be a four-breaker 230kV ring bus and will be set up for an ultimate six-breaker 230kV ring bus to meet the future growing demands of the region. Install line switches, two 230kV circuit switchers and high side switches, and necessary bus work for the new transformers.

Estimated Project Cost: \$7.1 M

Projected In-service Date: 7/15/2019

Project Status: Conceptual





Dominion Transmission Zone: Supplemental Haymarket 230kV Delivery

Existing s0918 Scope Modification and Cost Increase

Date Project Last Presented: 03/09/2015 Southern Sub-Regional

Original Problem Statement:

- In 2014, Dominion Distribution submitted a DP Request for a new substation (Haymarket) to accommodate a new datacenter campus and general growth in the Haymarket Load Area in Prince William County. Initial energization is summer 2018 with load of approximately 80 MVA, growing to over 100 MVA by 2019.

Original Solution:

- Loop (in-and-out) an overhead, double-circuit, 230kV transmission line extension approximately 6 miles (along new right-of-way) from a point in the corridor north of Gainesville to the proposed Haymarket Substation site. Install four 230kV breakers in a ring arrangement to accommodate the connection of DVP's 84 MVA, 230-34.5kV transformers (two initial, three ultimate).

Revised Solution:

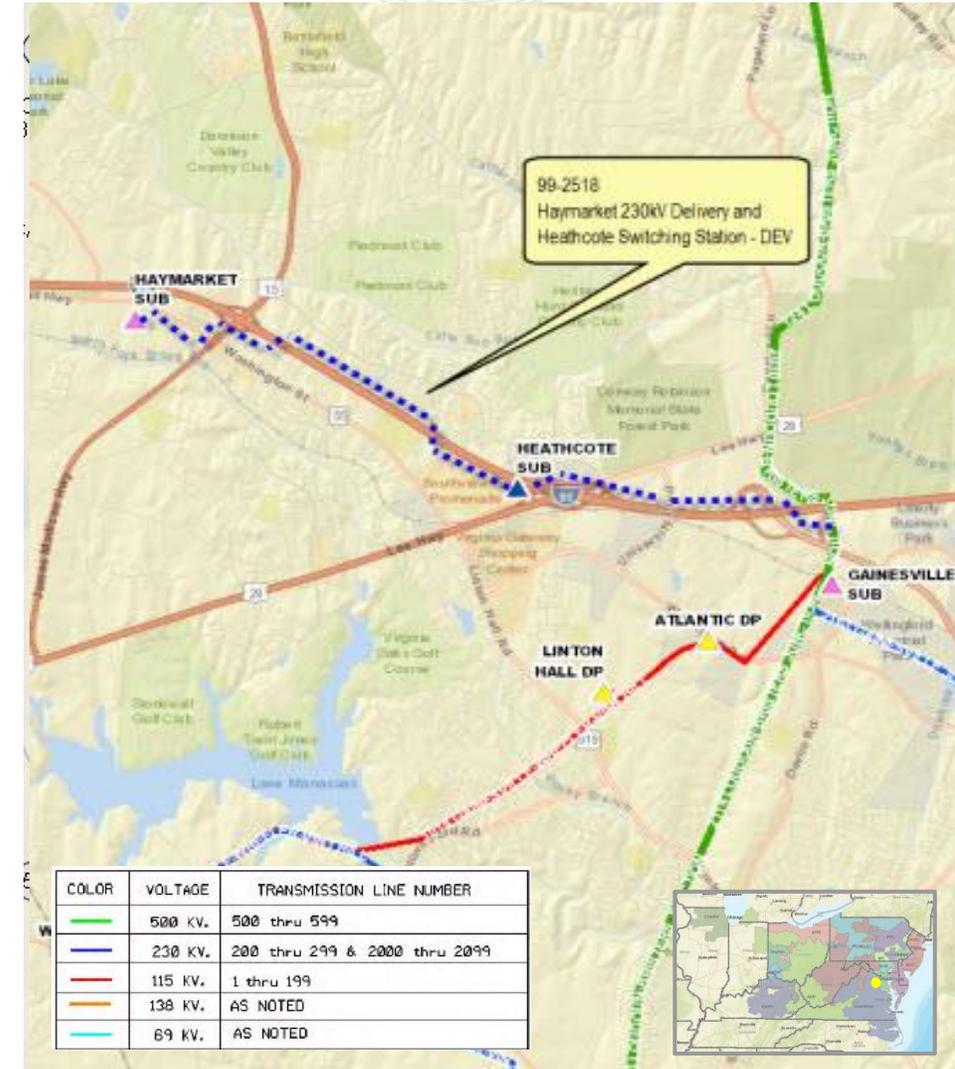
- Loop (in-and-out) an overhead, double-circuit, 230kV transmission line extension approximately 3 miles (along new right-of-way) from a point in the corridor north of Gainesville to Heathcote Switching Station. Install four breakers in a ring arrangement and two 50-100 MVAR variable reactors at Heathcote. Loop (in-and-out) an **underground***, double-circuit, 230kV transmission line extension approximately 3 miles (along new right-of-way) from Heathcote Switching Station to Haymarket Substation. Install four 230kV breakers in a ring arrangement to accommodate the connection of DVP's 84 MVA, 230-34.5kV transformers (two initial, three ultimate).
- The Virginia State Corporation Commission has approved the project under a newly enacted underground transmission pilot program as part of the Grid Transformation and Security Act of 2018. The legislation was signed into law on March 9, 2018 and went into effect July 1, 2018.

Revised Estimated Project Cost: \$174M (Original: \$45-57M)

Revised Projected In-service Date: 07/15/2021 (Original: 05/01/2018)

Project Status: Engineering

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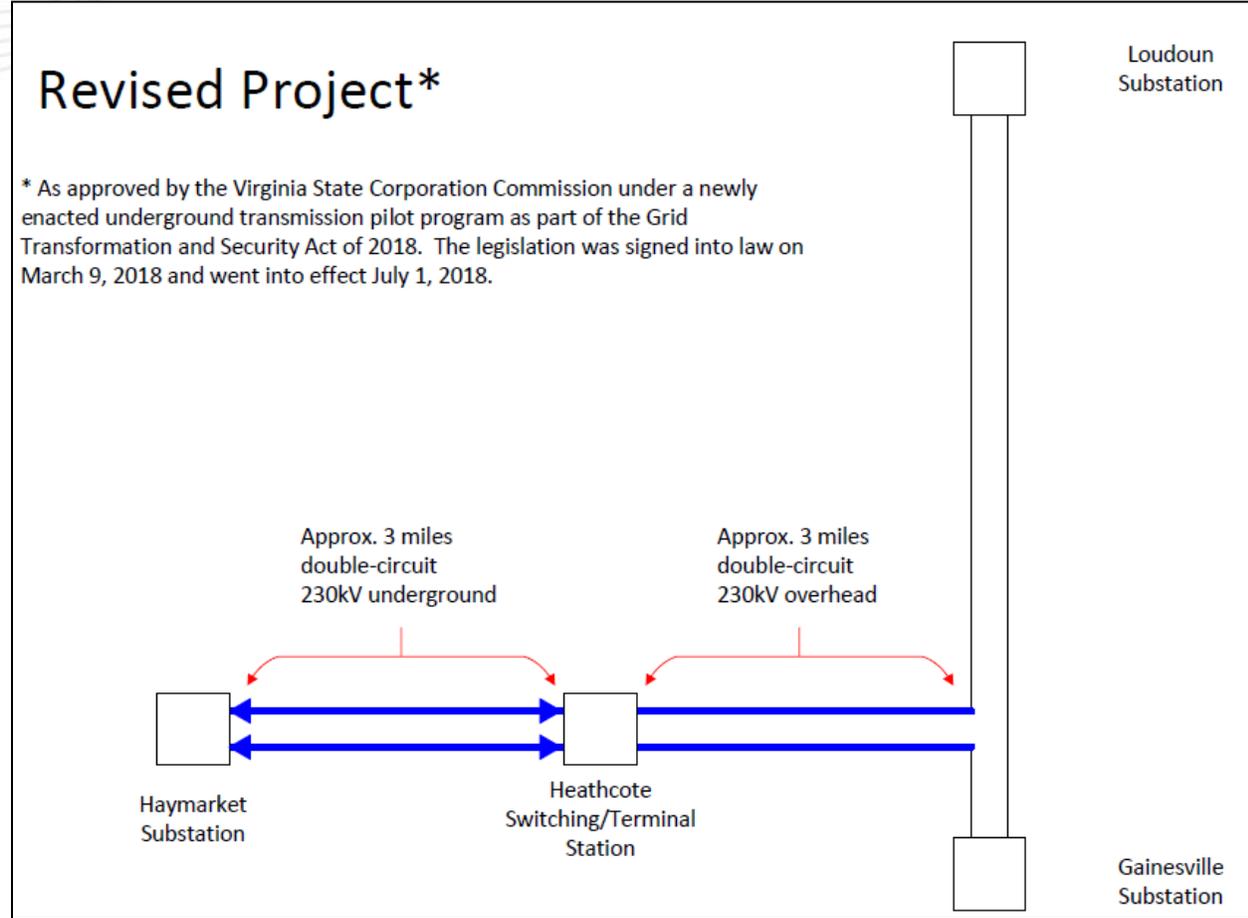
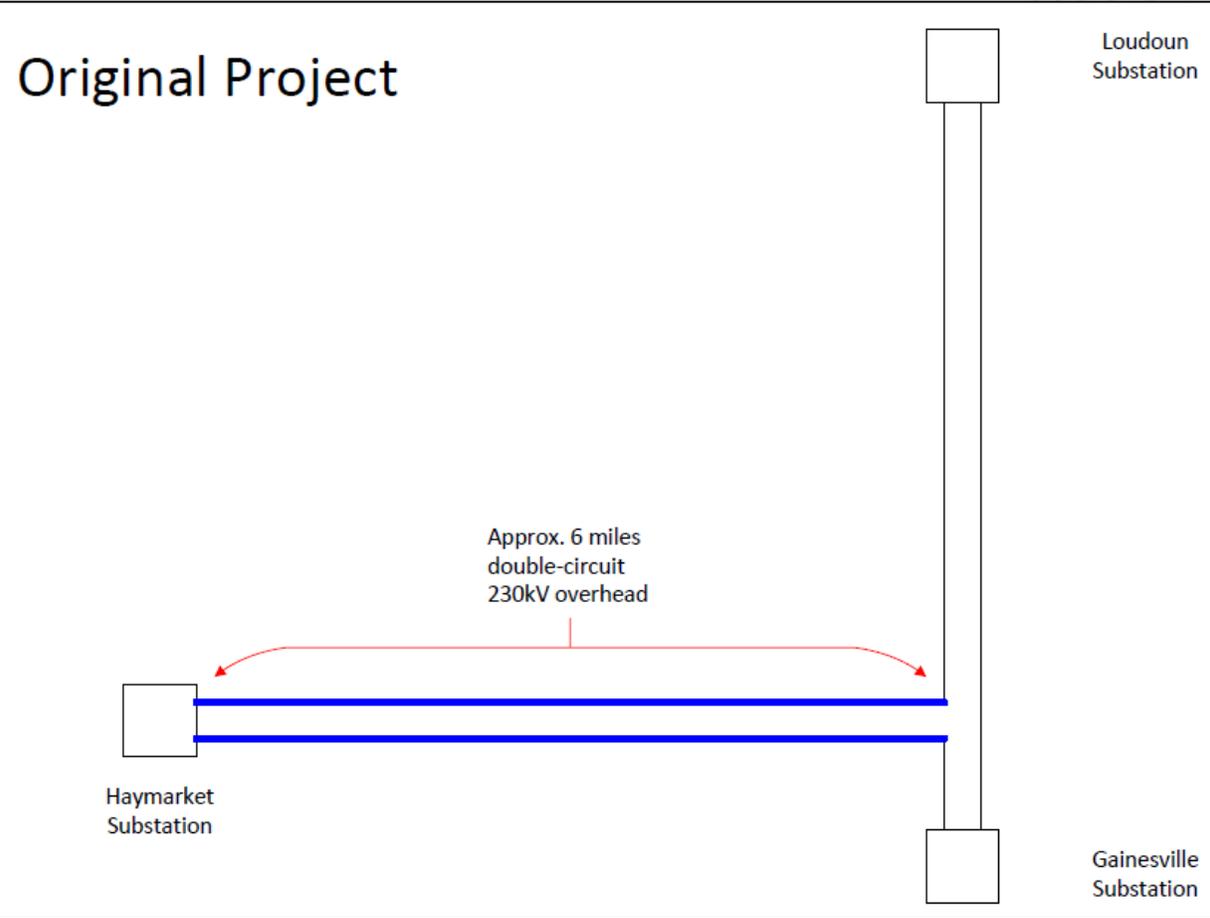




Dominion Transmission Zone: Supplemental Haymarket 230kV Delivery

Existing s0918 Scope Modification and Cost Increase
Date Project Last Presented: 03/09/2015 Southern Sub-Regional

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Existing s0605 Scope Modification and Cost Increase

Date Project Last Presented: 08/21/2013 Southern Sub-Regional

Original Problem Statement:

- In 2013, Dominion Distribution submitted a DP Request for a new substation (Farmwell) with an ultimate configuration to install four 84 MVA transformers in order to accommodate datacenter growth in the region. Energization is summer 2015.

Original Solution:

- Tap Line #2149 (Enterprise – Waxpool). Install two 84 MVA transformers with two double-dead end backbones and one 230kV breaker (in a 6 breaker ring configuration).

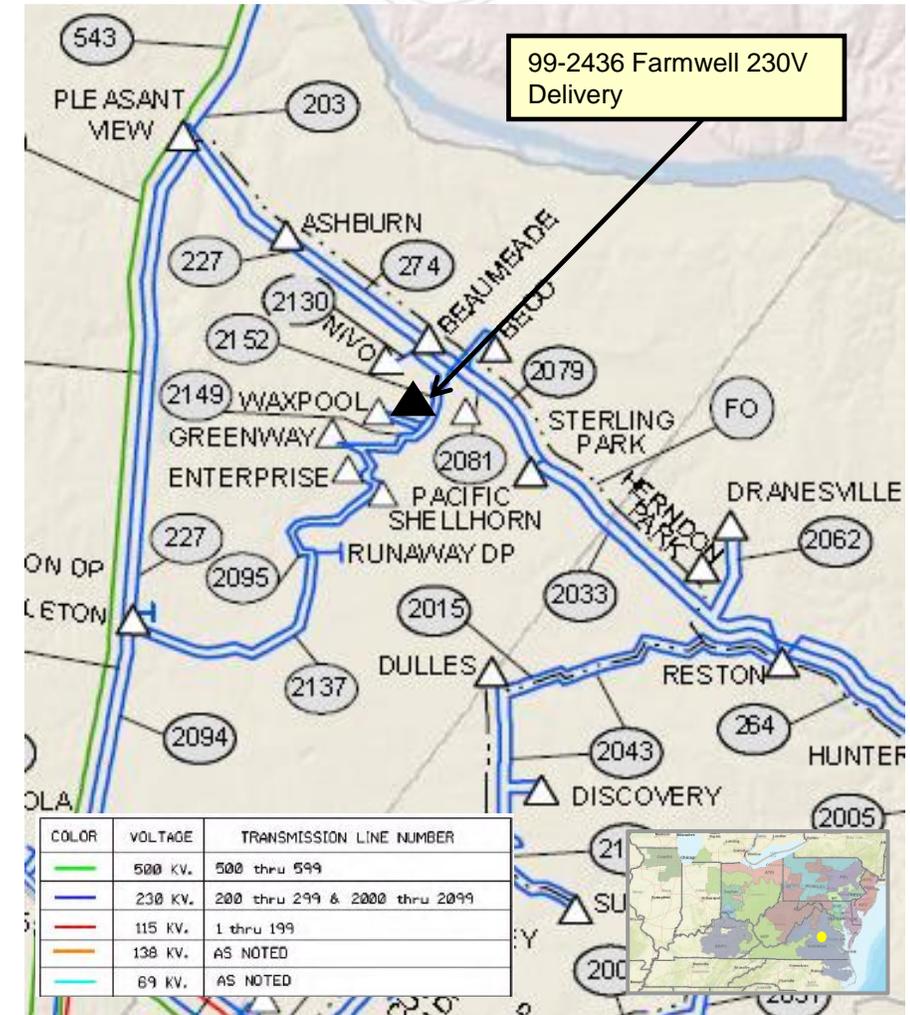
Revised Problem Statement:

- Dominion Distribution has submitted a revised DP request for a new substation (Farmwell) with projected load greater than 100 MVA by 2023 with an ultimate configuration to install four 84 MVA transformers.

Revised Solution:

- Cut and loop Line #2152 (Beaumeade – Waxpool) into a four breaker ring bus configuration with space for two additional breakers in the future. Install two 84 MVA transformers.

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Dominion Transmission Zone: Supplemental Farmwell 230kV Delivery

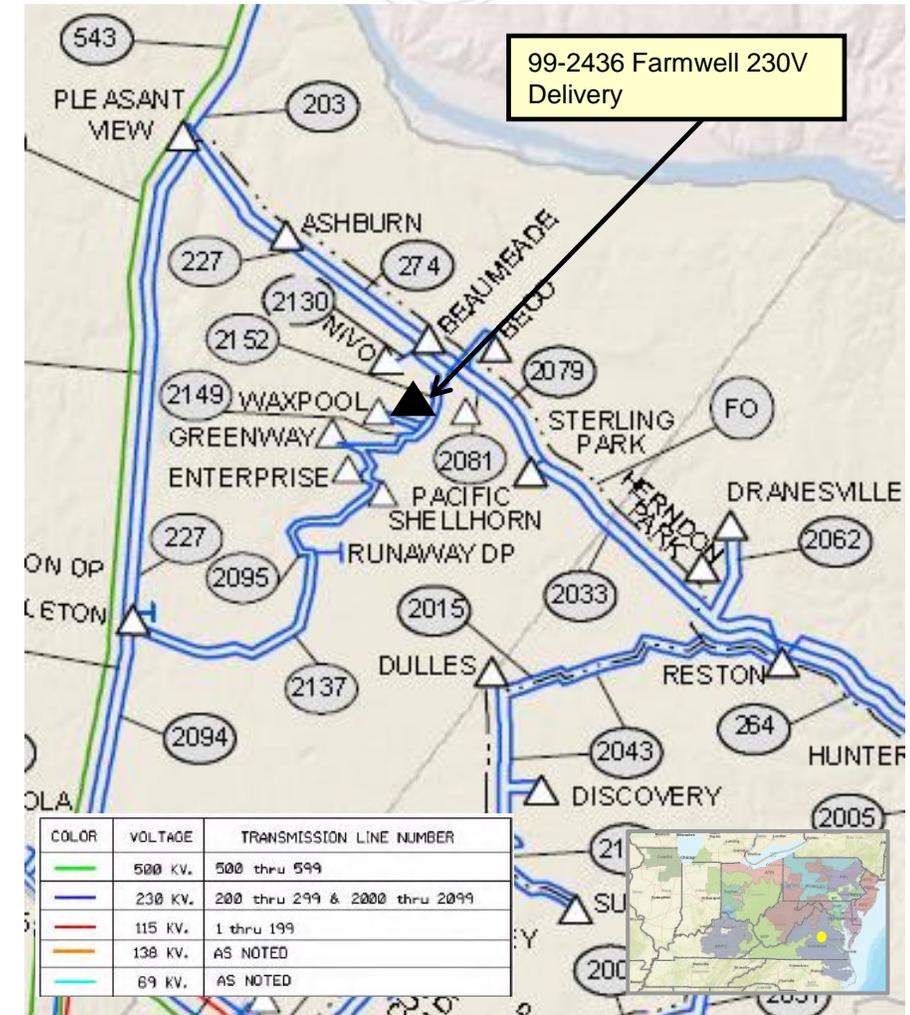
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Existing s0605 Scope Modification and Cost Increase
Date Project Last Presented: 08/21/2013 Southern Sub-Regional

Revised Estimated Project Cost: \$5.5M (Original: \$1.5M)

Revised Projected In-service Date: 11/15/2020 (Original: 05/15/2015)

Project Status: Conceptual





Dominion: Supplemental Project Line #121 Wave Trap Replacement

Previously Presented: 01/30/2018 SR RTEP

Problem Statement:

115kV Line #121 wave trap at Poe substation needs to be replaced due to age.

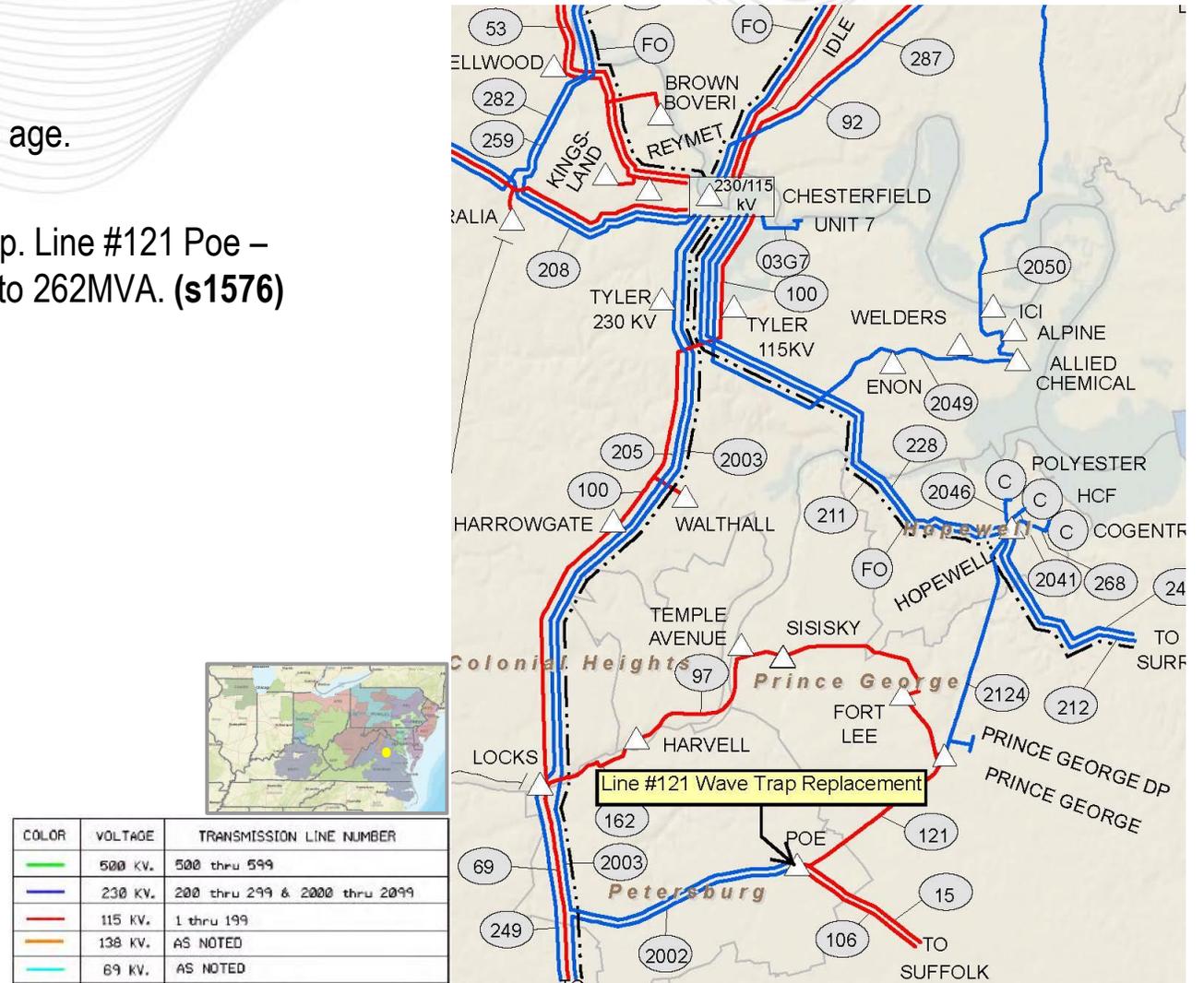
Selected Solution:

Replace existing line #121 1200A wave trap at Poe with a 2000A wave trap. Line #121 Poe – Prince George summer emergency rating will be increased from 239MVA to 262MVA. (s1576)

Estimated Project Cost: \$130 K

Projected In-service Date: 5/30/2018

Project Status: Engineering





Dominion: Supplemental Project Pumping Hill – New 115kV Delivery Point for Mecklenburg EC

Previously Presented: 01/30/2018 SRRTPEP

Problem Statement:

ODEC has requested a new 115kV delivery point on behalf of Mecklenburg EC to replace Hickory Grove DP #2 (3MW). The main drivers for the new 115kV delivery point are MEC's:

1. Aging equipment needs to be replaced and clearance issues need to be corrected; however, MEC cannot expand the station because MEC does not own Hickory Grove DP property.
2. It is not practical for the load to be served by DE distribution.

Selected Solution:

Dominion Energy to support the installation of MEC's new 115kV delivery point by installing 3 switches. Hickory Grove DP #2 will be retired. Hickory Grove DP #1 will remain as an industrial service to feed a pipeline. (s1577)

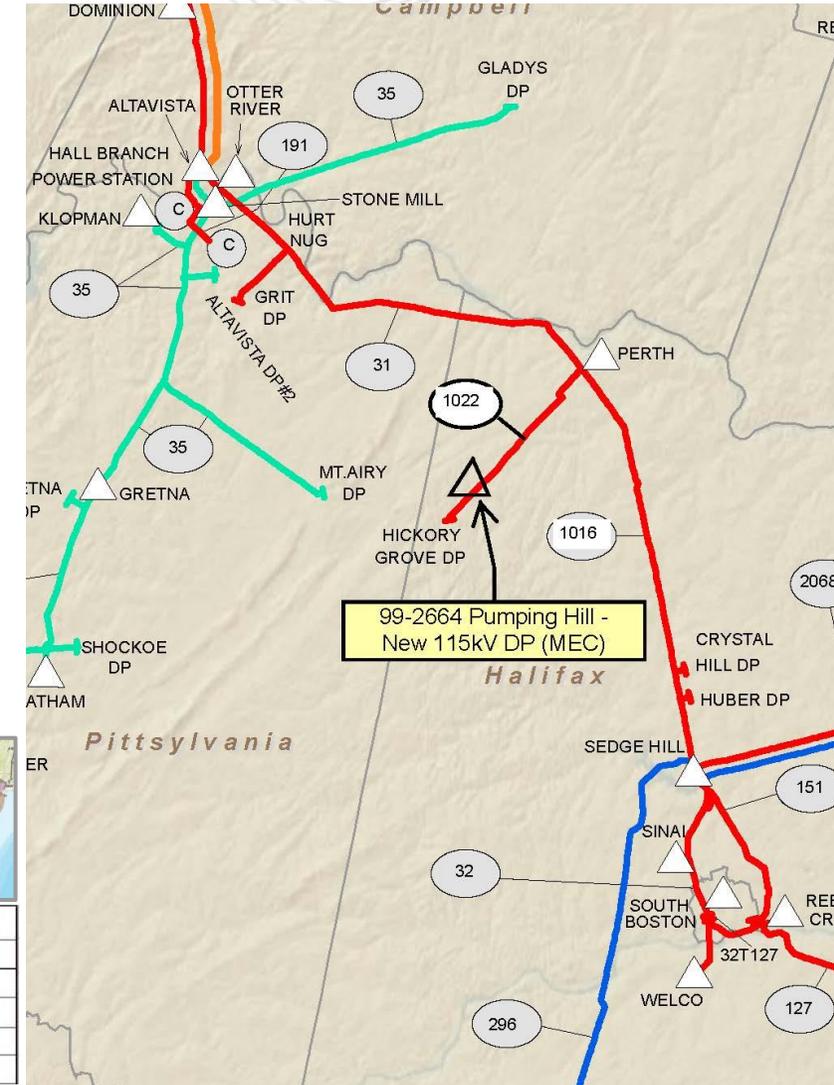
Estimated Project Cost: \$1.5 M

Projected In-service Date: 11/1/2018

Project Status: Conceptual



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	89 KV.	AS NOTED



Previously Presented: 01/30/2018 SRRTEP

Problem Statement:

CVEC has submitted a DP Request for a new Cobbs Creek station to accommodate the construction of water reservoir adjacent to existing 115kV Line #4. Anticipated load is expected to be 7 MVA.

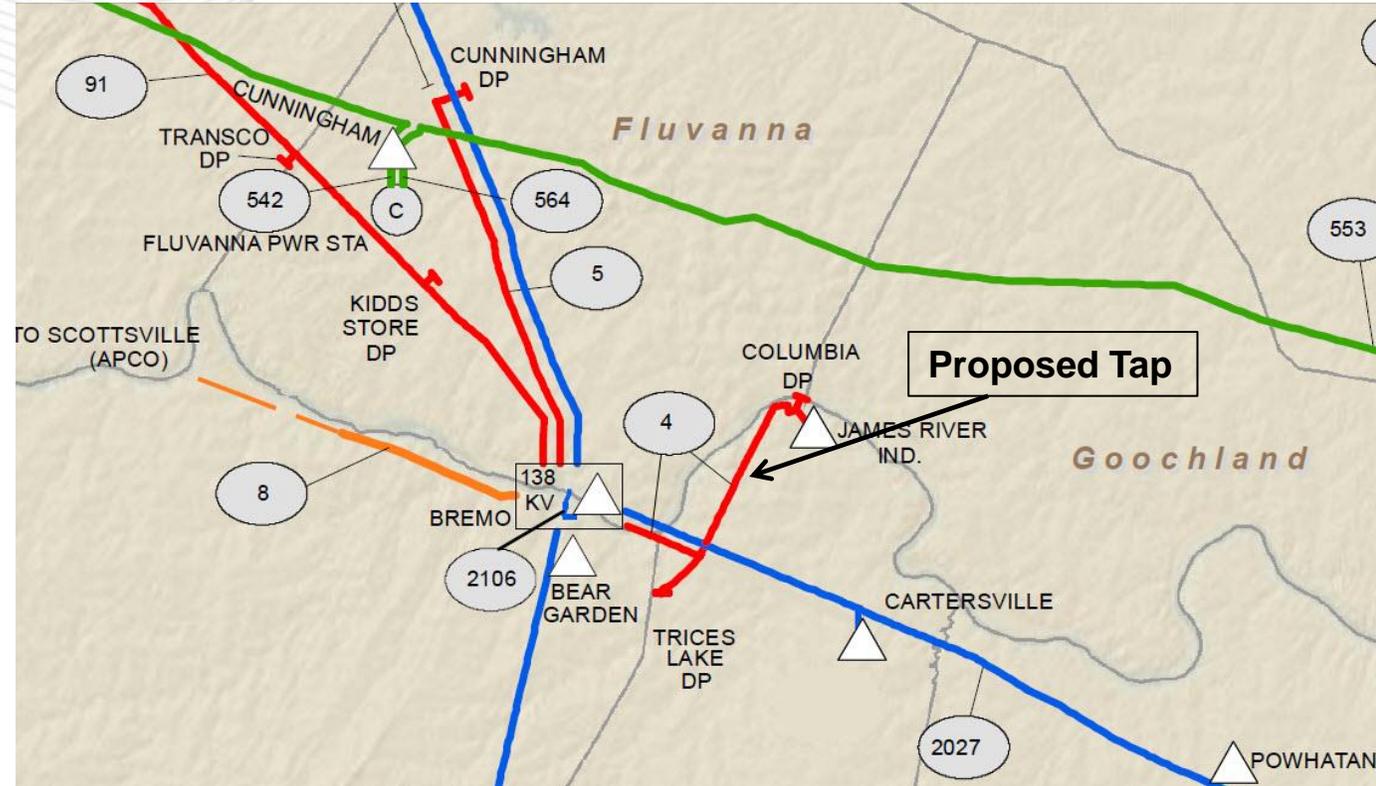
Selected Solution:

Install a tap off 115kV Line #4. (s1578)

Estimated Project Cost: \$450 K

Projected In-service Date: 1/1/2019

Project Status: Conceptual



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	69 KV.	AS NOTED



Skimmer Substation Reliability Project – 115kV Lines #30 and #141

Previously Presented: 05/30/2018 SRRTEP

Problem Statement:

- The breakers for 115kV Lines #30 and #141 at Skimmer Substation are of a type that has had operating issues and need to be replaced. Updated relaying will need to accompany this along with a new control house. Station service is currently supplied via distribution from AEP and a transmission primary source is being sought.

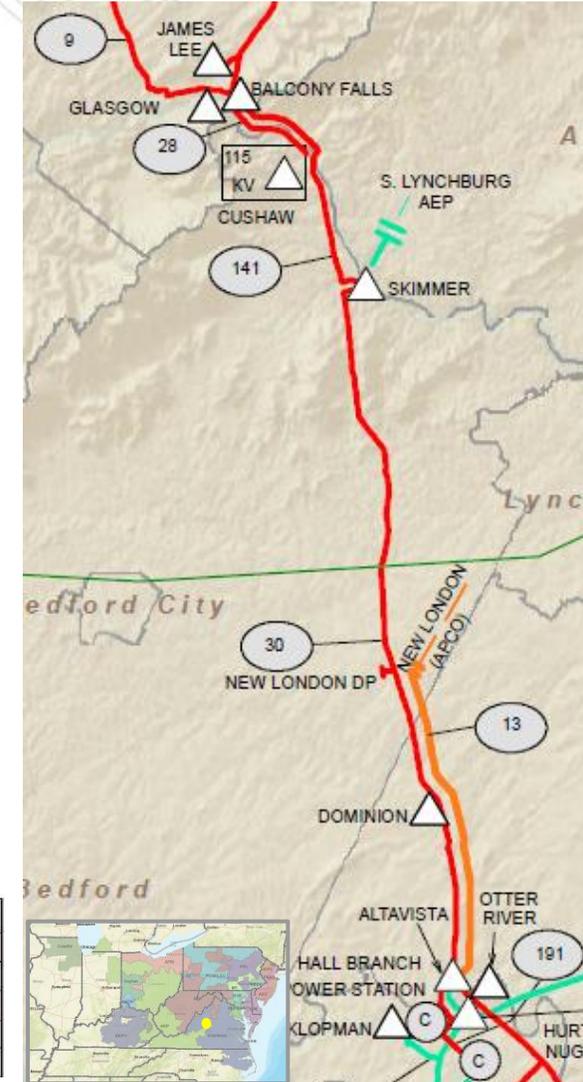
Selected Solution:

- Replace existing breakers for Lines #30 and #141 along with related breaker switches and wave traps. Construct a new control house and install a PVT for primary station service with a transfer switch for a distribution backup. **(s1676)**

Estimated Project Cost: \$2.54 M

Projected In-service Date: 11/15/2018

Project Status: Engineering



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	69 KV.	AS NOTED

Dominion: Supplemental Project Herbert – New 115kV Dominion Energy Substation

Previously Presented: 05/30/2018 SR RTEP

Problem Statement:

- A large customer is building facilities north of Boydton Plank Road substation in Mecklenburg County, VA. The minimum demand for this customer is 59 MW at full buildout in 2022.

Selected Solution:

- Build a new substation called Herbert with a 115kV four breaker ring bus and two distribution transformers
- Split Line #171 (Chase City to Boydton Plank Rd) into two lines and terminate both lines into the new Herbert substation (**s1677**)

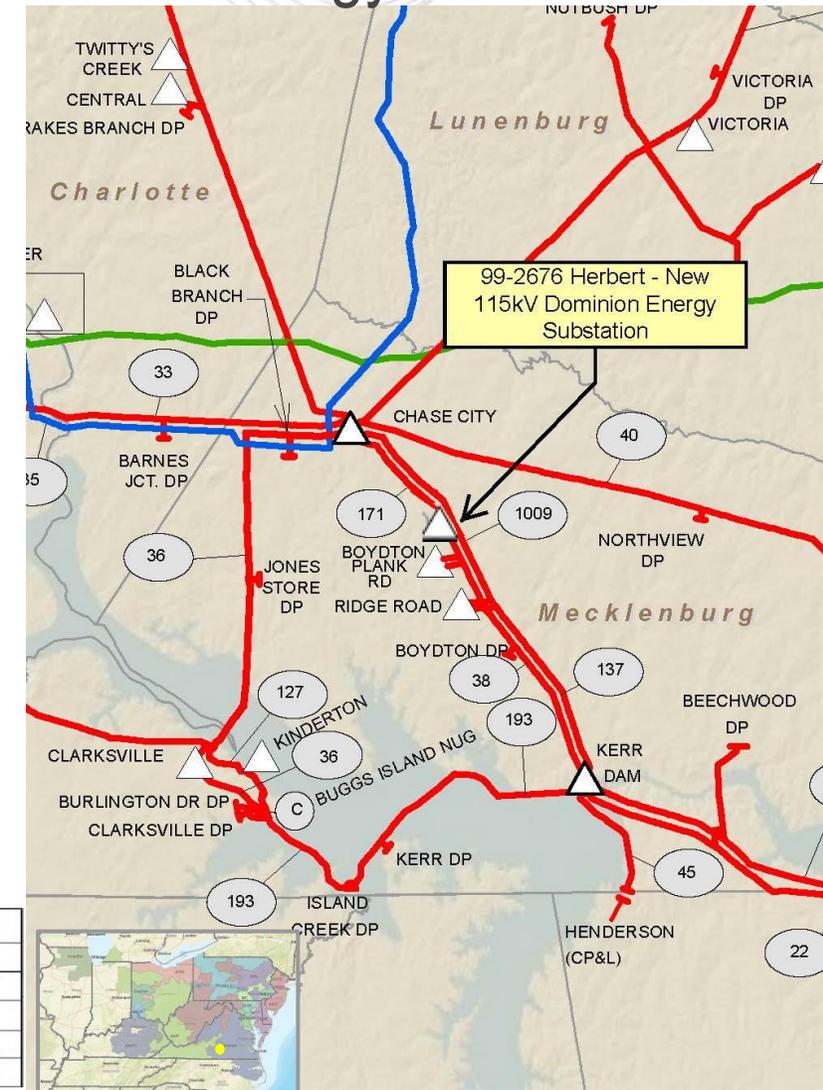
Revised Estimated Project Cost: \$4.7 M

Normal Service cost: \$1.4 M

Excess Facilities cost: \$3.3 M

Projected In-service Date: 10/1/2019

Project Status: Engineering



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	69 KV.	AS NOTED

Dominion: Supplemental Project Pamplin 115kV Circuit Switcher and High Side Switch

Previously Presented: 05/30/2018 SRRTEP

Problem Statement:

- Dominion Distribution needs to upgrade transformer #2 34.5-23kV due to winter load exceeding the transformer normal overload (NOL) rating. The NOL rating was exceeded January 2018 and additional load growth of 1.9 MVA will be added in 2019.
- The existing 34.5-23kV three single phase transformers (and a spare) in the substation is not standard within the DE system and DE's mobile transformers are 115-23kV, not 34.5-23kV.
- There is no available high side fuse protection for a transformer bank greater than 6 MVA and there is no room for other protective devices in the substation with this three single phase bank arrangement (with a spare).
- Removal of the single phase banks allows for removal of wooden poles in the substation which is a DE policy due to the risk of wooden poles catching on fire,
- The proposed three phase 115-23kV transformer will be located in the same location in the substation as the existing transformer #2 bank which provides space for a high side circuit switcher and switch.

Selected Solution:

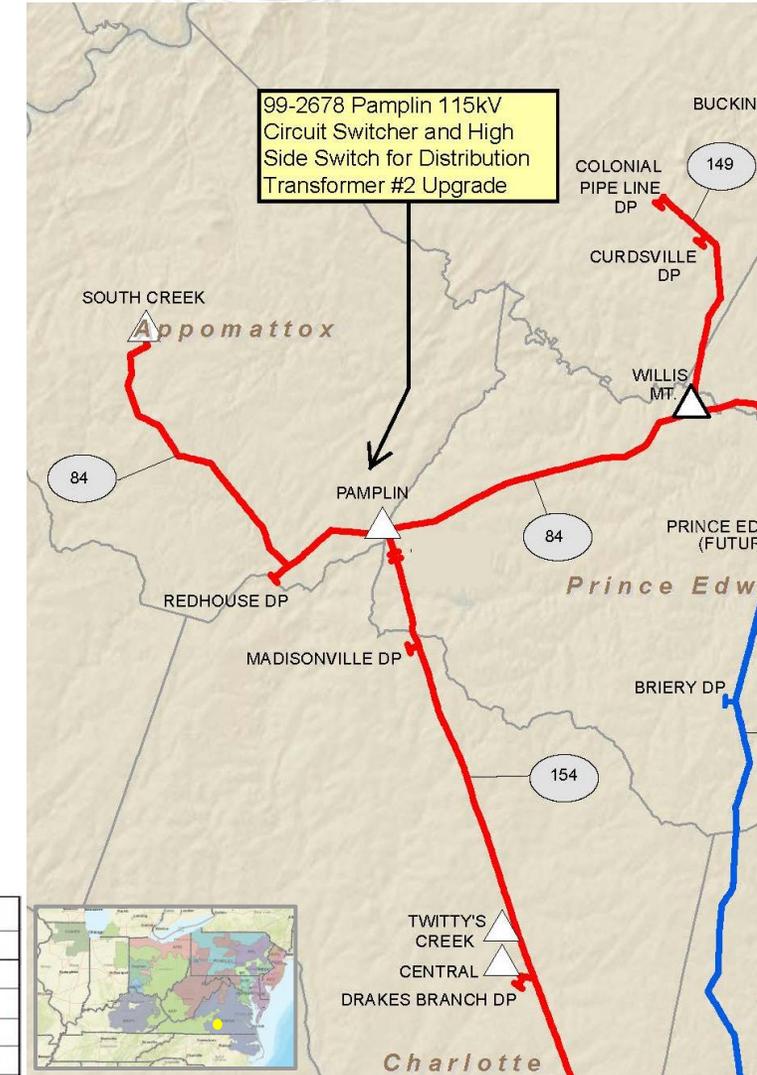
- Support the installation of the distribution transformer upgrade by installing a 115kV circuit switcher and high side switch. (s1678)

Estimated Project Cost: \$500 K

Projected In-service Date: 5/15/2019

Project Status: Conceptual

COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	69 KV.	AS NOTED



Previously Presented: 07/27/2018 SRRTEP

Problem Statement:

- A new block load is being added at Ridge Road substation in Mecklenburg County, VA. The minimum demand for this load addition is 38 MW in 2022.

Selected Solution:

- Add a three breaker row to the existing 115kV breaker and a half scheme
- Add a high side circuit switcher for the fifth distribution transformer (**s1719**)

Alternatives: No feasible alternatives

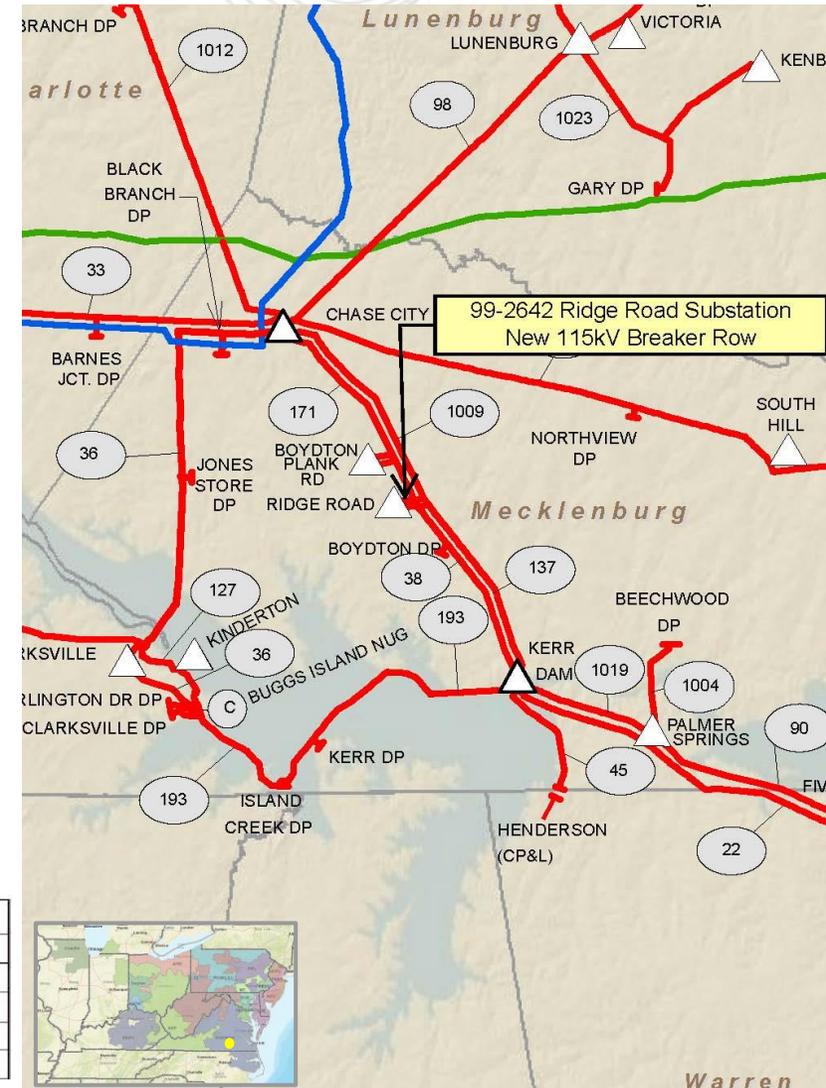
Estimated Project Cost: \$2.7 M

Normal Service cost: \$0.5 M

Excess Facilities cost: \$2.2 M

Projected In-service Date: 8/1/2019

Project Status: Conceptual



Dominion: Supplemental Project Elmont 230-115kV Transformer #5 Replacement

Previously Presented: 07/27/2018 SRRTEP

Problem Statement:

- Elmont 230-115kV 168 MVA transformer #5 needs to be replaced as a result of Dominion's ongoing transformer health assessment (THA) process. This process considers design characteristics, past electrical test results, dissolved gas-in-oil test results, age, ongoing maintenance issues, and past failures of similar designed transformers.
- This transformer was manufactured in 1971 and was remanufactured in 2003 following failure in November 2001.
- Drivers for replacement are:
 - Reduced BIL Ratings
 - Previously remanufactured following failure
 - Transformers of this manufacture are considered suspect due to previous transformer failures

Selected Solution:

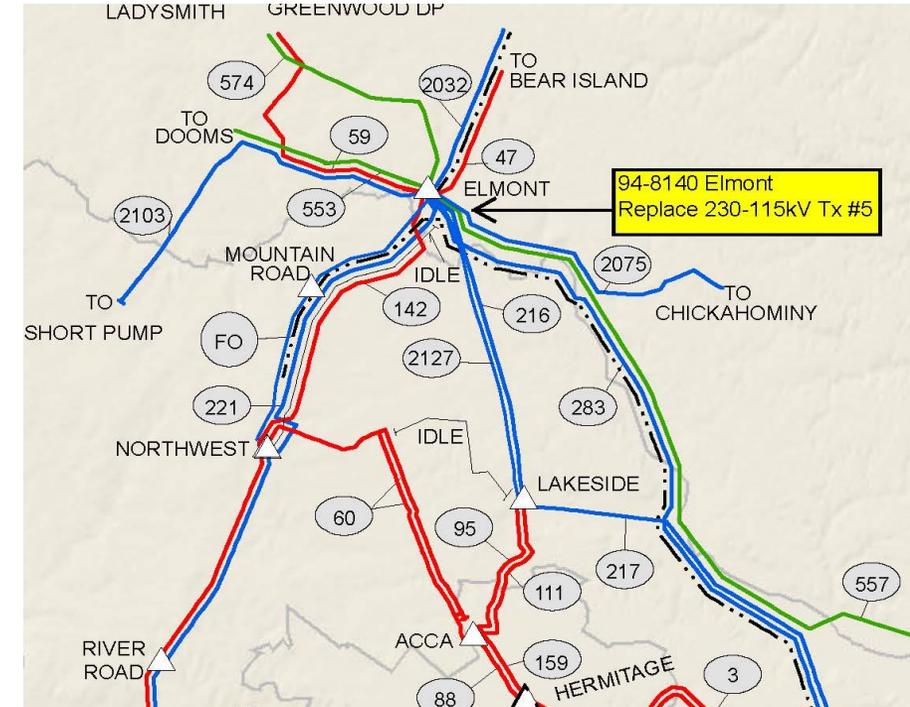
- Replace Elmont transformer #5 with a 168 MVA transformer (s1720)

Alternatives: No feasible alternatives

Estimated Project Cost: \$1.5 M

Projected In-service Date: 9/12/2019

Project Status: Engineering



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	69 KV.	AS NOTED



Previously Presented: 07/27/2018 SRRTEP

Problem Statement:

- 115kV Line #120 runs 11 miles from Chesapeake Energy Center to Greenwich substation. This line has a summer emergency rating of 147 MVA. The line serves approximately 21,000 customers with about 100MWs through Dozier substation and Thompsons Corner substation. Currently line #120 is normally open at Greenwich. To serve these customers with better reliability the line needs to be networked.

Selected Solution:

- Install a new 115kV breaker in line #120 at Greenwich and perform associated transmission work. Close the normally open point 67T120. There is no impact to the ratings of line #120 and #67. Update relay equipment for the new network line #120. (s1721)
- No harm analysis completed with no issues found.

Alternatives: No feasible alternatives

Estimated Project Cost: \$1.5 M

Projected In-service Date: 05/31/2020

Project Status: Conceptual

COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Green	500 KV.	500 thru 599
Blue	230 KV.	200 thru 299 & 2000 thru 2099
Red	115 KV.	1 thru 199
Orange	138 KV.	AS NOTED
Cyan	69 KV.	AS NOTED

