

South Carolina Regional Transmission Planning

Stakeholder Meeting

SCE&G - Lake Murray Training Center

1888 N Lake Drive - Room 100

Lexington, SC 29072

June 1, 2016 - 10 AM – 1 PM

Purpose and Goals for Today's Meeting

- Review Current Transmission Expansion Plans
- Receive Stakeholder Input on Current Transmission Expansion Plans
- SCRTP Regional and Interregional Processes
- Reliability Assessments and Multi-Party Studies
- EIPC Update

Proposed Transmission Expansion Plan

SCE&G

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 2016

- Aiken Transmission – Aiken Hampton 115 kV Line: Upgrade
- Church Creek 230/115 kV Sub: Replace 224 MVA transformer with 336 MVA
- CIP – Edenwood 115 kV: Rebuild from Edenwood to Newspaper tap w/1272 ACSR
- Summerville 230/115 kV Sub: Replace 224 MVA transformer with 336 MVA
- Canadys – Williams 230 kV Line: Replace Ashley River Crossing
- Purchase spare 230/115 kV 336 MVA Autobank
- St. Andrews – Queensboro 115 kV Line: Rebuild
- Thomas Island – Jack Primus 115 kV Line: Acquire R/W
- Queensboro 115 kV Switching Station: Construct
- Blythewood 115 kV Switching Station: Construct
- Toolebeck 115 kV Switching Station: Construct
- IST Critical Infrastructure Protection Hut Implementation at substations

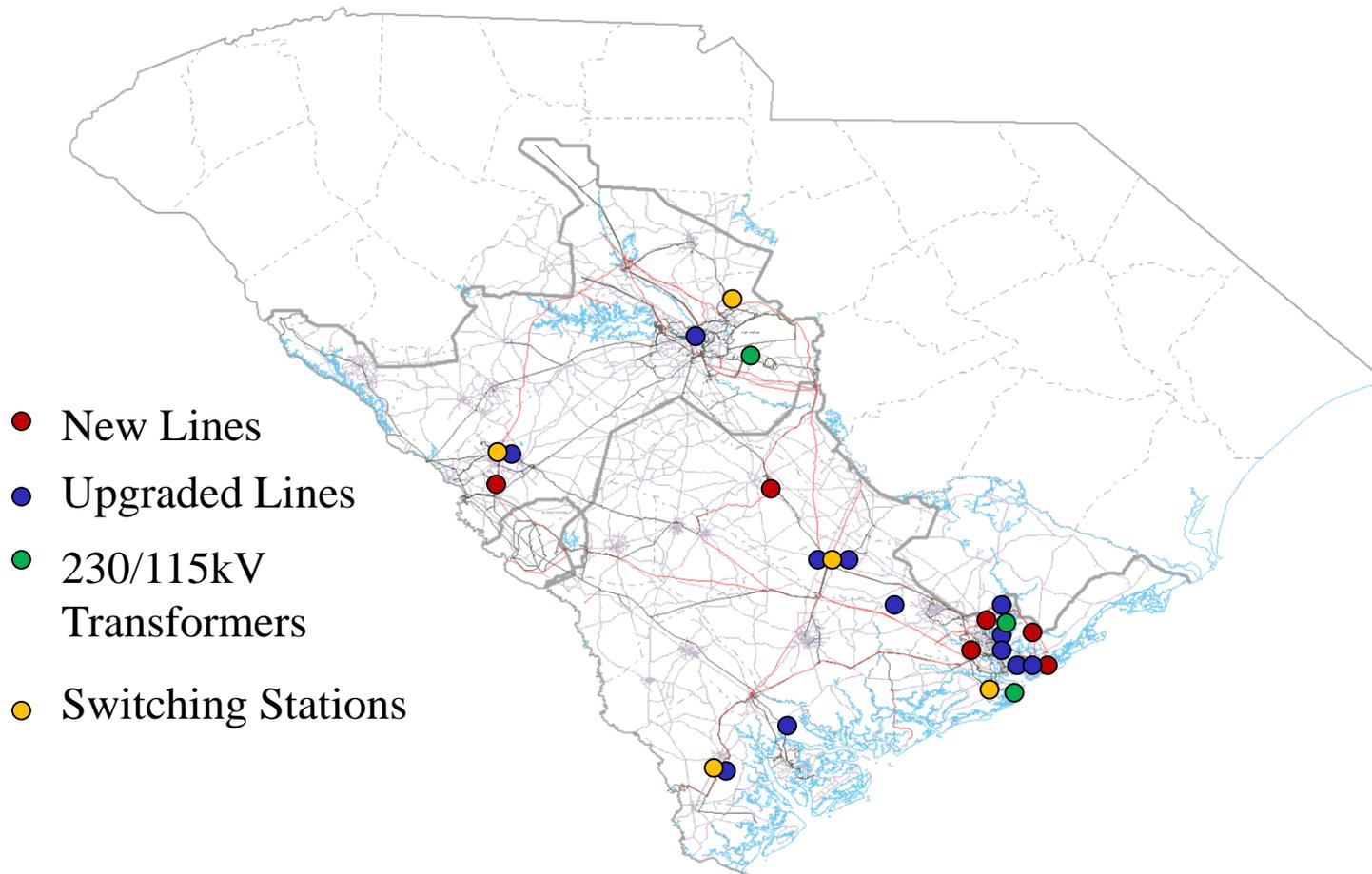
SCE&G Transmission Projects

Projects Scheduled for Completion in 2016

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

- Saluda Hydro – Williams St & McMeekin – Coit 115 kV: Rebuild

SCE&G Planned Projects



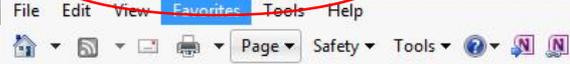
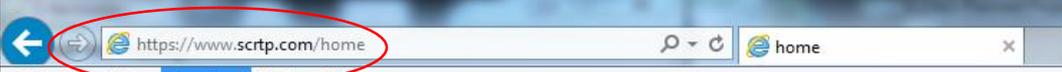
VC Summer Nuclear Unit #3 Related Projects

- St George 230 kV Switching Station Construct April 2016
- Canadys – St. George 230 kV Line Upgrade May 2016
- St George - Summerville 230 kV Line Upgrade May 2018
- VCS2- St George 230 kV 1&2 Construct May 2018

SCE&G Planned Projects 2016 (\$2 Million and above)

SCE&G Planned Project Table (\$2M and Over) 2016

	Project	Tentative Completion Date	Expenditures as of December 31, 2015	Projected 2016	Total
1	Aiken Trans - Aiken Hampton 115 kV Line: Upgrade	Mar-16	6,048,350	557,638	6,605,988
2	Church Creek: Replace 224 MVA transformer with 336 MVA	Mar-16	2,612,452	287,548	2,900,000
3	CIP-Edenwood 115 kV Rebuild from Edenwood to Newspaper Tap w/1272	Apr-16	451,710	1,548,290	2,000,000
4	Summerville 230 kV: Replace 224 MVA transformer with 336 MVA	May-16	2,751,513	648,487	3,400,000
5	Canadys - Williams 230 kV Line: Replace Ashley River Crossing	May-16	1,628,957	1,621,043	3,250,000
6	Purchase spare 230/115 kV autobank 336 MVA	Jun-16	2,593,914	256,087	2,850,000
7	St Andrews - Queensboro 115 kV Line: Rebuild	Jun-16	3,499,213	2,100,787	5,600,000
8	Thomas Island - Jack Primus 115 kV Line: Acquire R/W	Nov-16	2,716,867	783,133	3,500,000
9	Queensboro 115 kV Switching Station: Construct	Dec-16	67,559	4,232,441	4,300,000
10	Blythewood 115 kV Switching Station: Construct	Dec-16	2,214,066	1,628,734	3,842,800
11	Toolebeck 115 kV Switching Station: Construct	Dec-16	2,140,986	2,271,694	4,412,680
12	IST Critical Infrastructure Protection Hut Implementation at Substations	Dec-16	3,353,410	30,666	3,384,076
System Improvement (NND) Projects (not included in BLRA)					
13	Saluda Hydro - Williams St & McMeekin - Coit 115 kV Lines: Rebuild	June-16	9,258,300	541,700	\$9,800,000
Total:			39,337,295	16,508,249	55,845,544



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Welcome

The South Carolina Regional Transmission Planning (SCRTTP) 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 SCRTTP 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.

SCRTTP provides information on:

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

Events

The next meeting of the SCRTTP Stakeholder Group has not been scheduled.

[Meeting Archives](#)

Order 1000 Filing:

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

Planned Facilities

- [2014-2018 above \\$2M Project Descriptions](#)



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



Aiken Trans - Aiken Hampton 115 kV Line: Upgrade

Project ID

1272A

Project Description

Upgrade the 115 kV line between Aiken and Aiken Hampton substations from 336 ACSR to 1272 ACSR. Total line length approximately 3.7 miles.

Project Need

The line overloads under certain contingencies and needs 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

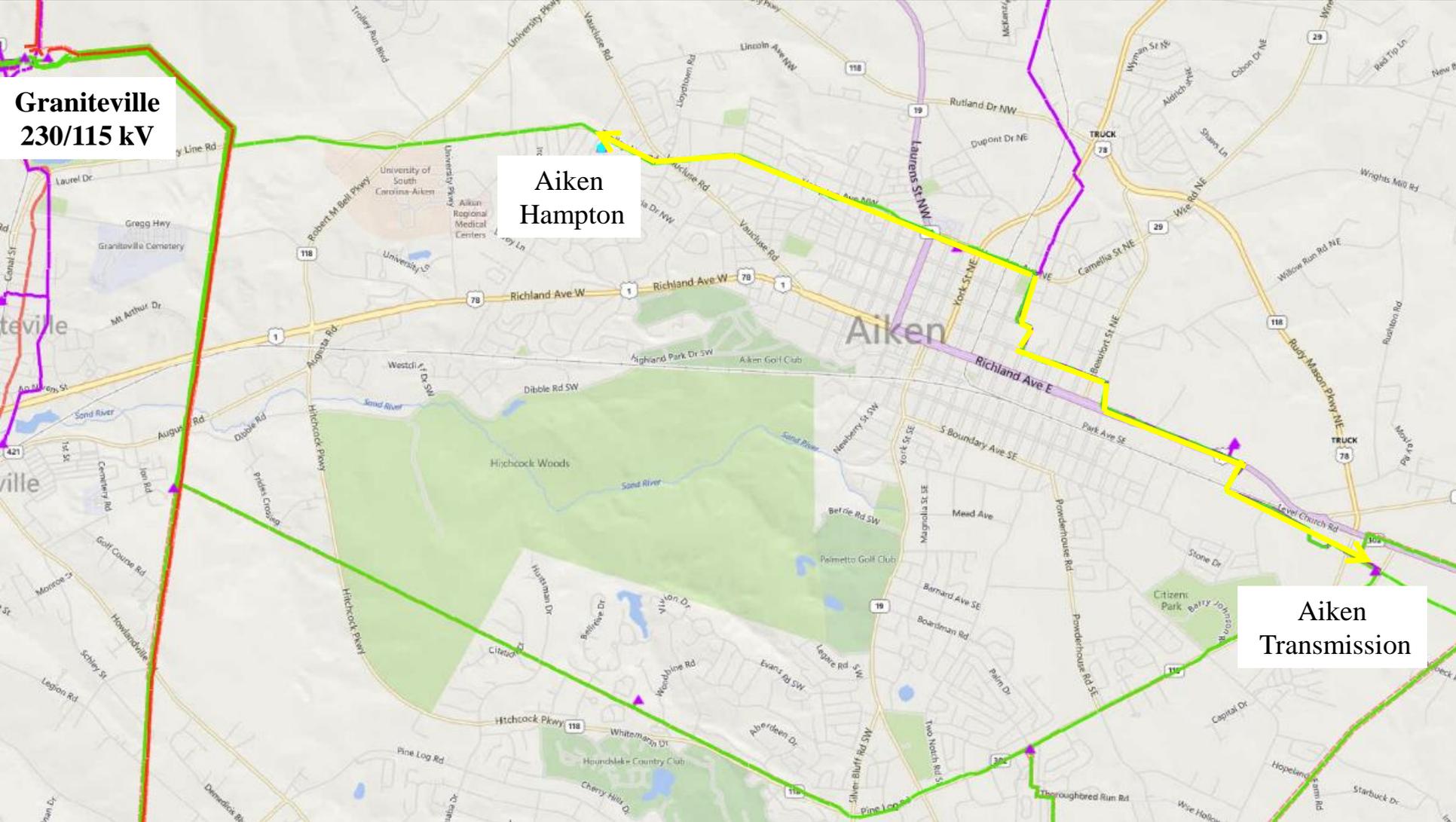
Planned In-Service Date

3/8/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$6,048,350	\$557,688	\$0	\$0	\$0	\$0	\$6,605,988

Project 2 of 38
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



Church Creek: Replace 224 MVA transformer with 336 MVA

Project ID

1723A, 1724A

Project Description

Replace Church Creek 224 MVA transformer with a 336 MVA transformer.

Project Need

Load growth in the Charleston 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

Planned In-Service Date

3/24/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$2,612,452	\$287,548	\$0	\$0	\$0	\$0	\$2,900,000

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



CIP - Edenwood 115 kV Line: Rebuild from Edenwood to Newspaper Tap w/1272 ACSR

Project ID

5385A

Project Description

Rebuild from State Newspaper tap to Columbia Industrial Park with steel structures and 1272 ACSR conductor. Total line length approximately 2.9 miles.

Project Need

Identified in Transmission Planning studies as one of Top 50 worst performers, improvements required. This project is also required to meet NERC TPL standards and SCE&G's internal Planning Criteria.

Project Status

Completed

Planned In-Service Date

4/7/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$451,710	\$1,548,290	\$0	\$0	\$0	\$0	\$2,000,000

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



Edenwood

Columbia
Industrial Park

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

Planned In-Service Date

5/31/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$2,751,513	\$648,487	\$0	\$0	\$0	\$0	\$3,400,000

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



Canadys – Williams 230 kV Line: Replace Ashley River Crossing

Project ID

05313A

Project Description

Replace 8 structures on the Canadys to Williams 230 kV Line and rebuild SPDC with the Pepperhill – Mateeba (SCPSA) 230 kV Tie. Install B-1272 ACSR for both circuits. Total line length approximately 1.04 miles.

Project Need

Structures show signs of aging and are in need of replacement. Wood poles will be replaced with steel pole construction.

Project Status

Completed

Planned In-Service Date

5/31/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$1,628,957	\$1,621,043	\$0	\$0	\$0	\$0	\$3,250,000



Project 5 of 32
South Carolina Electric and Gas Company
Planned Transmission Projects \$2M and above Total
5 Year Budget



Rebuild existing H-Frame (dual circuits) to SPDC steel poles with new Pepperhill - Mateeba & Canadys - Williams 230 kV lines

Dorchester Road

Ashley River

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



Purchase Spare 230/115 kV 336 MVA Autobank

Project ID

05001G

Project Description

Purchase a Spare 230/115kV, 336MVA Auto Transformer.

Project Need

As of 12/31/15, there are forty (40) 230/115kV autotransformers in service on the SCE&G transmission system with only 1 spare 224MVA autobank located at Faber Place.

Project Status

Completed

Planned In-Service Date

6/1/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$2,593,914	\$256,087	\$0	\$0	\$0	\$0	\$2,850,000

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



St. Andrews - Queensboro 115 kV Line: Rebuild

Project ID

0525A

Project Description

Rebuild St. Andrews to Queensboro 115 kV to provide increased capacity in order to serve future Queensboro 115 kV Switching Station. Line length approximately 4.2 miles.

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

6/30/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$3,499,213	\$2,100,787	\$0	\$0	\$0	\$0	\$5,600,000

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



St. Andrews

Queensboro

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

Project ID

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

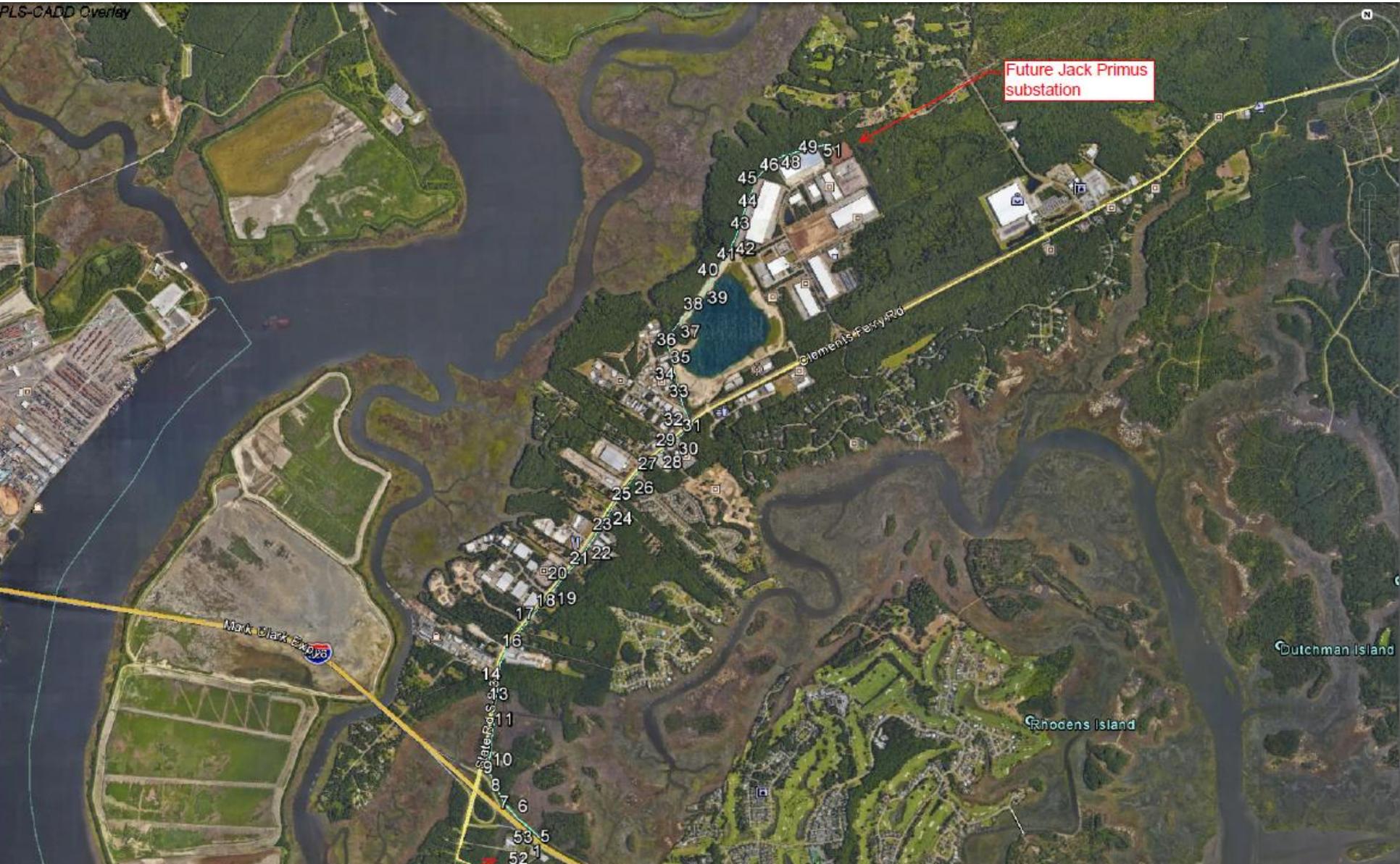
Planned In-Service Date

11/1/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$2,716,867	\$783,133	\$0	\$0	\$0	\$0	\$3,500,000

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



PLS-CADD Overlay

Dutchman Island

Rhodens Island

Mark Clark Expy

Clements Ferry Rd

State Road 53

**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

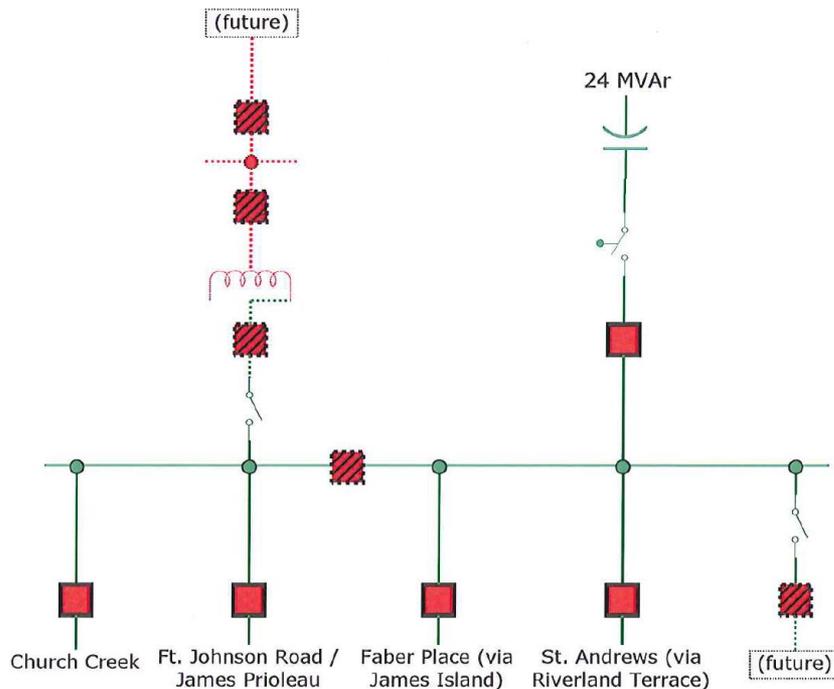
12/1/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$67,559	\$4,232,441	\$0	\$0	\$0	\$0	\$4,300,000

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.
- New Point of Interconnection agreement under legal review to establish a new Queensboro – Johns Island (SCPSA) 115 kV tie line.

**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

In Progress

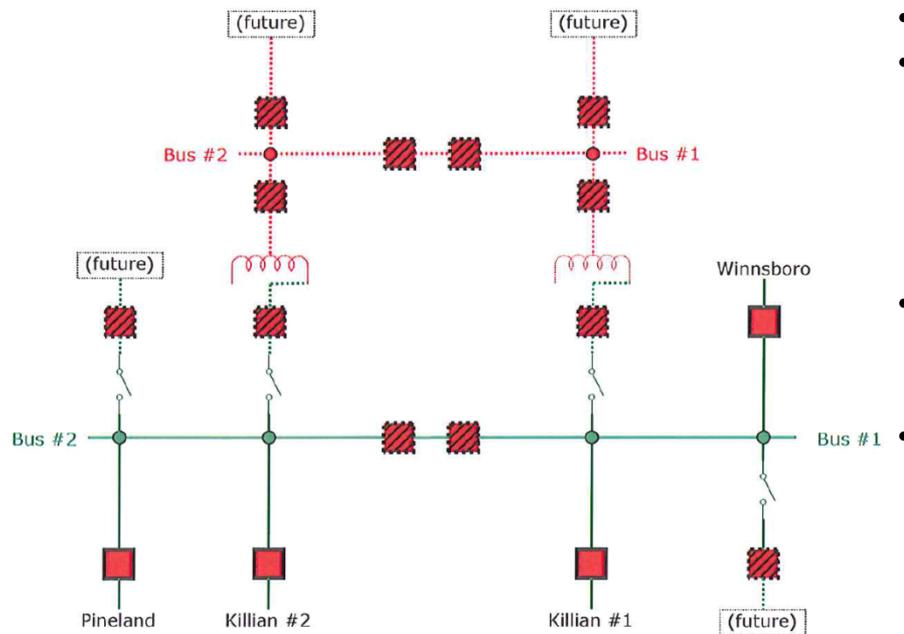
Planned In-Service Date

12/1/2016

Estimated Project Cost (\$)

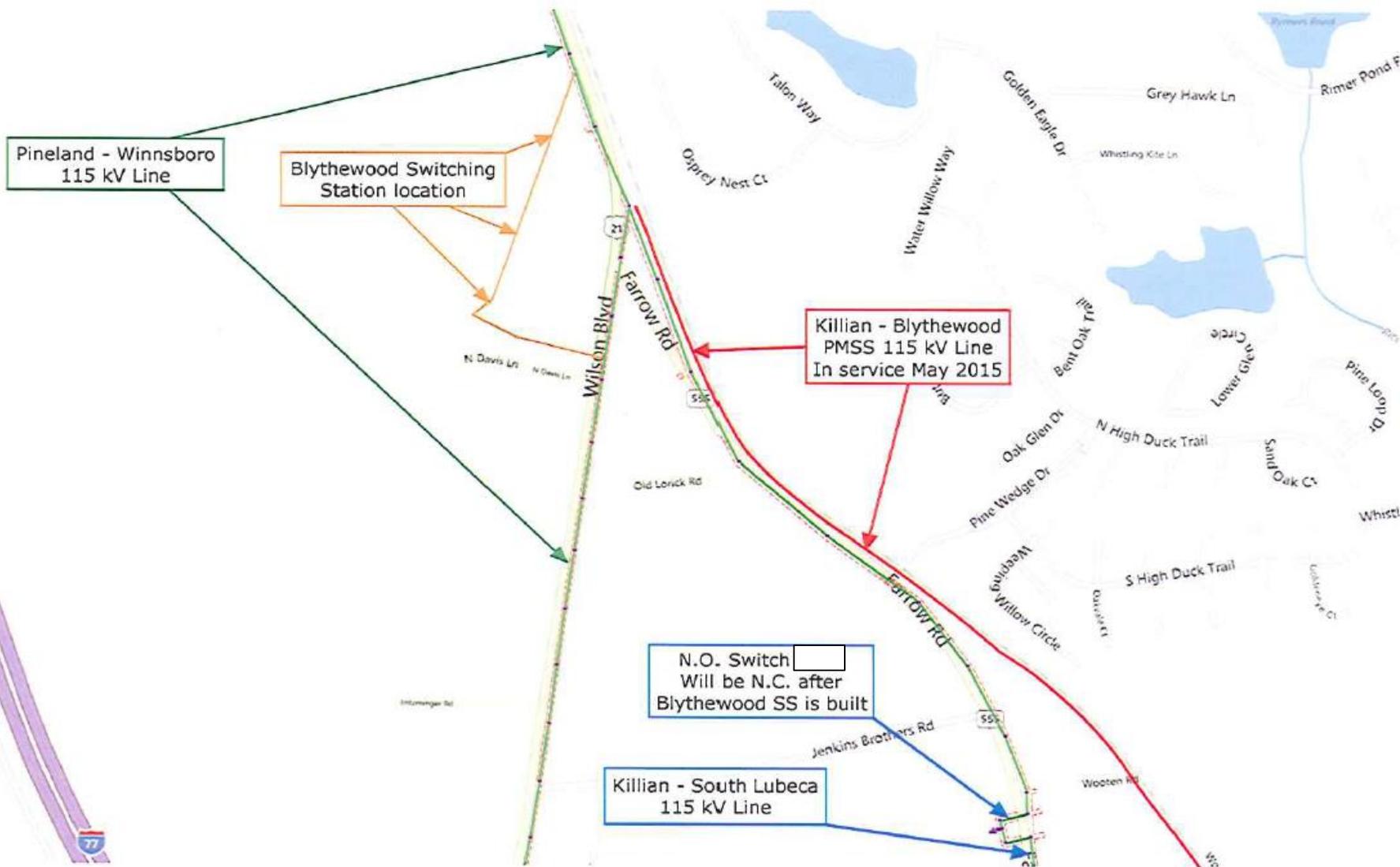
Previous	2016	2017	2018	2019	2020	Total
\$2,214,066	\$1,628,734	\$0	\$0	\$0	\$0	\$3,842,800

Blythewood 115 kV Switching Station



- Completion date delayed to **December 2016**
- 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**



Toolebeck 115 kV Switching Station: Construct

Project ID

1273A

Project Description

Install three additional 2000A, 115 kV PrCBs for Graniteville #2 – Aiken Trans, Graniteville – Aiken Trans, and Aiken Trans – AGY (Owens Corning) 115 kV lines. 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

In Progress

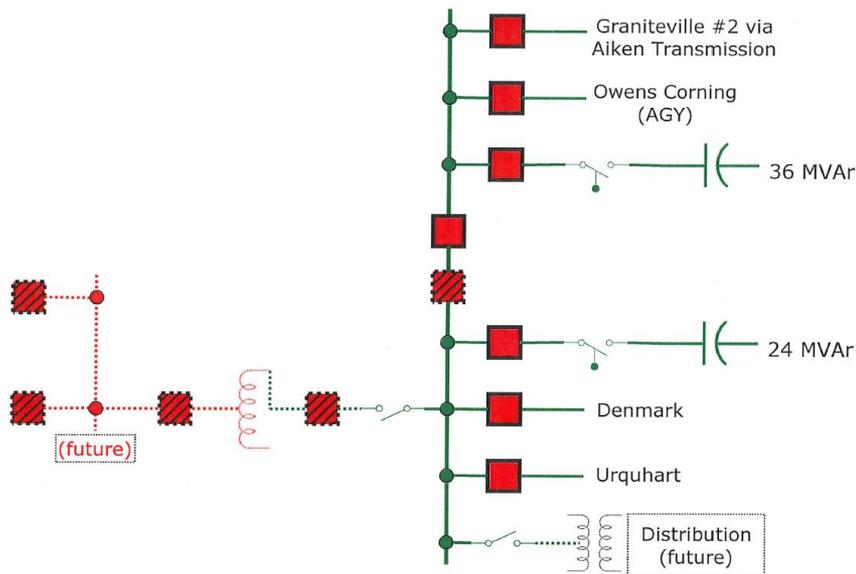
Planned In-Service Date

12/31/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$2,140,986	\$2,271,694	\$0	\$0	\$0	\$0	\$4,412,680

Toolebeck 115 kV Switching Station



- Completion date delayed to **December 2016**
- 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**



IST Critical Infrastructure Protection Hut Implementation at Substations

Project ID

N/A

Project Description

Install Critical Infrastructure Protection Huts at very substation locations across the SCE&G service territory (locations considered classified/CEII).

Project Need

Required to comply with newly enforced NERC CIP standards.

Project Status

In Progress

Planned In-Service Date

12/31/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$3,353,410	\$30,666	\$0	\$0	\$0	\$0	\$3,384,076

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



Saluda Hydro – Williams St & McMeekin – Coit 115 kV Lines: Rebuild

Project ID

0094D3

Project Description

Rebuild 2 mile section of the Saluda Hydro – Williams & McMeekin – Coit 115 kV SPDC 1272 ACSR.

Project Need

This project is needed to allow VCS2-St. George 230 kV Line #1/#2 to be constructed within existing R/W.

Project Status

Completed

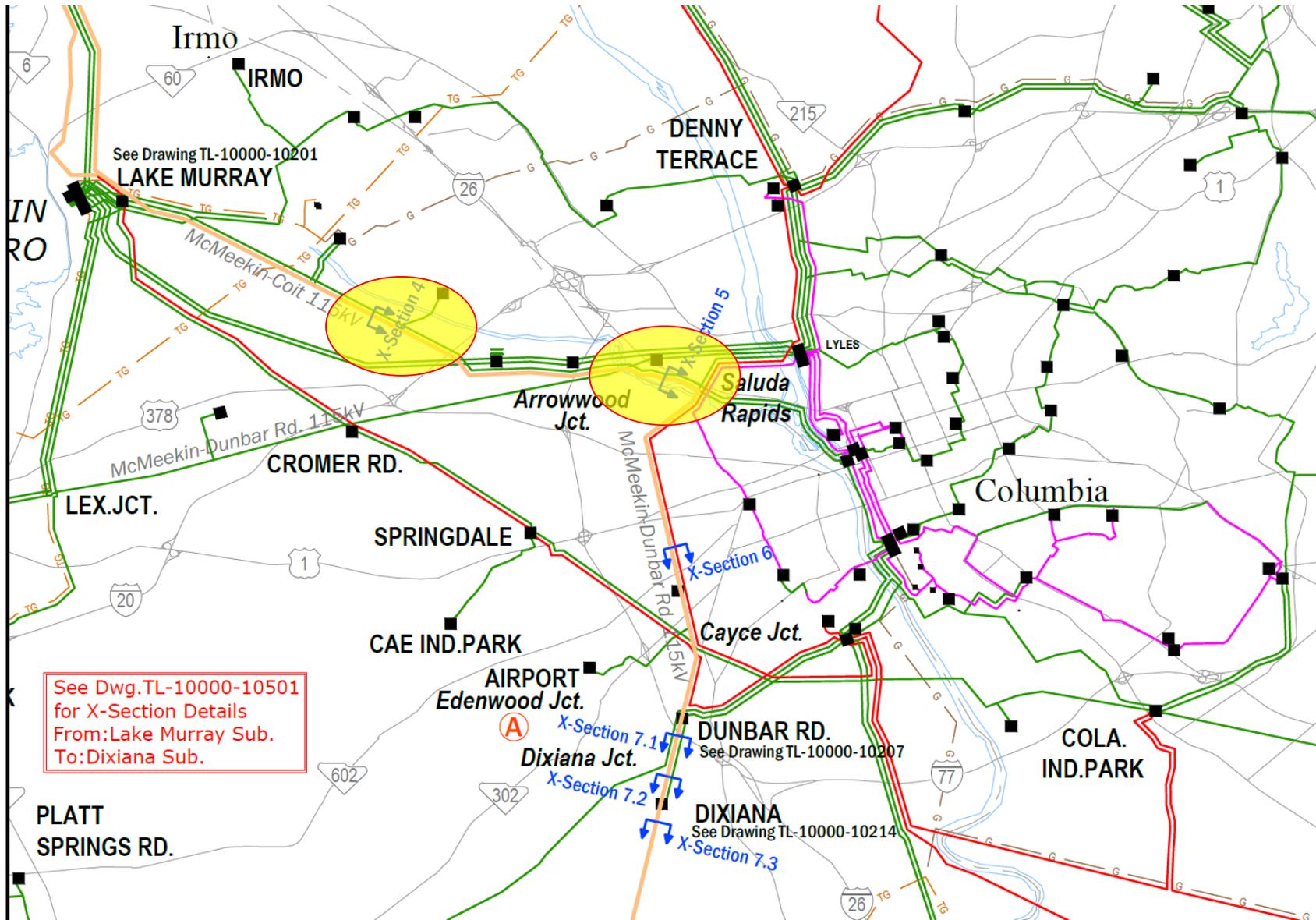
Planned In-Service Date

6/1/2016

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$9,258,300	\$541,700	\$0	\$0	\$0	\$0	\$9,800,000

Project 13 of 32
 South Carolina Electric and Gas Company
 Planned Transmission Projects \$2M and above Total
 5 Year Budget



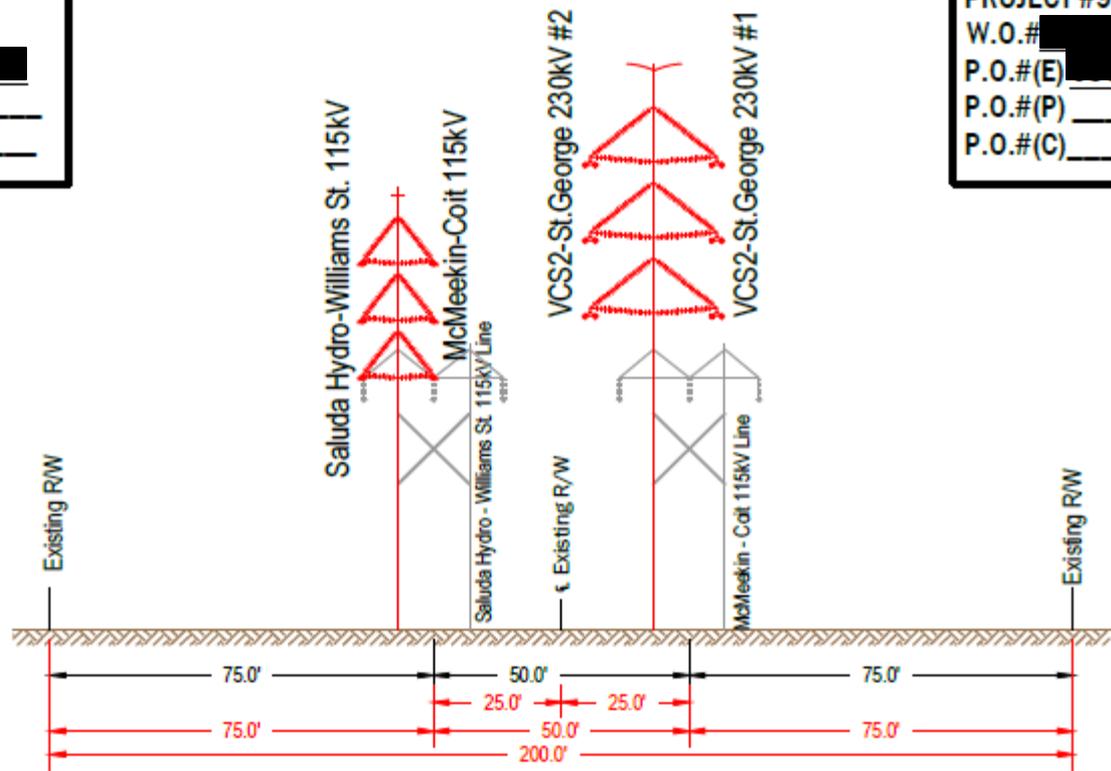
See Dwg.TL-10000-10501
 for X-Section Details
 From: Lake Murray Sub.
 To: Dixiana Sub.



Project 13 of 32
 South Carolina Electric and Gas Company
 Planned Transmission Projects \$2M and above Total
 5 Year Budget

PROJECT #94D3
 W.O.# [REDACTED]
 P.O.#(E) [REDACTED]
 P.O.#(P) _____
 P.O.#(C) _____

PROJECT #94D4
 W.O.# [REDACTED]
 P.O.#(E) [REDACTED]
 P.O.#(P) _____
 P.O.#(C) _____



CROSS SECTION 4
 LAKE MURRAY to ARROWWOOD JCT. MILEAGE - 8.0
 EXISTING 200' R / W CORRIDOR

SCE&G Planned Projects 2017-2020 (\$2 Million and above)

SCE&G Planned Projects Table (\$2M and Over) 2017-2020

	Project	Tentative Completion Date	Expenditures as of December 31, 2015	Projected 2017	Projected 2018	Projected 2019	Projected 2020
14	Okatie 230/115 kV Sub Construct and Line Upgrades	Mar-17	31,891	5,075,000			
15	Jack Primus 115 kV Line Construct	May-17	599,409	3,600,000			
16	Lyles - Williams St 115 kV Rebuild	May-17	702,164	2,550,000			
17	Cainhoy 230/115kV Sub Construct and Line Upgrades	May-17	11,266,577	25,365,000			
18	Orangeburg 230kV Sub: Fold in VCS2_St.George #1 Line	May-17	1,216,954	3,000,000			
19	Faber Place-Charlotte Street 115 kV Line Upgrade	Dec-17	21,288		2,200,000		
20	Faber Place-Hagood 115 kV #2 Construct	Dec-17	31,113	1,400,000	4,000,000		
21	Urquhart Sub: Replace Switch House	Dec-17	2,338,537	3,600,000			
22	Saluda Hydro - Harbison 115 kV: Reterminate to Lake Murray	Dec-17	34,846		5,000,000		
23	Bluffton-Santee 115 kV Tie Construct	May-18		2,640,000			
24	Summerville-Pepperhill 230 kV Construct	May-18	239,765		9,300,000		
25	Burton - Yemassee 115 kV #2 Line Rebuild SPDC B795 ACSR	May-18	11,679,281		36,500,000		
26	Hopkins 230/115 kV Substation: Install 2nd Autobank	May-18			5,191,600		
27	VCS #2-St. George 230 kV Lines #1 & #2	Dec-18	821,255	8,700,000	16,000,000		
28	St. George-Summerville 230 kV #2 B1272: Construct	Dec-18	3,560,487	1,800,000	15,000,000		
29	Canadys 230 kV: Add Back-Back Bus Tie Breakers	May-19				2,800,000	
30	AM Williams-Summerville 115 kV Line Upgrade	May-19				12,000,000	
31	Urquhart - Graniteville 230 kV #2 Line Construct	Dec-19	133,179			19,000,000	
32	Leesburg Rd. 115-23 kV Sub: Construct	May-20			960,000		3,000,000
33	New Nuclear Deployment BLRA Unit 2 - Transmission	Aug-19	137,084,435			143,000,000	
34	New Nuclear Deployment BLRA Unit 3 - Transmission	Aug-20	103,491,749				234,000,000
		Total:	\$32,676,746	\$57,730,000	\$94,151,600	\$176,800,000	\$237,000,000

**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 and upgrade 115 kV circuit to Hardeeville.

Project Need

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

Project Status

Planned

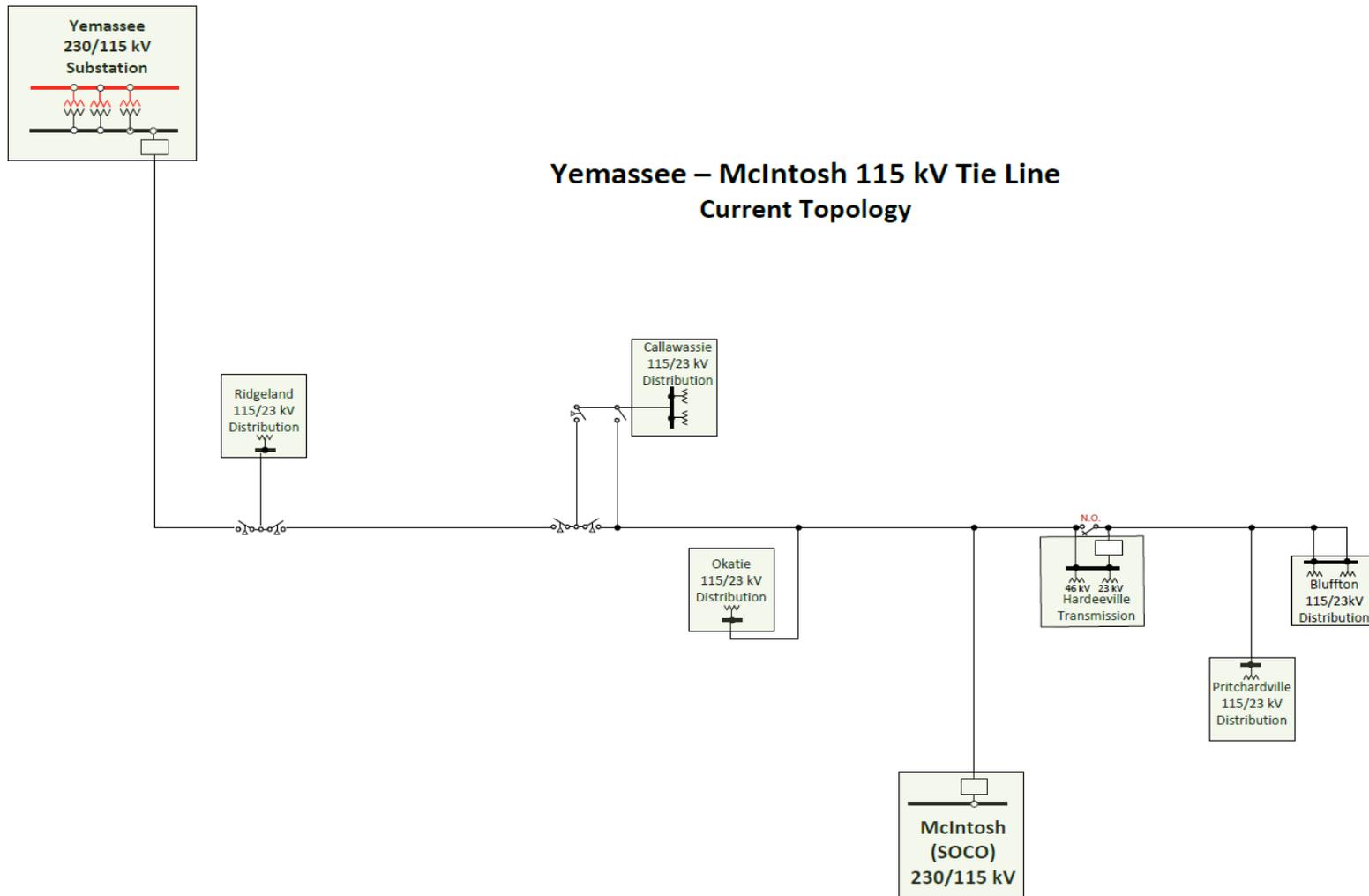
Planned In-Service Date

5/31/2017

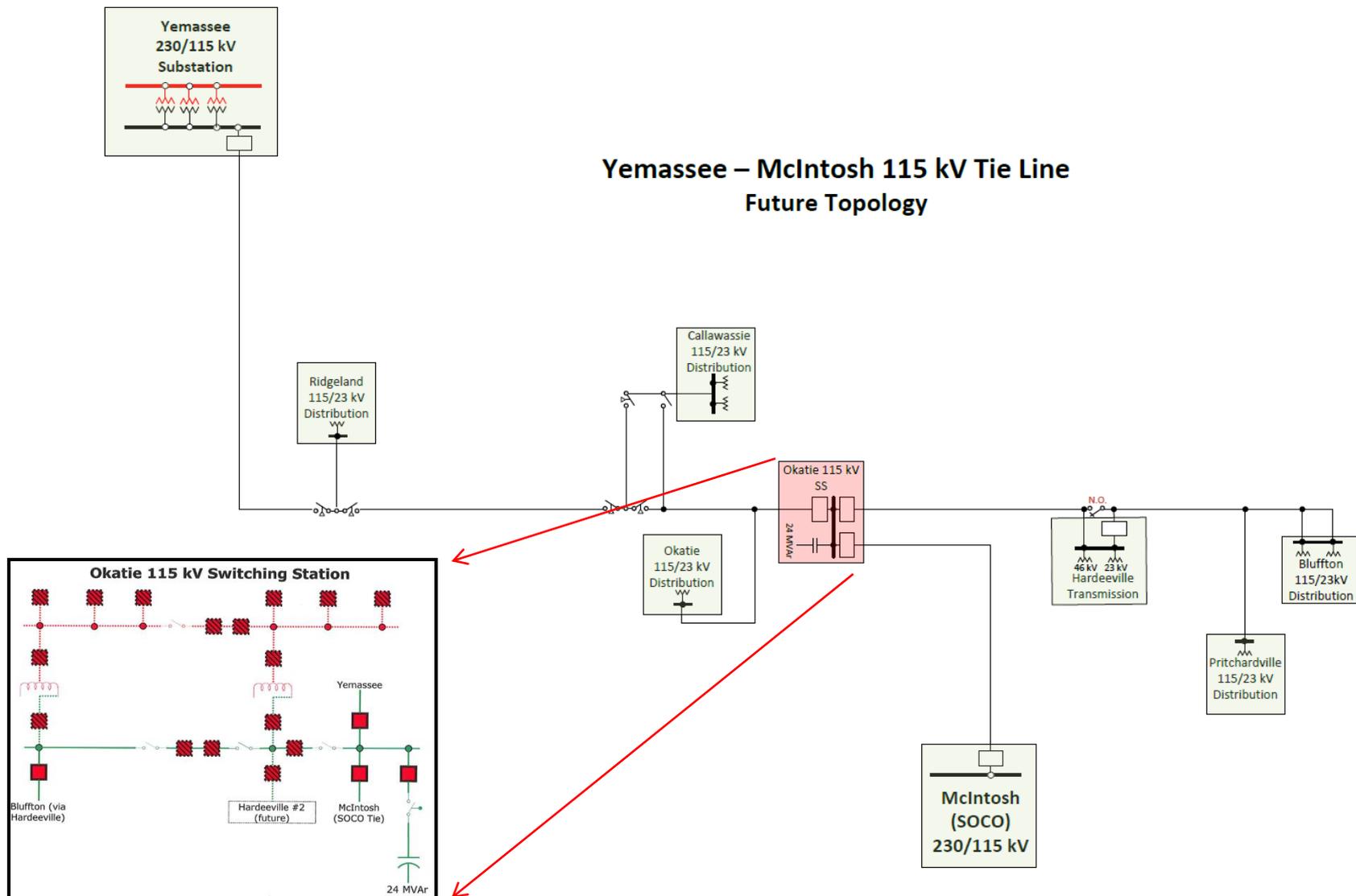
Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$31,891	\$0	\$5,0435,109	\$0	\$0	\$0	\$5,075,000

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**



Jack Primus 115 kV Line: Construct

Project ID
0270B

Project Description

Construct a new 115 kV line from the Thomas Island substation to the new Jack Primus substation with 1272 ACSR conductor.

Project Need

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

Project Status

Planned

Planned In-Service Date

5/31/2017

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$599,409	\$0	\$3,000,591	\$0	\$0	\$0	\$3,600,000

Project 15 of 32
South Carolina Electric and Gas Company
Planned Transmission Projects \$2M and above Total
5 Year Budget

PLS-CADD Overlay



**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, 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.

Project Status

In Progress

Planned In-Service Date

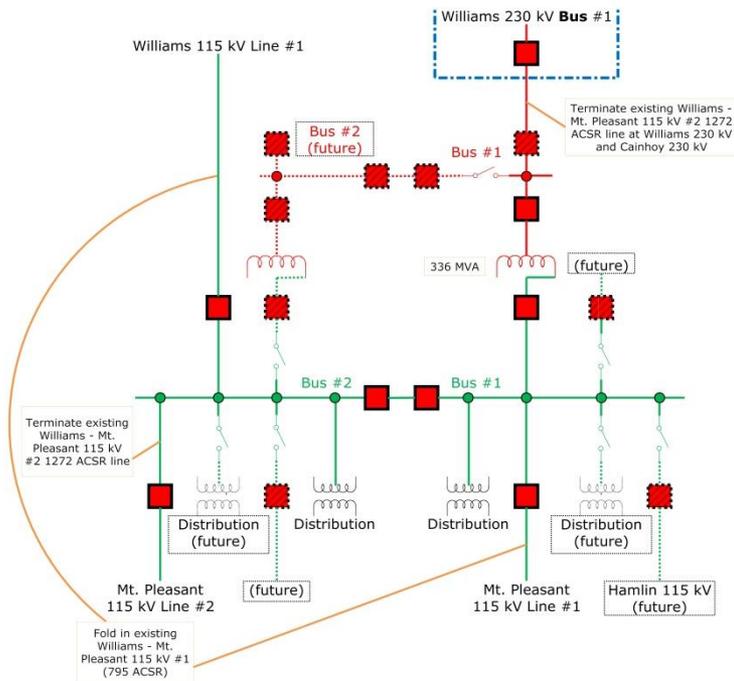
5/31/2017

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$11,266,577	\$0	\$14,098,423	\$0	\$0	\$0	\$25,365,000

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

Cainhoy 230/115 kV Transmission

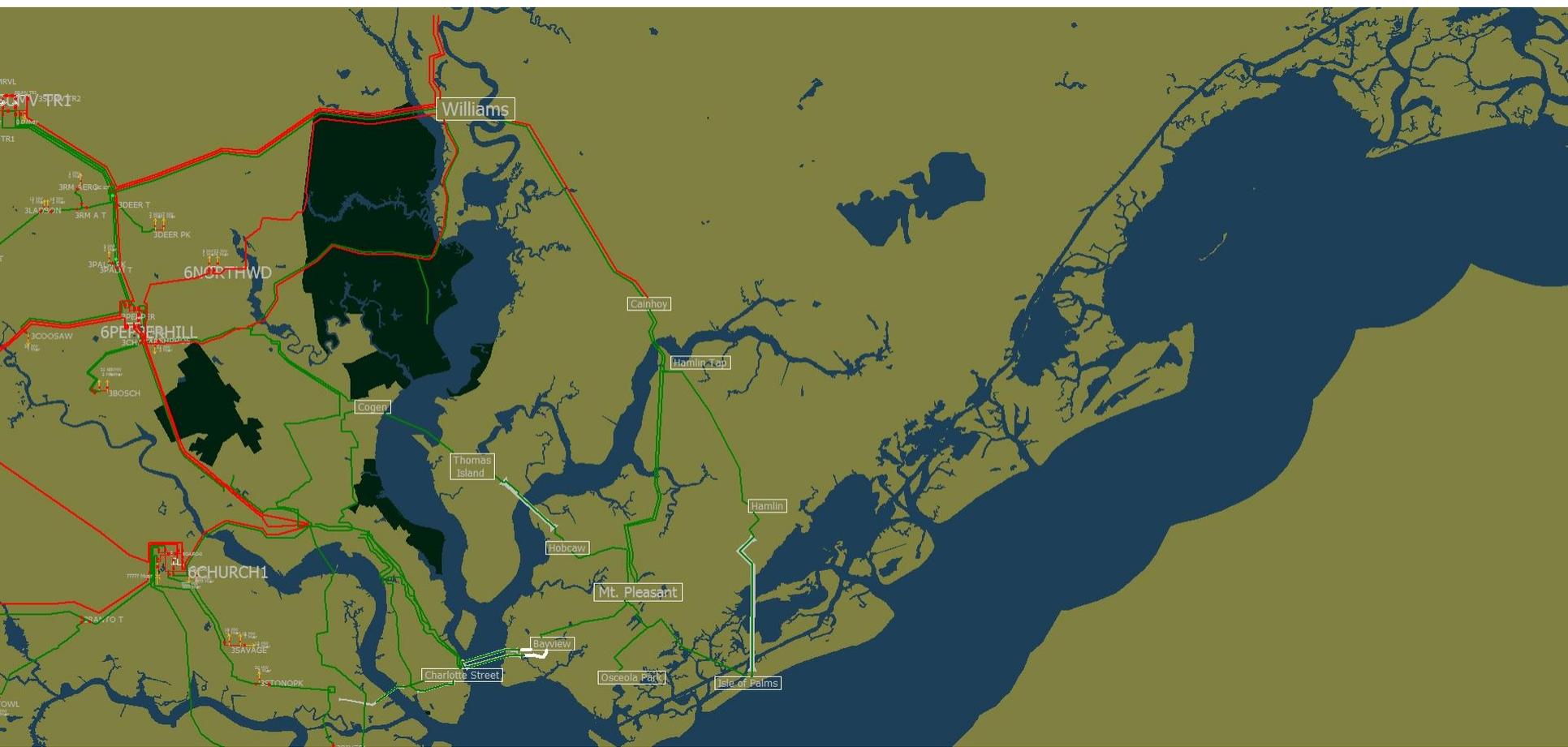


Phase I & Phase II now combined (Delayed to May 31, 2017)

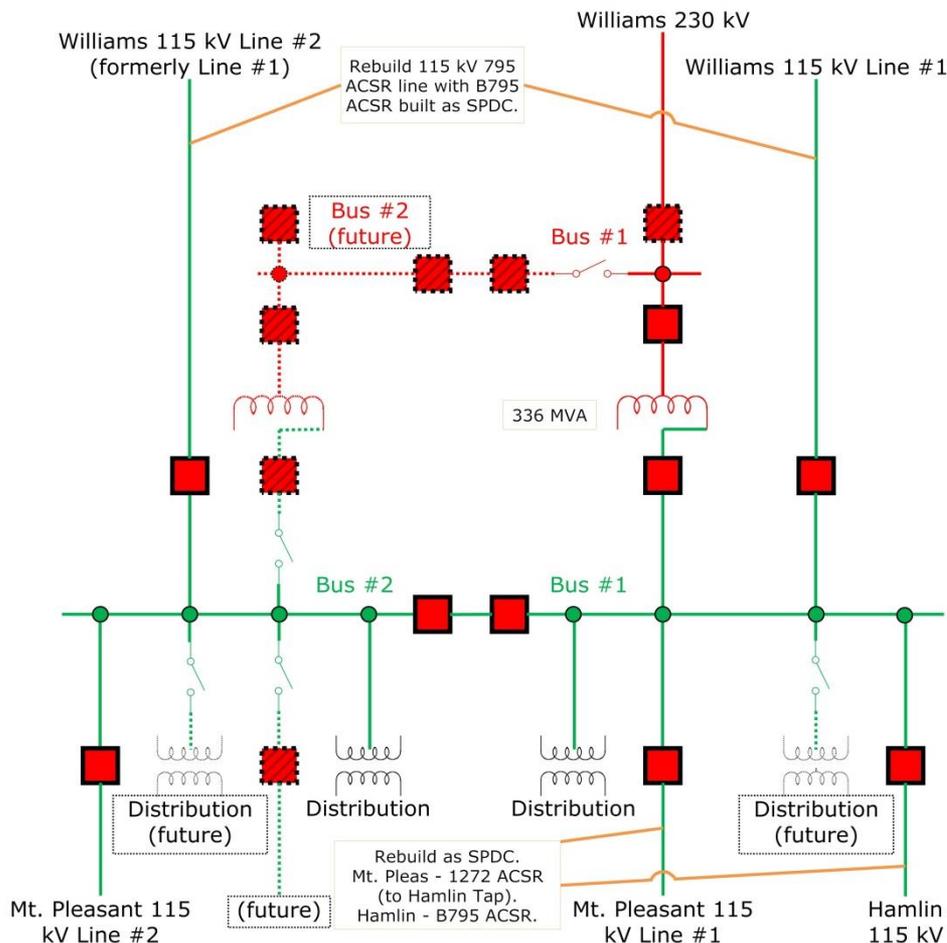
- Construct 230/115 kV transmission substation near existing Cainhoy distribution substation
 - Three 115 kV line terminals
 - Back-to-back bus tie breakers on 115 kV bus
 - One 230/115 kV 336 MVA autotransformer with high side and low side breakers
- Add one 230 kV terminal to #1 AM Williams 230 kV 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



Project 17 of 32
 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

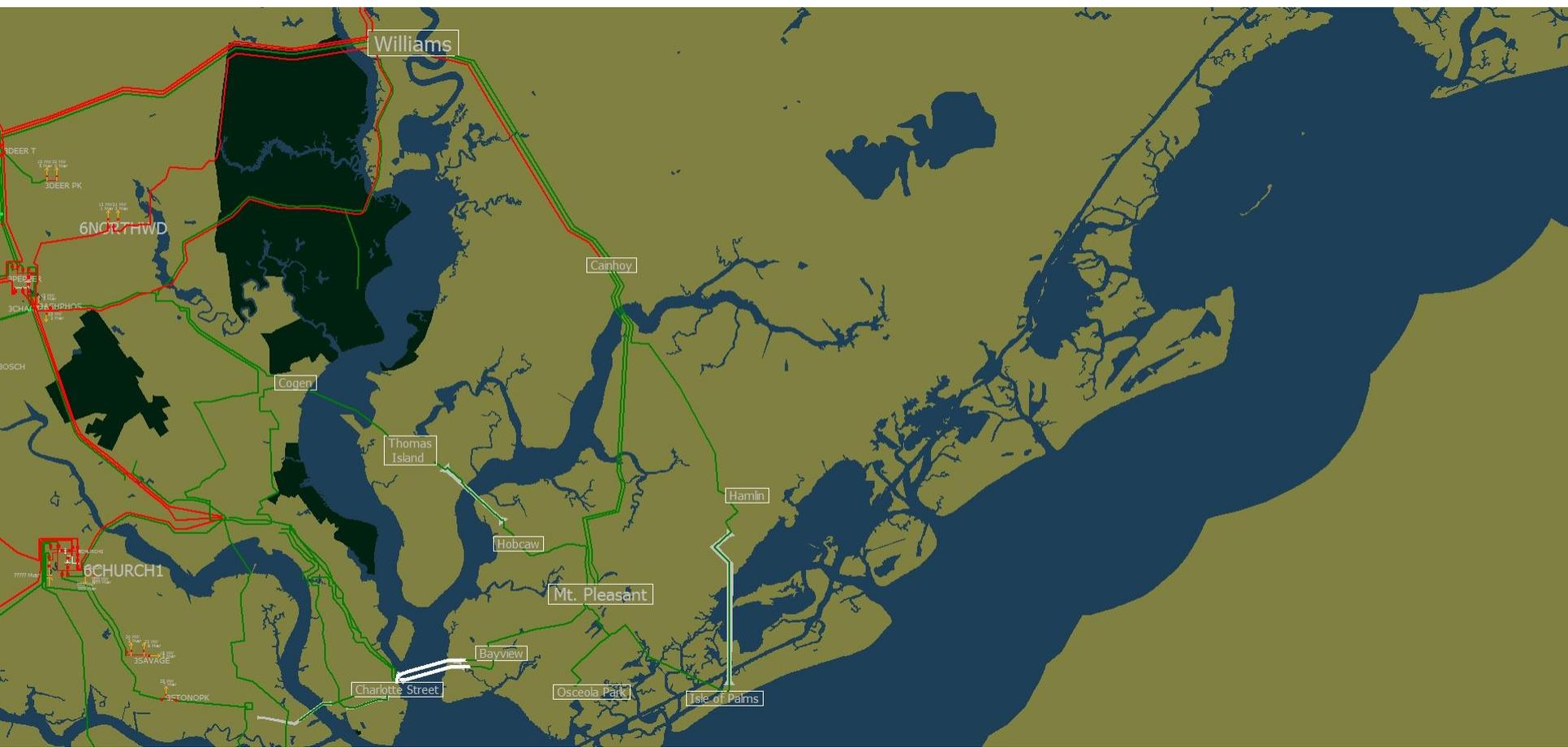


Phase II

- 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
- Rebuild Williams – Cainhoy 230 kV SPDC
 - Creates Williams – Cainhoy 115 kV #1 & #2 B795 ACSR
- Upgrade terminals at Williams to 2000A for Cainhoy 115 kV circuits



Project 17 of 32
 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**



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

5/31/2017

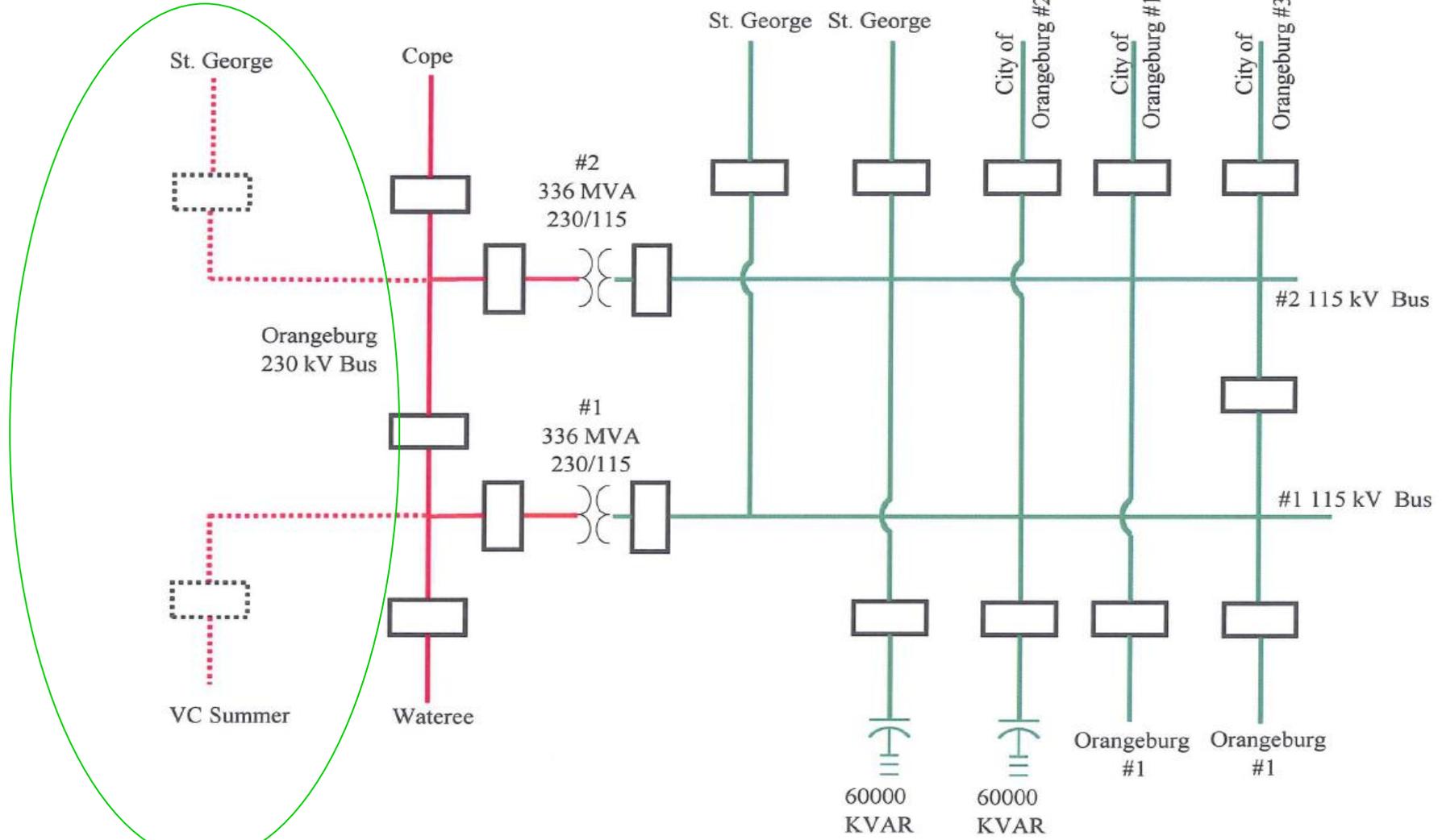
Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$1,216,954	\$0	\$1,783,046	\$0	\$0	\$0	\$3,000,000

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



Orangeburg East 230/115 kV Substation



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



Summerville – Pepperhill 230 kV: Construct

Project ID

2600A

Project Description

Construct a new 230 kV line from Pepperhill to Summerville with B-1272 ACSR. Total line length is approximately 9 miles.

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

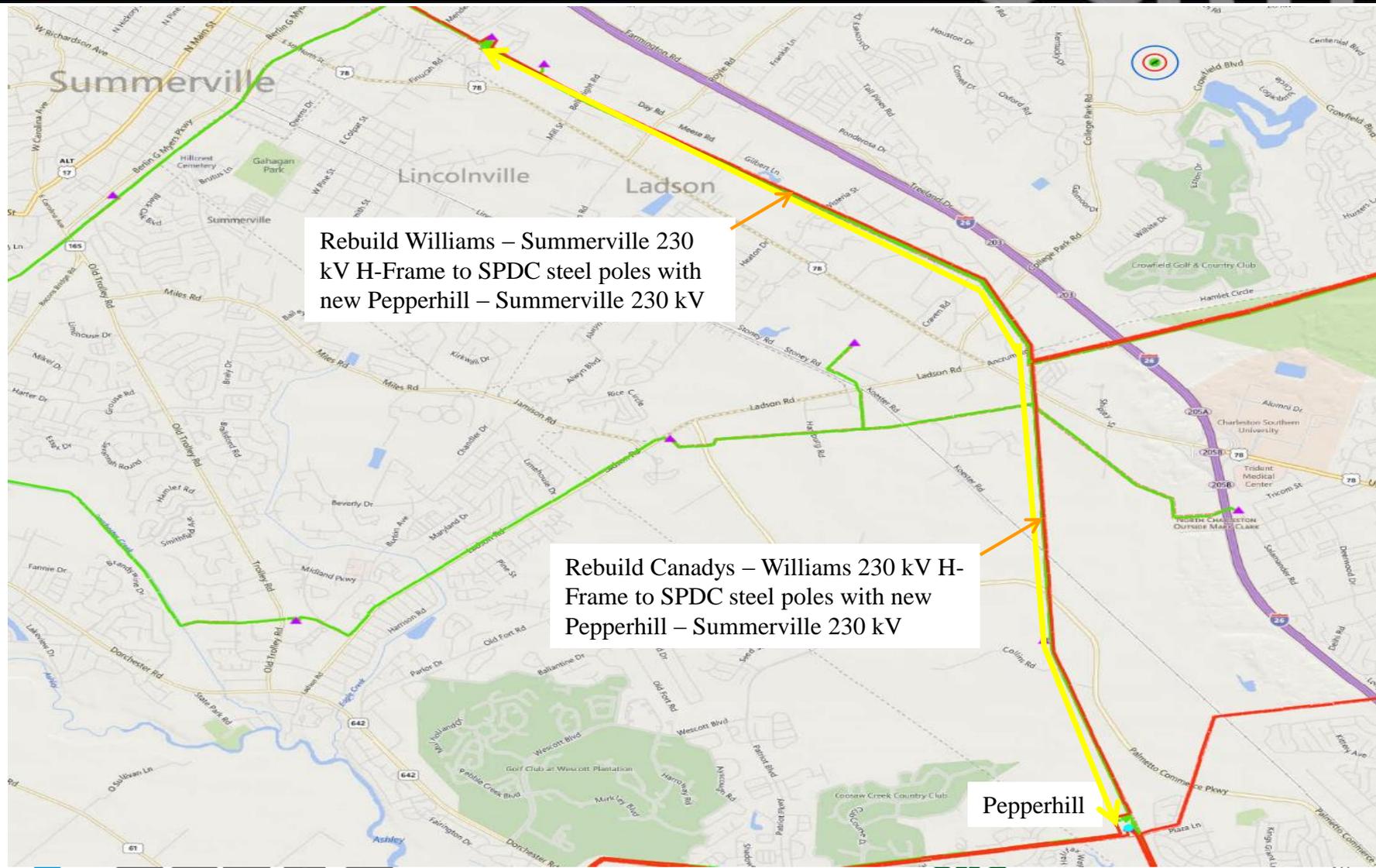
5/31/2018

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$239,765	\$0	\$0	\$9,060,235	\$0	\$0	\$9,300,000



Project 25 of 32
 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**



Burton-Yemassee 115 kV #2 Line Rebuild SPDC B795 ACSR

Project ID

1268A, 1268C

Project Description

Yemassee-Burton 115 kV Line #2: Rebuild 115 kV SPDC using B795 ACSR (line length 21.24 miles). Communications has requested fiber optic cable be added.

Project Need

System load growth in the Burton area requires additional transmission capacity from the Yemassee 230/115 kV substation and added redundancy to increase reliability.

Project Status

In Progress

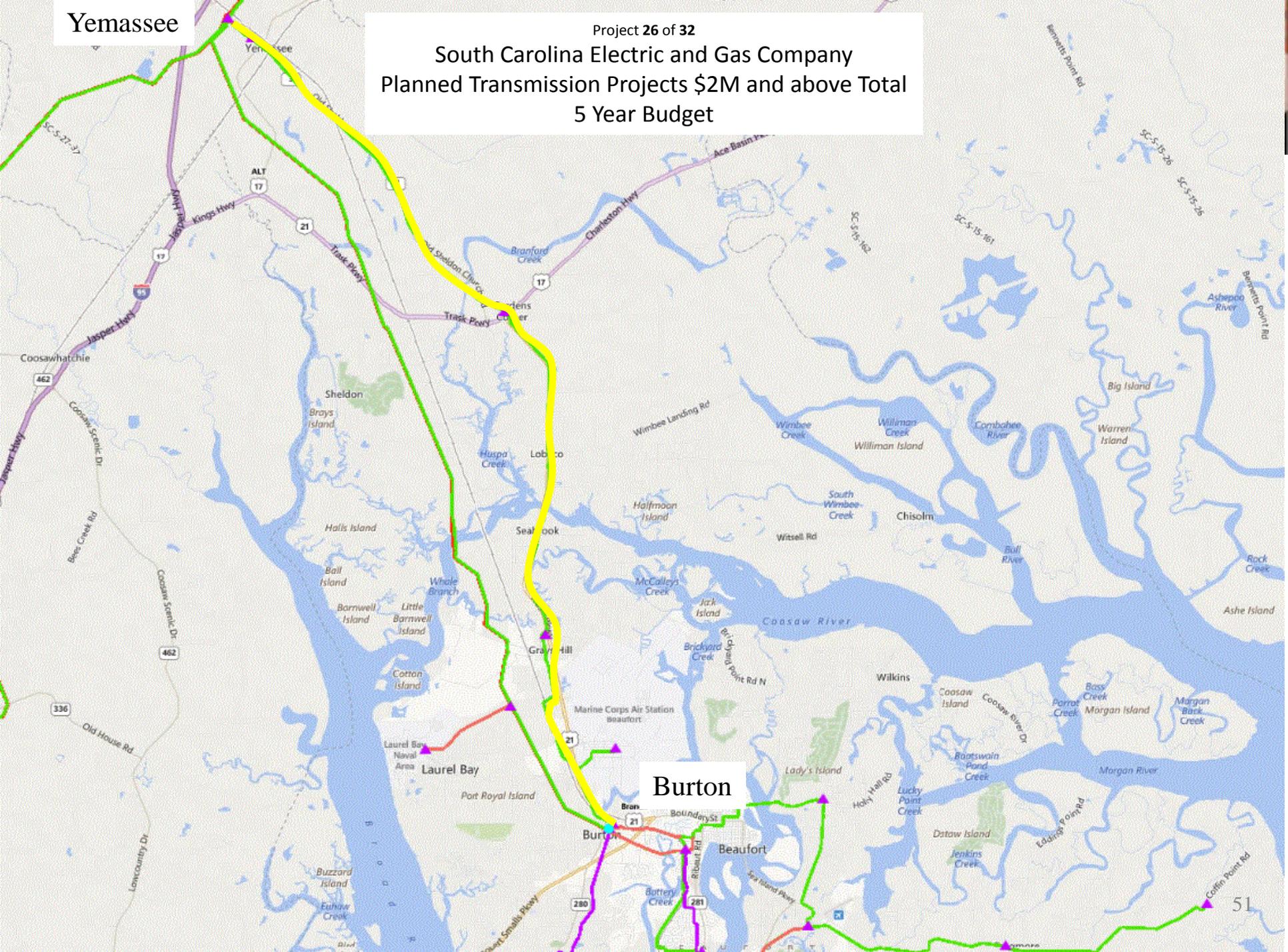
Planned In-Service Date

5/31/2018

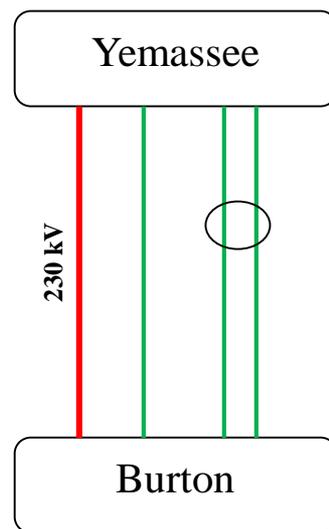
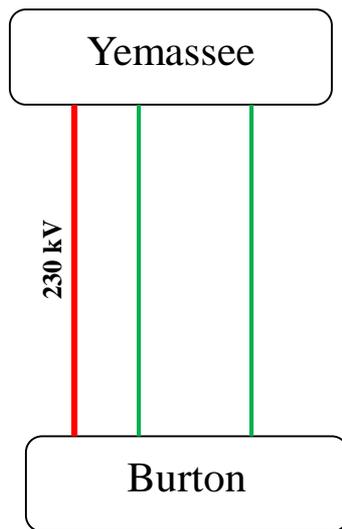
Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$11,679,281	\$0	\$0	\$24,820,719	\$0	\$0	\$36,500,000

Project 26 of 32
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



- Remove existing H-Frame 477 ACSR 115 kV line, rebuild approximately 21 miles SPDC B795 ACSR
 - Burton – Yemassee 115 kV #2 upgraded
 - Burton – Yemassee 115 kV #3 created
- Upgrade/Add 115 kV terminals at Yemassee & Burton
- Project required to alleviate potential N-2 contingency overload that requires load shedding under peak conditions
 - Radial load shed only, does not have any adverse effects on BES
- Scheduled for completion by May 31, 2016, but new R/W constraints, FAA permitting delays, and wetlands issues have created significant delays and will most likely push completion date out to **5/31/2018**.

Current Configuration:

1-230 kV 1272 ACSR
 2-115 kV 477 ACSR

Future Configuration:

1-230 kV 1272 ACSR
 1-115 kV 477 ACSR
 2-115 kV B795 ACSR

Total Capacity: **500 MVA** Total Capacity: **1,074 MVA**

**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

Project ID

0094D1, 0094D2, 0094D4, 0094D5, 0094D6, 0094D7, 0094D8, 0094D10, 0094D12, 0094D14, 0094D16, 0094D18

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

12/31/2018

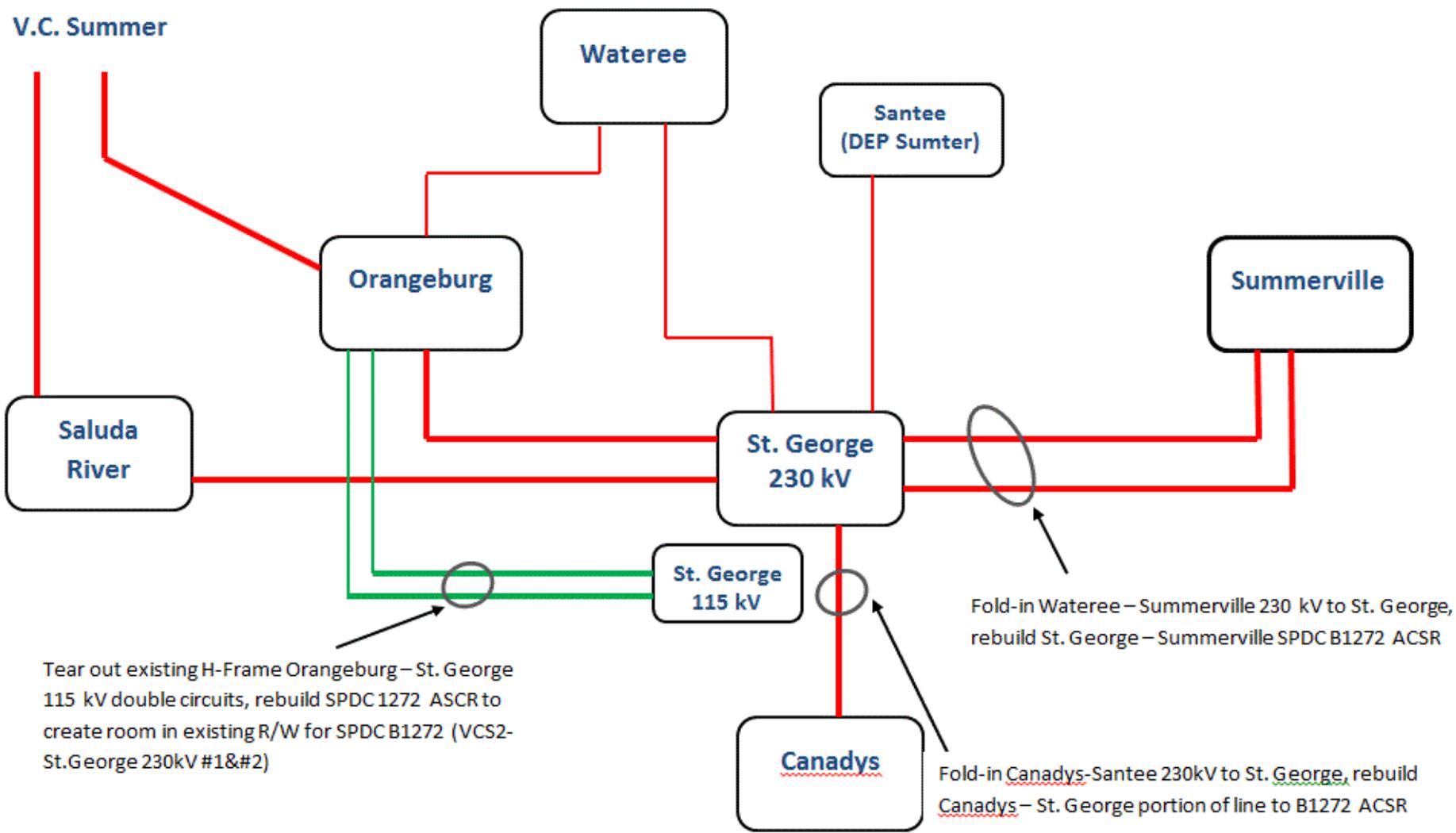
Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$821,255	\$0	\$7,878,745	\$16,000,000	\$0	\$0	\$24,700,000

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



V.C. Summer



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



St. George – Summerville 230 kV #2 B1272: Construct

Project ID

0094P

Project Description

Upgrade St. George to Summerville 230 kV to SPDC Bundled 1272 ACSR conductor, adding an additional St. George – Summerville 230 kV #2 line.

Project Need

System load growth in the Charleston and outlying areas requires an additional 230 kV source from the central portion of the SCE&G system, in conjunction with the in-service dates for VC Summer Units 2 and 3.

Project Status

Planned

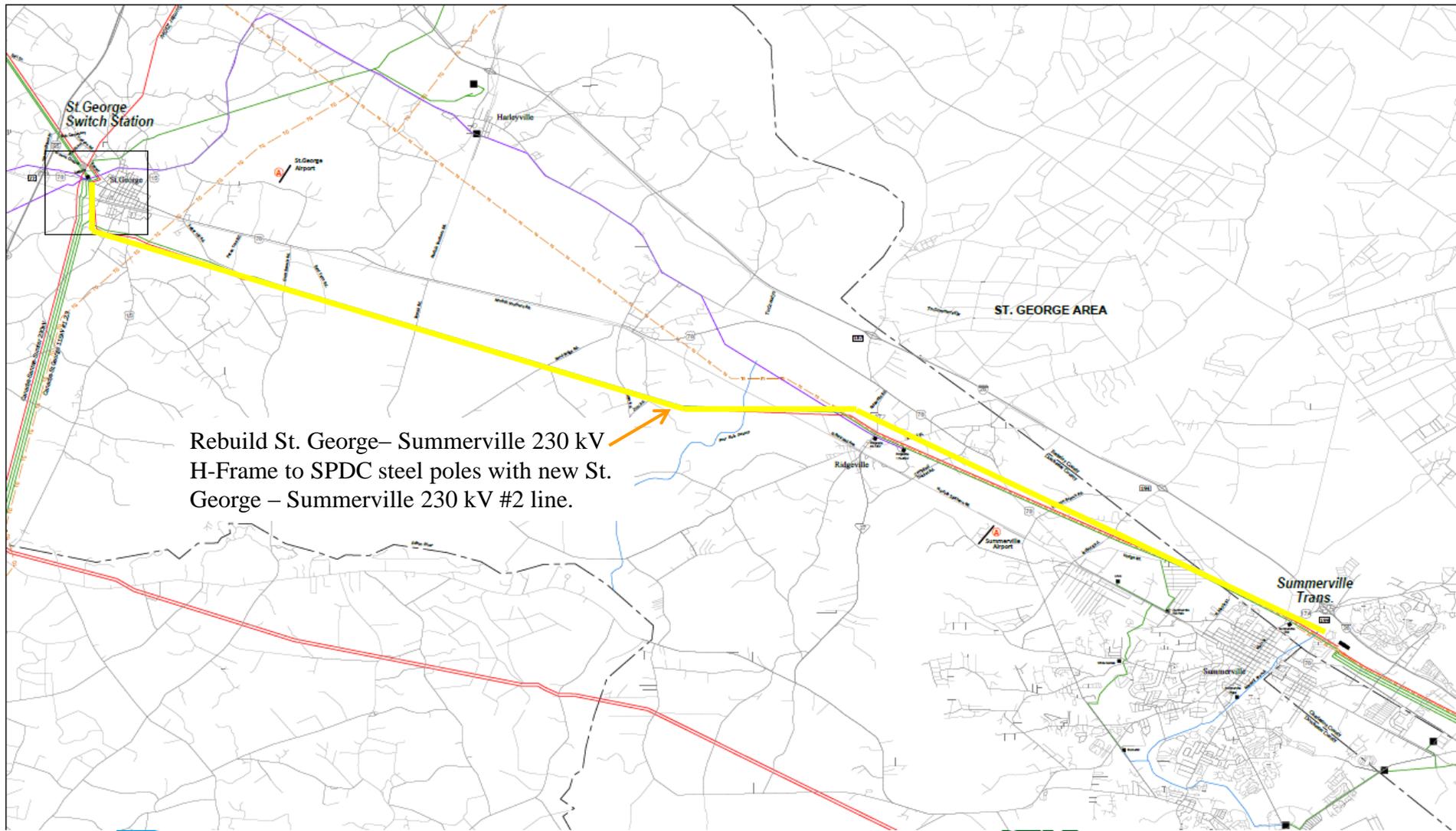
Planned In-Service Date

12/31/2018

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$3,561,487	\$0	\$	\$11,439,513	\$0	\$0	\$15,000,000

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



Rebuild St. George– Summerville 230 kV
H-Frame to SPDC steel poles with new St.
George – Summerville 230 kV #2 line.

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

Planned In-Service Date

8/31/2019

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$137,084,435	\$0	\$0	\$0	\$143,000,000	\$0	\$143,000,000

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

8/31/2020

Estimated Project Cost (\$)

Previous	2016	2017	2018	2019	2020	Total
\$103,491,749	\$0	\$0	\$0	\$0	\$234,000,000	\$234,000,000

SCE&G Planned Project Scope/Date Changes

Urquhart – Graniteville 230/115 kV Rebuild SPDC

- Currently exploring other options to replace/supplement this project
 - Possible new tie line with Southern Company, from their South Augusta 230 kV substation to Graniteville 230 kV. Line would utilize the proposed path of the Urquhart – Graniteville 230 kV #2 line and use existing R/W from SCE&G's Urquhart Generation Plant to South Augusta (SOCO).
- Delayed to **December 31, 2019**

SCE&G Planned Project Scope/Date Changes

Savannah River Services – Vogtle 230 kV

- Potential overloads have been identified in 2015 NERC TPL studies, beginning in 2018/2019 as a result of new nuclear installations at Southern Company's Vogtle Plant.
- Currently conducting joint studies with Southern Company and Georgia Power to identify possible solutions

SCE&G Planned Project Scope/Date Changes

Salem SS – Baldock 115 kV

- Potential overloads have been identified in 2015 NERC TPL studies, beginning in 2018/2019 as a result of new nuclear installations at Southern Company's Vogtle Plant.
- Currently conducting joint studies with SOCO to identify possible solutions

Questions?

Proposed Transmission Expansion Plan

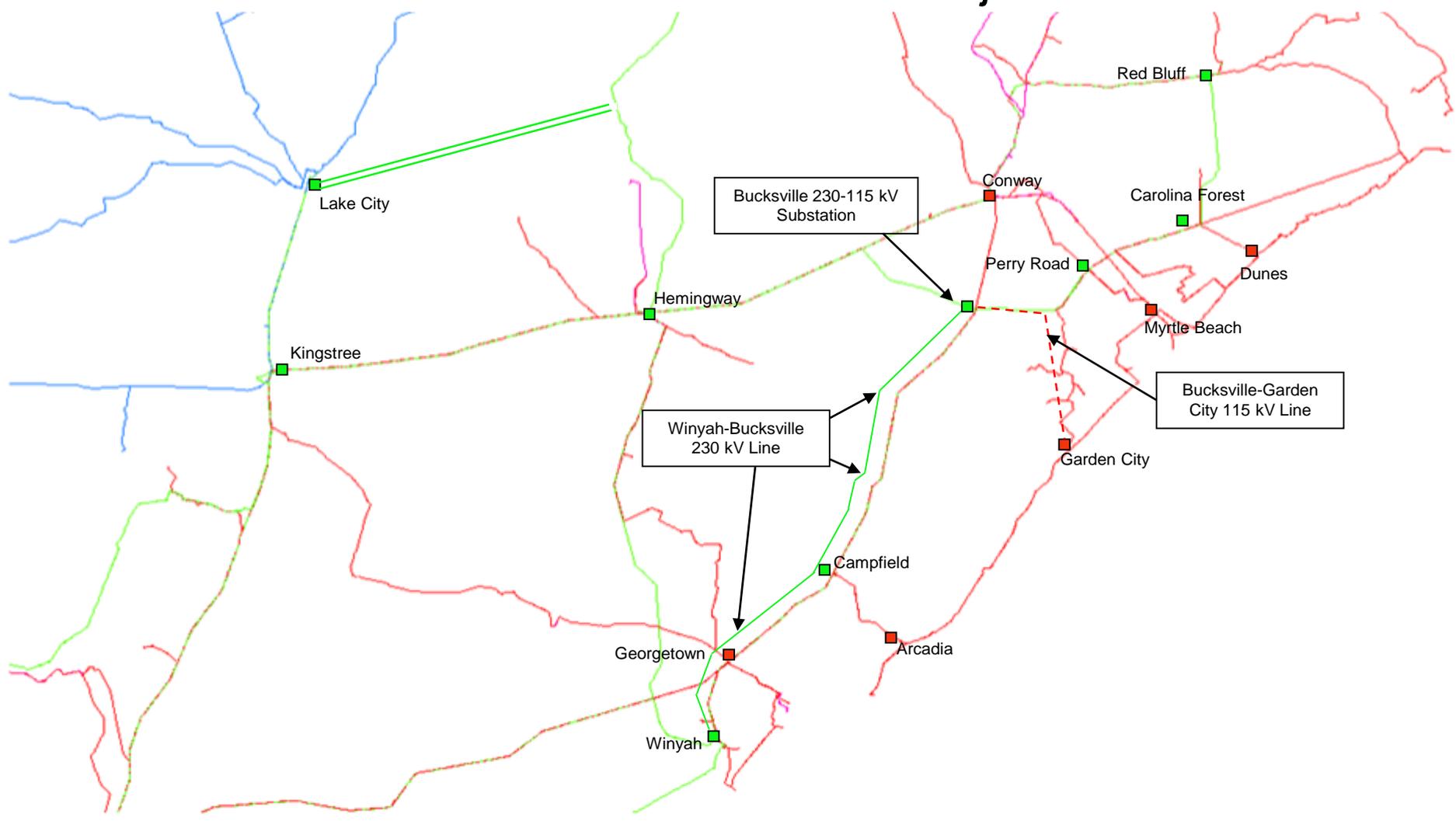
Santee Cooper

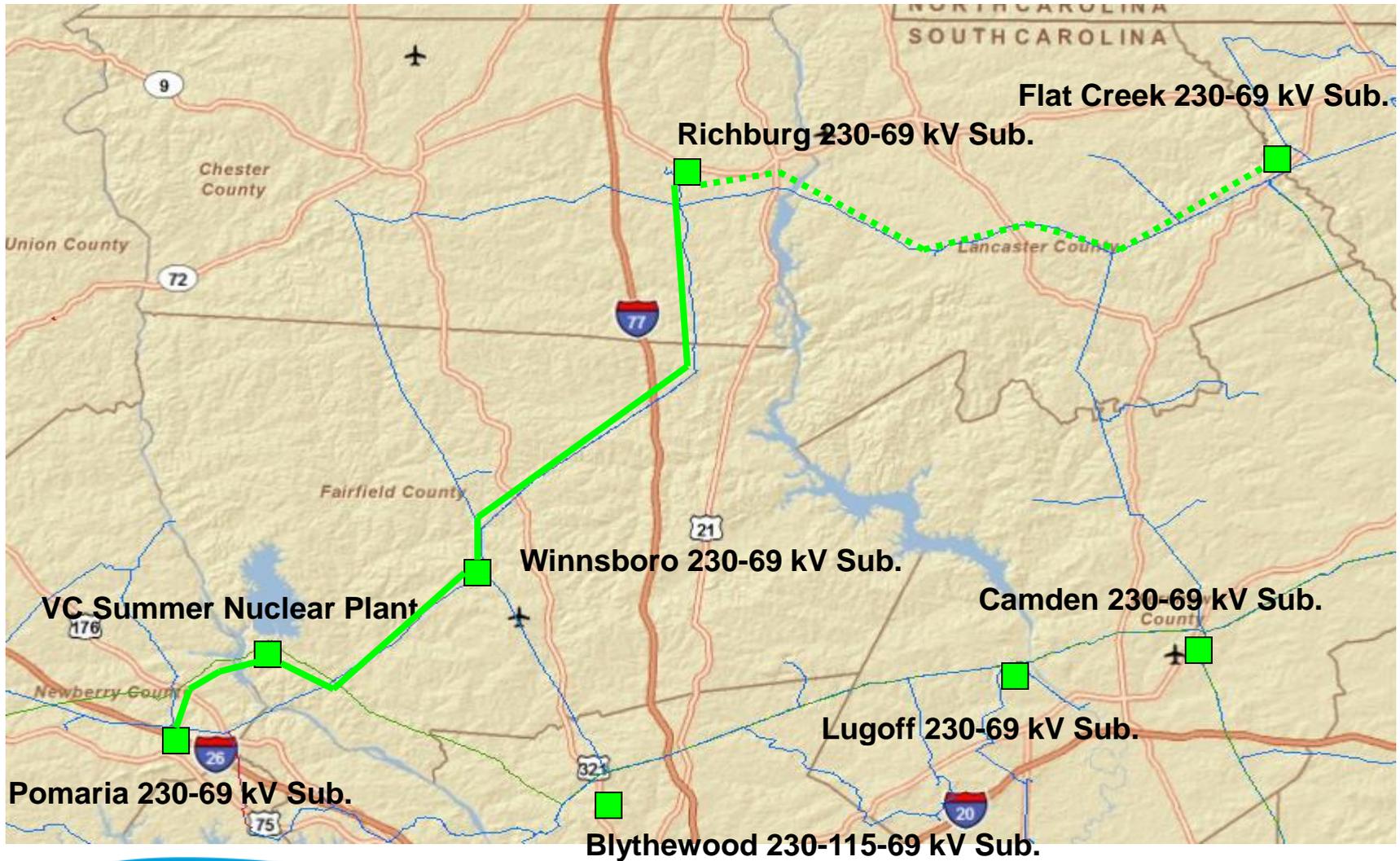
Rick Thornton

Transmission Network Active Projects

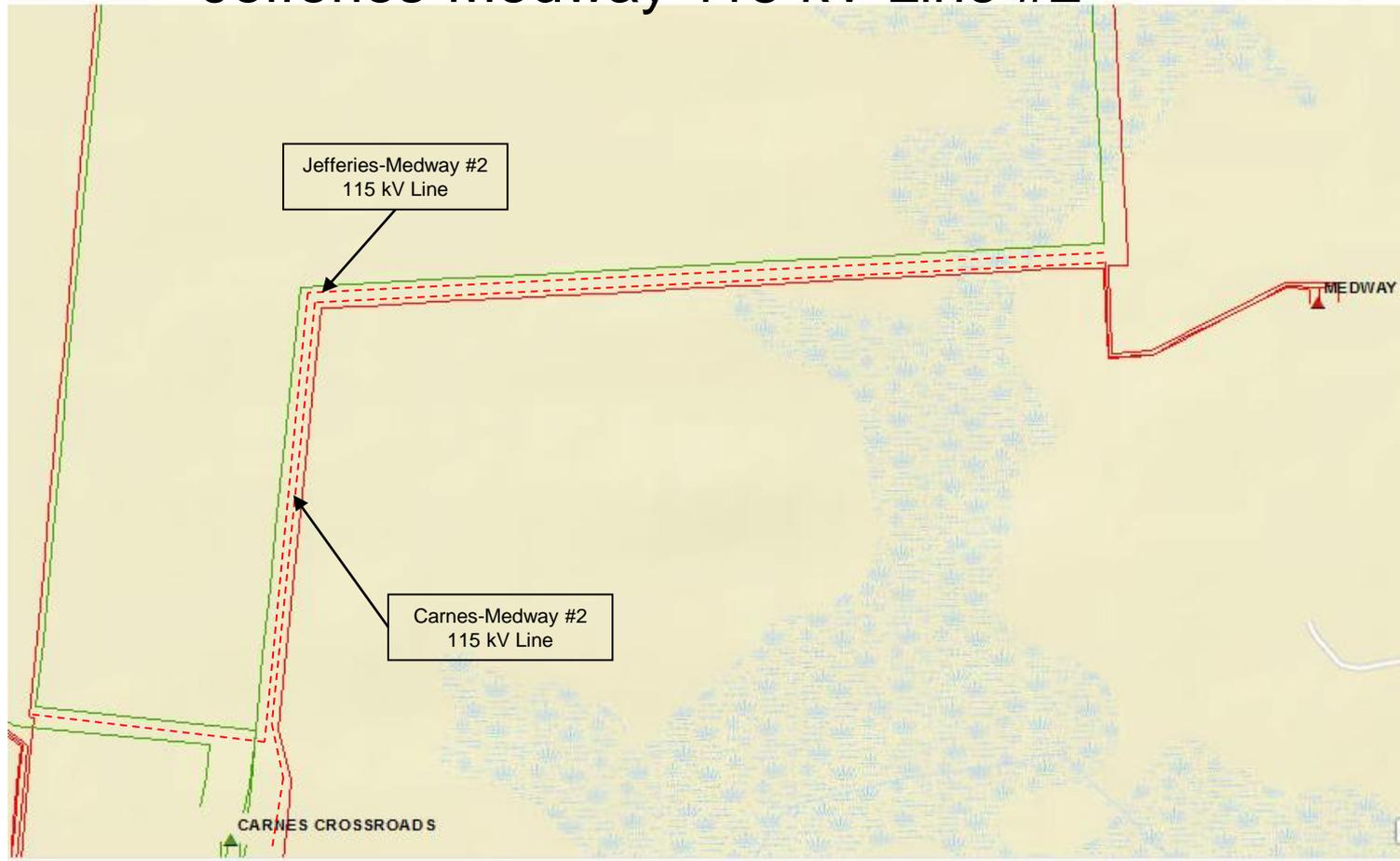
- Richburg-Flat Creek 230 kV Line 06/2016
- Bucksville-Garden City 115 kV Line 06/2016
- Carnes Crossroads-Medway 115 kV Line #2 06/2016
- Jefferies-Medway 115 kV Line #2 06/2016
- Bucksville-Myrtle Beach 115 kV Line 12/2016
- Pringletown 115 kV Switching Station 12/2016
- Perry Road-Myrtle Beach #3 06/2017
- Pine Level-Allen #2 115 kV Line 06/2017
- New Harleys Bridge 115-69 kV Substation 12/2017
- Sandy Run 230-115 kV Substation 05/2018
- Pomaria-Sandy Run 230 kV Line 05/2018
- Marion-Red Bluff 230 kV Line 12/2018
- Sandy Run-Orangeburg 230 kV Line 06/2019

Bucksville Transmission Projects

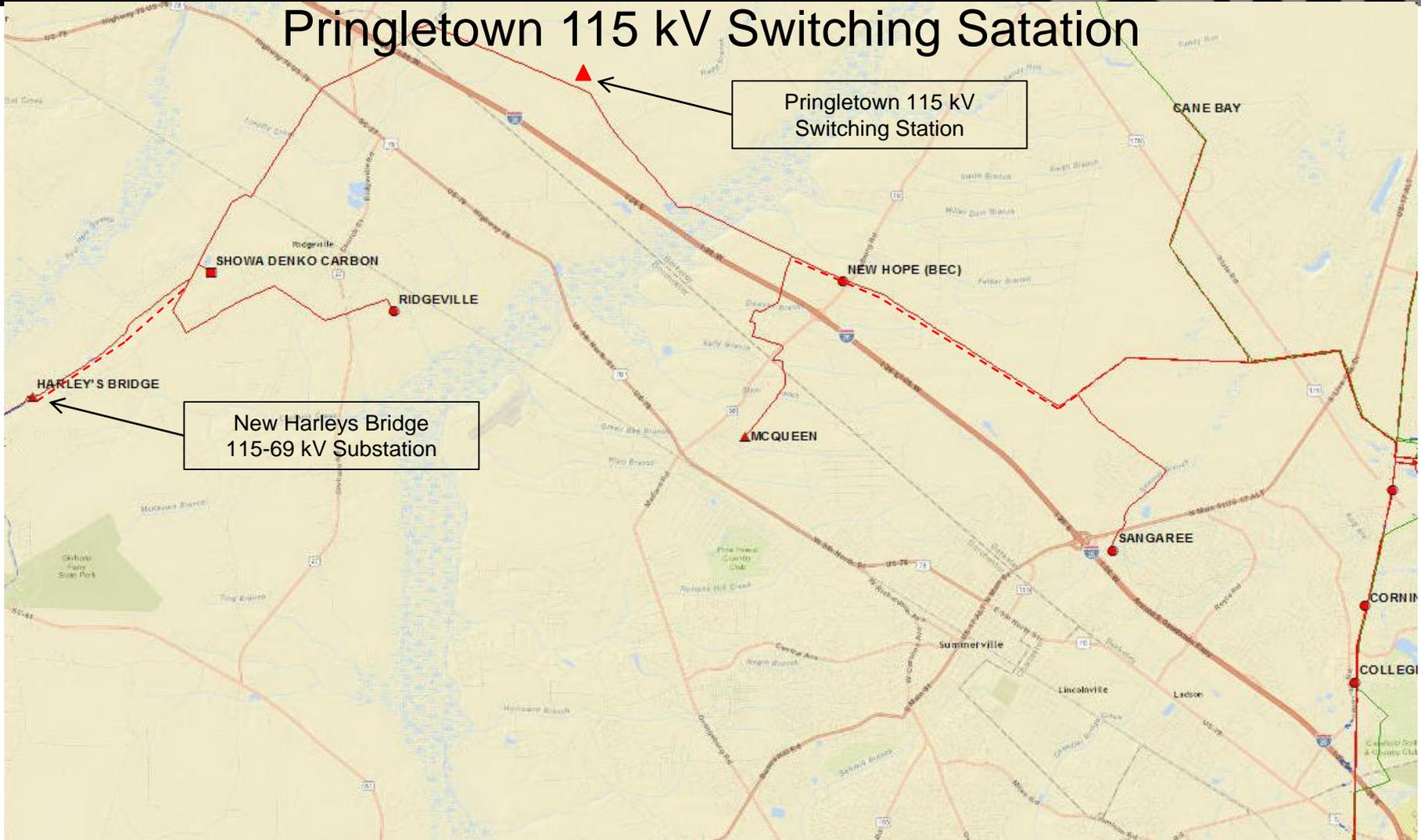




Carnes-Medway 115 kV Line #2 Jefferies-Medway 115 kV Line #2



Pringletown 115 kV Switching Satation



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



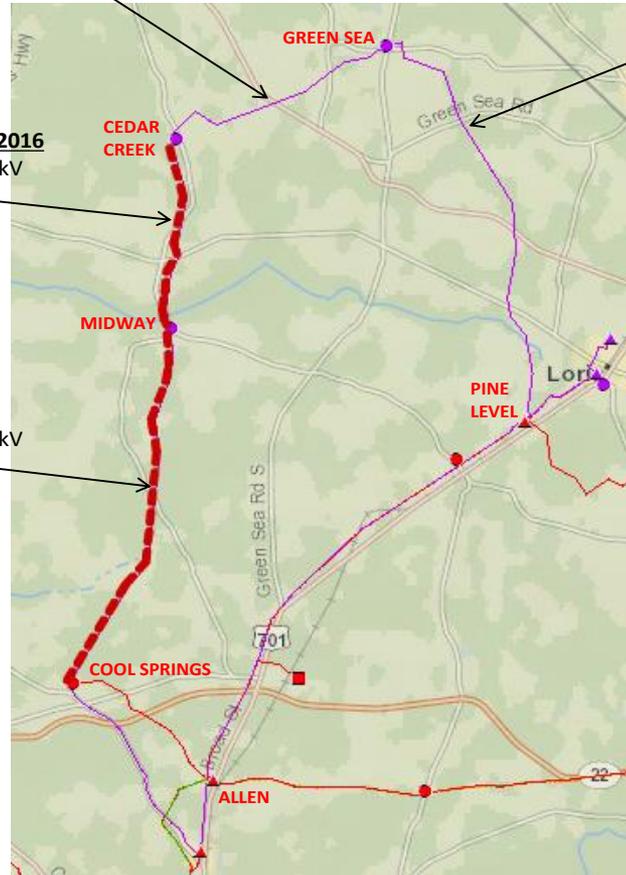
Allen – Pine Level #2 115 kV Line

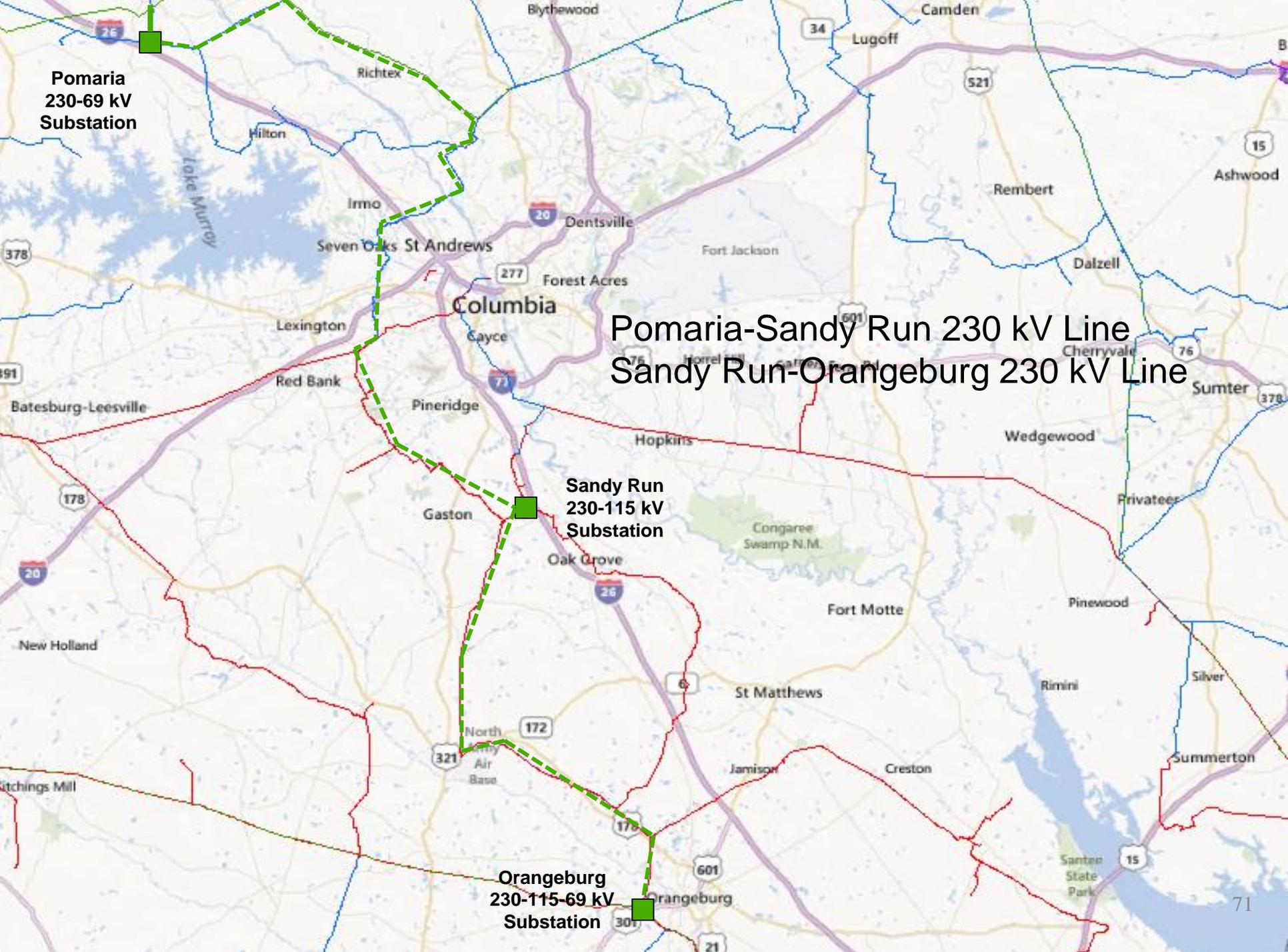
Changed to **3/1/2017**
OPERATE AT 115kV
 (ALREADY 477 ACSR
 BUILT FOR 115kV)

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)



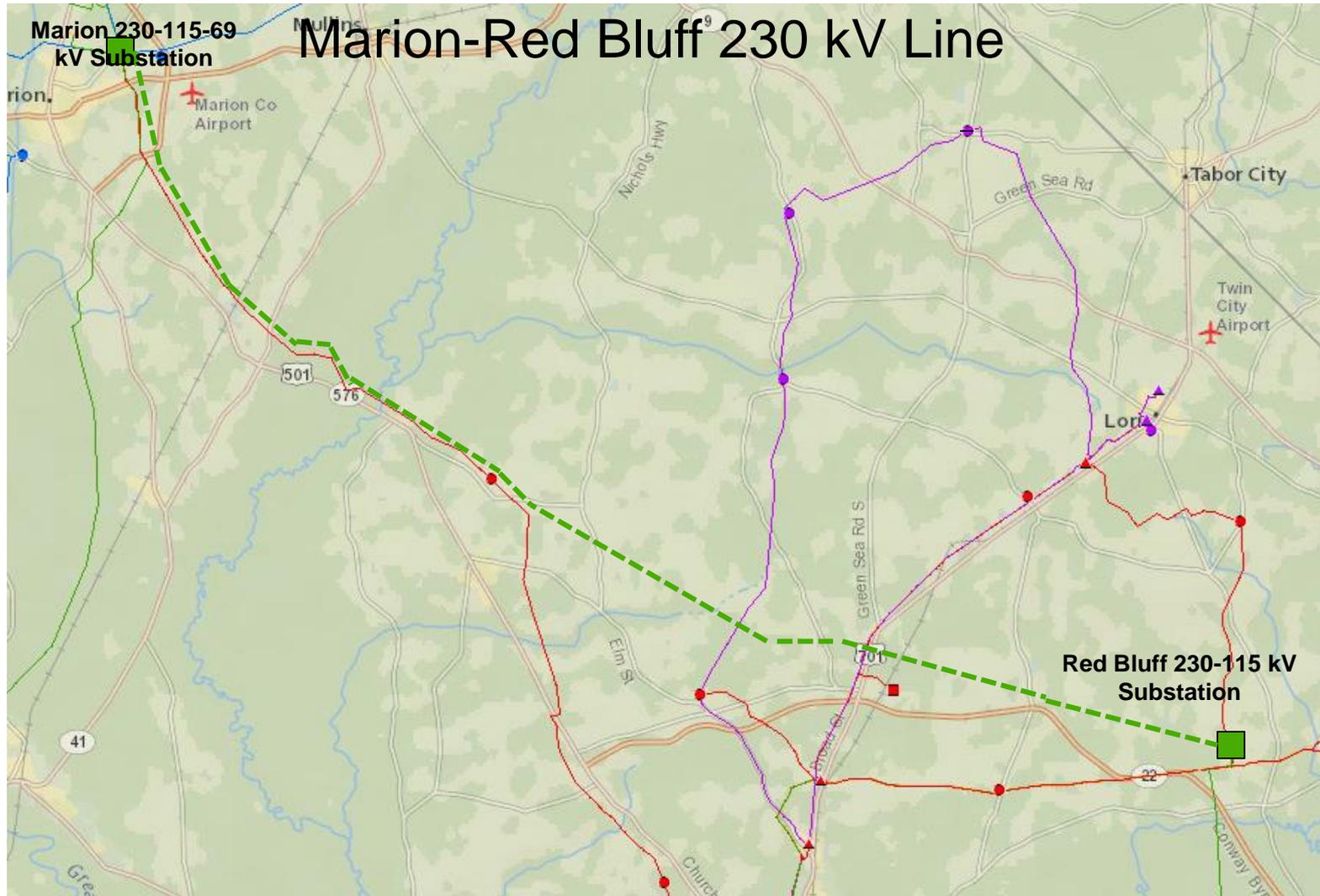


**Pomaria
230-69 kV
Substation**

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

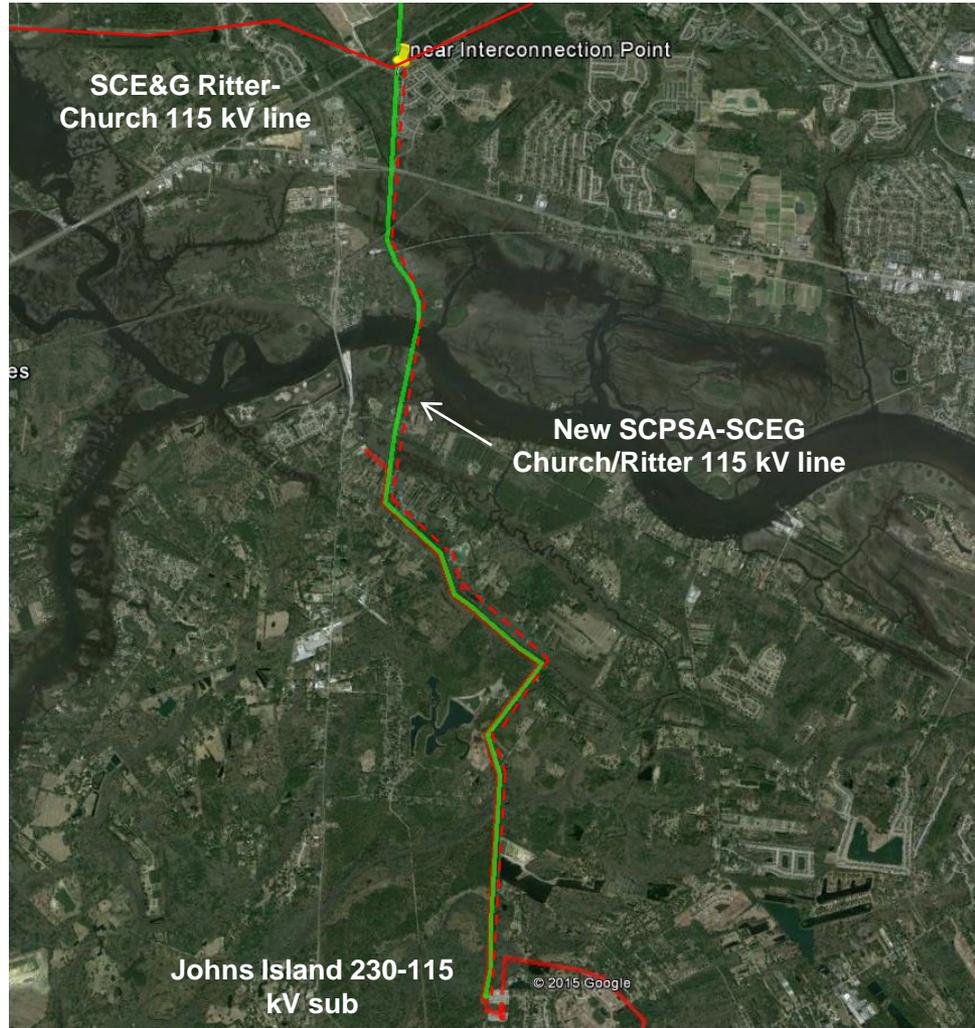
**Sandy Run
230-115 kV
Substation**

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

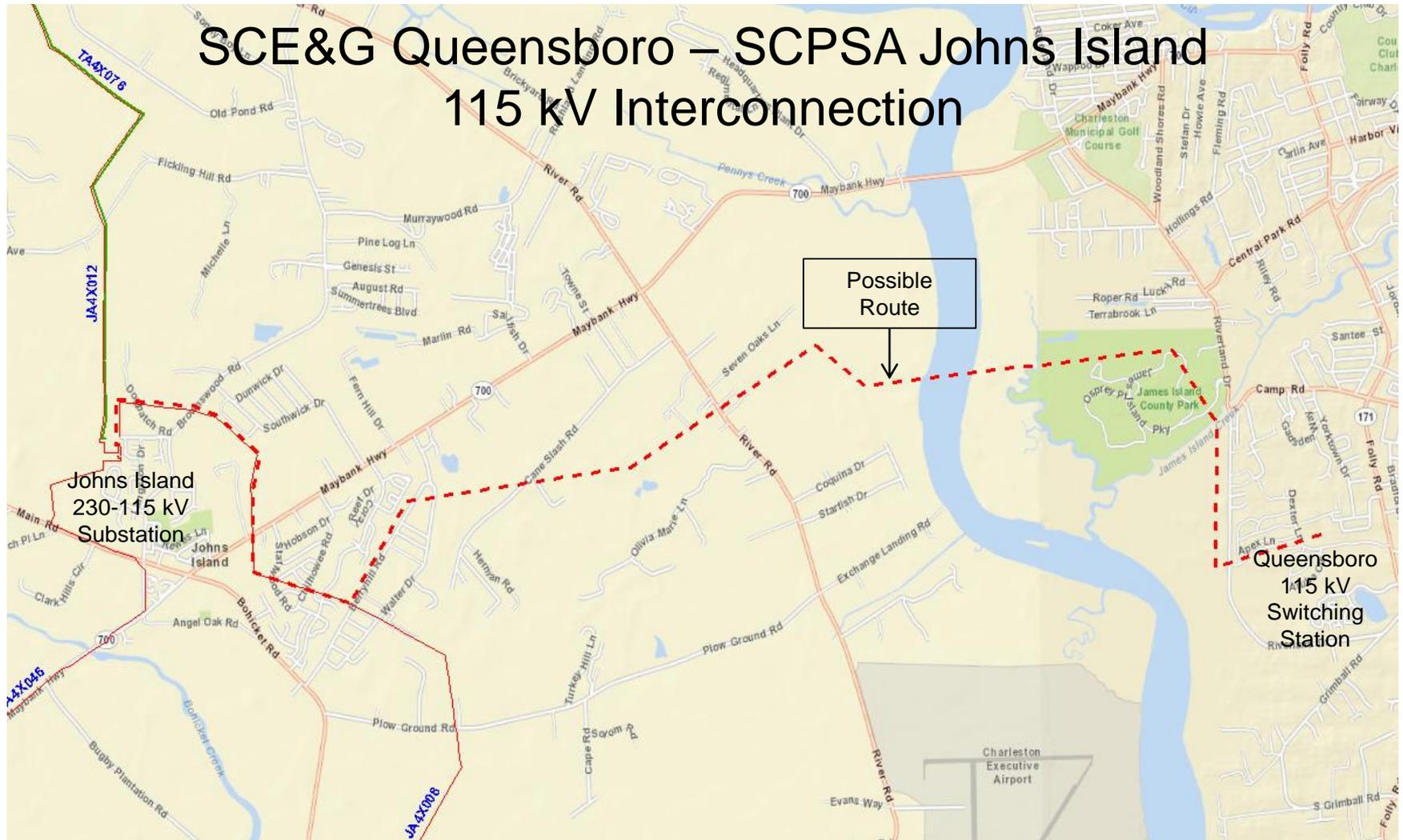


Transmission Network Planned Projects

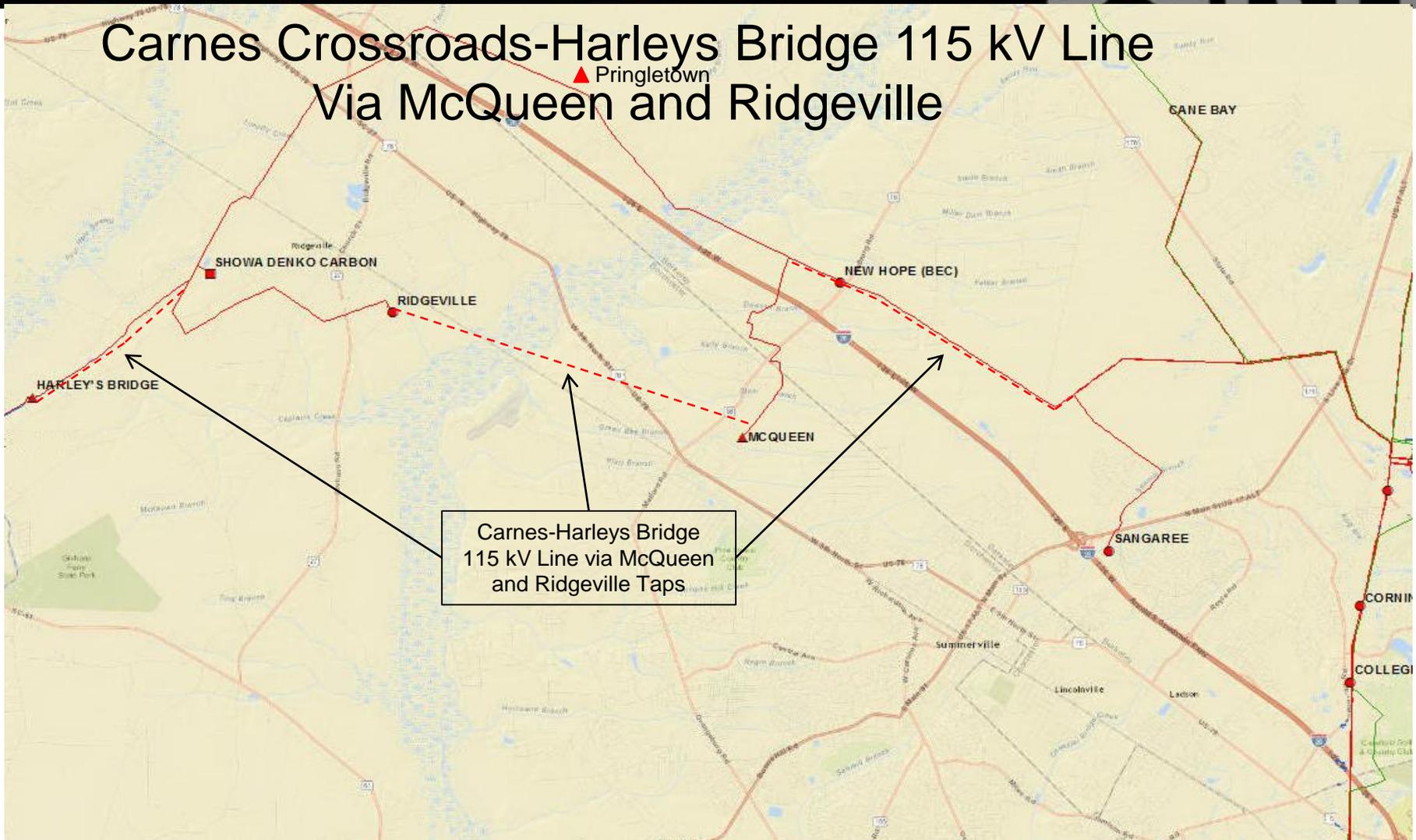
- New Harleys Bridge 115-69 kV Substation 12/2017
- SCE&G Church Creek / Ritter-SCPSA Johns Island 12/2017
- SCE&G Queensboro-SCPSA Johns Island
115 kV Interconnection 06/2018
- Carnes-Harleys Bridge 115 kV Line via McQueen 12/2020
- Dalzell-Lake City 230 kV Line 04/2020
- Sandy Run-Pinewood 230 kV Line 12/2021



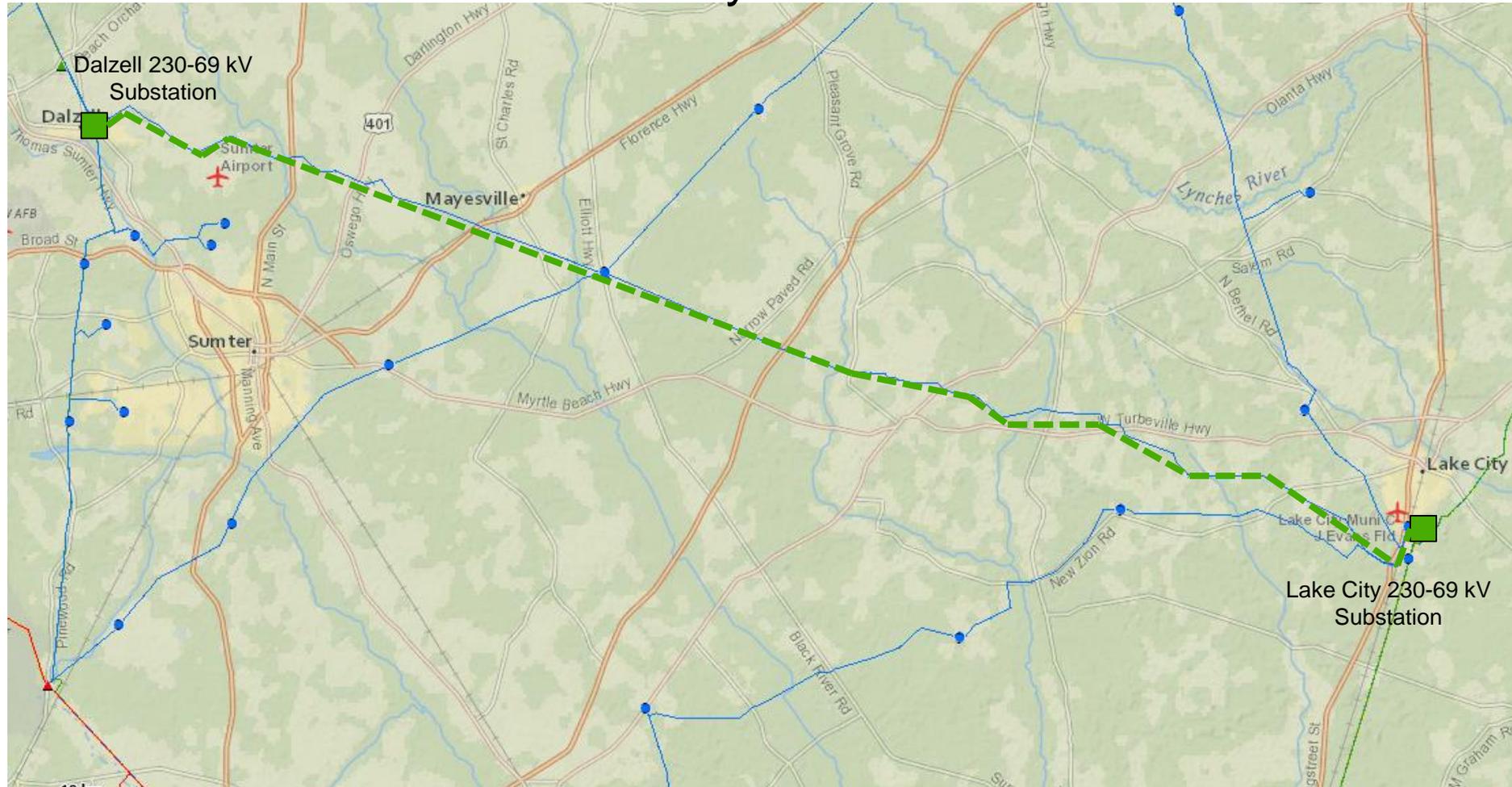
SCE&G Queensboro – SCPSA Johns Island 115 kV Interconnection



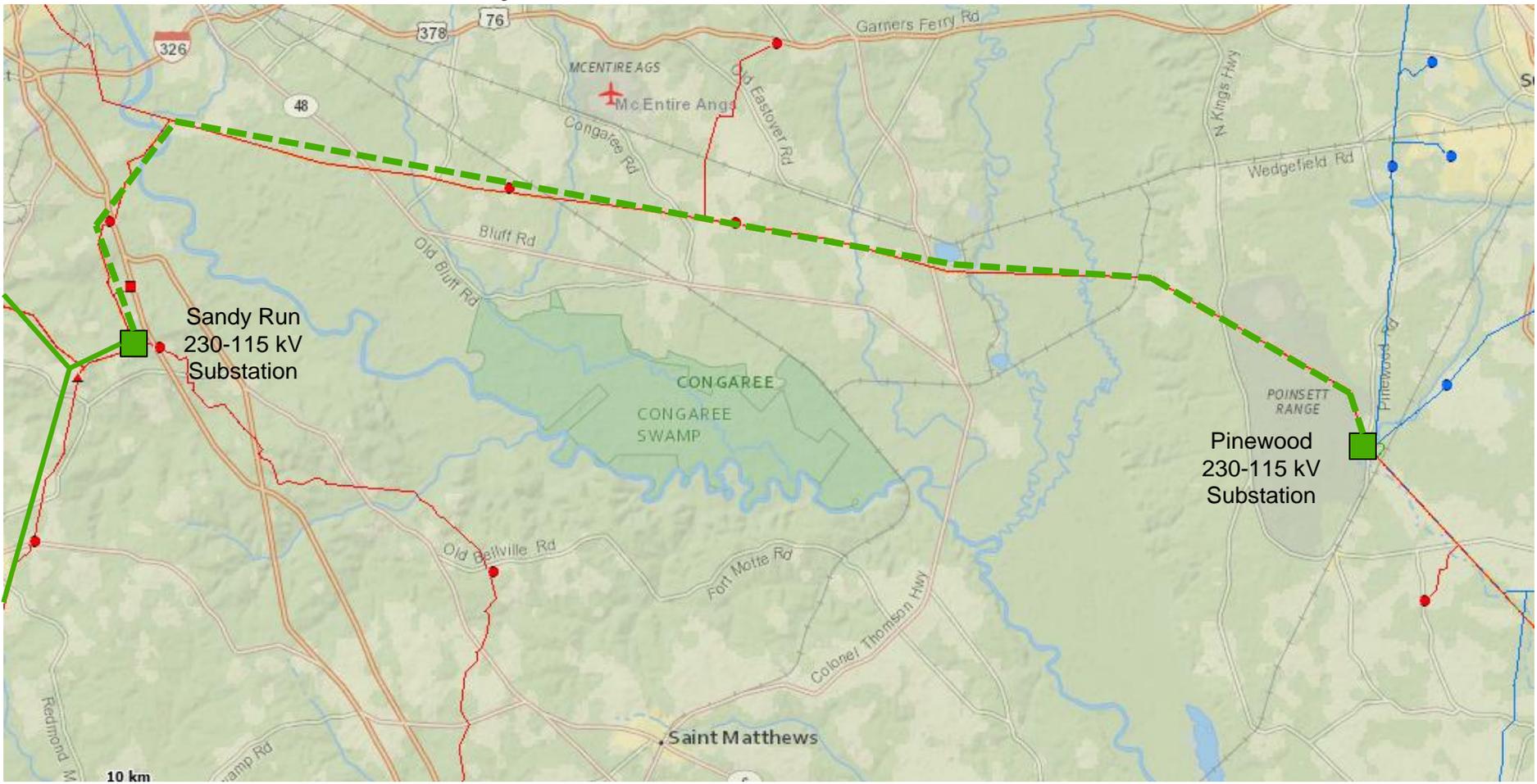
Carnes Crossroads-Harleys Bridge 115 kV Line Via McQueen and Ridgeville



Dalzell-Lake City 230 kV Line



Sandy Run-Pinewood 230 kV Line



Questions?

Proposed Transmission Expansion Plan

Stakeholder Input, Comments and Questions

SCRTP Regional and Inter-regional Processes

Clay Young

SCRTP Regional and Public Policy Planning

- Biennial Process (currently in year 2, Meeting #7)
- Restarts in 4th 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

When proposals are submitted, during this meeting

- Transmission Providers will review requests for cost allocation submitted by Qualified Developers
- Stakeholders may submit comments on all requests for cost allocation
- Transmission Providers and Stakeholders may discuss requests for cost allocation
- Transmission Providers will post all comments on the SCRTP website

SCRTP Regional and Public Policy Planning

- Public Policy – Proposed, Evaluation and Selection
 - Must be submitted by January 15 of odd years
 - None received in current Public Policy Planning cycle

SCRTP Inter-regional Process

- Inter-regional process includes SCRTP and SERTP (Southeastern Regional Transmission Planning)
- Includes requirement to:
 - Coordinate Regional and Local Plans
 - Exchange data, power flow base cases and transmission expansion plans
 - Joint Evaluation of Proposed Inter-regional Projects
 - Cost Allocation Methodology for selected Inter-regional Projects
- May 17, 2016 – Joint SCRTP/SERTP Web Conference
 - Regional Planning Processes for SCRTP and SERTP presented
 - Local and Regional Plans for near the seams was presented for both SCRTP and SERTP
 - Transmission Providers are currently reviewing each others plans to determine if more effective or cost efficient joint alternatives are available

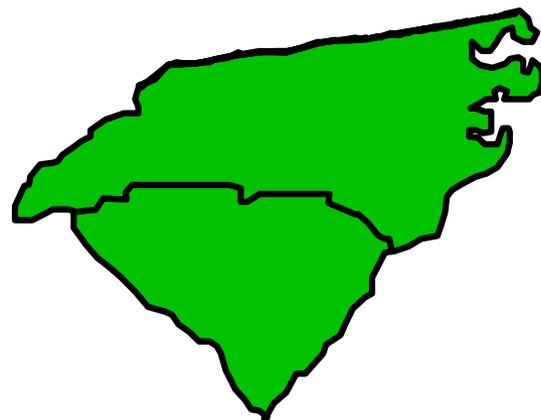
Reliability Assessment and Multi-Party Studies

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 and assessment and operating activities among the specific parties associated with the CTCA**

CTCA Purpose

Interchange Agreements associated with the CTCA

Duke Energy Carolinas (“DEC”) and Duke Energy Progress (“DEP”)

Duke Energy Carolinas (“DEC”) and South Carolina Electric & Gas Company (“SCEG”)

Duke Energy Carolinas (“DEC”) and South Carolina Public Service Authority (“SCPSA”)

Duke Energy Progress (“DEP”) and South Carolina Electric & Gas Company (“SCEG”)

Duke Energy Progress (“DEP”) and South Carolina Public Service Authority (“SCPSA”)

South Carolina Electric & Gas Company (“SCEG”) and South Carolina Public Service Authority (“SCPSA”)

CTCA Power Flow Study Group

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

CTCA Studies

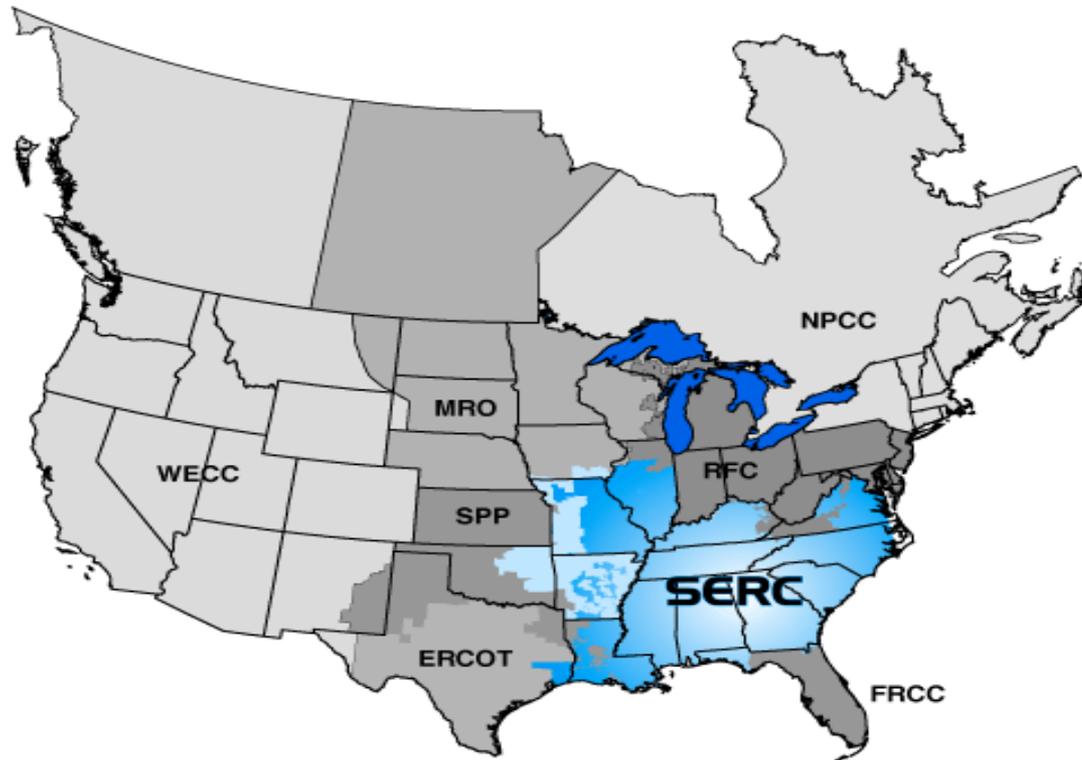
- Assess the existing transmission expansion plans of DEC, DEP, SCEG, and SCPSA to ensure that the plans are simultaneously feasible.
- Identify any potential joint solutions that are more efficient or cost-effective than individual company plans, which also improve the simultaneous feasibility of the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

CTCA Studies 2016 Study

- 2018 Summer (Near-Term)
- 2022 Summer (Long-Term)
- Study begins late June

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 2016 Work Schedule

- LTSG Data Bank Update –May 24-26 Hosted by Southern
- Study Case: 2021 Summer Peak Load
- Work completed by LTSG June thru October
- Final Report in December

Questions?

Eastern Interconnection Planning Collaborative Update

Phil Kleckley

SCRTP Regional Stakeholder Meeting

June 1, 2016

About the EIPC

- 20 Planning Authority (Planning Coordinator) members including ISOs/RTOs, non-ISO regions, municipals, cooperatives, ...
- Members are from the U.S. and Canada
- Approximately 95% of the Eastern Interconnection customers covered

EIPC Supporting Activities

- CEII: Continue to make EIPC models available to those who have completed the EIPC CEII process (based on regional clearance)
- Website: www.eipconline.com
 - Continue to host the EIPC website
 - Post material from both grant and non-grant EIPC activities

EIPC Stakeholder Process

- Existing stakeholder groups previously created for other purposes such as compliance with FERC Order 890 will be used to facilitate stakeholder input
- Ensure a regional focus:
 - Present roll-up models and results
 - Receive stakeholder feedback, input, comments and suggestions on specific scenarios to be studied
 - Present the results of scenario studies
 - Seek stakeholder feedback on reports that are created

EIPC 2016 Study

- Webinar conducted November 17, 2015
- Presented 2025 Summer Peak and 2025 Winter Peak Roll-up cases development
- Presented sample scenarios options to stakeholders for 2016 study

2025 Summer/Winter Peak Roll-up Cases

Transmission Gap Analysis

- Consistent with NERC TPL Standard
 - No transmission elements loaded beyond capacity
 - No voltages above or below PCs planning criteria
- Contingencies
 - N-0 contingency: All facilities in-service
 - N-1 contingency: Event resulting in loss of a single element (230kV and above + selected 161kV, all transformers with high side of 230kV and above)

2025 Summer/Winter Peak Roll-up Cases Transmission Gap Analysis

- Numerous high and low voltage issues were identified for N-0 contingency and N-1 contingency cases
- Conceptual solutions identified and under review

2025 Summer/Winter Roll-up Cases

Linear Transfer Analysis

- Analyzed 5,000 MW transfers between selected areas
 - Additional cases with high base transfers from/to NPCC
- Monitored 100kV and above
 - N-0 branch overloads
 - N-1 branch overloads (including NYISO specific regional contingencies)
- Conceptual solutions provided by PCs

2025 Summer/Winter Roll-up Cases

Linear Transfer Analysis

- Currently planned transmission is capable of transferring power between areas
 - NPCC/MISO and NPCC/PJM exceptions
- Incremental transfer capabilities ranged from 335 MW to over 5,000 MW
- Limits should be further analyzed and validated by limiting PCs

Questions?

Contact Phil Kleckley

pkleckley@scana.com

Next SCRTP Meeting

- Review and receive stakeholder input on the results of requested economic power transfer sensitivities selected by the Stakeholder Group
- SCRTP Email Distribution List will be notified
- Register online

South Carolina Regional Transmission Planning

Stakeholder Meeting

SCE&G - Lake Murray Training Center

1888 N Lake Drive - Room 100

Lexington, SC 29072

June 1, 2016 - 10 AM – 1 PM