

# South Carolina Regional Transmission Planning

## Stakeholder Meeting

### Web Conference

June 1, 2017 2:00 – 4:00 PM

## Purpose and Goals for Today's Meeting

- Review of Current Transmission Expansion Plans
- Update on Regional Planning Process
- Discussion on Multi-Party Studies

# Current Transmission Expansion Plans



# Current Transmission Expansion Plans



**Jeff Neal**



- The projects described in these presentations represent the current transmission plans within the SCRTP footprint.
- The expansion plan is continuously reviewed and may change due to changes in key data and assumptions.
- This presentation does not represent a commitment to build.

# SCE&G Transmission Projects

## Projects Scheduled for Completion in 2017

- **Blythewood 115 kV Switching Station:** Construct
- **Ward Substation:** 230/115 kV Back-up Bank & Add Bus Tie Breakers
- **Summerville 230 kV Substation:** Replace 224 MVA transformer with 336 MVA
- **Cainhoy 230/115 kV Substation:** Construct and Line upgrades
- **Toolebeck 115 kV Switching Station:** Construct and R/W
- **Okatie 115 kV Substation:** Construct and Line Upgrades
- **Queensboro 115 kV Switching Station:** Construct
- **Faber Place – Hagood 115 kV #2 Line:** Construct
- **Faber Place – Charlotte Street:** Upgrade 1272 ACSR
- **Thomas Island – Jack Primus 115 kV Line:** Acquire R/W and Construct

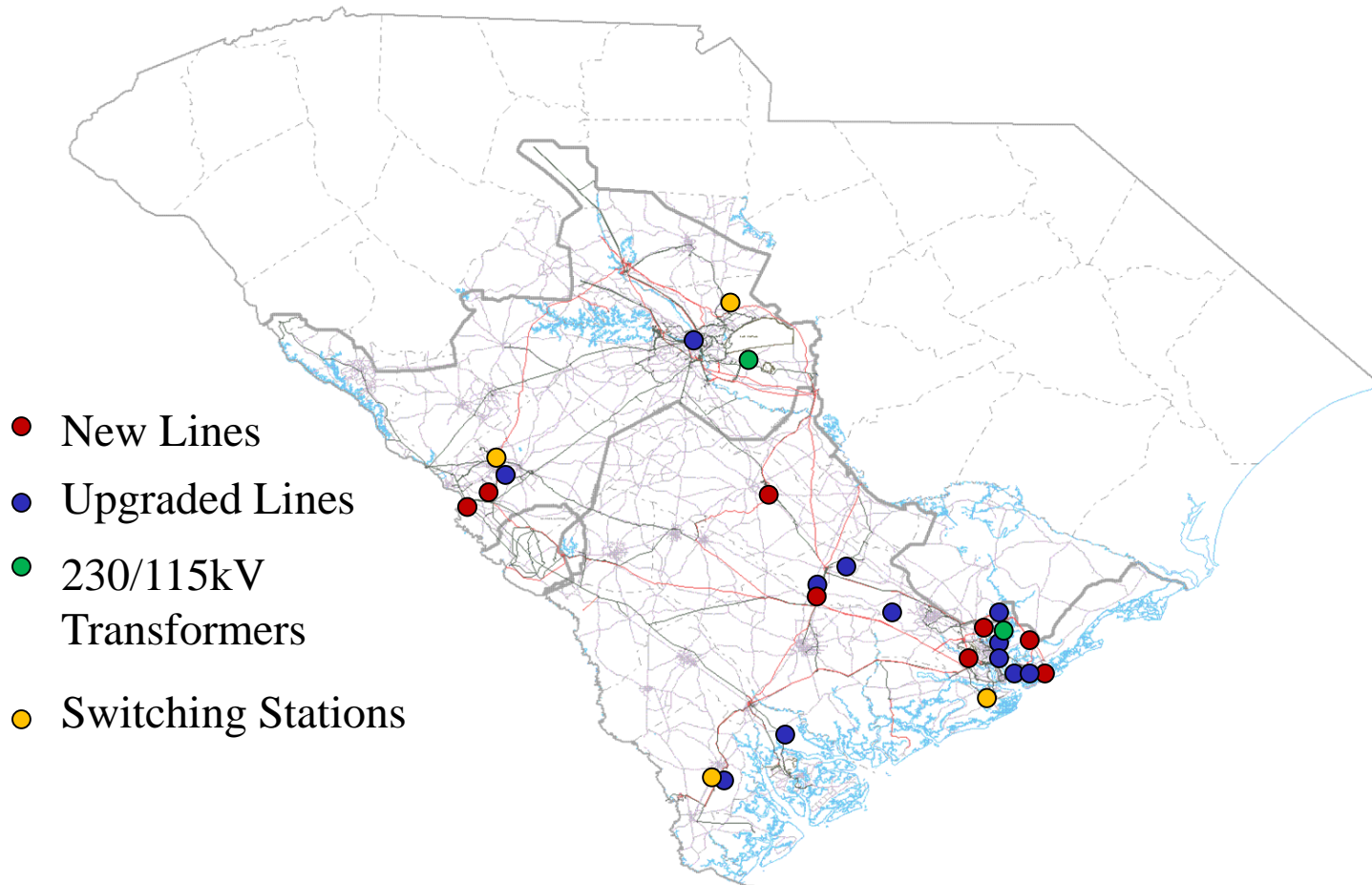
# SCE&G Transmission Projects

## Projects Scheduled for Completion in 2017

### System Improvement (NND) Projects (not included in BLRA)

- **VCS2 – St. George 230 kV #1&#2 Lines:**
  - Riverbanks Zoo – Dunbar Rd Construction
- **Wateree – Orangeburg 230 kV & Eastover – Orangeburg 115 kV:**
  - Rebuild SPDC
- **Orangeburg East 230 kV Substation:**
  - Add 2 230 kV Terminals to VCS2 & St. George

# SCE&G Planned Projects





# VC Summer Nuclear Unit #3 Related Projects

- **St George - Summerville 230 kV Line:** Upgrade May 2018
- **VCS2- St George 230 kV 1&2 Lines:** Construct December 2018
  - VCS2 – Orangeburg East 230 kV
  - Saluda River – St. George 230 kV



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## Welcome

The South Carolina Regional Transmission Planning (SCRTP) process was established by South Carolina Electric & Gas Company (SCE&G) and the South Carolina Public Service Authority (Santee Cooper) to meet the transmission planning requirements of [FERC Order No. 890](#), [890-A](#) and [890-B](#), orders designed to "prevent undue discrimination and preference in transmission service." The SCRTP process was expanded to meet the transmission planning requirements of [FERC Order No. 1000](#), [1000-A](#), and [1000-B](#), orders that reform the Commission's electric transmission planning and cost allocation requirements for public utility transmission providers.

SCRTP provides information on:

- Activities of the SCRTP process
- Order No. 890 (including subsequent rulings associated with Order No. 890)
- Documents related to our compliance with Order No. 890

### FERC Order No. 890

On March 15, 2007 the Federal Energy Regulatory Commission (FERC) published in the Federal Register a final rule reforming the 1996 open-access transmission regulatory framework rules in Orders No. 888 and 889.

## Events

The next meeting of the SCRTP Stakeholder Group will be held June 1, 2017. This will be a WebEx only meeting.

[Meeting Announcement \(PDF\)](#)

[register now](#)

[Meeting Archives](#)

### Order 1000 Filing:

- [Order 1000 Transmittal Letter](#) - 7/14/2014
- [Attachment K Clean Order 1000 Revision](#) - 7/14/2014

### Planned Facilities

- [2016-2020 above \\$2M Project Descriptions](#) 10

# SCE&G Planned Projects 2017 (\$2 Million and above)

## SCE&G Planned Project Table (\$2M and Over) 2017

	Project	Tentative Completion Date	Expenditures as of 12/31/2016	2017 Estimated Expenditures	Total - Amount Estimated for Additions in 2017
1	Blythewood 115 kV Switching Station: Construct	02/15/17	4,667,024	457,976	5,125,000
2	Ward Sub: 230/115kV Back-up Bank & Bus Tie Breakers	03/09/17	2,268,265	131,735	2,400,000
3	Summerville 230 kV: Replace 224 MVA transformer with 336 MVA	03/15/17	3,744,589	55,411	3,800,000
4	Cainhoy 230/115kV Sub: Construct and Line Upgrades	05/30/17	15,316,829	4,906,710	20,223,539
5	Toolebeck 115 kV Switching Station: Construct and R/W	05/31/17	4,940,475	898,432	5,838,907
6	Okatie 115kV Substation: Construct and Line Upgrades	06/01/17	2,440,868	4,084,132	6,525,000
7	Queensboro 115 kV Switching Station: Construct and Terminate 4 Transmission Lines	09/30/17	1,448,706	1,501,294	2,950,000
8	Faber Place-Hagood #2 115 kV Line - Construct 1272 and Faber Place-Charlotte 115 kV Line	12/29/17	821,250	4,578,750	5,400,000
9	Thomas Island-Jack Primus 115 kV Line: Acquire R/W and Construct	12/31/17	3,867,544	5,082,456	8,950,000
<b>System Improvement (NND) Projects (not included in BLRA)</b>					
10	VCS #2-St. George 230 kV #1 Line	07/31/17	6,625,083	2,374,917	9,000,000
11	Wateree-Orangeburg 230 kV & Eastover-Orangeburg 115 kV: Rebuild	09/01/17	88,593	2,711,407	2,800,000
12	Orangeburg East Sub: 2 230 kV Terminals to VCS2 & St. George	12/29/17	1,905,589	594,411	2,500,000
<b>Total:</b>			<b>\$48,134,814</b>	<b>\$27,377,632</b>	<b>\$75,512,446</b>

## South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget



### Blythewood 115 kV Switching Station: Construct

#### Project ID

03087A

#### Project Description

Construct Blythewood Switching Station with four 115 kV line terminals, with plans to expand to 230 kV at a future date. Fold in the Pineland – Winnsboro 115 kV line, re-tap the Killian – S. Lubeca (Amcor) 115 kV and Killian – Blythewood 115 kV lines.

#### Project Need

Load growth in the Blythewood and Columbia areas requires additional transmission capacity and reliability. This project is required to meet NERC TPL standards and SCE&G's internal Planning Criteria.

#### Project Status

Completed

#### In-Service Date

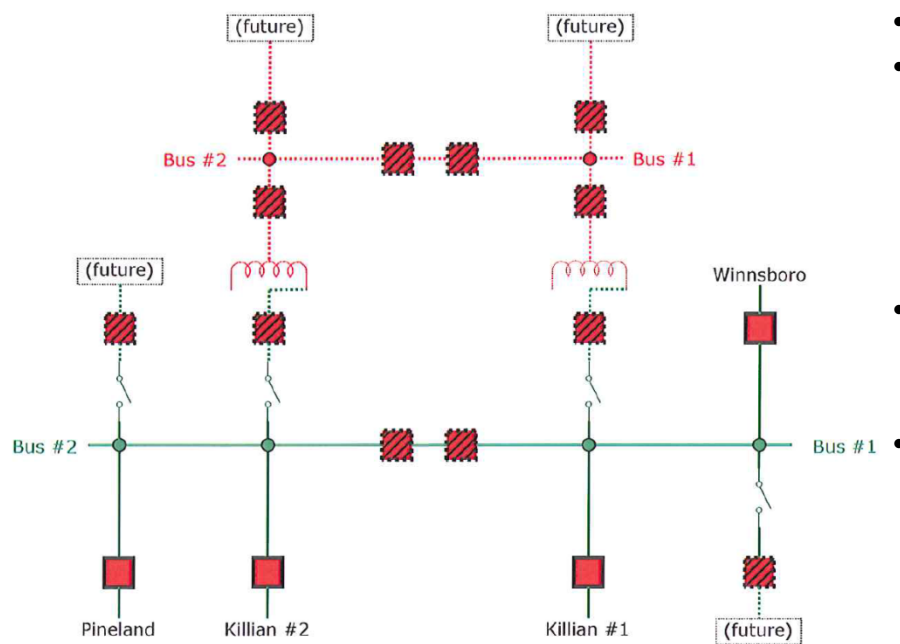
2/15/17

#### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total
\$4,667,024	\$457,976	\$0	\$0	\$0	\$0	\$5,125,000

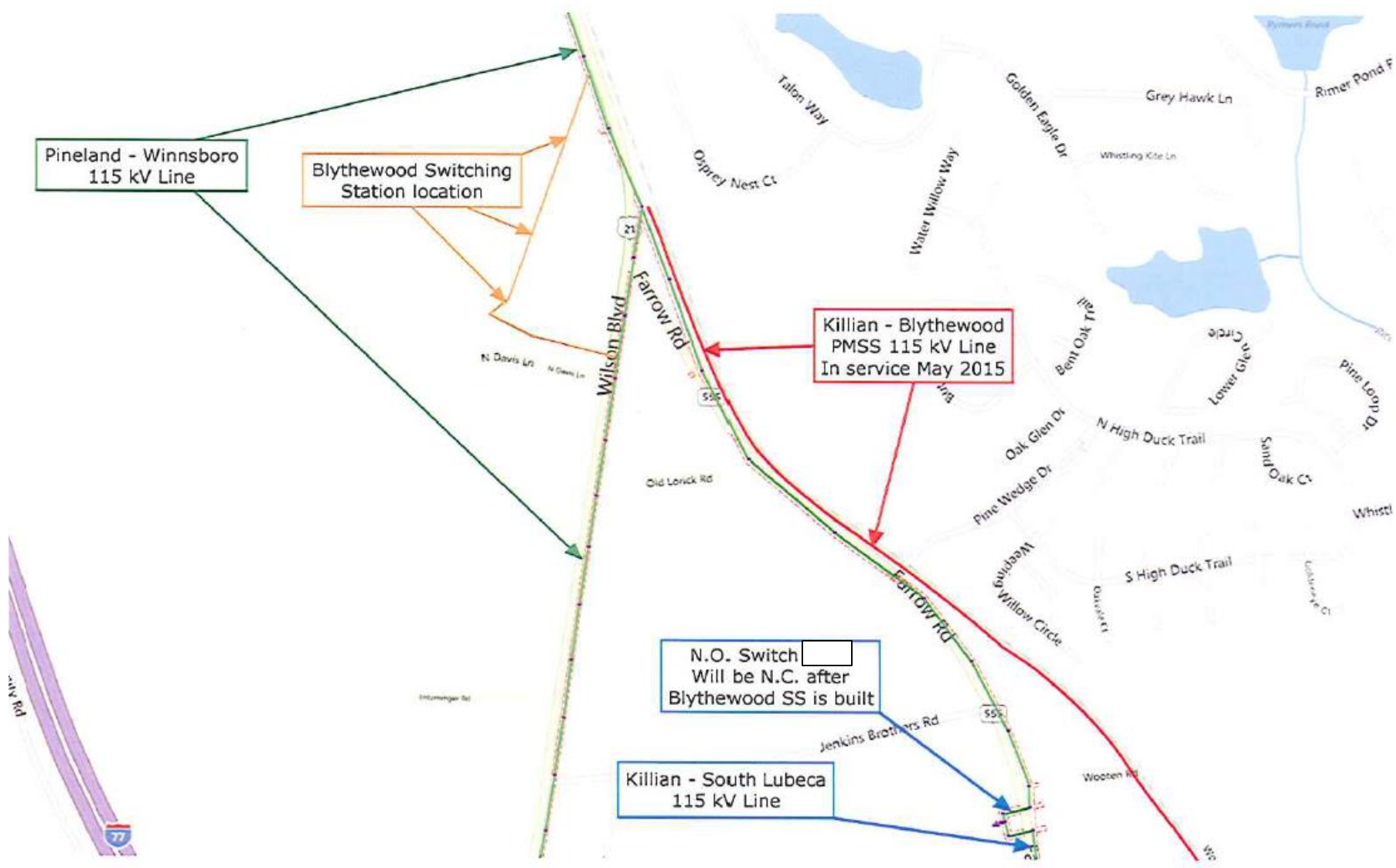
South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget

## Blythewood 115 kV Switching Station



- Placed In Service 2/15/17
- Construct 115 kV transmission switching station with future 230 kV capability in Blythewood
  - Four 115 kV line terminals
  - Future Back-to-back bus tie breakers on 115 kV bus
  - Future 230/115 kV 336 MVA autotransformers with high side and low side breakers
- Normally open point between Killian and Blythewood will be closed, creating new Killian – Blythewood 115 kV #1 line .
- Killian – Blythewood 115 kV #2 line completed in May 2014 along with VCS1 – Killian 230 kV line construction (NND)

# South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget



**South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget**



## Ward 230/115 kV substation: Add Back-up Bank & Bus Tie Breakers

### Project ID

1725A

### Project Description

Relocate the spare 230/115 kV autotransformer from Summerville to Ward as a second bank. Install one 230 kV bus tie breaker and one 115 kV bus tie breaker.

### Project Need

Load growth in the Lexington, Gilbert, and Saluda areas requires the increased capacity of the 230/115 transformation at the Ward substation, which is used as a secondary source to these areas.

### Project Status

Completed

### In-Service Date

3/9/17

### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total
\$2,268,265	\$131,735	\$0	\$0	\$0	\$0	\$2,400,000

**South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget**



## Summerville 230 kV: Replace 224 MVA transformer with 336 MVA

### Project ID

1722A, 1725A

### Project Description

Replace Summerville 224 MVA transformer with a 336 MVA transformer and relocate the 224 MVA transformer to the Ward substation

### Project Need

Load growth in the Summerville area requires additional 230/115 kV transformation. This project is required to meet NERC TPL standards and SCE&G's internal Planning Criteria.

### Project Status

Completed

### In-Service Date

3/15/17

### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total
\$3,744,589	\$55,411	\$0	\$0	\$0	\$0	\$3,800,000



## South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget



### Cainhoy 230/115kV Sub: Construct and Line Upgrades

#### Project ID

2499A, 2499B, 2499C, 2499E, 2499F, 2499G, 2499H, 2499K, 2499L

#### Project Description

Establish a new 230/115 kV substation near the Cainhoy distribution substation, initially with one 230/115 kV 336 MVA transformer.

#### Project Need

System load growth in the Cainhoy, Hamlin, Mt Pleasant, and Thomas Island areas require additional 230/115 kV transformation. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

4|

#### Project Status

In Progress

#### Planned In-Service Date

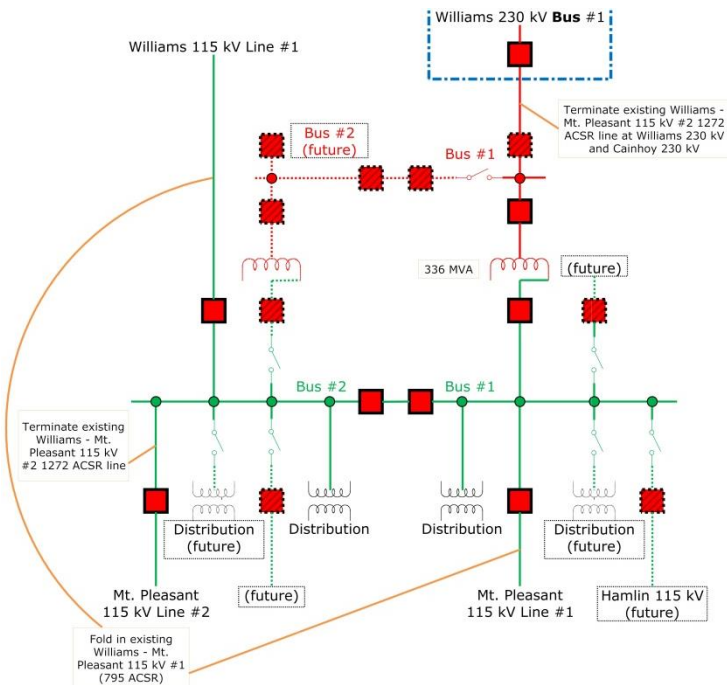
5/30/2017

#### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total
\$15,316,829	\$4,906,710	\$0	\$0	\$0	\$0	\$20,233,539

South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget

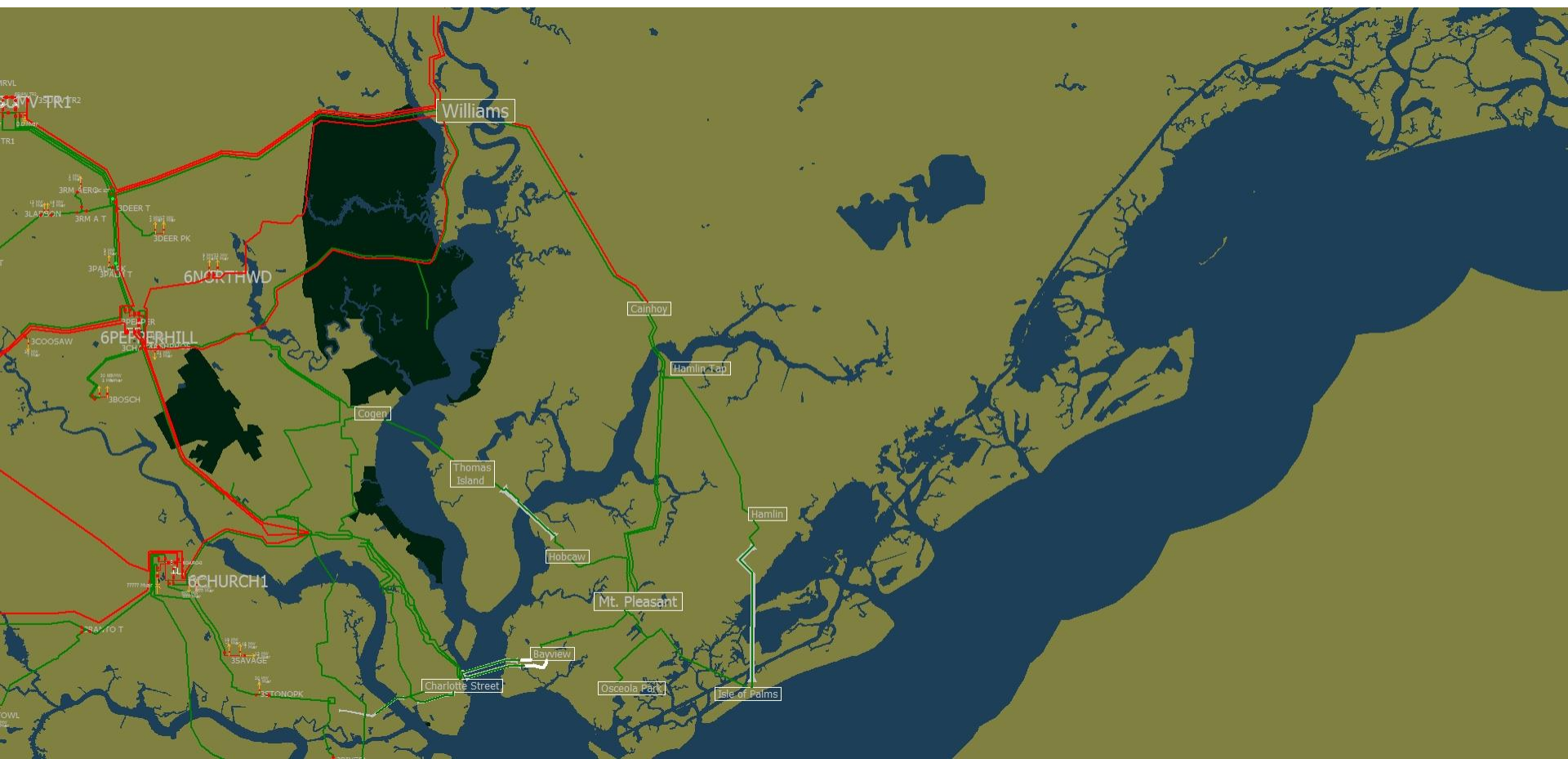
## Cainhoy 230/115 kV Transmission



- Scheduled to be in service 5/30/17
- Construct 230/115 kV transmission substation near existing Cainhoy distribution substation
  - Three 115 kV line terminals
  - Back-to-back bus tie breakers on 115 kV bus
  - One 230/115 kV 336 MVA autotransformer with high side and low side breakers
- Add one 230 kV terminal to #1 AM Williams 230 kV bus
- Fold Williams – Mt. Pleasant 115 kV #2 into Cainhoy 230 kV and 115 kV
  - **Creates Williams – Cainhoy 230 kV & Cainhoy – Mt. Pleasant 115 kV #2**
- Fold Williams – Mt. Pleasant 115 kV #1 into Cainhoy 115 kV #2 bus
  - **Creates Williams – Cainhoy 115 kV and Cainhoy – Mt. Pleasant 115 kV #1**
- Rebuild Cainhoy – Hamlin 115 kV to SPDC
  - **Creates Cainhoy – Mt. Pleasant 115 kV partially 1272 ACSR & Cainhoy – Hamlin 115 kV B795 ACSR**
- Add 115 kV Hamlin terminal



Project 4 of 28  
 South Carolina Electric and Gas Company  
 Planned Transmission Projects \$2M and above Total  
 5 Year Budget



**South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget**



## **Toolebeck 115 kV Switching Station: Construct**

### **Project ID**

1273A

### **Project Description**

Construct 230/115 kV substation at Toolebeck site with four 115 kV terminals and spacing for future additional 230 kV autotransformer and line terminals. Also add two 115 kV capacitor banks.

### **Project Need**

There are several potential line overloads under certain contingencies and the need for additional capacity to continue providing reliable service to Aiken area load. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

### **Project Status**

Completed

### **In-Service Date**

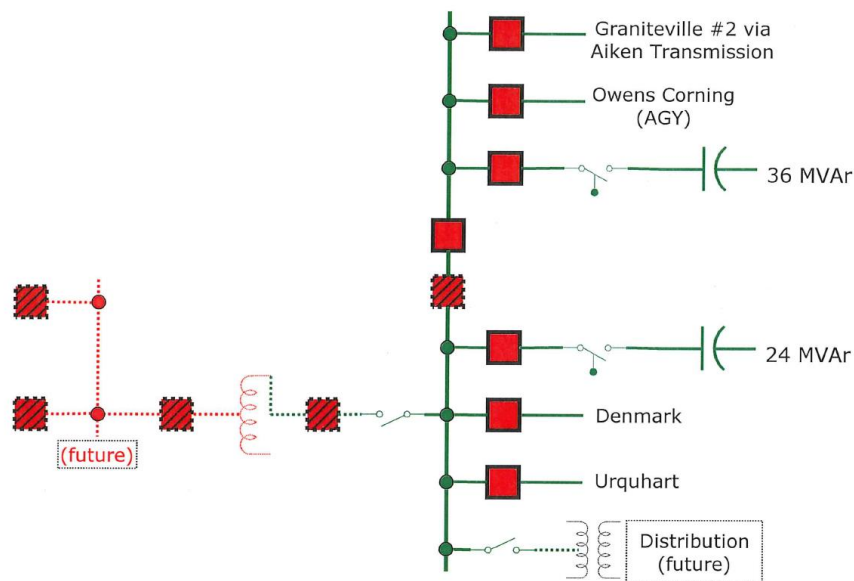
5/15/17

### **Estimated Project Cost (\$)**

Previous	2017	2018	2019	2020	2021	Total
\$4,940,475	\$898,432	\$0	\$0	\$0	\$0	\$5,838,907

South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget

## Toolebeck 115 kV Switching Station



- In-Service May 15, 2017
- Construct 115 kV transmission substation near existing Aiken Transmission and Owens Corning substations
  - Four 115 kV line terminals
  - Bus tie breaker (Future Back-to-Back)
  - One 24 MVAR and one 36 MVAR capacitor
  - Built to accommodate future growth, i.e. 230/115 kV transformation and distribution transformer
- Fold-in of Urquhart – Owens Corning 115 kV line
- Fold-in of Aiken – Denmark 115 kV line
- NERC TPL System Improvement
  - Operating guides in place to alleviate potential branch overloads and voltage concerns

**South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget**



## Okatie 230/115 kV Sub Construct and Line Upgrades

### Project ID

0139A, 0139B

### Project Description

Construct 230/115 kV substation at Okatie site with four 115 kV terminals and spacing for future additional 230 kV autotransformer and line terminals.

### Project Need

System load growth in the Hardeeville and Bluffton areas require additional transmission capacity.

### Project Status

In Progress

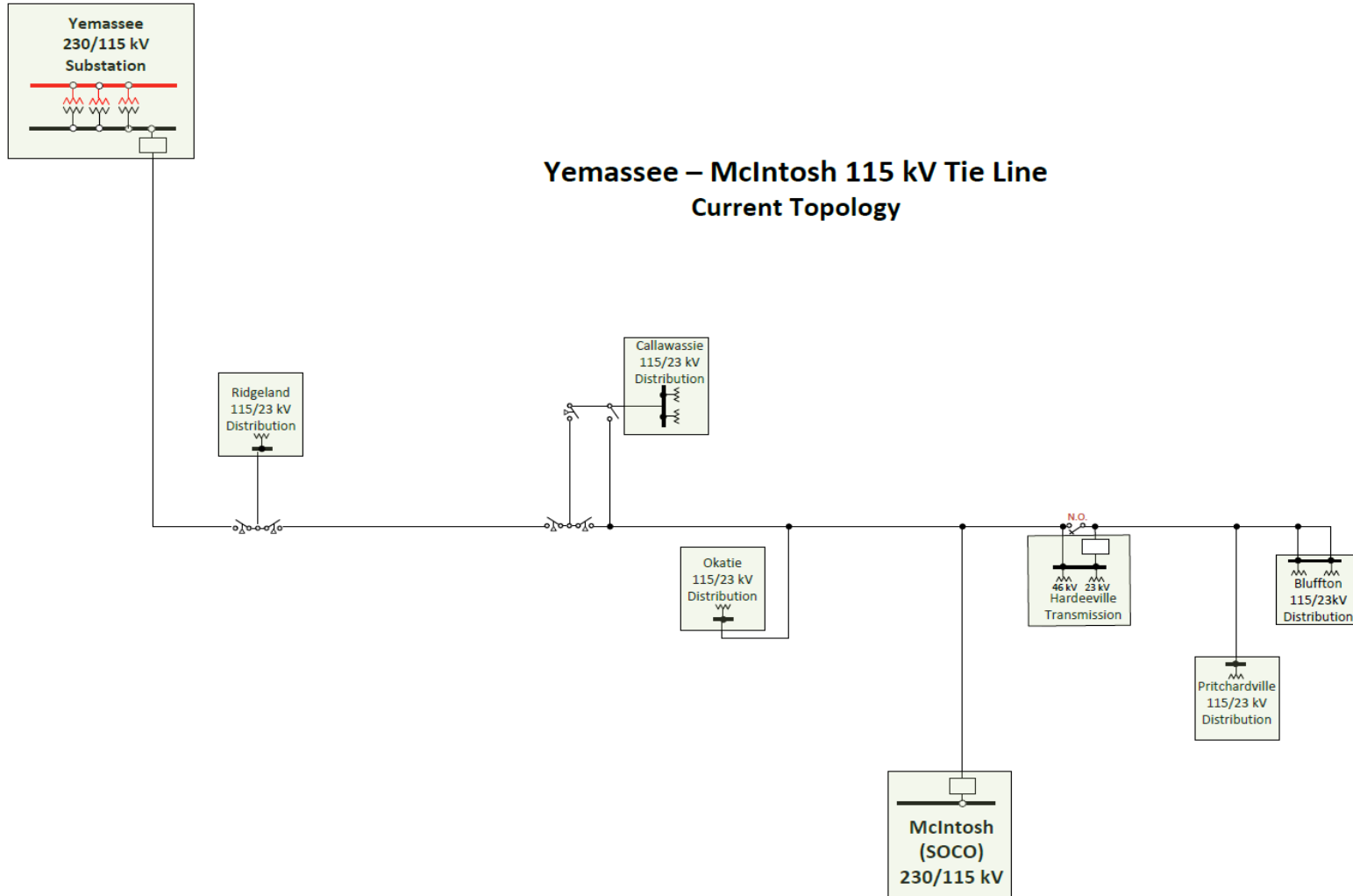
### Planned In-Service Date

6/1/2017

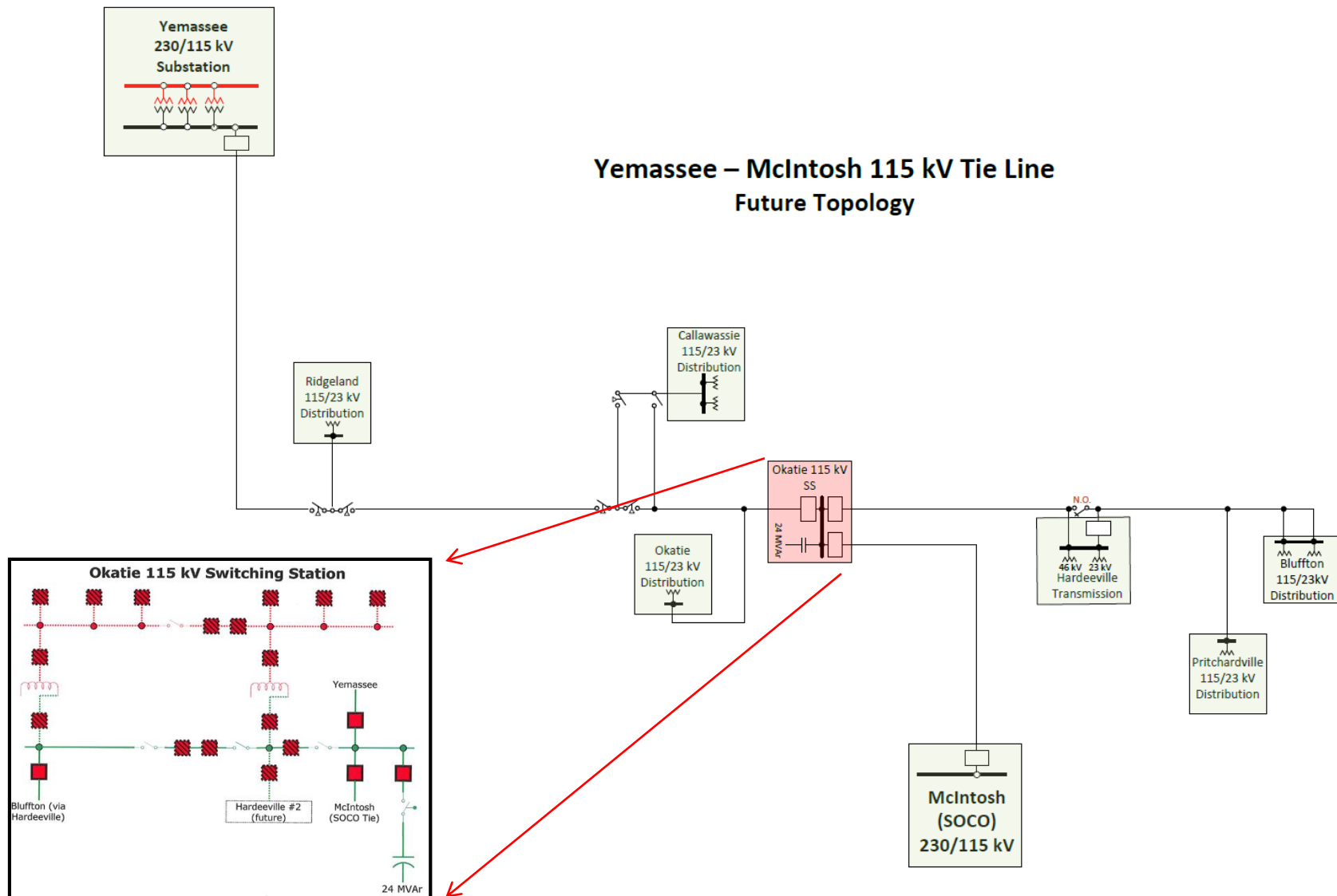
### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total
\$2,440,868	\$4,084,132	\$0	\$0	\$0	\$0	\$6,525,000

# South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget



# South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget





**South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget**



## Queensboro 115 kV Switching Station: Construct

### Project ID

0062A, 0062B

### Project Description

Build 4 terminal 115 kV switching station at Queensboro substation. Terminate the existing Queensboro - St. Andrews, Church Creek – Queensboro, Queensboro – Ft. Johnson Rd, and Queensboro – Bayfront 115 kV lines into Queensboro Switching station.

### Project Need

System load growth in Church Creek, Faber Place and Queensboro areas require increased transmission capacity from the Charleston Peninsula.

### Project Status

In Progress

### Planned In-Service Date

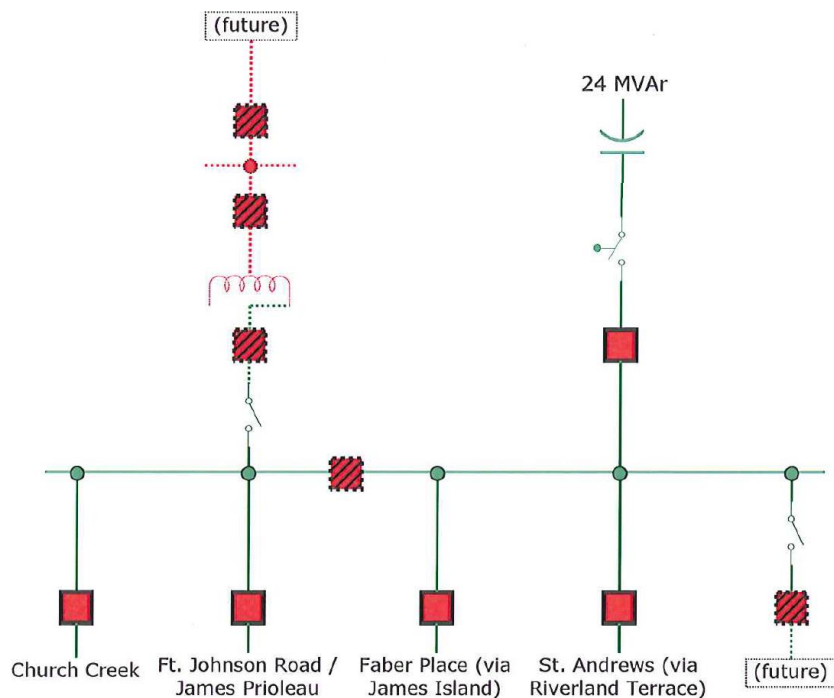
9/30/17

### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total
\$1,448,706	\$1,501,294	\$0	\$0	\$0	\$0	\$2,950,000

South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget

## Queensboro 115 kV Switching Station



- Construct 115 kV transmission switching station with future 230 kV capability at existing Queensboro substation in James Island
  - Four 115 kV line terminals
  - One 24 MVAR Capacitor Bank
  - Future bus tie breaker on 115 kV bus
  - Future terminal space for 230/115 kV 336 MVA autotransformer with high side and low side breakers
- Terminate Queensboro – St. Andrews, Church Creek – Queensboro, Queensboro – Ft. Johnson Rd, and Queensboro – Bayfront 115 kV lines into Queensboro SS.

**South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget**



**Faber Place - Hagood 115 kV #2 Line: Construct and Faber Place - Charlotte Street 115 kV Line Upgrade**

**Project ID**

1721L, 1721K

**Project Description**

Construct Faber Place to Hagood 115 kV #2 line with 1272 ACSR. Upgrade the Faber Place to Hagood Junction 115 kV line to 1272 ACSR or equivalent capacity conductor.

**Project Need**

System load growth in the Charleston area requires additional 115 kV transmission capacity.

**Project Status**

In Progress

**Planned In-Service Date**

12/29/2017

**Estimated Project Cost (\$)**

Previous	2017	2018	2019	2020	2021	Total
\$821,250	\$4,578,750	\$0	\$0	\$0	\$0	\$5,400,000

South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget



## Thomas Island - Jack Primus 115 kV Line: Acquire R/W and Construct

### Project ID

0270B, 0270C

### Project Description

Acquire R/W in order to construct a new 115 kV line from the Thomas Island substation to the new Jack Primus substation with 1272 ACSR conductor. Total line length approximately 4 miles.

### Project Need

System load growth around Thomas Island requires additional transmission capacity in the area.

### Project Status

In Progress

### Planned In-Service Date

12/31/2017

### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total
\$3,867,544	\$5,082,456	\$0	\$0	\$0	\$0	\$8,950,000

Project 8 of 28  
South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget



South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget



## VCS2 – St. George 230 kV Line #1 & #2: Construct (Riverbanks Zoo – Dunbar Road Section)

### Project ID

0094D6

### Project Description

Construct two 230 kV lines from VCS #2 to future St. George 230 kV switching station

### Project Need

VCS Nuclear Unit #3 Interconnection Requirement. Distribute power from the generation to load while meeting NERC TPL standards and SCE&G's Internal Planning Criteria.

### Project Status

In Progress

### Planned In-Service Date

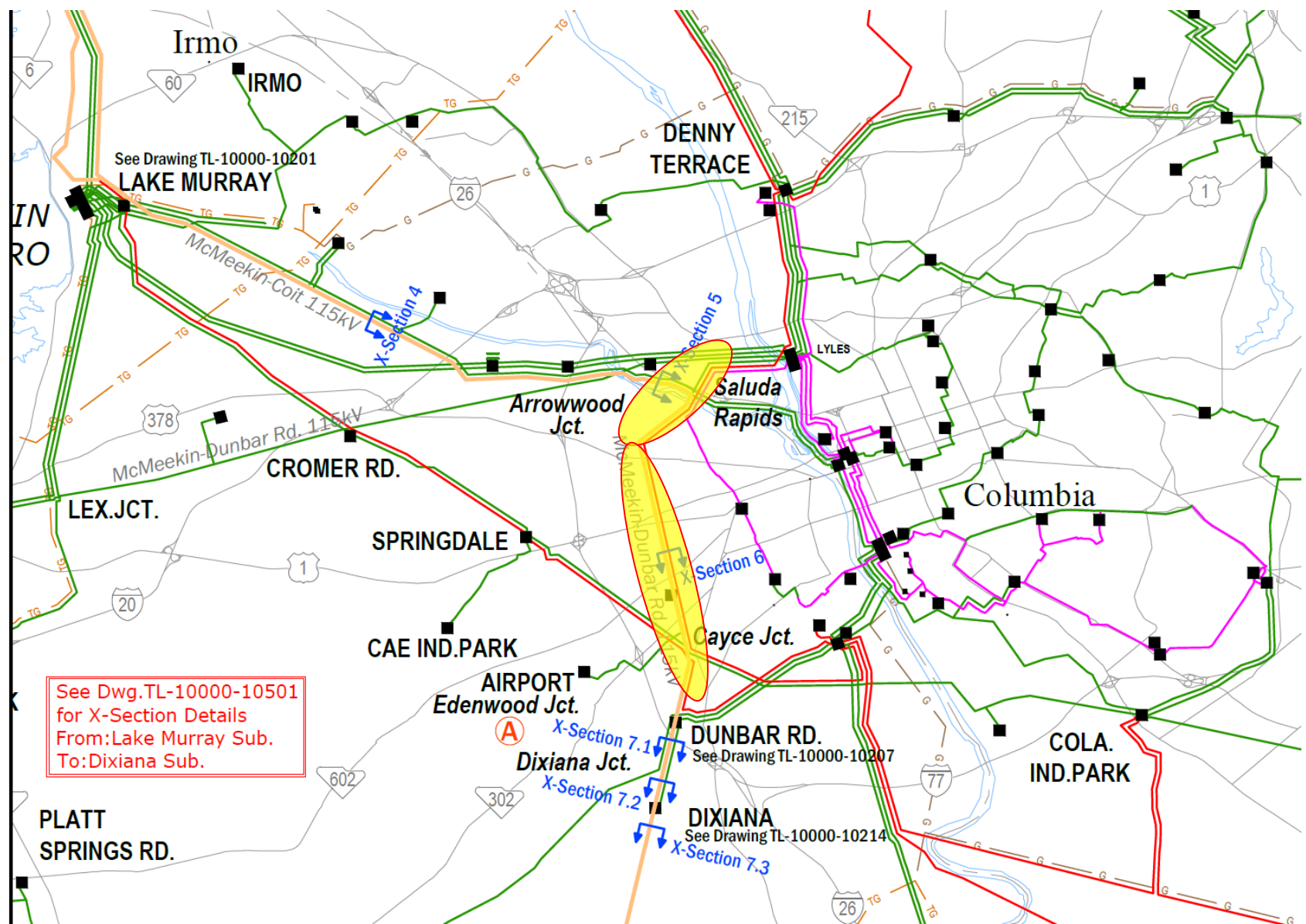
7/31/2017

### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total
\$6,625,083	\$2,374,917	\$0	\$0	\$0	\$0	\$9,000,000



Project 10 of 28  
 South Carolina Electric and Gas Company  
 Planned Transmission Projects \$2M and above Total  
 5 Year Budget



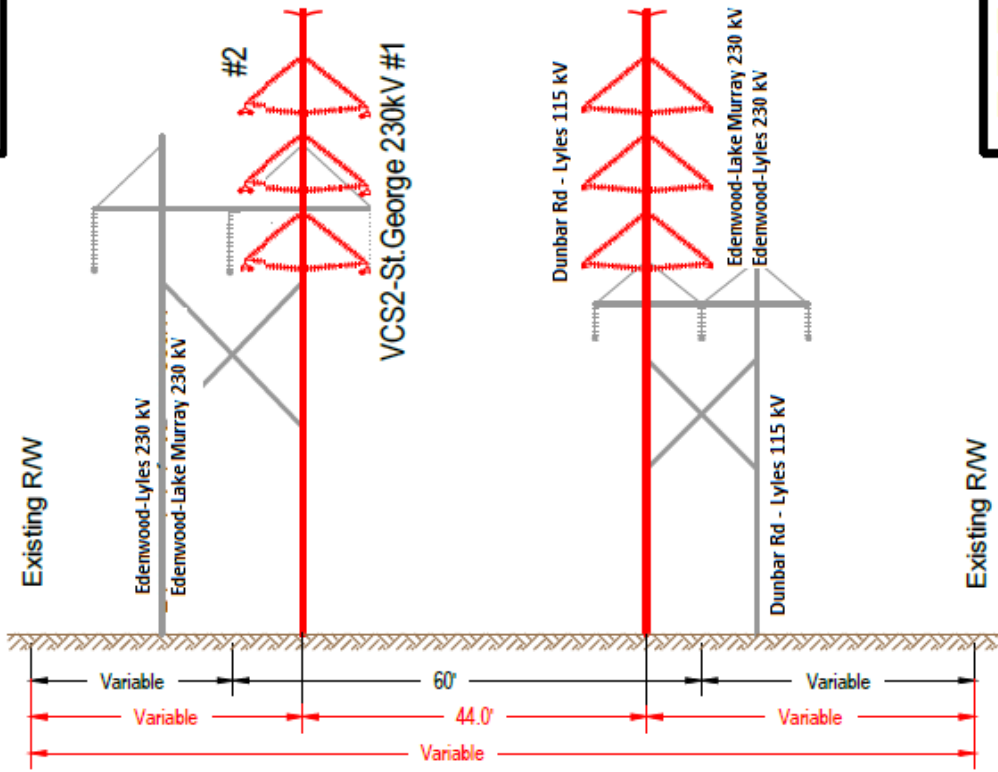
See Dwg. TL-10000-10501  
 for X-Section Details  
 From: Lake Murray Sub.  
 To: Dixiana Sub.



Project 10 of 28  
 South Carolina Electric and Gas Company  
 Planned Transmission Projects \$2M and above Total  
 5 Year Budget

**PROJECT #94D7**  
 W.O.# [REDACTED]  
 P.O.#(E) [REDACTED]  
 P.O.#(P) \_\_\_\_\_  
 P.O.#(C) \_\_\_\_\_

**PROJECT #94D6**  
 W.O.# [REDACTED]  
 P.O.#(E) [REDACTED]  
 P.O.#(P) \_\_\_\_\_  
 P.O.#(C) \_\_\_\_\_



**CROSS SECTION 6**  
 SALUDA RAPIDS to DUNBAR RD. MILEAGE - 6.0  
 EXISTING 200' R / W CORRIDOR



South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget



## Wateree – Orangeburg 230 kV & Eastover – Orangeburg 115 kV: Rebuild

### Project ID

0094D25

### Project Description

Rebuild the Wateree – Orangeburg 230 kV and Eastover – Orangeburg 115 kV lines as SPDC steel pole construction to make room in existing right of way for the new VCS2 – St. George 230 kV #1 & #2 lines.

### Project Need

VCS Nuclear Unit #3 Interconnection Requirement. Distribute power from the generation to load while meeting NERC TPL standards and SCE&G's Internal Planning Criteria.

### Project Status

In Progress

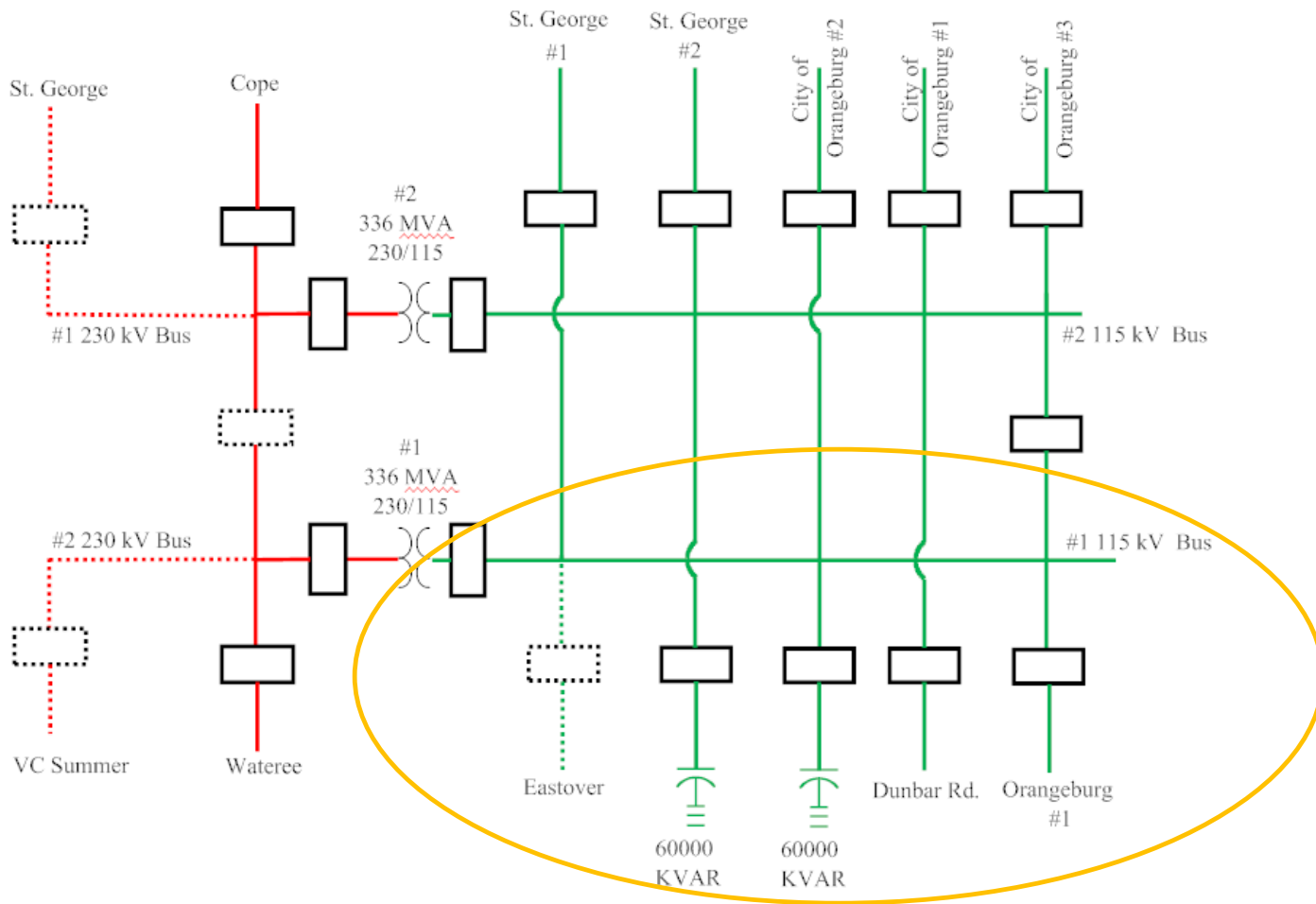
### Planned In-Service Date

9/1/2017

### Estimated Project Cost (\$)

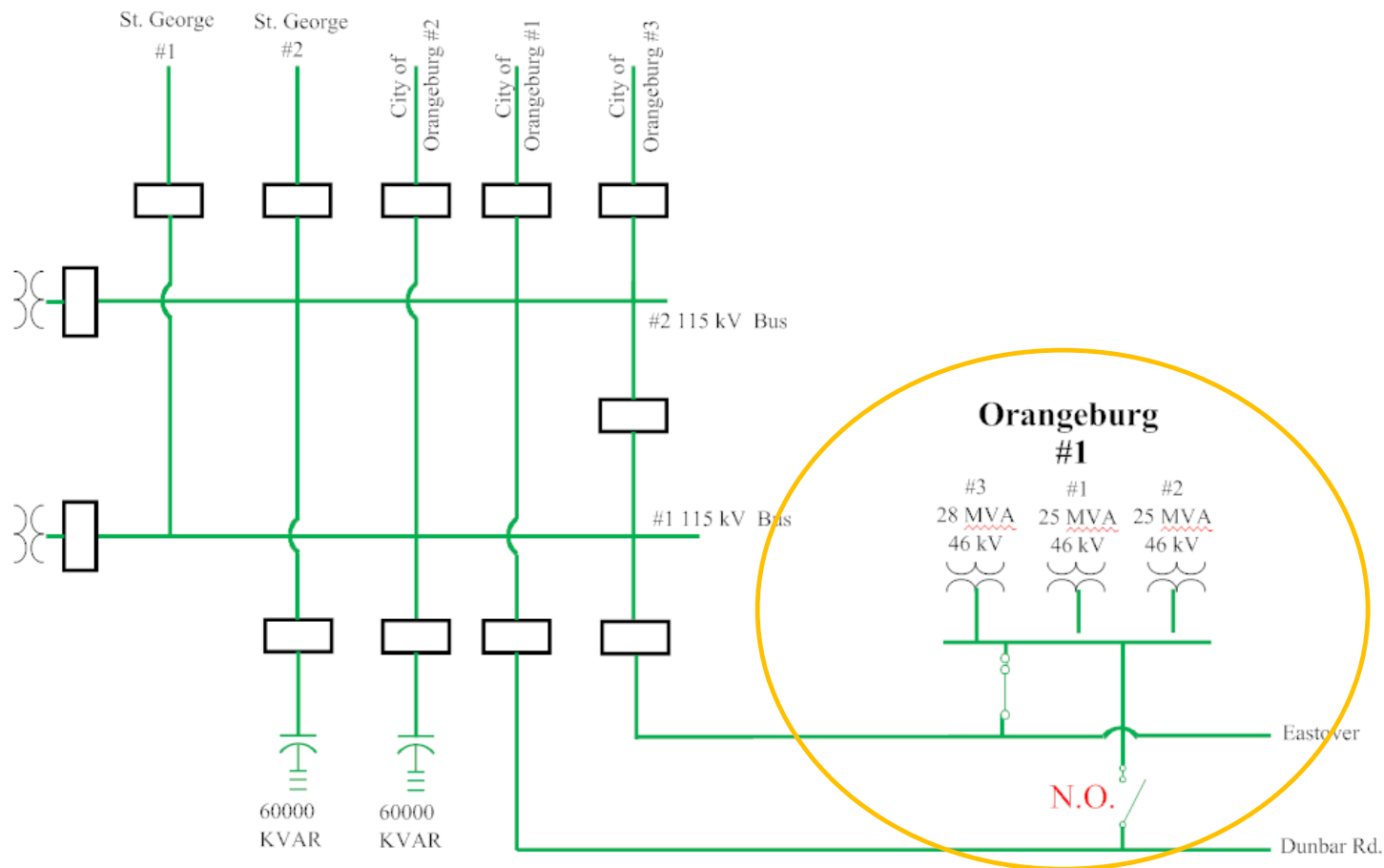
Previous	2017	2018	2019	2020	2021	Total
\$88,953	\$2,711,407	\$0	\$0	\$0	\$0	\$2,800,000

# South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget



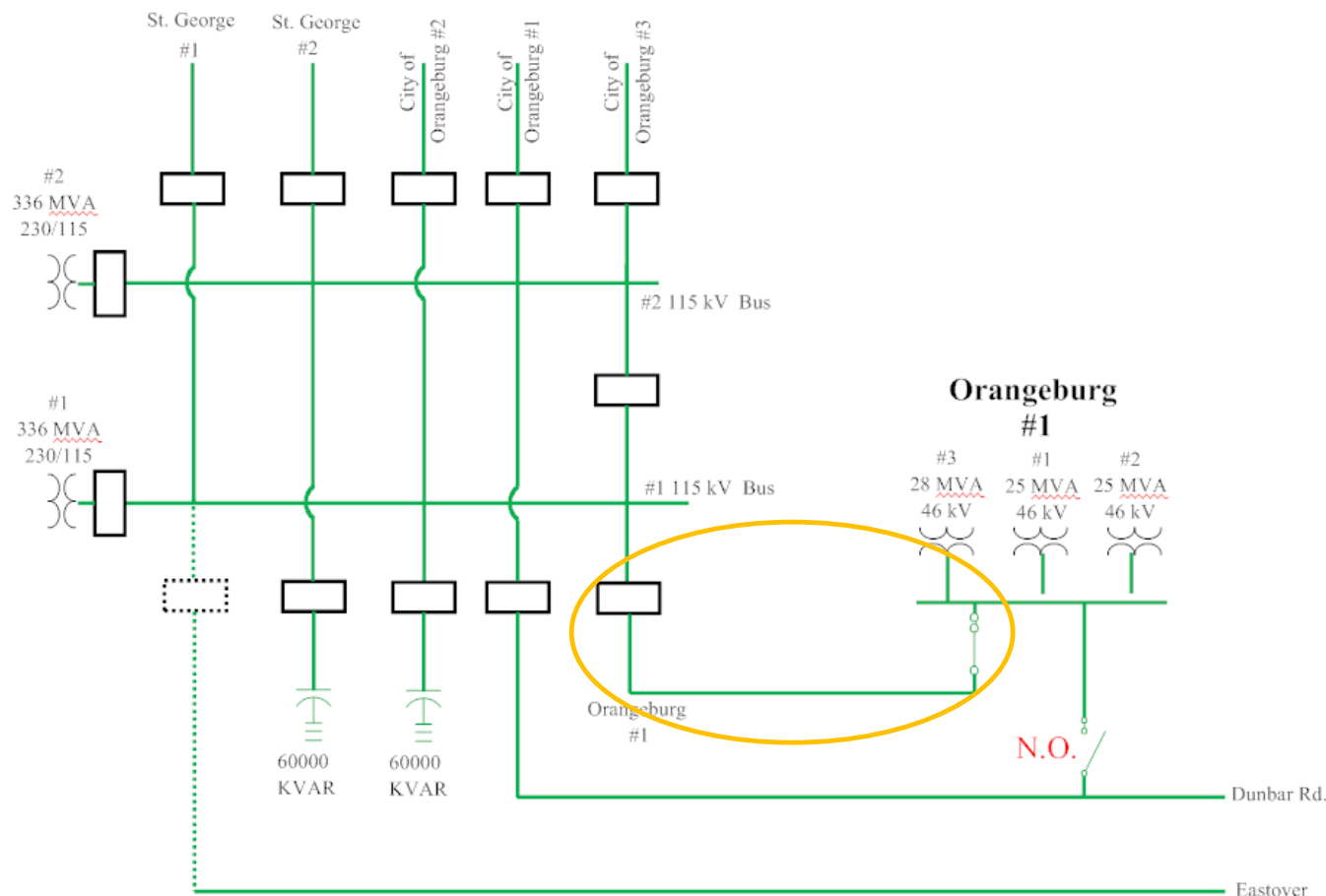
## Orangeburg East 230/115 kV Substation Future

# South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget



### Orangeburg East 230/115 kV Substation Present 115 kV Layout

# South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget



### Orangeburg East 230/115 kV Substation Future 115 kV Layout

**South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget**



## **Orangeburg 230 kV Sub: Fold in VCS2\_St. George #1 Line**

### **Project ID**

94D23, 94D24

### **Project Description**

Fold in the future VCS2 – St. George 230 kV #1 line at Orangeburg Transmission. Add two 230 kV line terminals at Orangeburg transmission, replace existing 230 kV 2000 Amp bus-tie breaker with 3000 Amp circuit breaker.

### **Project Need**

Canadys generation previously provided 323 MW of support to the 115 kV transmission system serving load around the Orangeburg, St. George and Walterboro load centers. Increased support of Orangeburg 230 kV will decrease the burden of 115 kV system in Orangeburg/St. George areas. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria, as well as providing increased reliability to the Orangeburg and St. George areas.

### **Project Status**

In Progress

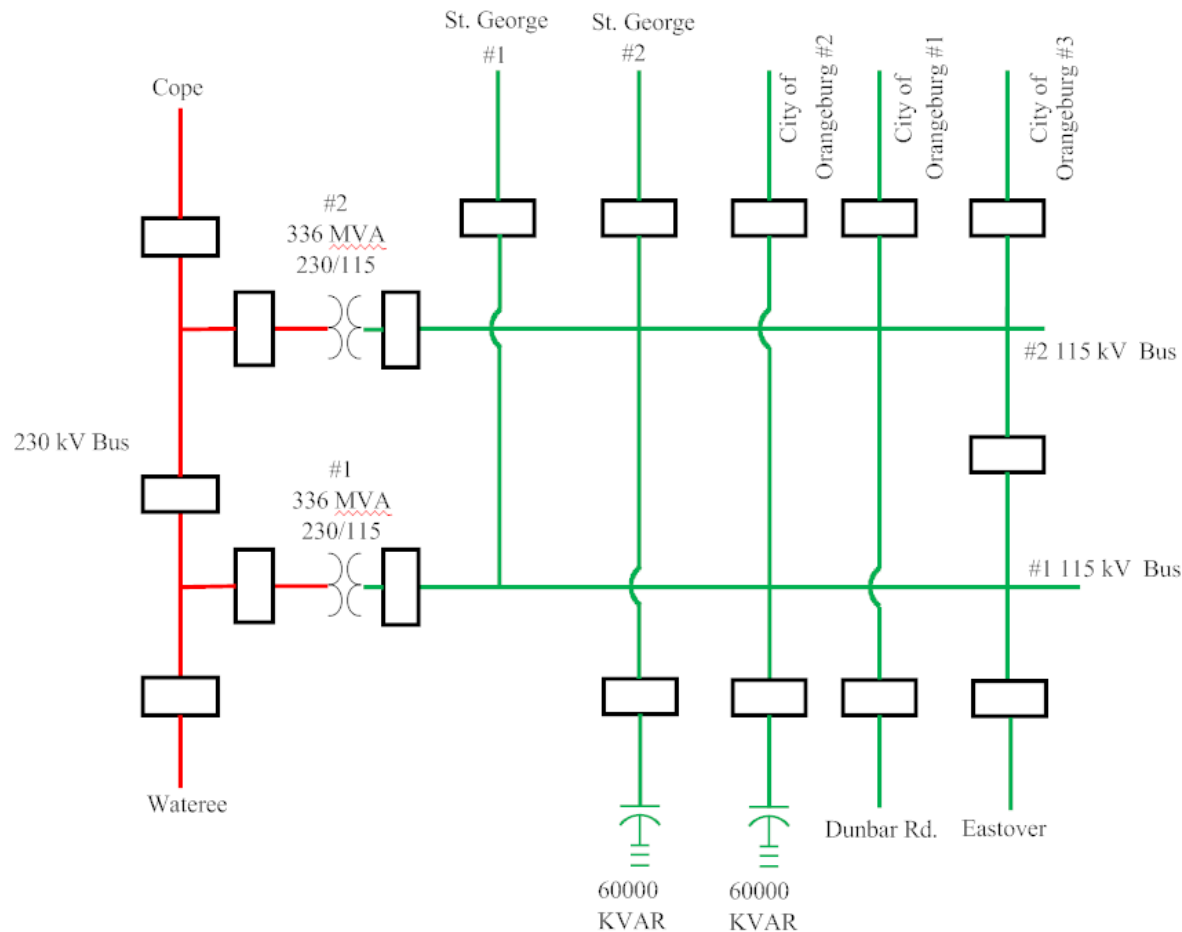
### **Planned In-Service Date**

12/29/17

### **Estimated Project Cost (\$)**

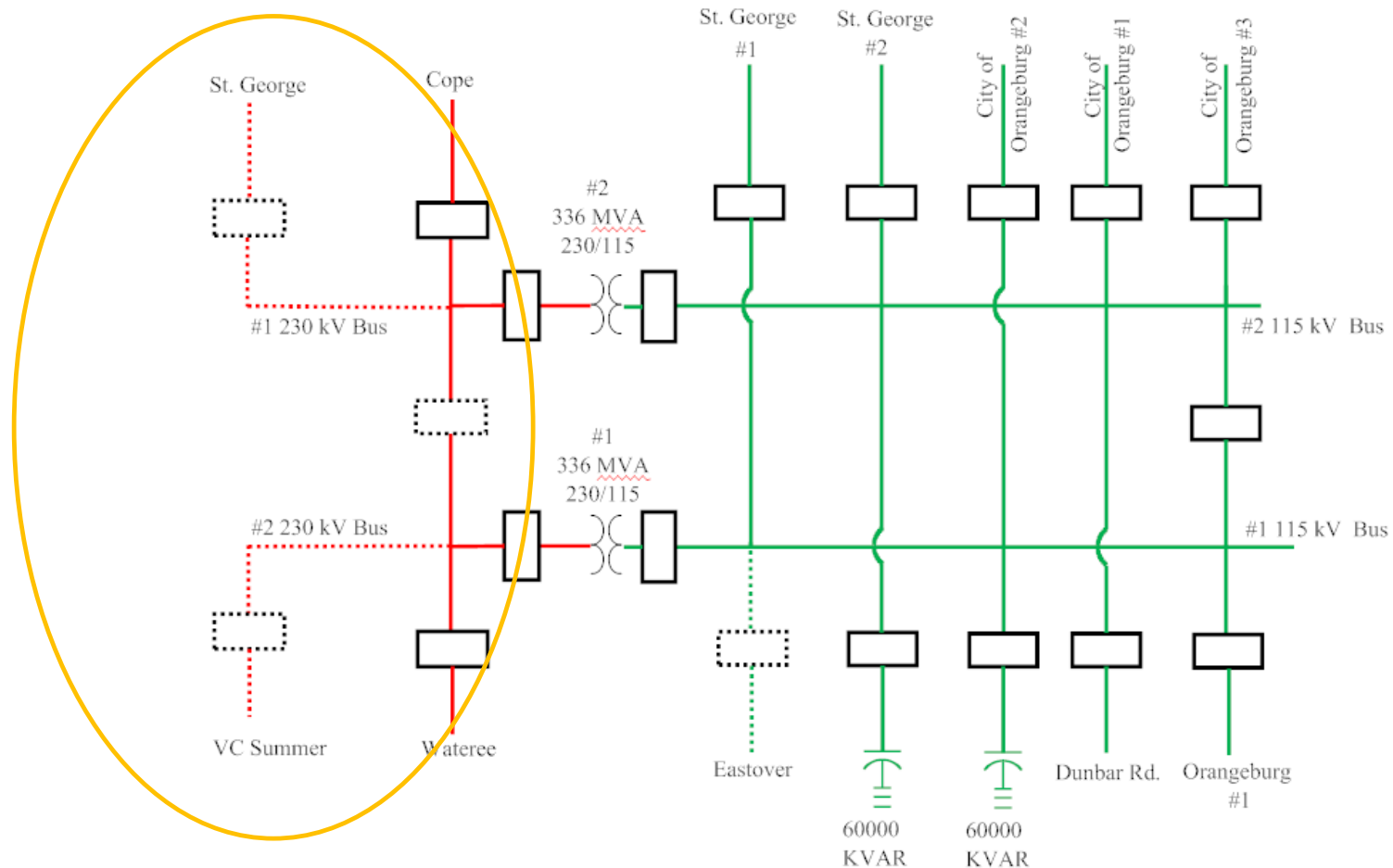
Previous	2017	2018	2019	2020	2021	Total
\$1,905,589	\$594,411	\$0	\$0	\$0	\$0	\$2,500,000

South Carolina Electric and Gas Company  
 Planned Transmission Projects \$2M and above Total  
 5 Year Budget



**Orangeburg East 230/115 kV Substation**  
**Present**

# South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget



## Orangeburg East 230/115 kV Substation Future

# SCE&G Planned Projects 2018-2021 (\$2 Million and above)

## SCE&G Planned Projects Table (\$2M and Over) 2018-2021

	Project	Tentative Completion Date	Expenditures as of December 31, 2016	Projected 2018	Projected 2019	Projected 2020	Projected 2021
13	Church Creek - Faber Place 230 & 115 kV Lines: Rebuild Ashley River Crossing	05/31/18		2,000,000			
14	Hopkins 230/115 kV Substation: Install 2nd Autobank	05/31/18	38,992	7,650,000			
15	AMW-Cainhoy: Rebuild SPDC 1272 ACSR (230 kV), B795 ACSR (115	12/03/18	346,972	9,000,000			
16	Urquhart Sub: Replace Switch House	12/31/18	2,832,343	3,000,000			
17	VCS #2-St. George 230 kV Lines #1 & #2	12/31/18	8,978,054	18,500,000			
18	St. George-Summerville 230 kV #2 B1272: Construct	12/31/18	7,544,557	17,500,000			
19	Canadys 230 kV: Add Back-Back Bus Tie Breakers	05/01/19	11,561		4,300,000		
20	Lake Murray - Harbison 115 kV Rebuild & Saluda Hydro - Denny Terrace 115 kV Construct 1272 ACSR	05/31/19	191,720		5,200,000		
21	Burton - Yemassee 115 kV #2 Line Rebuild SPDC B795 ACSR	05/31/19	11,860,061		37,000,000		
22	Urquhart - Graniteville - South Augusta 230/115 kV Tielines	05/31/19	135,320		30,550,000		
23	Bluffton-Santee 115 kV Tie Construct	12/31/19			2,550,000		
24	Summerville - Pepperhill - Goose Creek 230 kV Construct	05/01/20	239,765			9,700,000	
25	Coit - Gills Creek 115 kV Line: Construct	12/01/20				2,500,000	
26	Union Pier 115-13.8 kV Sub: Tap Construct	12/01/21					2,500,000
27	New Nuclear Deployment BLRA Unit 2 - Transmission	08/31/19	138,260,582		143,000,000		
28	New Nuclear Deployment BLRA Unit 3 - Transmission	08/31/20	139,308,431			231,000,000	
		<b>Total:</b>	<b>\$309,748,358</b>	<b>57,650,000</b>	<b>222,600,000</b>	<b>\$243,200,000</b>	<b>\$2,500,000</b>



## South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget



### AMW – Cainhoy 115 kV: Rebuild SPDC B795 ACSR (115 kV & 230 kV)

#### Project ID

2499K, 2499L

#### Project Description

Rebuild the existing AMW Cainhoy 115 kV line to steel pole SPDC construction using B795 ACSR for both circuits. The Williams – Cainhoy 115 kV #1 line will be built insulated to 115 kV, and the Williams – Cainhoy 115 kV #2 line will be built insulated to 230 kV for future expansion capability. Total line length is 8.5 miles.

#### Project Need

System load growth in the Cainhoy, Hamlin, Mt Pleasant, and Thomas Island areas require additional 230/115 kV transformation. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

#### Project Status

In Progress

#### Planned In-Service Date

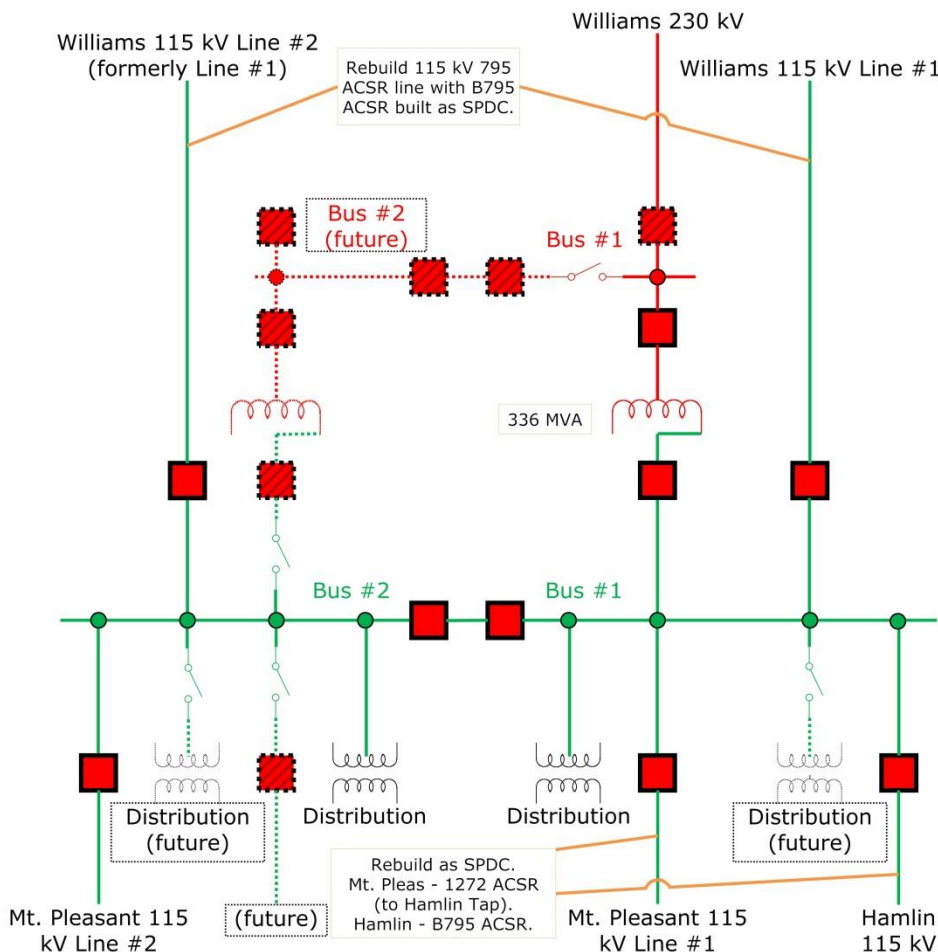
12/3/2018

#### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total*
\$346,972	\$3,253,028	\$5,400,000	\$0	\$0	\$0	\$9,000,000

\*Total Amount applied to 2018 Rate Base Calculation

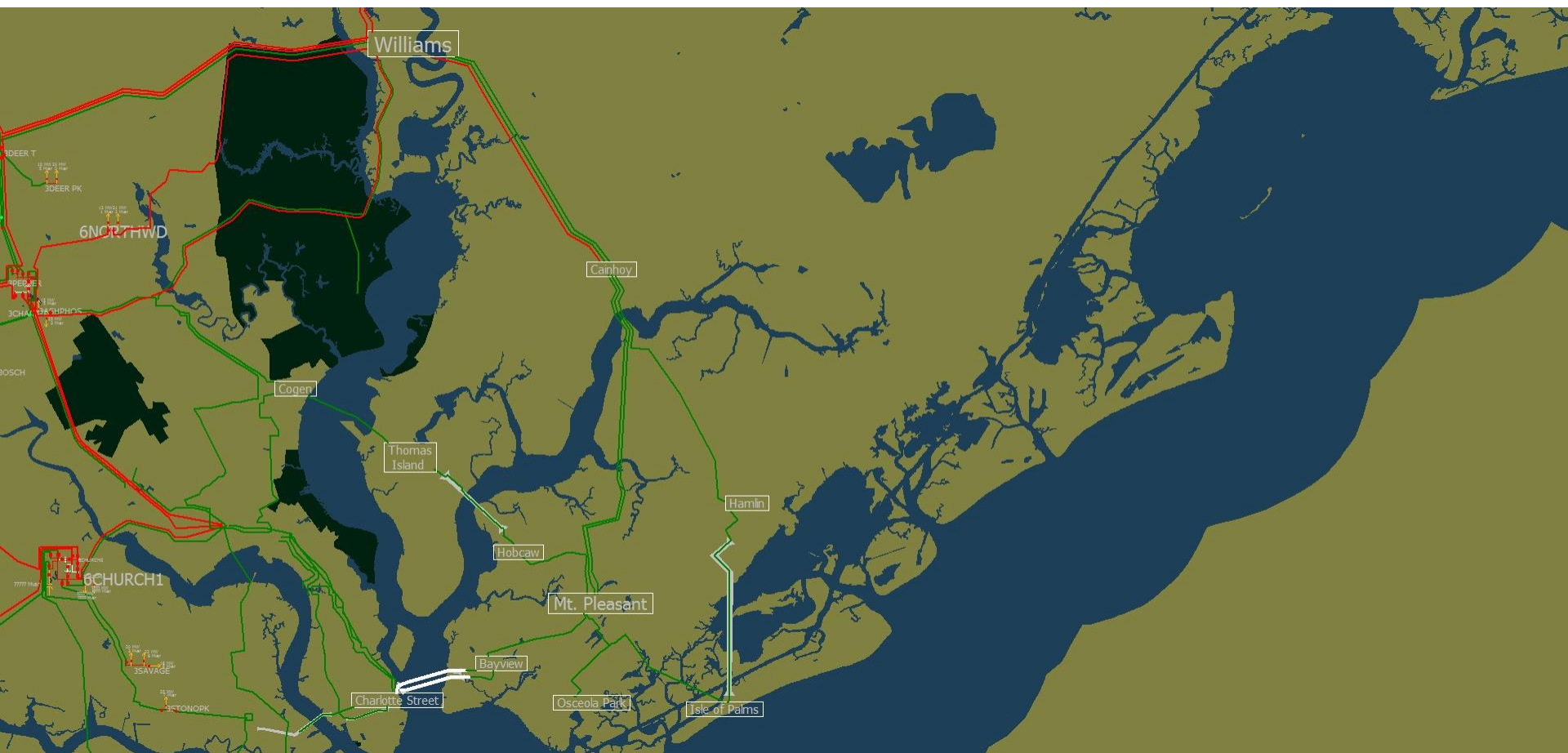
South Carolina Electric and Gas Company  
 Planned Transmission Projects \$2M and above Total  
 5 Year Budget



- Rebuild Williams – Cainhoy 115 kV SPDC
  - Creates Williams – Cainhoy 115 kV #1 & #2 B795 ACSR
- Add 1-115 kV at AMW and 1-115 kV terminal at Cainhoy



Project 15 of 28  
 South Carolina Electric and Gas Company  
 Planned Transmission Projects \$2M and above Total  
 5 Year Budget



## South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget

### Urquhart - Graniteville – South Augusta 230 kV Line: Construct

#### Project ID

7973A – 7973N

#### Project Description

Rebuild current Urquhart – Graniteville 115 kV line to 230 kV SPDC B1272 ACSR construction in order to upgrade the Urquhart – Graniteville 230 kV #2 line and create Graniteville – South Augusta 230 kV SCE&G/SOCO tieline. The old Urquhart – Graniteville 230 kV line will be converted to 115 kV and re-connected to the newly built South Augusta 115 kV SOCO line to create the Graniteville – South Augusta 115 kV tieline. In addition, a 230 kV Series Reactor will be installed on the SRS – Vogtle 230 kV SCE&G/SOCO tieline in order to reduce real-time and post contingency line-loading concerns.

#### Project Need

Load growth in the Aiken area requires additional transmission capacity. Constructing a new 230 kV line from South Augusta to Graniteville will provide an additional source needed during contingencies and increase the transfer capability between SCE&G and Southern Company. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

#### Project Status

Planned

#### Planned In-Service Date

5/31/2019

#### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total*
\$135,320	\$3,850,000	\$10,400,000	\$16,164,680	\$0	\$0	\$30,550,000

\*Total Estimated Amount to be applied to 2019 Rate Base Calculation

## South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget

# SC RTP

VOGTLE

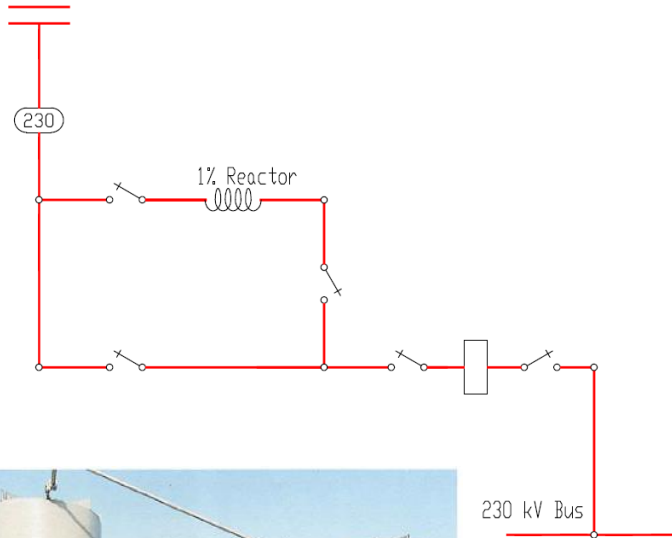


Fig. 3

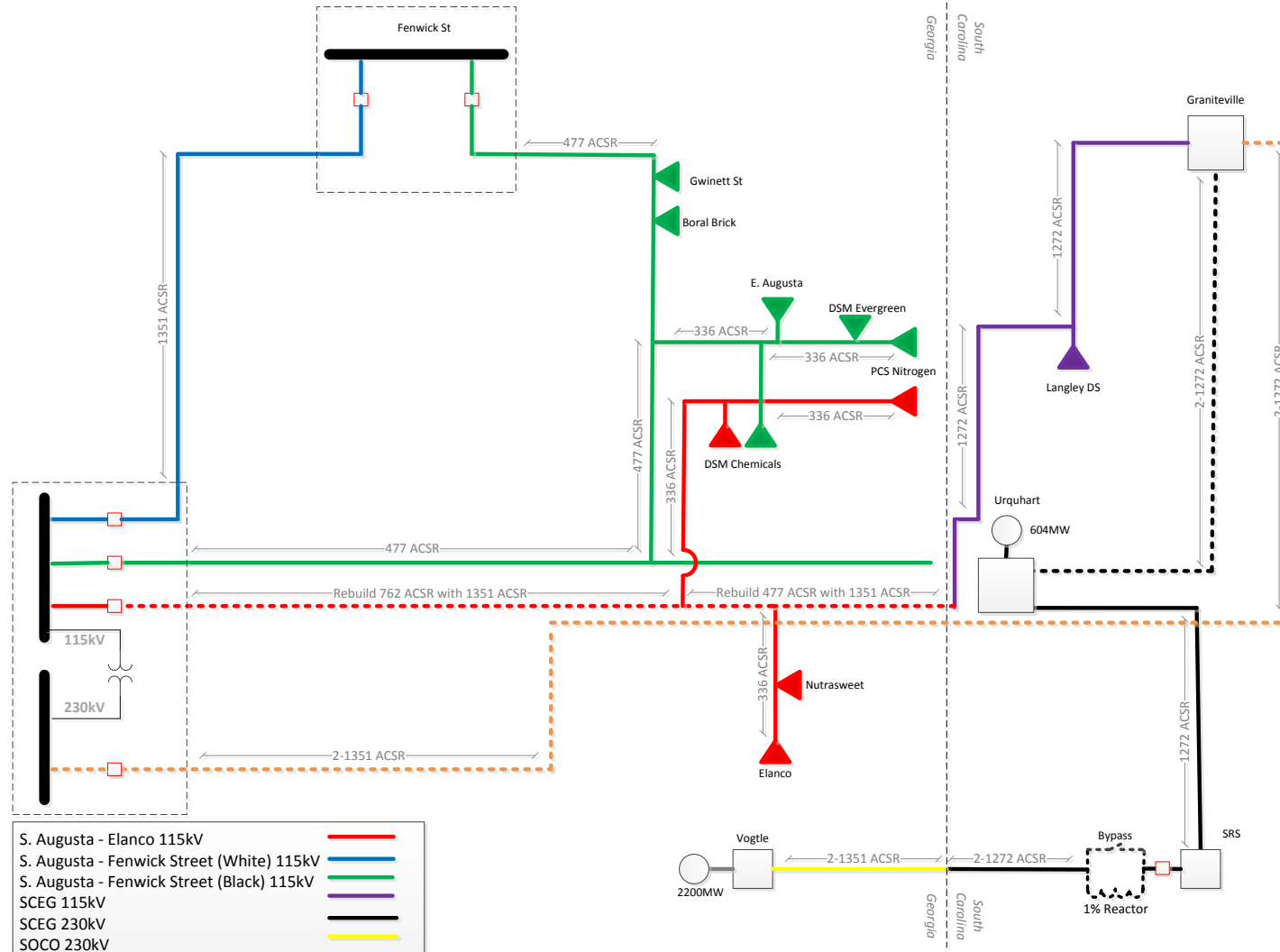
### Phase I of Joint Study Results Assessment agreed upon between SCE&G and Southern Company

- Install 1% Series Reactor at SRS end of SRS – Vogtle 230 kV (SCE&G/SOCO) tie line
- Required to alleviate high loading due to market flows and loop flows, and/or potential overloading due to certain contingencies
- Long lead times associated with the specific design, engineering, and construction of reactors. Scheduled to be in service by 12/2017

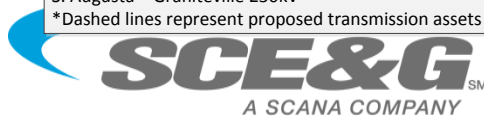
## Phase II of Joint Study Results Assessment agreed upon between SCE&G and Southern Company

- Construct a 230 & 115 kV tieline from SOCO's South Augusta substation to SCE&G's Graniteville substation
  - Rebuild current Urquhart – Graniteville 115 kV line to SPDC B1272 ACSR 230 kV lines
    - Creates Graniteville – South Augusta 230 kV & Urquhart – Graniteville #2 230 kV lines
  - Existing Urquhart – Graniteville #2 230 kV line will be converted to 115 kV and re-terminated from Urquhart to new 115 kV SOCO line to become Graniteville – South Augusta 115 kV line (1272 ACSR)
- Mitigates high loading and/or potential overloading seen in future cases on the SRS – Vogtle 230 kV line by increasing the transfer capability on the SCE&G and SOCO interface
- Replaces project “Urquhart – Graniteville 230 kV #2 Line: Construct” previously in queue for SCE&G

Project 22 of 28  
 South Carolina Electric and Gas Company  
 Planned Transmission Projects \$2M and above Total  
 5 Year Budget



- S. Augusta - Elanco 115kV
  - S. Augusta - Fenwick Street (White) 115kV
  - S. Augusta - Fenwick Street (Black) 115kV
  - SCEG 115kV
  - SCEG 230kV
  - SOCO 230kV
  - S. Augusta - Graniteville 230kV
- \*Dashed lines represent proposed transmission assets



**South Carolina Electric and Gas Company  
Planned Transmission Projects \$2M and above Total  
5 Year Budget**



## Summerville – Pepperhill – Goose Creek 230 kV: Construct

### Project ID

2600A, 2600A2

### Project Description

Construct a new 230 kV line from Pepperhill to Summerville with B-1272 ACSR. The existing Canadys – Williams 230 kV line will be re-terminated to Pepperhill and Goose Creek to create Canadys – Goose Creek 230 kV line and Williams – Pepperhill 230 kV line.

### Project Need

System load growth in the Pepperhill and Summerville areas require additional transmission capacity. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

### Project Status

Planned

### Planned In-Service Date

5/31/2020

### Estimated Project Cost (\$)

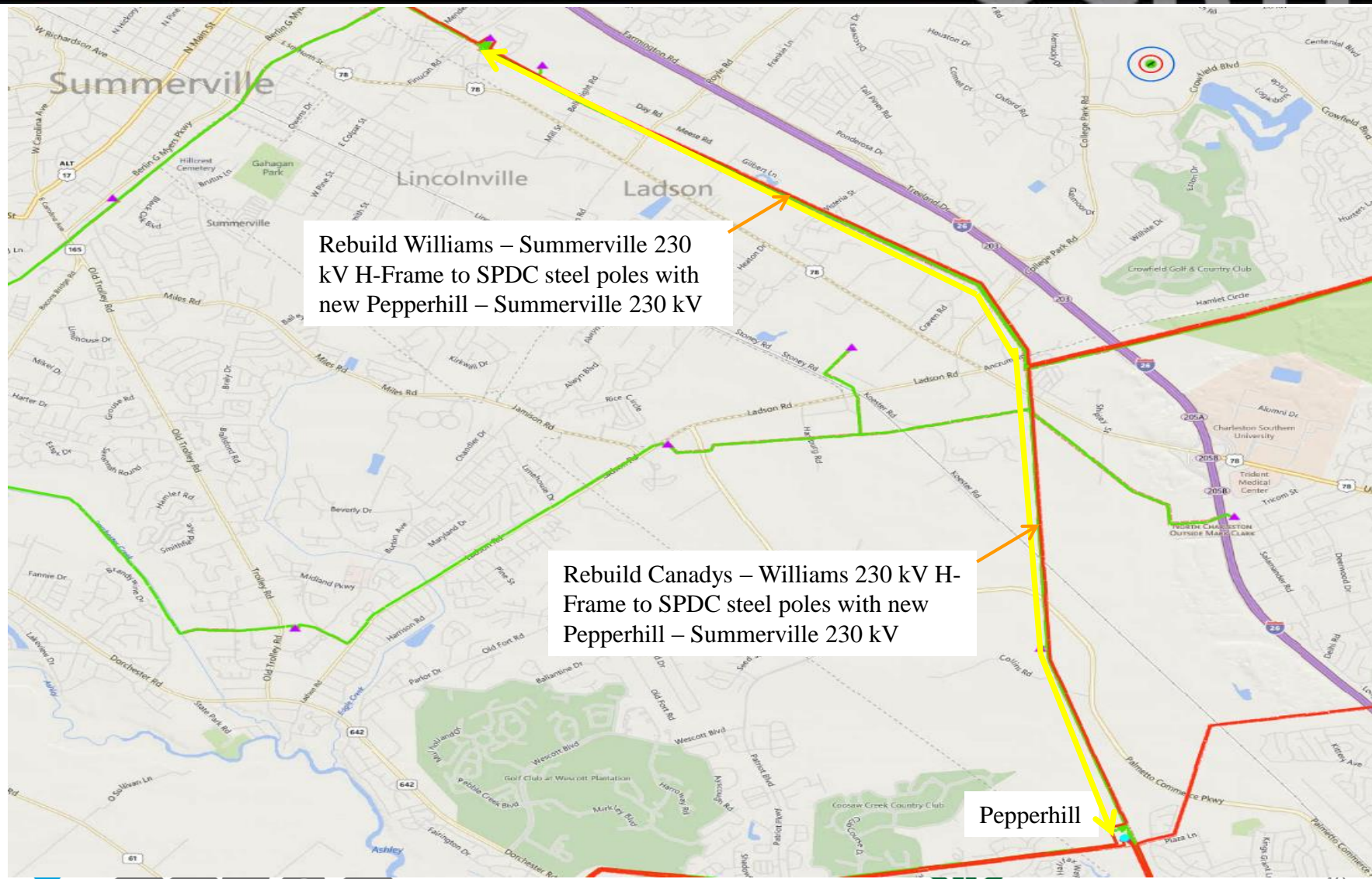
Previous	2017	2018	2019	2020	2021	Total*
\$239,765	\$0	\$700,000	\$5,000,000	\$3,760,235	\$0	\$9,700,000

\*Total Estimated Amount to be applied to 2020 Rate Base Calculation





Project 24 of 28  
 South Carolina Electric and Gas Company  
 Planned Transmission Projects \$2M and above Total  
 5 Year Budget



Rebuild Williams – Summerville 230 kV H-Frame to SPDC steel poles with new Pepperhill – Summerville 230 kV

Rebuild Canadys – Williams 230 kV H-Frame to SPDC steel poles with new Pepperhill – Summerville 230 kV

Pepperhill

## South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget

### New Nuclear Deployment BLRA Unit 2 - Transmission

#### Project ID

0090B, 0090D, 0090E, 0090F, 0090G, 0090H, 0090I, 0090J, 0090K, 0090L, 0090M, 0090N, 0090Q, 0090R, 0090S, 0090T, 0090U, 0091F, 0091M, 0091N, 0091P, 0091F, 0091U

#### Project Description

Various projects in the northwestern portion of the SCE&G transmission system needed to accommodate SCE&G's portion of the 1,165 MW of generation from VC Summer Unit #2:

- Construct a new 230 kV generator switchyard using breaker-and-a-half design with ten (10) 230 kV terminals
- Install a VC Summer #2 generator step-up transformer
- Construct a 230 kV connection from the switchyard to the GSU
- Construct a 230 kV connection from the switchyard to the reserve auxiliary transformers
- Construct two VC Summer #2 – VC Summer #1 230 kV lines with B1272 ACSR
- Re-terminate multiple lines at VC Summer #1 to accommodate new transmission lines associated with Unit #2
- Construct an additional VC Summer #2 – Lake Murray 230 kV line
- Construct a VCS #1 – Killian 230 kV line
- Replace existing 115 kV and 230 kV circuit breakers with higher interrupting capability breakers

#### Project Need

VCS Nuclear Unit #2 Interconnection Requirement. Distribute power from the generation to load while meeting NERC TPL standards and SCE&G's Internal Planning Criteria.

#### Project Status

In Progress

#### In-Service Date

12/31/16

#### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total*
\$138,260,582	\$0	\$0	\$4,739,418	\$0	\$0	\$143,000,000

\*Total Estimated Amount to be applied to 2019 Rate Base Calculation (To coincide with on-line commercial operation date for VC Summer Unit 2)

## South Carolina Electric and Gas Company Planned Transmission Projects \$2M and above Total 5 Year Budget

### New Nuclear Deployment BLRA Unit 3 - Transmission

#### Project ID

0094D, 0094E, 0094H, 0094I, 0094J, 0094K, 0094M, 0094N, 0094O, 0094P, 0094Q, 0095A

#### Project Description

Various projects in the western/southern portion of the SCE&G transmission system needed to accommodate SCE&G's portion of the 1,165 MW of generation from VC Summer Unit #3:

- Add six (6) terminals to the VC Summer #2 switchyard using breaker-and-a-half design
- Install a VC Summer #3 generator step-up transformer
- Construct a 230 kV connection from the switchyard to the GSU
- Construct a 230 kV connection from the switchyard to the reserve auxiliary transformers
- Construct one additional VC Summer #2 – VC Summer #1 230 kV line with B1272 ACSR
- Construct a 230 kV switching station located in St. George, SC with six (6) terminals
- Construct two lines from VC Summer #2 to St. George using B1272 ACSR (135 miles)
- Upgrade Canadys – St. George 230 kV line
- Upgrade St. George – Summerville 230 kV line
- Replace existing 115 kV and 230 kV circuit breakers with higher interrupting capability breakers

#### Project Need

VCS Nuclear Unit #3 Interconnection Requirement. Distribute power from the generation to load while meeting NERC TPL standards and SCE&G's Internal Planning Criteria.

#### Project Status

In Progress

#### Planned In-Service Date

12/31/18

#### Estimated Project Cost (\$)

Previous	2017	2018	2019	2020	2021	Total*
\$139,308,431	\$0	\$0	\$0	\$91,691,569	\$0	\$231,000,000

\*\*Total Estimated Amount to be applied to 2020 Rate Base Calculation (To coincide with on-line commercial operation date for VC Summer Unit 3)

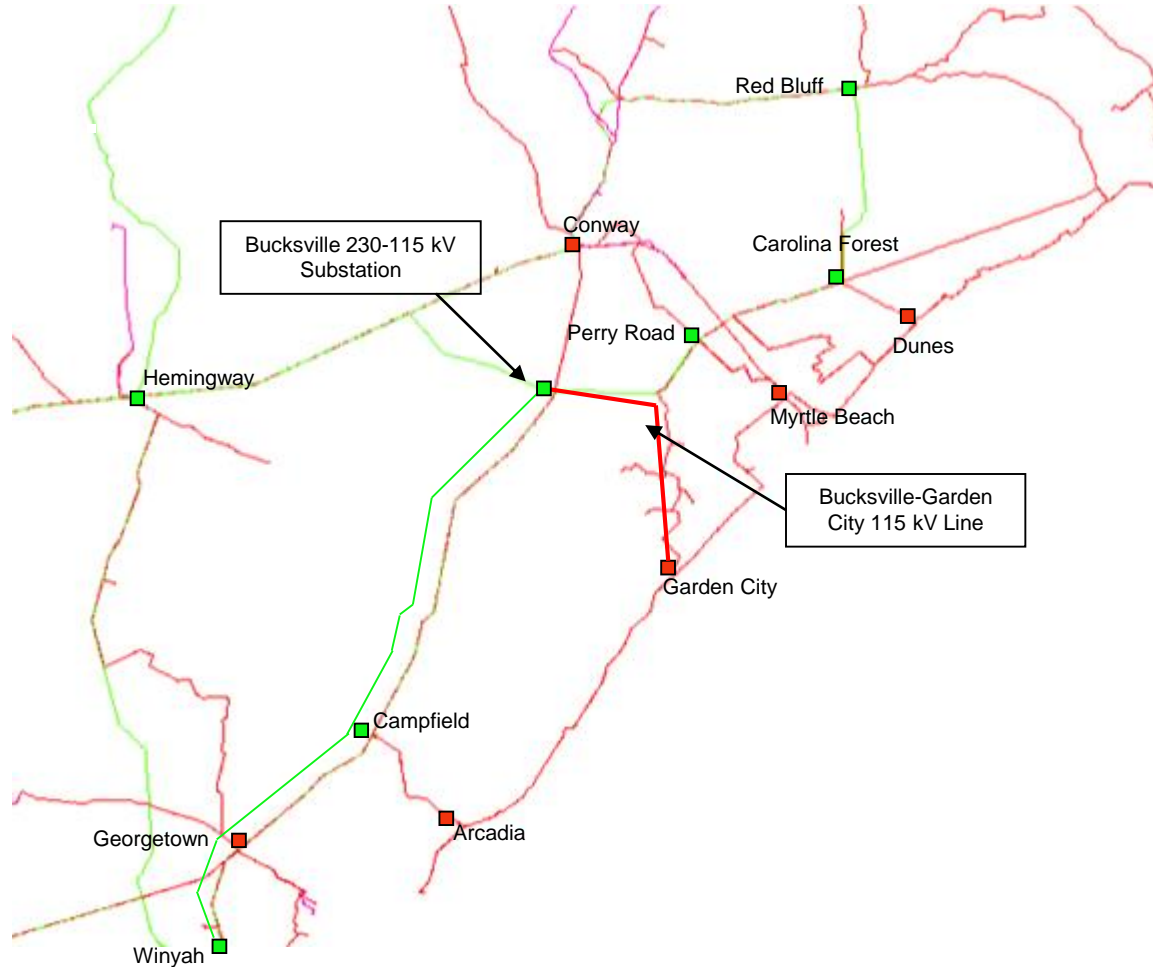
# Questions?

# Proposed Transmission Expansion Plan

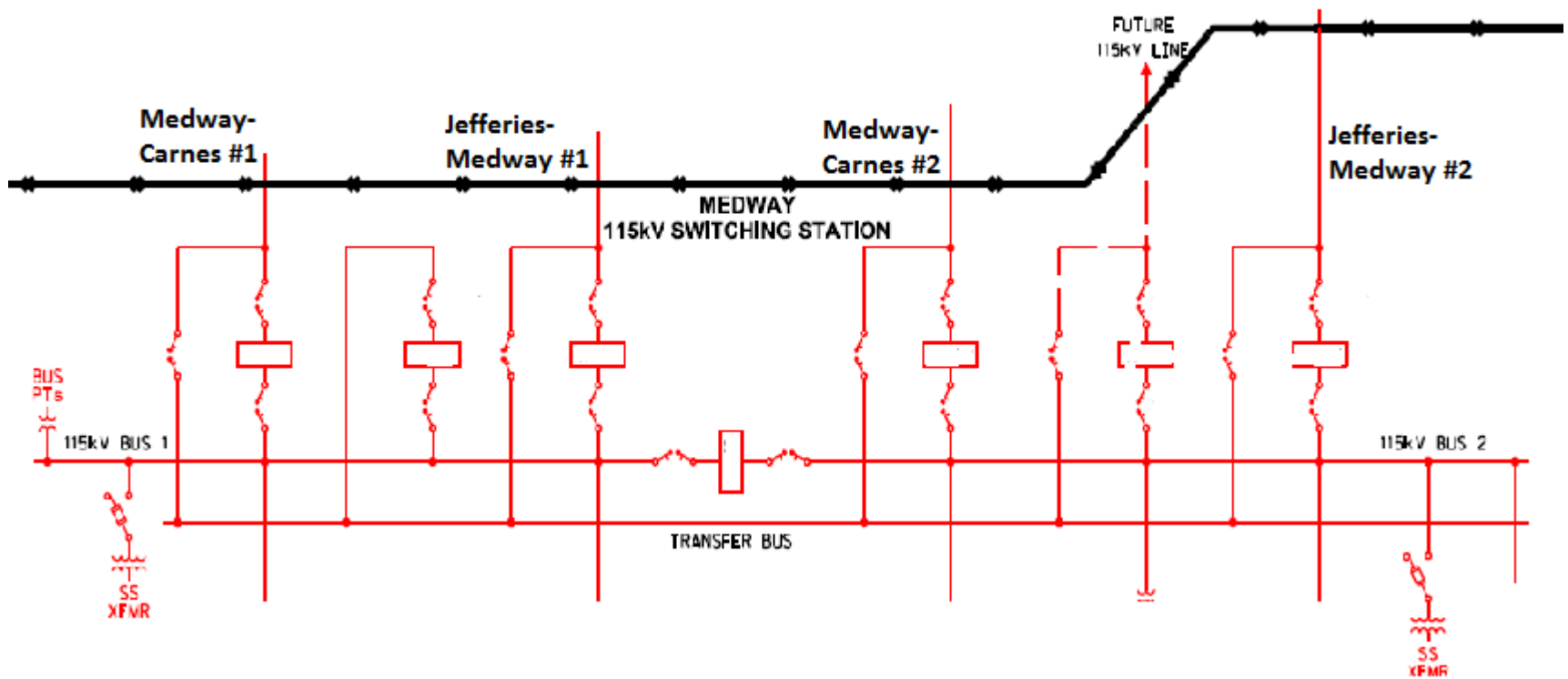
**Santee Cooper**

**Rick Thornton**

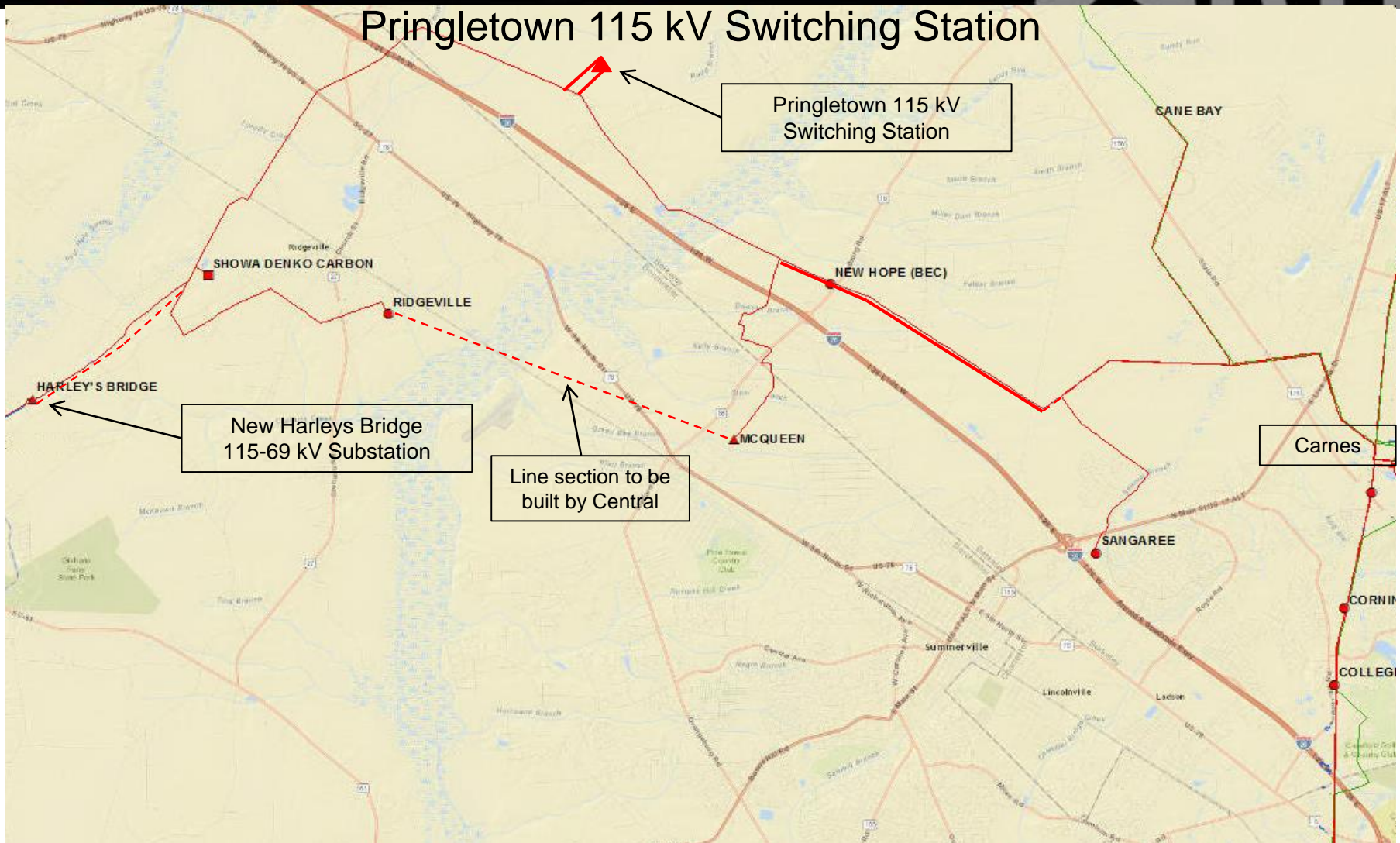
## Bucksville-Garden City 115 kV Line



# Medway Station 115 kV Line additions



## Pringletown 115 kV Switching Station





## Transmission Network Active Projects

Pine Level-Allen #2 115 kV Line	06/01/2017
Richburg-Flat Creek 230 kV Line	10/01/2017
Bucksville-Myrtle Beach 115 kV Line	12/01/2017
Perry Road-Myrtle Beach #3 115 kV Line	07/01/2018
New Harleys Bridge 115-69 kV Substation	12/31/2017
Carnes Crossroads-Harleys Bridge 115 kV Line via McQueen Phase I	12/31/2017
Sandy Run 230-115 kV Substation	05/31/2018
Add Bucksville 230-115 kV Transformer #2	12/31/2019
Pomaria-Sandy Run 230 kV Line	06/30/2019
Sandy Run-Orangeburg 230 kV Line	06/30/2019
Marion-Red Bluff 230 kV Line	12/31/2019

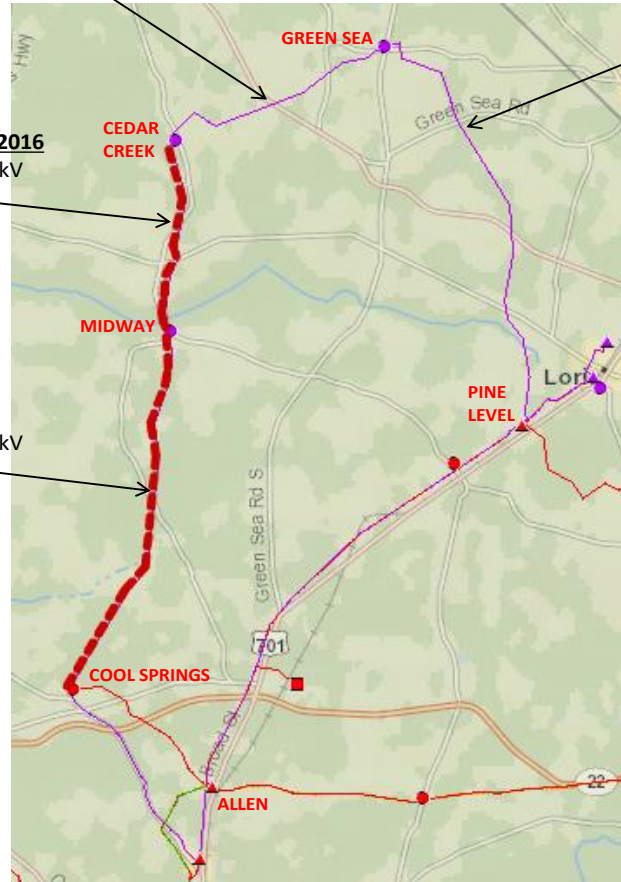
# Allen – Pine Level #2 115 kV Line

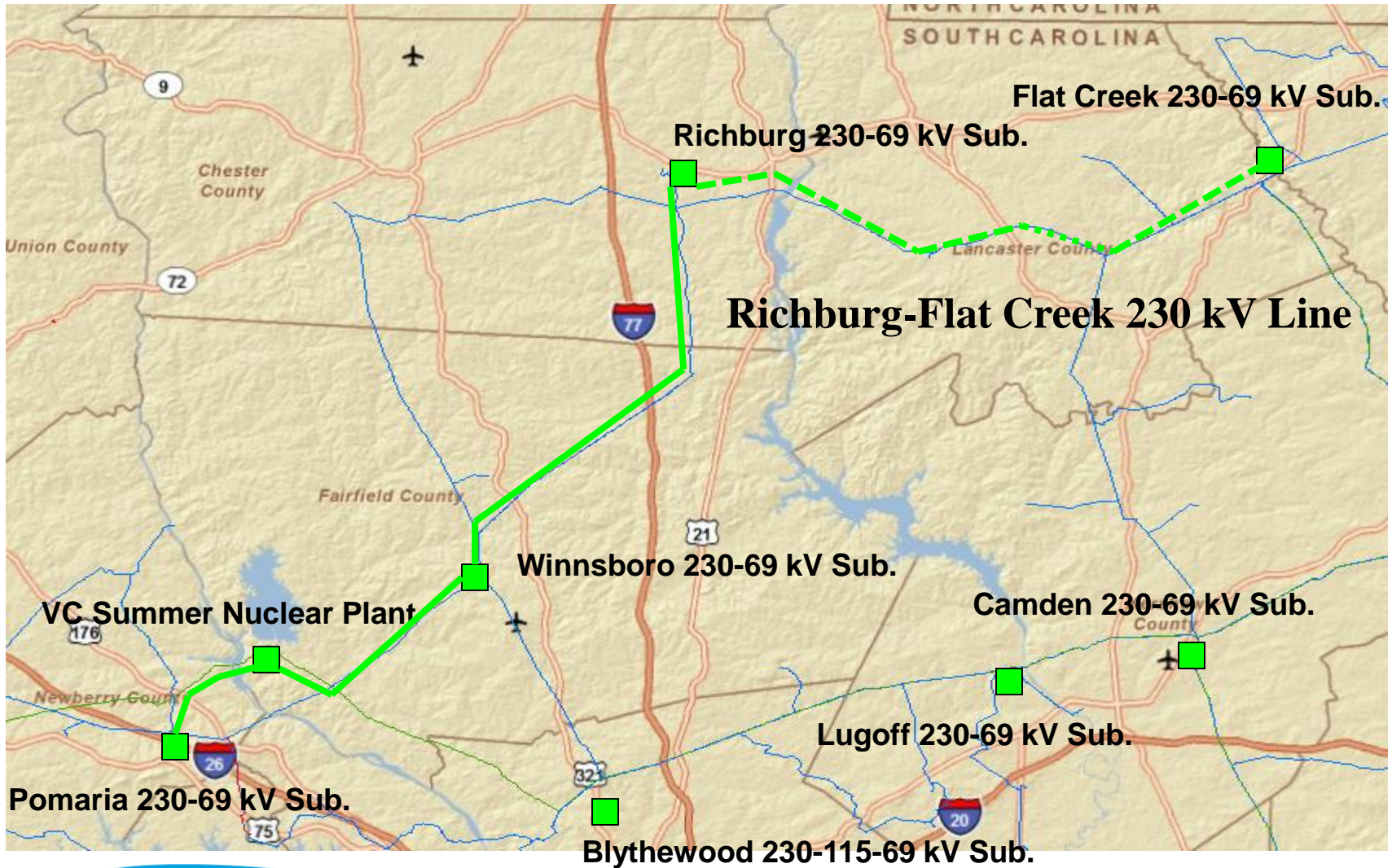
Changed to **3/1/2017**  
 OPERATE AT 115kV  
 (ALREADY 477 ACSR  
 BUILT FOR 115kV)

Changed to **5/1/2016**  
 REBUILD FOR 115kV  
 795 ACSR

BY **11/30/2015**  
 REBUILD FOR 115kV  
 795 ACSR

Changed to **3/1/2017**  
 OPERATE AT 115kV  
 (ALREADY 477 ACSR  
 BUILT FOR 115kV)

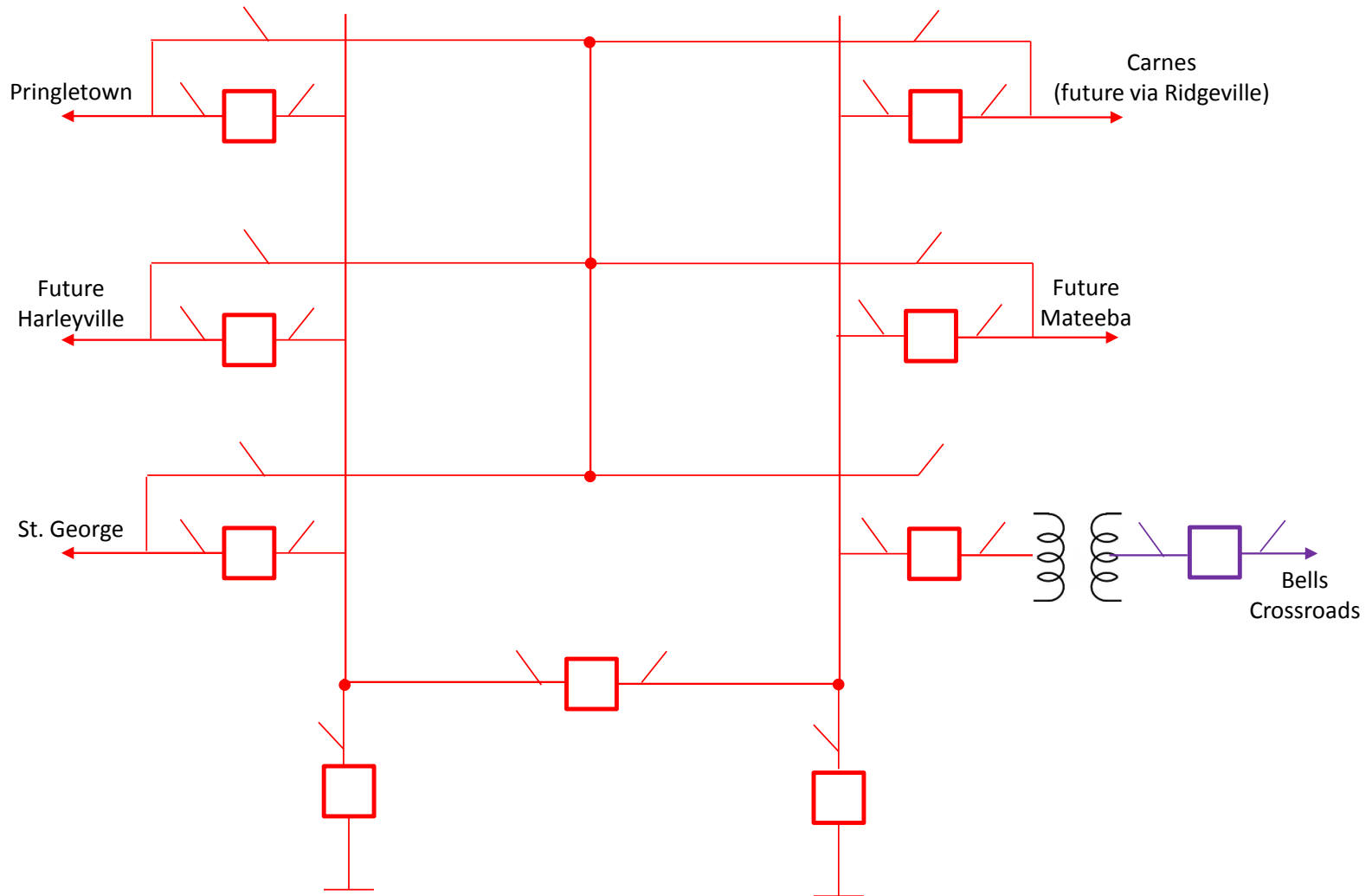




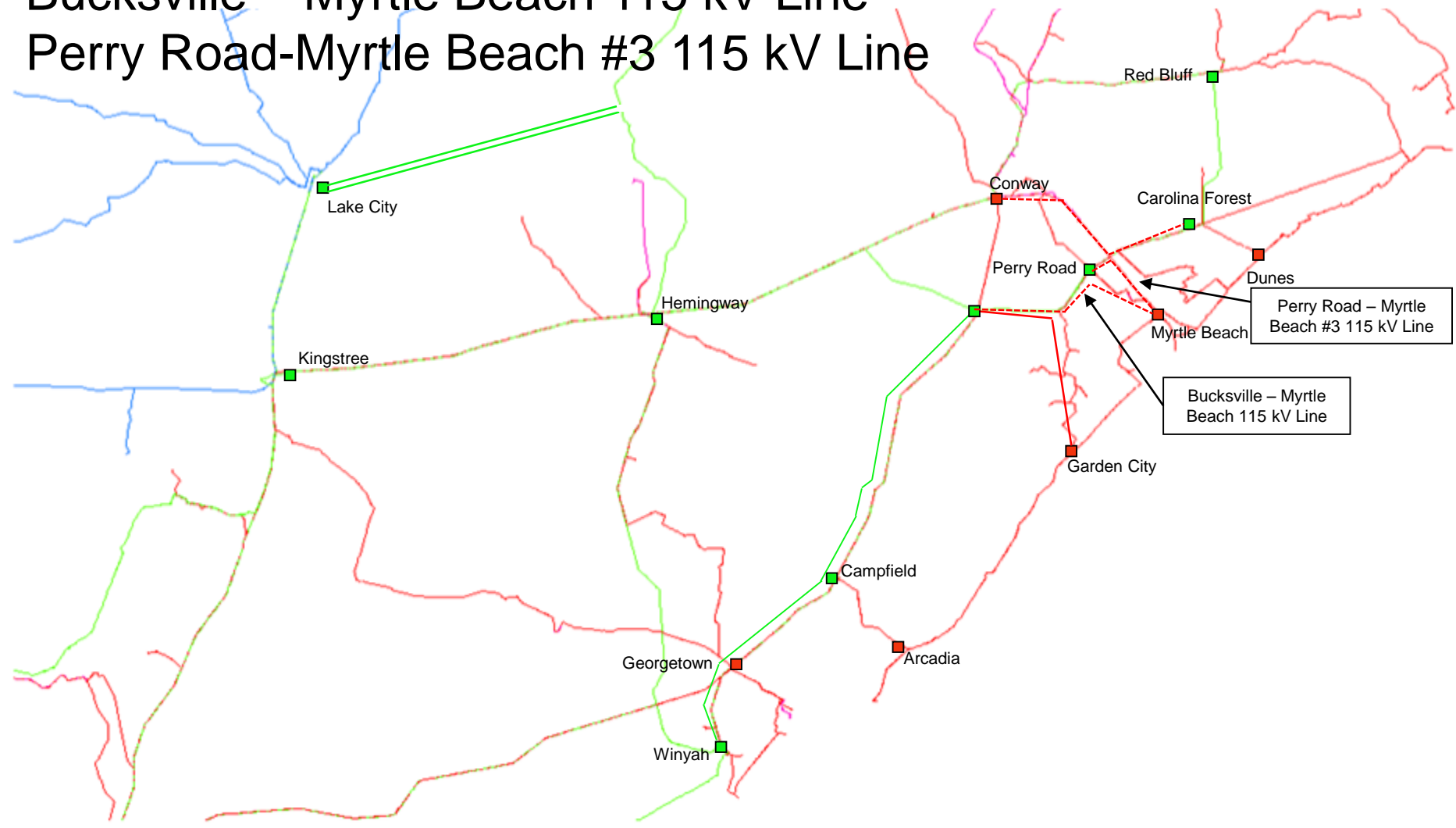
## Richburg-Flat Creek 230 kV Line

- Approx. 32 miles of 230 kV line
- At Flat Creek 230-69 kV Substation:
  - Add a new 230 kV Bay
  - Add a 230 kV bus tie breaker
- Completion of this project would loop the 230 kV network that will connect V.C. Summer to existing 230 kV line at Flat Creek via Winnsboro and Richburg

# NEW HARLEYS BRIDGE 115-69 kV SUBSTATION

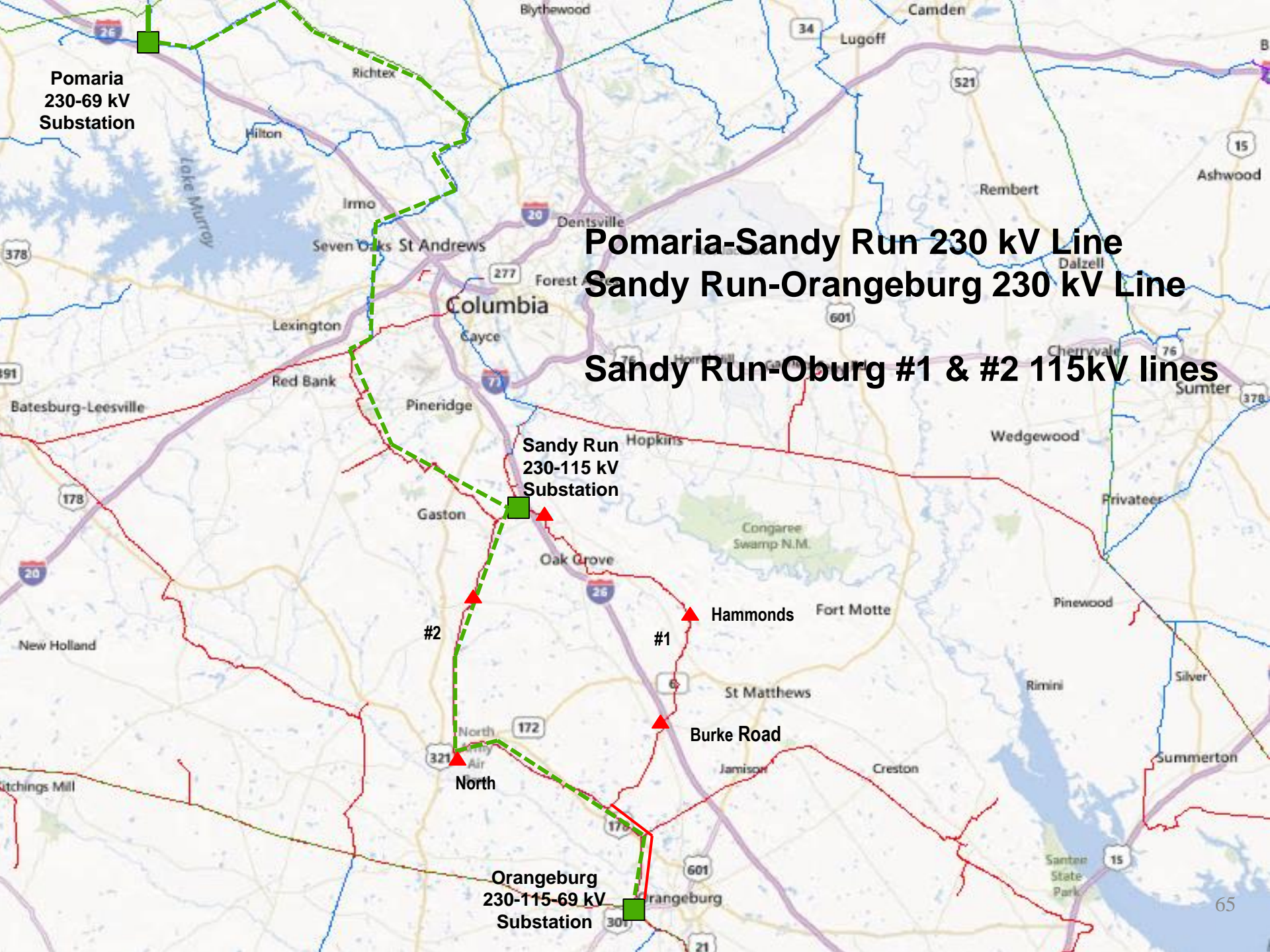


## Bucksville – Myrtle Beach 115 kV Line Perry Road-Myrtle Beach #3 115 kV Line



# Add 230-115 kV transformer 2 at Bucksville

- Need for more transformation in the area
  - Alleviate loading concern for other transformers/transmission facilities
- Address TPL-001-4 assessment findings



**Pomaria  
230-69 kV  
Substation**

**Pomaria-Sandy Run 230 kV Line  
Sandy Run-Orangeburg 230 kV Line**

**Sandy Run-Oburg #1 & #2 115kV lines**

**Sandy Run  
230-115 kV  
Substation**

#2

#1

**Orangeburg  
230-115-69 kV  
Substation**

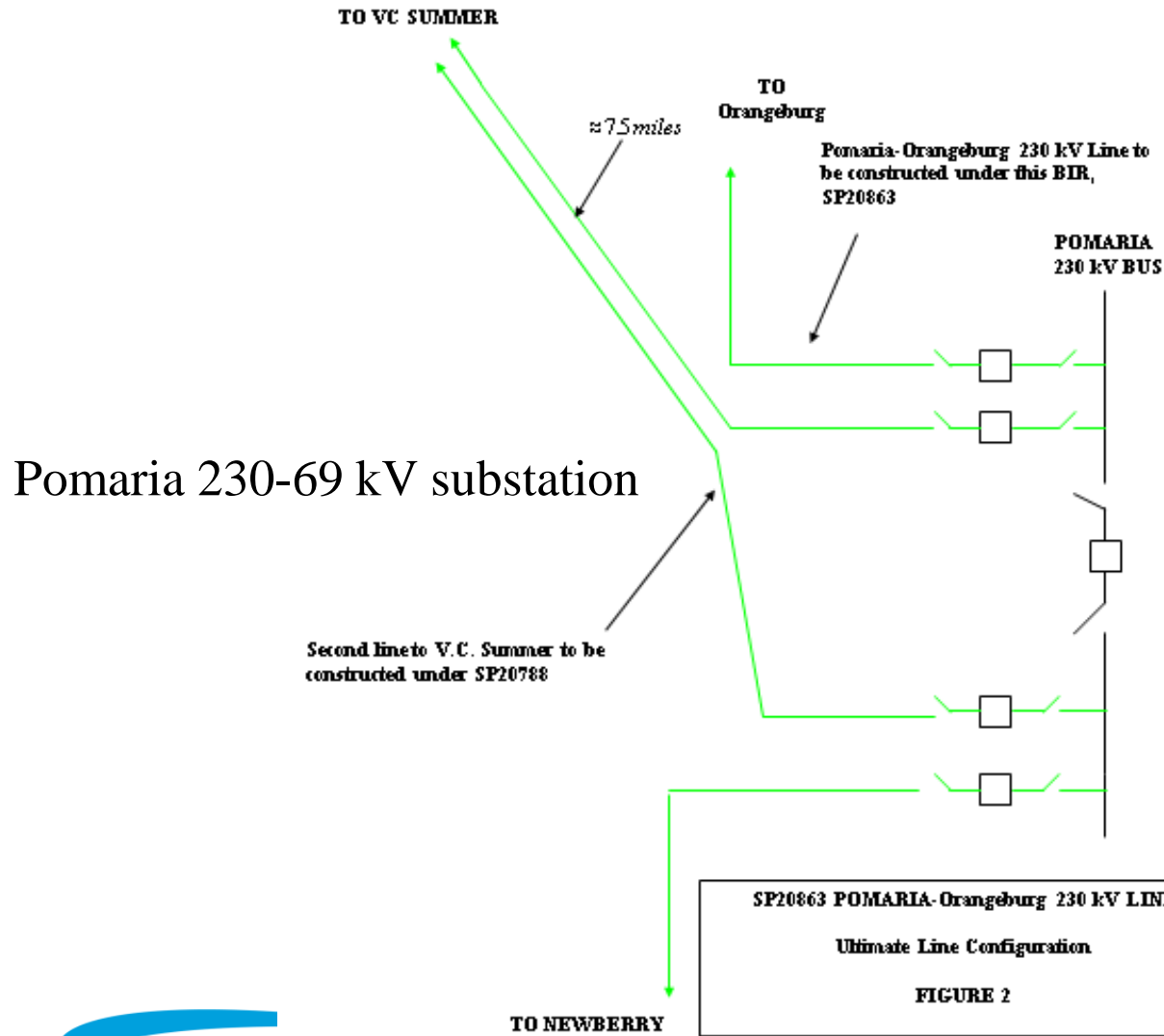


# Pomaria-Orangeburg 230 kV Line

- Approx. 90 miles of transmission line will be built from Pomaria to Sandy Run 115 kV Switching Station and then to Orangeburg substation. Sandy Run will become a 230-115 kV substation with the addition of one 230-115 kV transformer
- At Orangeburg: one new 230 kV terminal will be added. New 115 kV line from Orangeburg to Sandy Run has been completed (total of two Orangeburg-Sandy Run 115 kV circuits in-service)

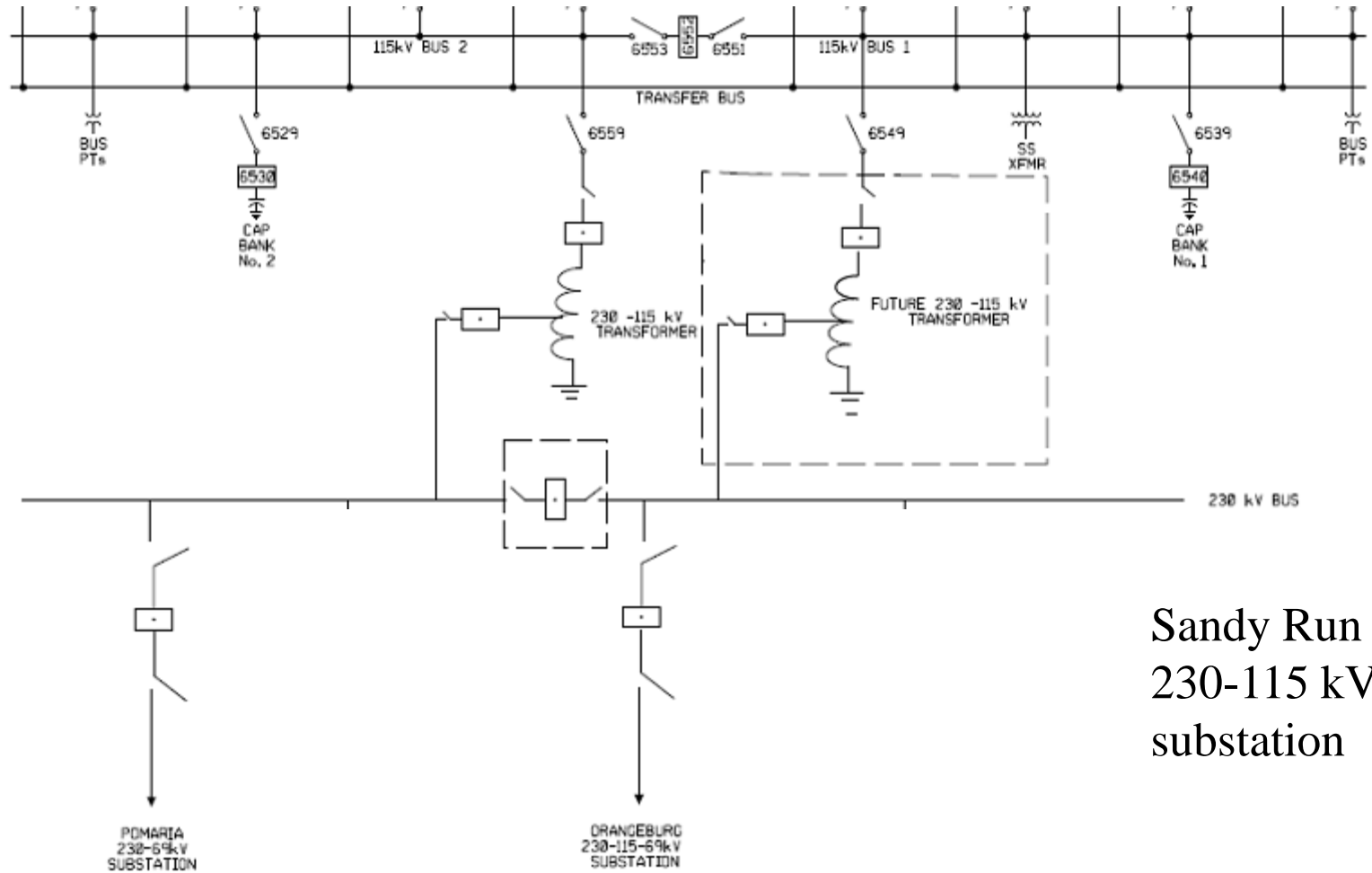


# Pomaria-Orangeburg 230 kV Line



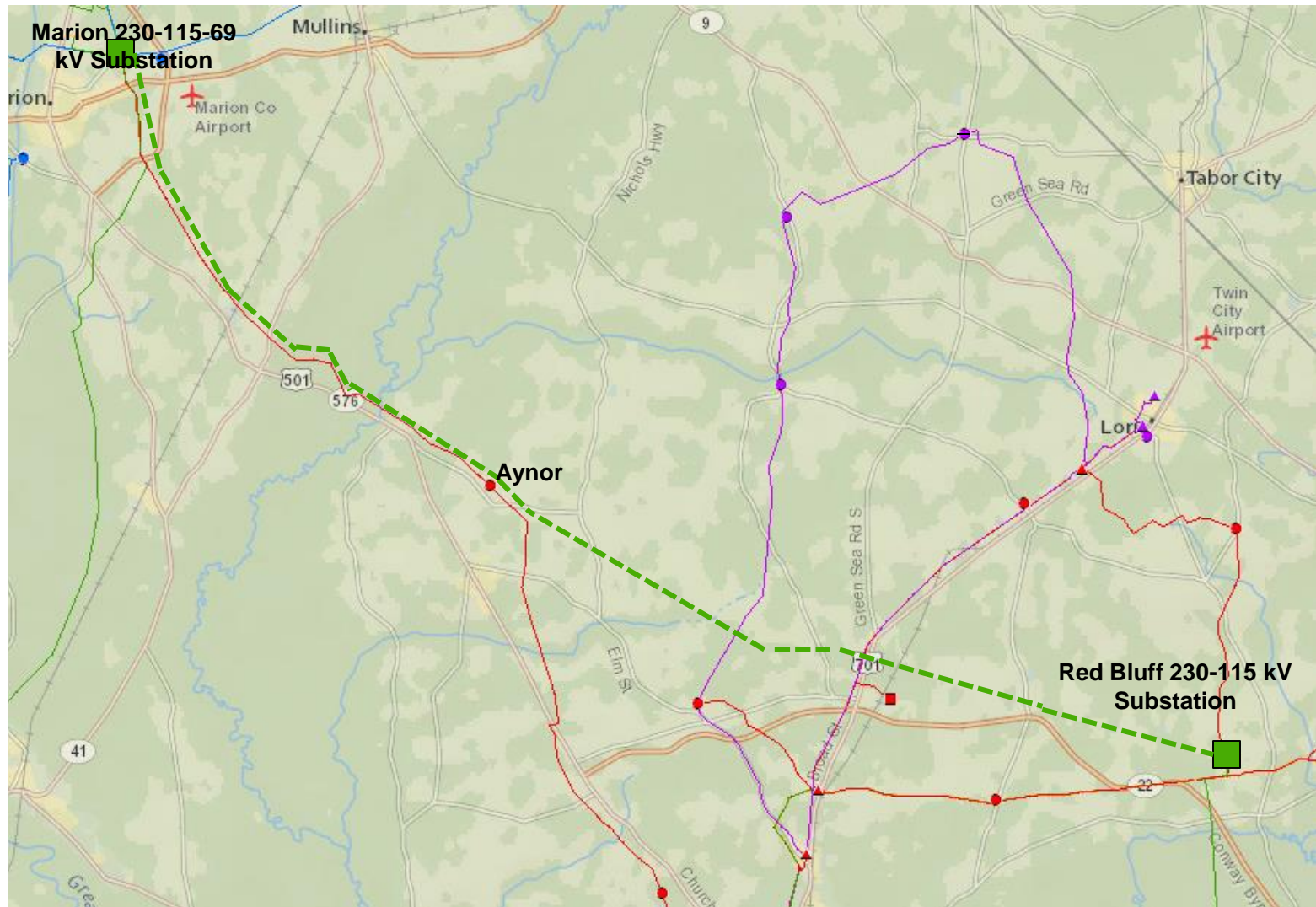


# Pomaria-Orangeburg 230 kV Line



Sandy Run  
230-115 kV  
substation

# Marion-Red Bluff 230 kV Line

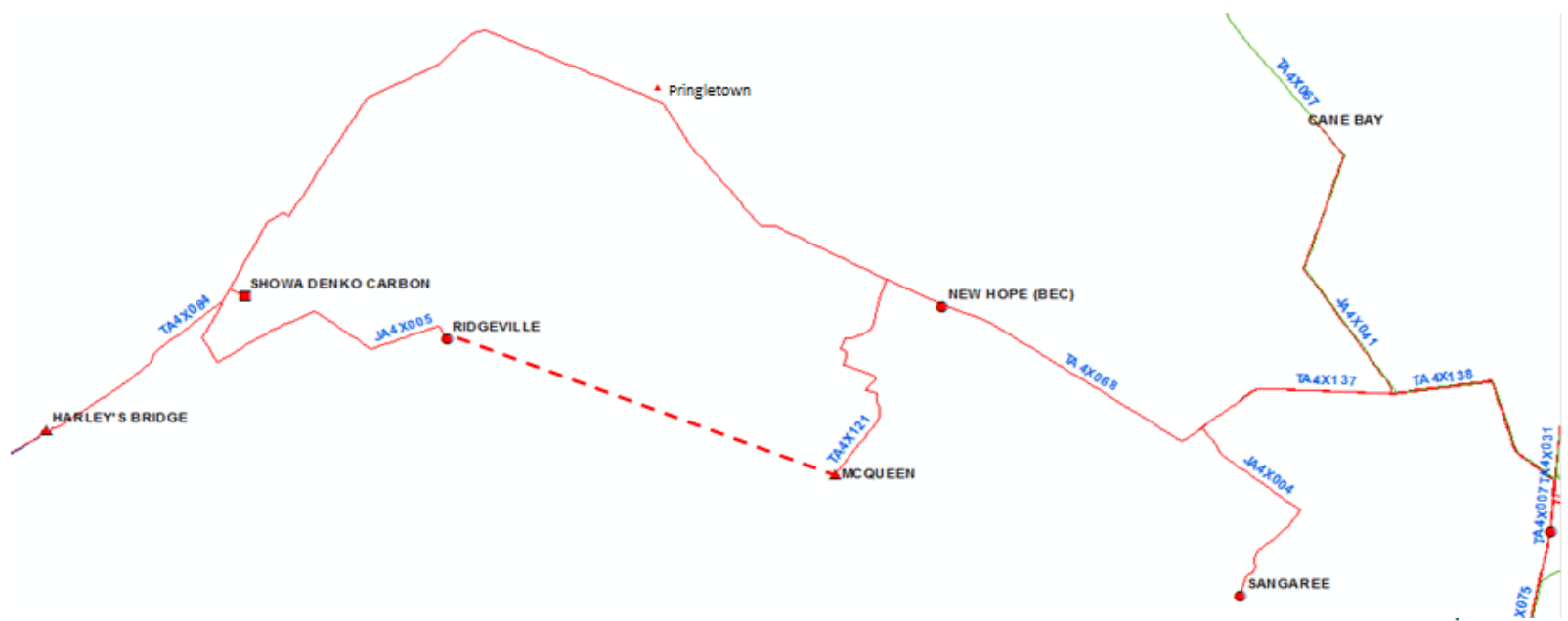


# Transmission Network Planned Projects

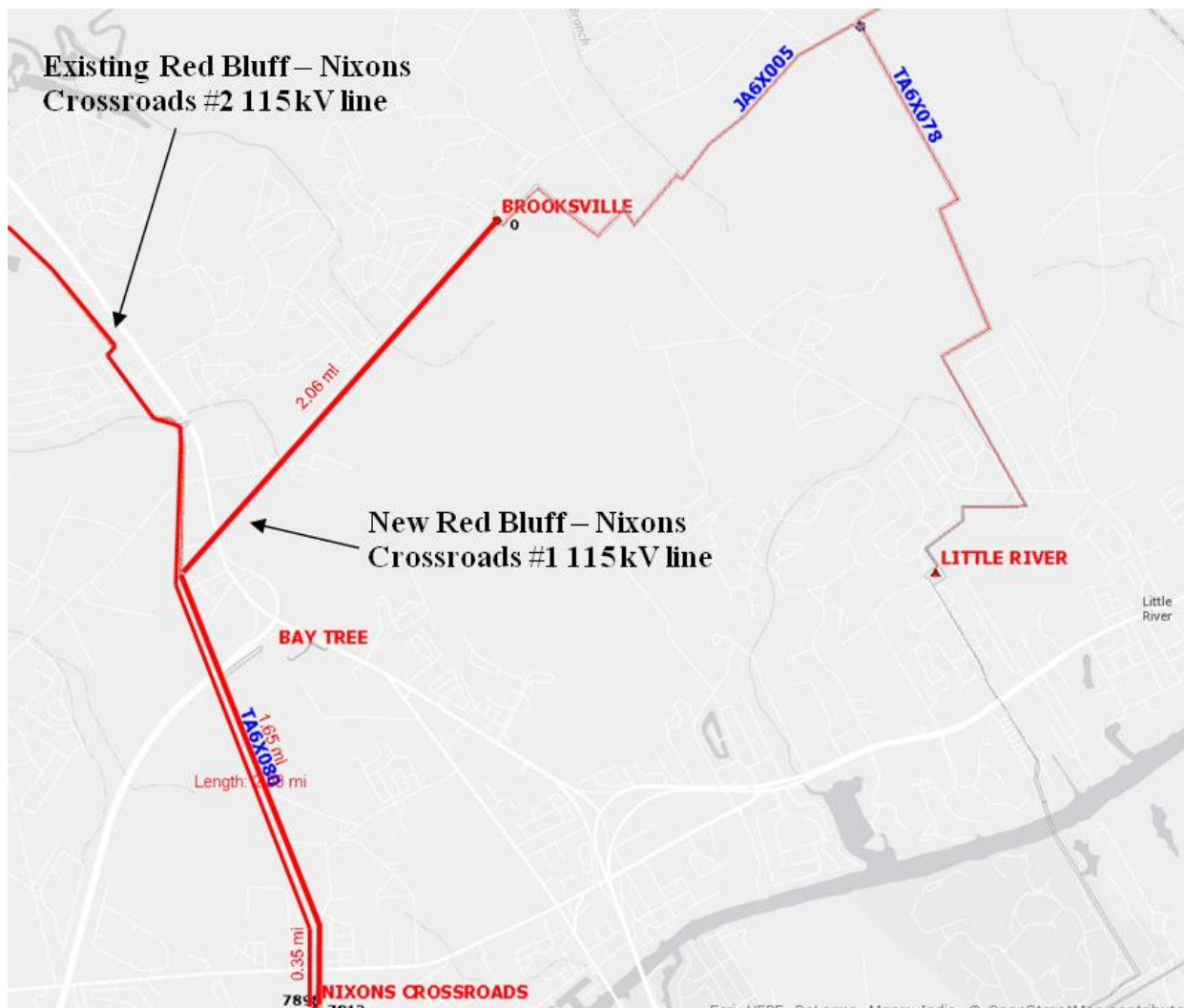
- Carnes-Harleys Bridge 115 kV Line via McQueen phase II 12/2019
- Red Bluff-Nixons Crossroads #1 115 kV 06/2020
- HHGT-Market Place #2 115 kV Line 06/2021
- Dalzell-Lake City 230 kV Line 06/2022

# Carnes-Harleys Bridge 115 kV Line via McQueen phase II

- Central plans to build a 115 kV line from McQueen DP to Ridgeville DP
- Phase I of Carnes-Harleys Bridge 115 kV line has Ridgeville Tap operated as a radial circuit out of the new Harleys Bridge 115-69 kV substation
- Reconfigure transmission line connections at Carnes Crossroads 230-115 kV sub and Cane Bay tap to establish:
  - Carnes-Pringletown 115 kV
  - Carnes-Cane Bay 115 kV Tap
  - Carnes-Harleys Bridge 115 kV via McQueen and Ridgeville



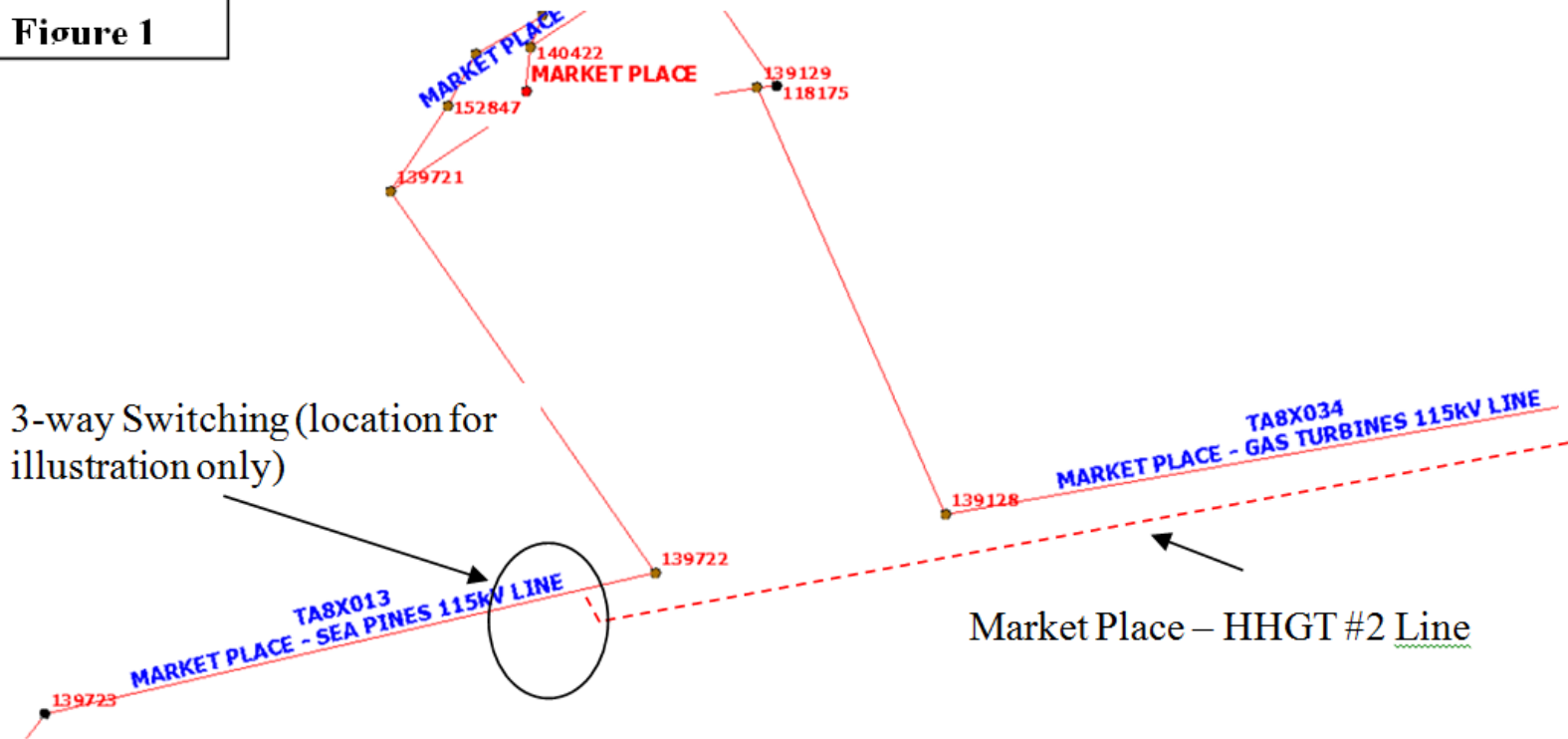
# Red Bluff-Nixons Crossroads #1 115 kV Line





# Hilton Head-Market Place 115 kV Line #2

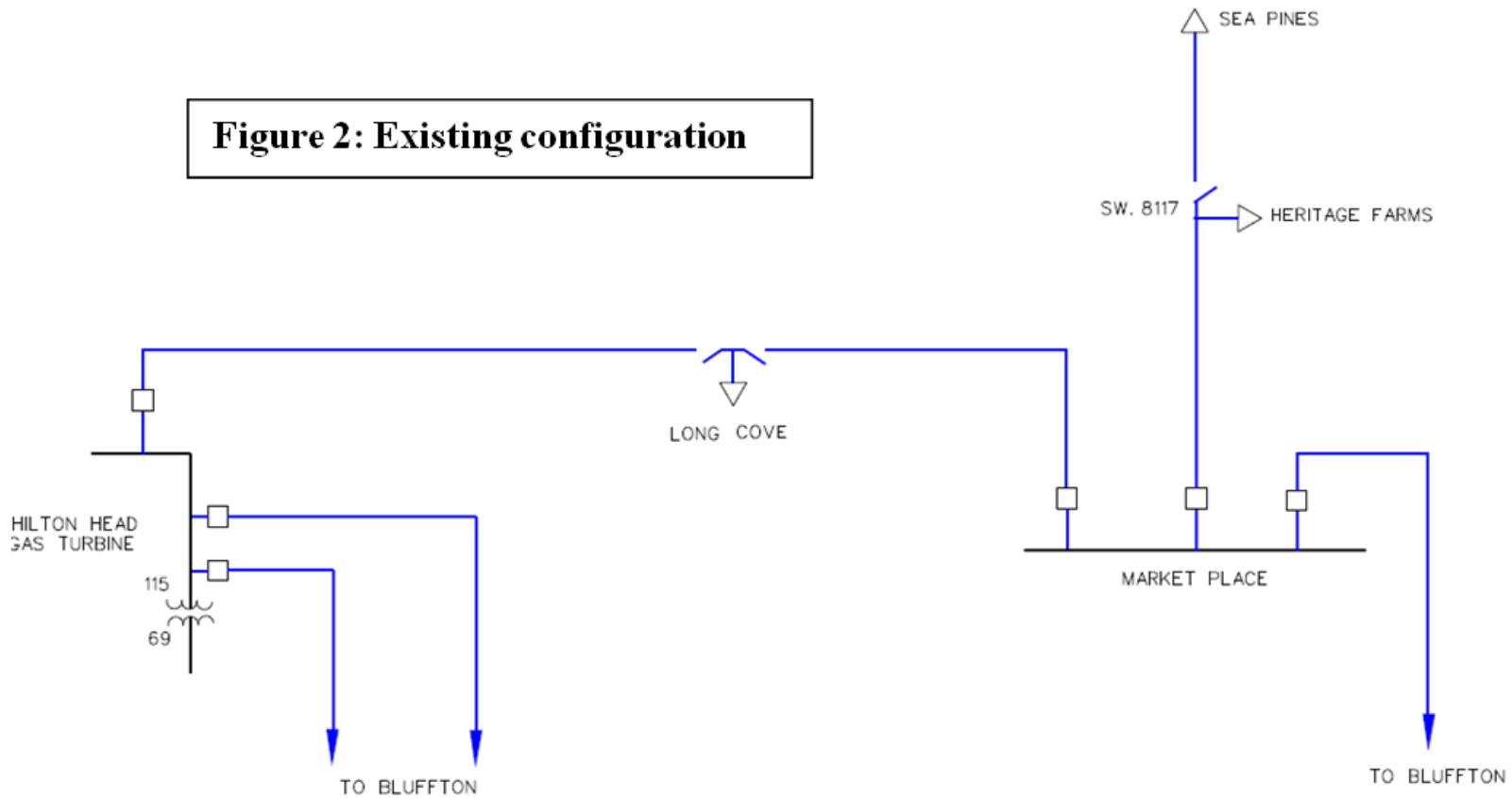
Figure 1





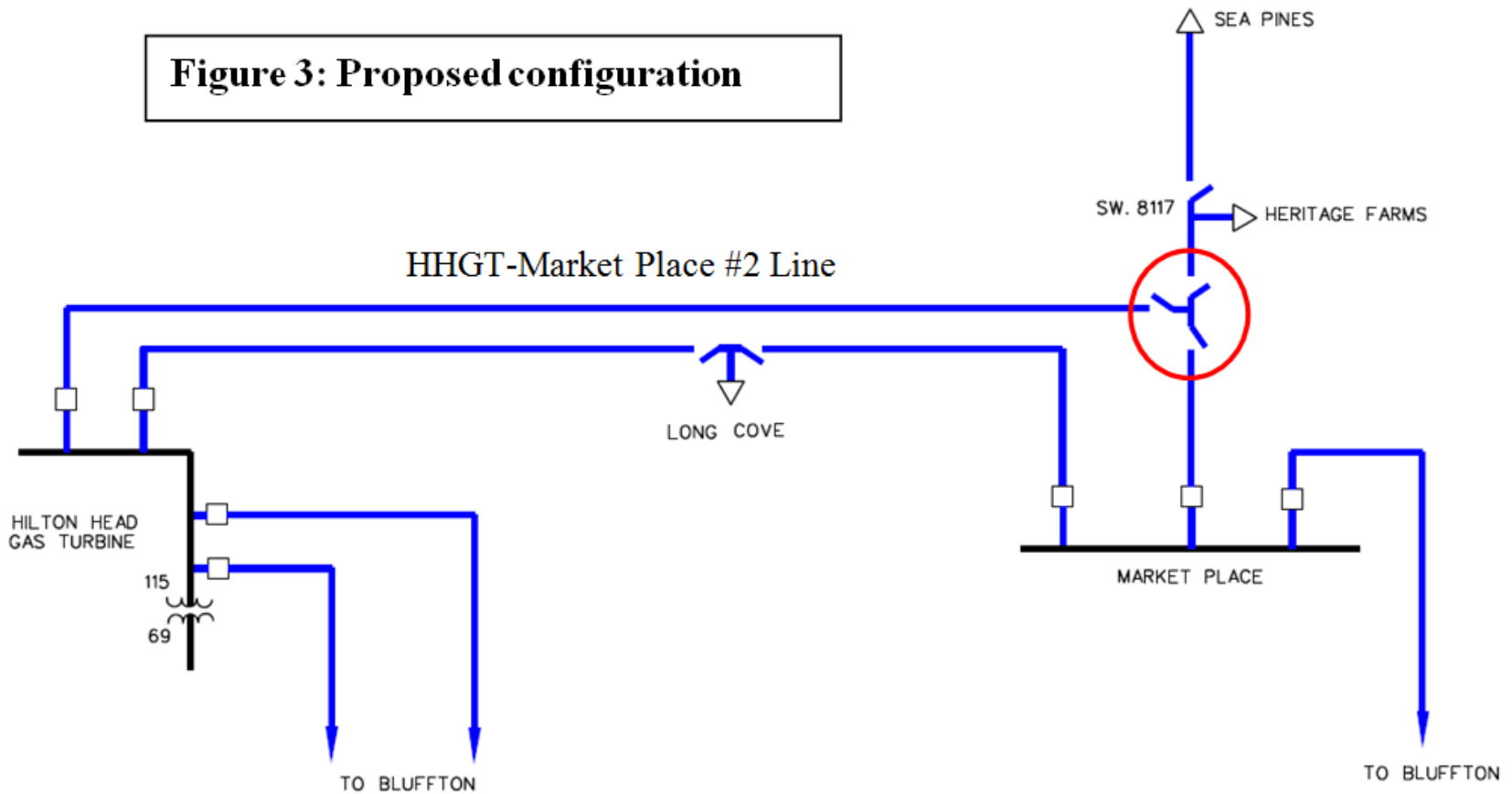
# Hilton Head-Market Place 115 kV Line #2

**Figure 2: Existing configuration**

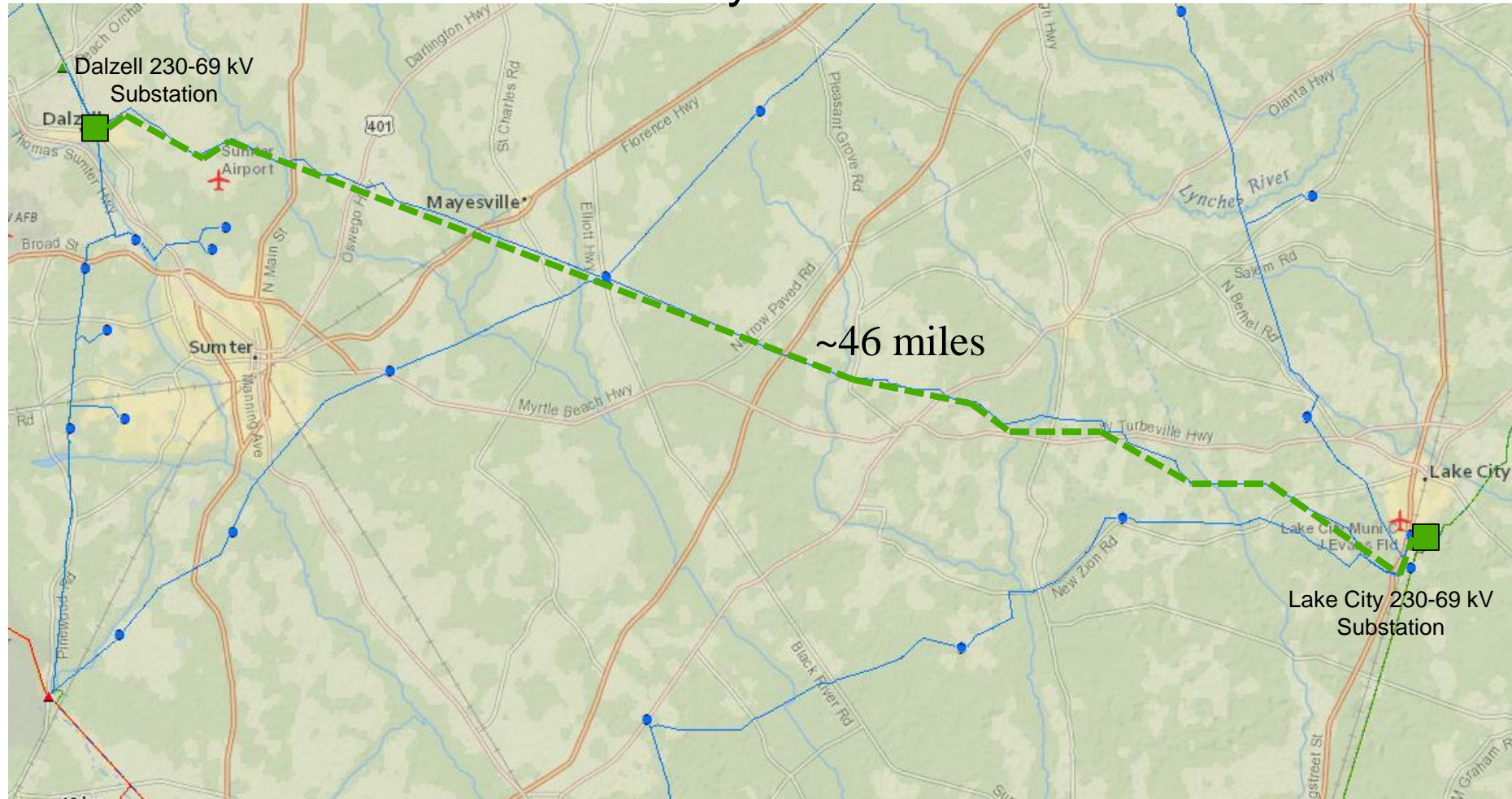


# Hilton Head-Market Place 115 kV Line #2

**Figure 3: Proposed configuration**



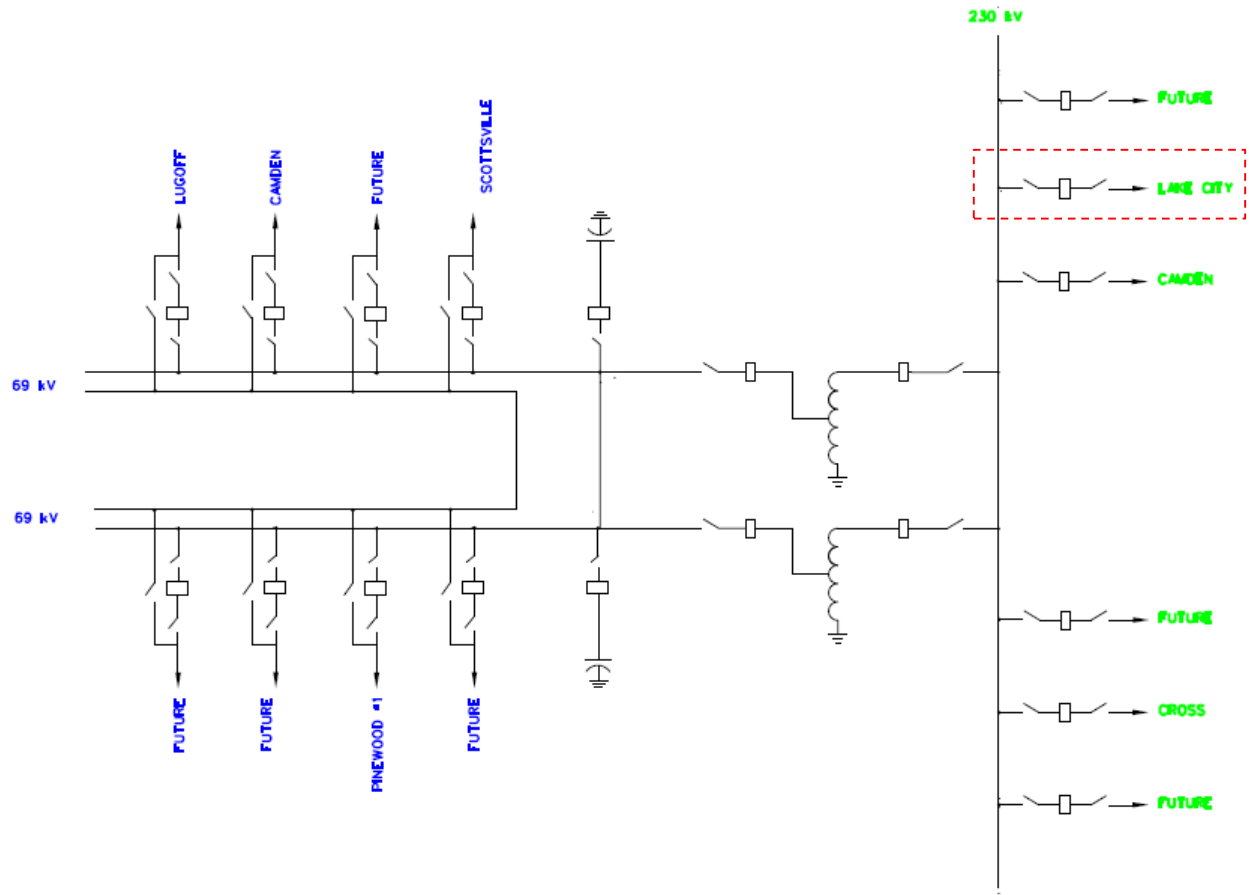
## Dalzell-Lake City 230 kV Line





# Dalzell-Lake City 230 kV Line

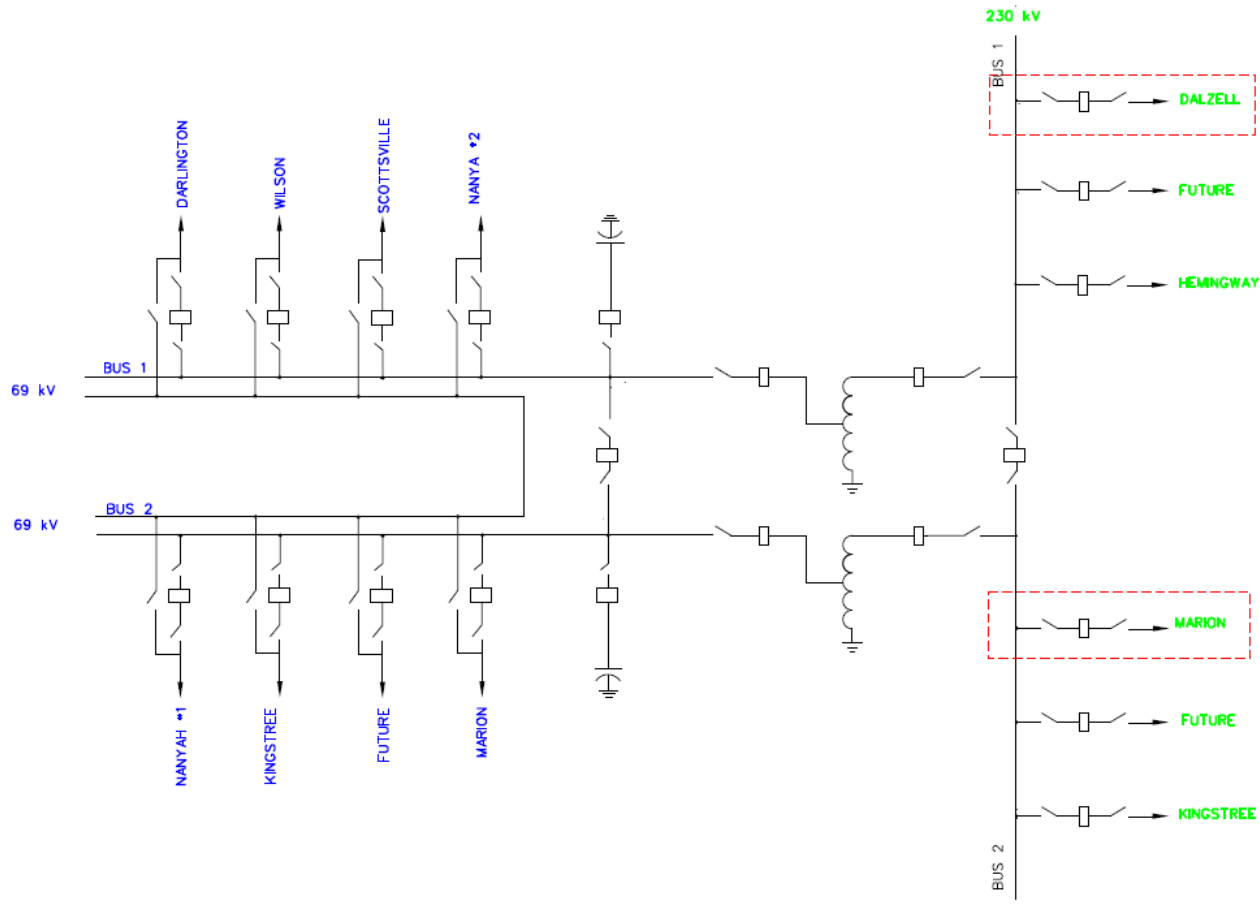
## DALZELL 230-69 kV SUBSTATION





# Dalzell-Lake City 230 kV Line

## LAKE CITY 230-69 kV SUBSTATION



# Stakeholder Input, Comments and Questions

# SCRTP Regional and Inter-regional Processes

Clay Young

# SCRTP Regional and Public Policy Planning

- Biennial Process (currently in year 1, Meeting #3)
- Restarts in 4<sup>th</sup> quarter of even years
- Regional Projects – Proposed, Evaluation and Selection
  - **Must be submitted by January 15 of odd years**
  - None received in current Regional Planning cycle

## During this meeting:

- Stakeholders may submit comments on all proposed Regional Projects. Comments must be submitted by June 15. The Transmission Provider will post all comments on the SCRTP website
- The Transmission Providers will review proposed Regional Projects and Stakeholder comments



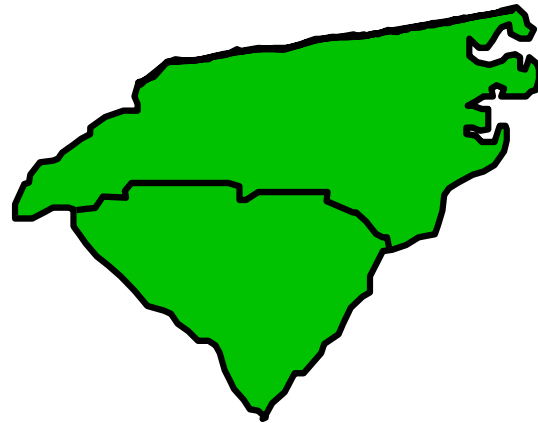
# Reliability Assessment and Multi-Party Studies

**Rick Thornton**

# Multi-Party Assessments

- **Carolina Transmission Coordination Arrangement (CTCA) Assessments**
- **Southeastern Electric Reliability Corporation (SERC) Assessments**

# CTCA Future Year Assessments



## CTCA Purpose

- **Collection of agreements developed concurrently by the Principals, Planning Representatives, and Operating Representatives of multiple two-party Interchange Agreements**
- **Establishes a forum for coordinating certain transmission planning assessment and operating activities among the specific parties associated with the CTCA**

# CTCA Power Flow Study Group

- **Duke Energy Carolinas (“Duke”)**
- **Duke Energy Progress (“Progress”)**
- **South Carolina Electric & Gas (“SCEG”)**
- **South Carolina Public Service Authority (“SCPSA”)**

# CTCA Studies

- Assess the existing transmission expansion plans of Duke, Progress, SCEG, and SCPSA to ensure that the plans are simultaneously feasible.
- Identify any potential joint solutions that are more efficient or cost-effective than individual company plans, which also improve the simultaneous feasibility of the Participant companies' transmission expansion plans.
- The Power Flow Study Group ("PFSG") , performs the technical analysis outlined in this study scope under the guidance and direction of the Planning Committee ("PC").

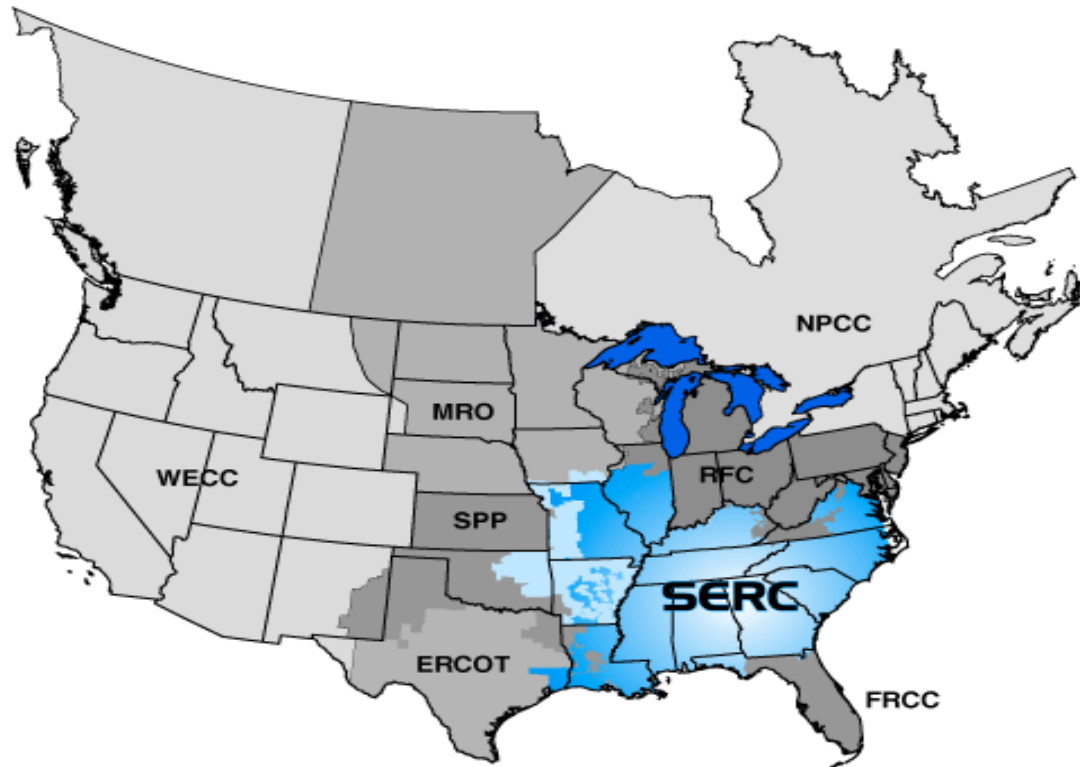
# CTCA Studies 2017 PFSG Study

- No study chosen for 2017

# SERC LTSG Assessments



## SERC Future Year Assessments Long Term Study Group (LTSG)



# SERC LTSG Study Purpose

- Analyze the performance of the members' transmission systems and identify limits to power transfers occurring non-simultaneously among the SERC members.
- Evaluate the performance of bulk power supply facilities under both normal and contingency conditions for future years.
- Focus on the evaluation of sub-regional and company-to-company transfer capability.

# SERC Long Term Study Group 2017 Work Schedule

- LTSG Data Bank Update on May 23-24
- Power flow cases to be finalized by June 13, 2017
- Study Case: 2022 Summer Peak Load
- Study to be completed by LTSG June thru October
- Final Report Complete December 4, 2017

Questions?

## Next SCRTP Meeting

- Review and discuss the initial results of the Economic Transfer Studies
- Review and discuss Multi-Party Assessment Studies
- SCRTP Email Distribution List will be notified
- Register online

# South Carolina Regional Transmission Planning

## Stakeholder Meeting

### Web Conference

June 1, 2017 2:00 – 4:00 PM