Transmission Improvements Plan for 575 MW Network Service Request Wansley CC 7 Generation Facility (OASIS # 143556)

Georgia Transmission Corporation

November 11, 2010

Wansley CC7 Transmission Improvements Plan

PROBLEM STATEMENT

A System Impact Study (SIS) was conducted by the Georgia Transmission Corporation to determine the impact to the Integrated Transmission System (ITS) of granting 575 MW of firm transmission service out of the existing Wansley CC 7 combined-cycle (CC) site in Heard County, GA (OASIS # 143556). The firm 575 MW transmission service request (TSR) was requested for the period 01/01/2010 – 01/01/2020.

Beginning in 2010, the Villa Rica 500/230 kV Transformer can exceed its thermal capacity for the loss of the Villa Rica – Union City 500 kV Line. Also, the Villa Rica – Wansley 500 kV line loads to 100 % of its thermal capacity for the loss of O'Hara – Wansley 500 kV line. Additionally, the Union City - Flat Shoals section of the Union City – East Point 230 kV line (Black) and the Morrow - Murray Lake Junction – Fort Gillem sections of the Grady – Morrow 115 kV line (Black) can exceed their respective thermal capacities under contingency situations. Beginning in 2014, O'Hara – Wansley 500 kV Line may reach 99 % of its thermal capacity for the loss of Villa Rica – Wansley 500 kV Line. The Wansley CC 7 generation is a contributing factor to these loadings.

As no improvements can be implemented in 2010 to address the above limitations, firm service would be limited to 344 MW in 2010. Several major transmission improvements will be required beginning in 2011 to grant full service for the Wansley CC7 generation facility through the requested period. This request was confirmed on May 12, 2010 pending completion of required transmission improvements.

STUDY RESULTS

Villa Rica Related Improvements (2011)

To address the near-term issues, the Wansley CC7 System Impact Study report (3/18/2010) proposed the addition of two 2%, 2000 A, 230 kV series reactors in parallel (equivalent 1%, 4000 A) on the low-side of the existing Villa Rica 500/230 kV transformer (see Diagram 1). While this improvement will alleviate the potential overloads of the Villa Rica 500/230 kV transformer and the Wansley – Villa Rica 500 kV line, it will further increase overloads of the Union City - Flat Shoals section (3.1 miles) of the Union City – East Point 230 kV line (Black) and the Morrow - Murray Lake Junction – Fort Gillem sections (3.3 miles) of the Grady – Morrow 115 kV line (Black). The overall plan includes upgrades of these two lines.

Note that Wansley CC7 System Impact Study report identified the above limitations and required transmission improvements as 2012 issues. However, subsequent to the finalization of the report, Georgia Power announced that planned modifications to the existing McDonough generation facility (retirements and additions) will be delayed by one year (from 2011 to 2012). Accordingly, additional analysis indicates that a one year delay

in the McDonough generation modifications would result in a one year advancement of the limitations and required transmission improvements (as identified in the Wansley CC7 System Impact Study report) from 2012 to 2011.

Dresden 500/230 kV Improvements (2014)

To address the longer-term issues, the Wansley CC7 System Impact Study report proposed expansion of the existing Dresden 230 kV switching station (see Diagram 3) for 500 kV to accommodate installation of a new 500/230 kV transformer and termination of a new 500 kV line from the Heard County area (see Diagram 2). Note that the Wansley CC7 System Impact Study report recommended a Dresden to Tenaska 500 kV line. However, termination of the Dresden 500 kV line at the Heard County 500 kV Switching Station would result in a cost savings of about $5,000,000. With the completion of the Dresden 500/230 kV project in 2014, the 230 kV series reactors will no longer be needed at Villa Rica.

While the Dresden 500/230 kV project will negate the need for the two proposed Villa Rica 230 kV series reactors beginning in 2014, it also creates a potential overload of the Dresden – Yates 230 kV line beginning in 2014. Therefore, one of the Villa Rica 230 kV series reactors can be moved to Dresden on the Yates 230 kV line in 2014 to address this new overload. Moving one of the 230 kV series reactors to Dresden (on the Yates 230 kV line) also mitigates potential overloads of the Yates – Union City 230 kV line (23 miles) in 2014. The other Villa Rica series reactor could be reused for a future project or as a spare.

Dresden 500 kV Termination Issues

Preliminary routing analysis of the proposed Dresden - Heard County 500 kV line identified that this new line would have to cross the existing Wansley – O'Hara 500 kV and the Dresden – Hollingsworth Ferry 230 kV lines at the same point (see Plan A of Diagram 4). This crossing would create an unacceptable operational issue because a single contingency could result in the simultaneous outage of all three lines. Therefore, alternative methods for routing and terminating the Heard County 500 kV line at Dresden have been evaluated.

Plan B1 (Diagram 5) and Plan B2 (Diagram 6) permit a "crossing" of the existing Wansley – O'Hara 500 kV line and the proposed Dresden - Heard County 500 kV line to occur via bus work within the Dresden 500 kV switchyard. Plan C (Diagram 8), would completely avoid a crossing of the existing Wansley – O'Hara 500 kV line and the proposed Dresden - Heard County 500 kV line by breaking and rerouting the existing Wansley – O'Hara 500 kV line (increases new 500 kV line length by 1 mile). A section of the existing Wansley – O'Hara 500 kV line could then be utilized to terminate the proposed Heard County 500 kV line at Dresden.

Note that for Plans B1, B2 and C, initially the new Dresden - Heard County 500 kV line and the existing Wansley – O'Hara 500 kV line would not interconnect at the Dresden site (a by-pass would be created via 500 kV bus work).

Plan B1 (Diagram 5) and Plan C (Diagram 8) only utilize the north end of the existing Dresden substation property and require additional property acquisition to expand the substation to the east. Plan B1 has a greater risk of simultaneous outages of Dresden 500 kV lines due to shared ROW.

While Plans B1, B2 and C are comparable in electrical performance and costs, Plan B2 is the preferred method for terminating the proposed Heard County 500 kV line at Dresden. Plan B requires less 500 kV line mileage (initially and in future), has the best utilization of the existing Dresden property and has the most flexibility for future expansion of the Dresden substation. A conceptual future build-out of Plan B2 is shown in Diagram 7.

Heard County and Hawk Road 500 kV Improvements (2014)

As previously stated, the Wansley CC7 System Impact Study report recommended a Dresden to Tenaska 500 kV line. While termination of the Dresden 500 kV line at the Heard County 500 kV Switching Station results in a cost savings of about $5,000,000, there are minor modifications required at the Heard County and Hawk Road 500 kV sites.

The preferred route for the new Dresden – Heard County 500 kV line requires the line to be terminated at the existing (occupied) bay in northeast corner of the Heard County 500 kV Switching Station. Presently the 500 kV line from the Hawk Road 500 kV collector bus is terminated at that position. Therefore, the empty 500 kV bay at Heard County will be built-out and the 500 kV line to the Hawk Road 500 kV collector bus will be re-terminated there. This will also require the existing 500 kV line termination equipment on the Hawk Road 500 kV collector bus to be transferred to an existing empty bay at Hawk Road in order to re-terminate the "collector bus" line to Heard County (see Diagram 10).

RECOMMENDATION

The following is a summary of the near-term and longer-term improvements **(~$60 M)** that will be required to support the Wansley #7 TSR:

2010: Operating Procedure *(reduce Wansley CC 7 generation as necessary)*

2011: Install two 2%, 2000 A, 230 kV series reactors in parallel on the Villa Rica 500/230 kV transformer (equivalent 1%, 4000 A; see Diagram 1)

2011: Reconductor Union City - Flat Shoals section (3.1 miles) of the Union City – East Point 230 kV line (Black) with 1351 ACSS conductor

2011: Reconductor the Morrow - Murray Lake Junction – Fort Gillem sections (3.3 miles) of the Grady – Morrow 115 kV line (Black) with at least 636 ASCR conductor

2012: *(No improvements)*

2013: *(No improvements)*

2014: Construct Dresden - Heard County 500 kV line (~8 miles)

2014: Create a by-pass for the existing Wansley – O'Hara 500 kV line through the Dresden site (via bus work) to avoid crossing of the 500 kV lines (see Plan B2 of Diagram 6)

2014: Build out empty bay at Heard County 500 kV substation and re-terminate 500 kV "collector bus" line from Hawk Road 500 kV substation (see Diagram 10)

2014: Terminate the new Dresden 500 kV line at the existing (occupied) bay in northeast corner of the Heard County 500 kV Switching Station (see Diagram 10)

2014: Transfer the existing termination equipment on the Hawk Road 500 kV collector bus to an existing empty bay at Hawk Road in order to re-terminate the "collector bus" line to Heard County (see Diagram 10)

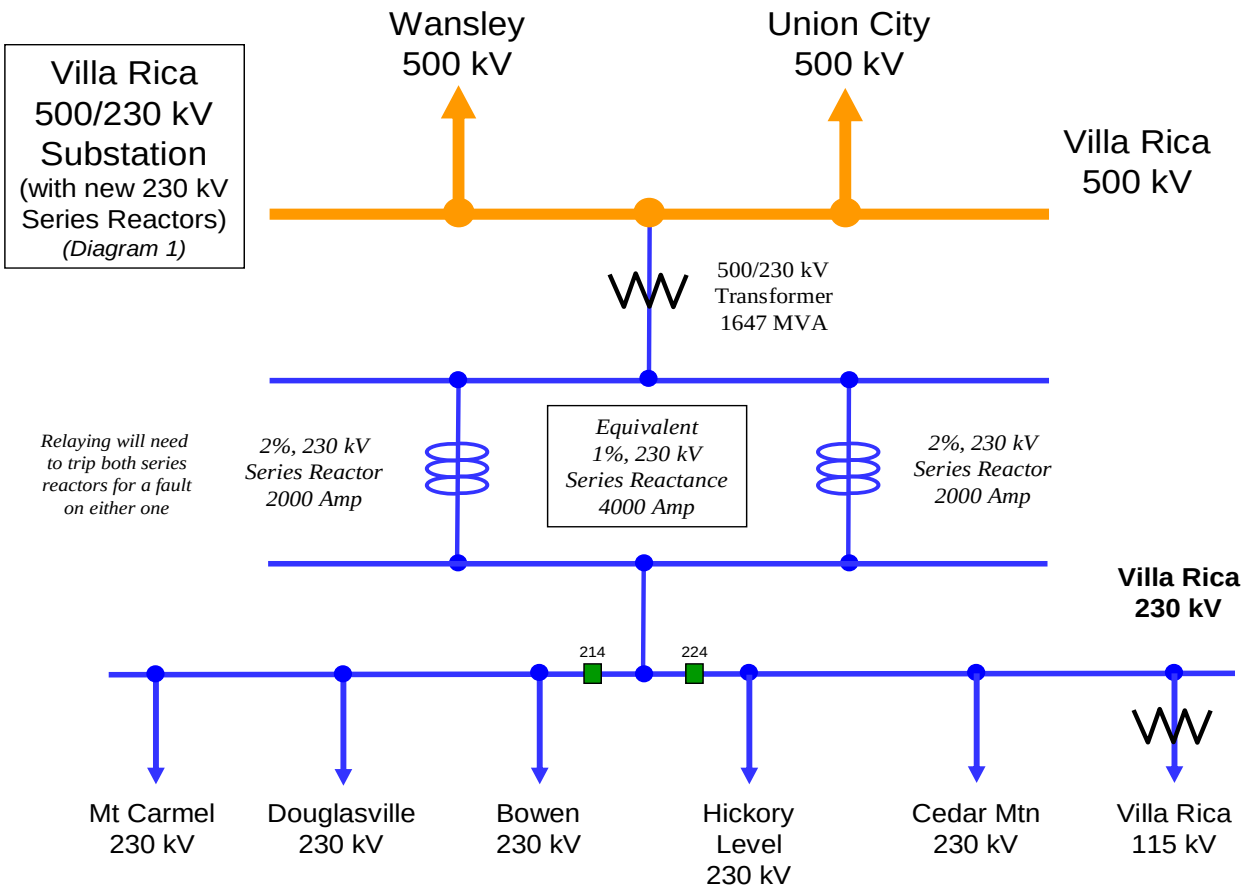
2014: Expand Dresden substation for 500 kV and terminate 500 kV line (see Diagram 6)

2014: Install a 2016 MVA, 500/230 kV transformer at Dresden

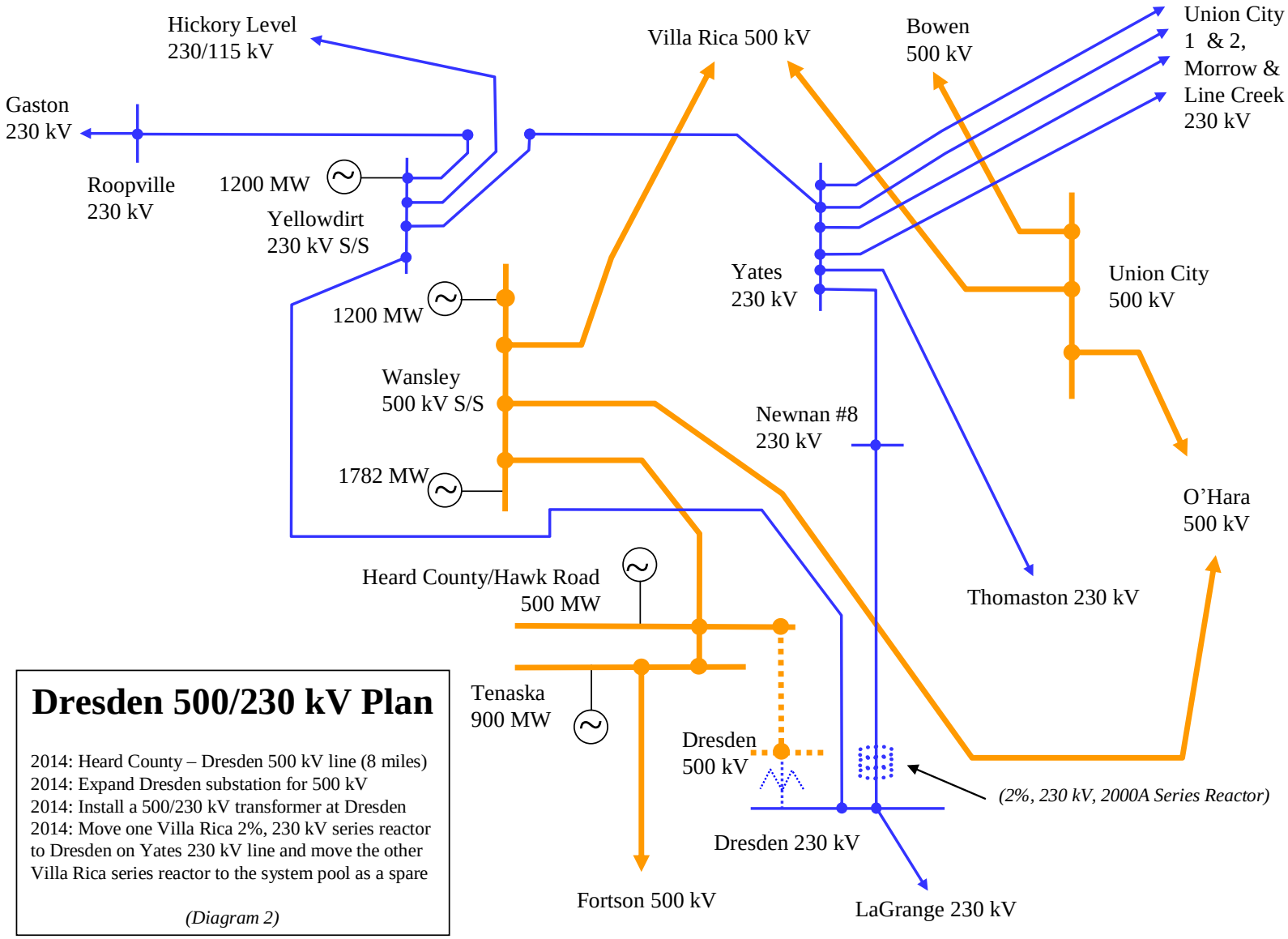
2014: Move one Villa Rica 230 kV series reactor to Dresden on Yates 230 kV line

2014: Remove and reuse second Villa Rica 230 kV series reactor for a future project or as a system spare

Wansley CC7 Transmission Improvements Plan



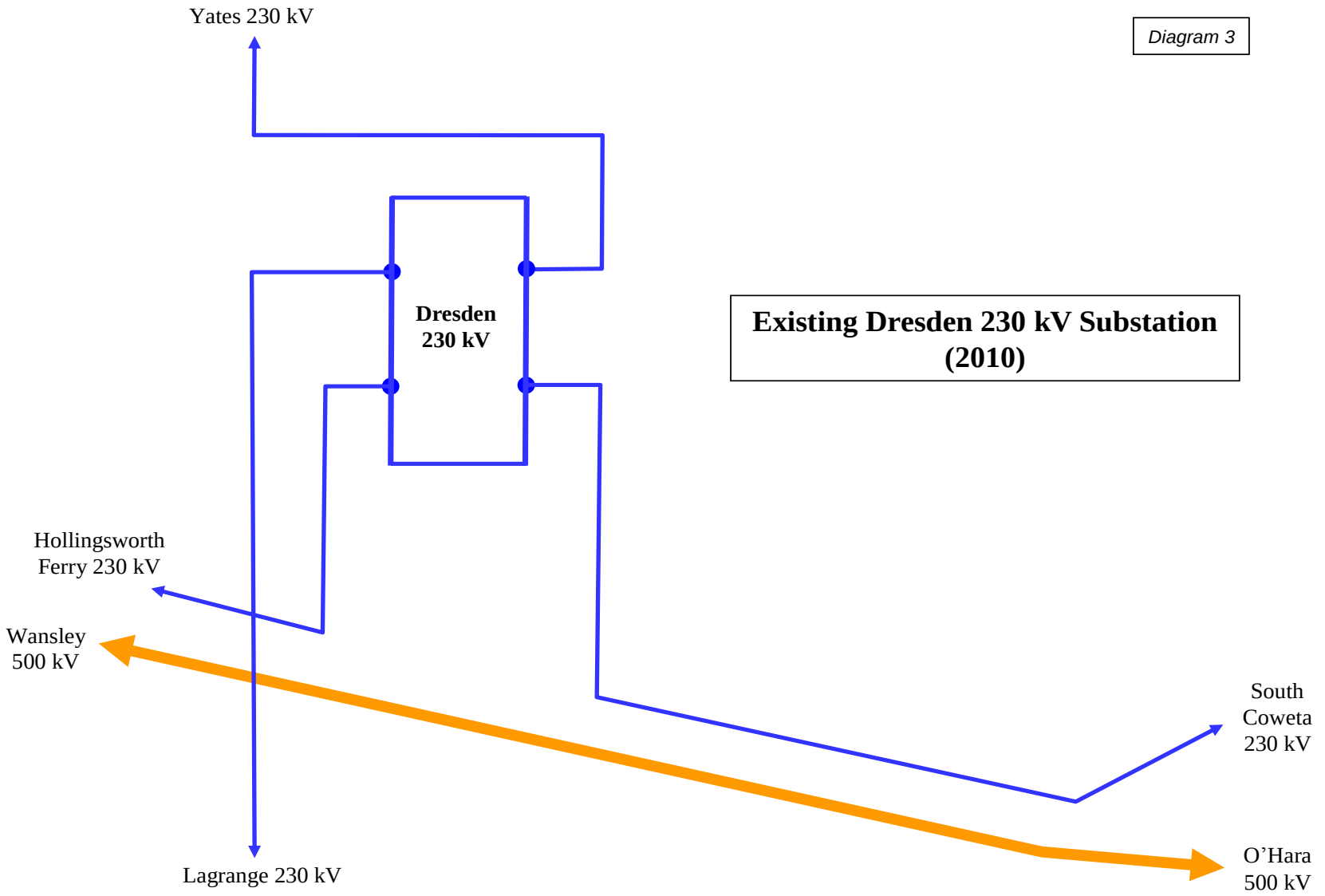
Wansley CC7 Transmission Improvements Plan



Dresden 500/230 kV Plan

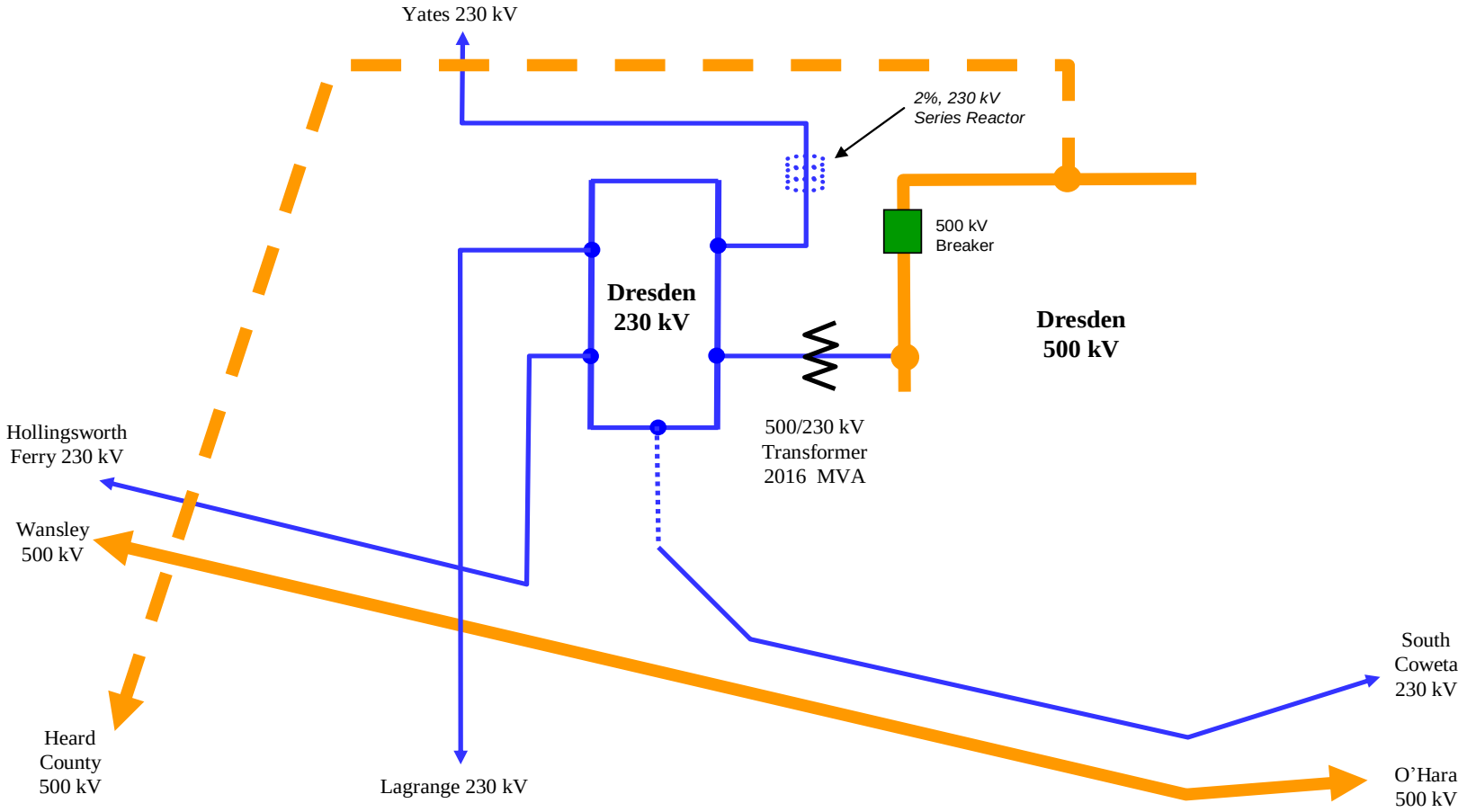
2014: Heard County – Dresden 500 kV line (8 miles)
2014: Expand Dresden substation for 500 kV
2014: Install a 500/230 kV transformer at Dresden
2014: Move one Villa Rica 2%, 230 kV series reactor to Dresden on Yates 230 kV line and move the other Villa Rica series reactor to the system pool as a spare

(Diagram 2)


Yates 230 kV
Diagram 3
Dresden
230 kV
Existing Dresden 230 kV Substation
(2010)
Hollingsworth
Ferry 230 kV
Wansley
500 kV
South
Coweta
230 kV
O'Hara
500 kV
Lagrange 230 kV

Plan A
Dresden 500/230 kV Substation with
New Dresden - Heard County 500 kV Line Crossing
Existing Wansley – O'Hara 500 kV Line

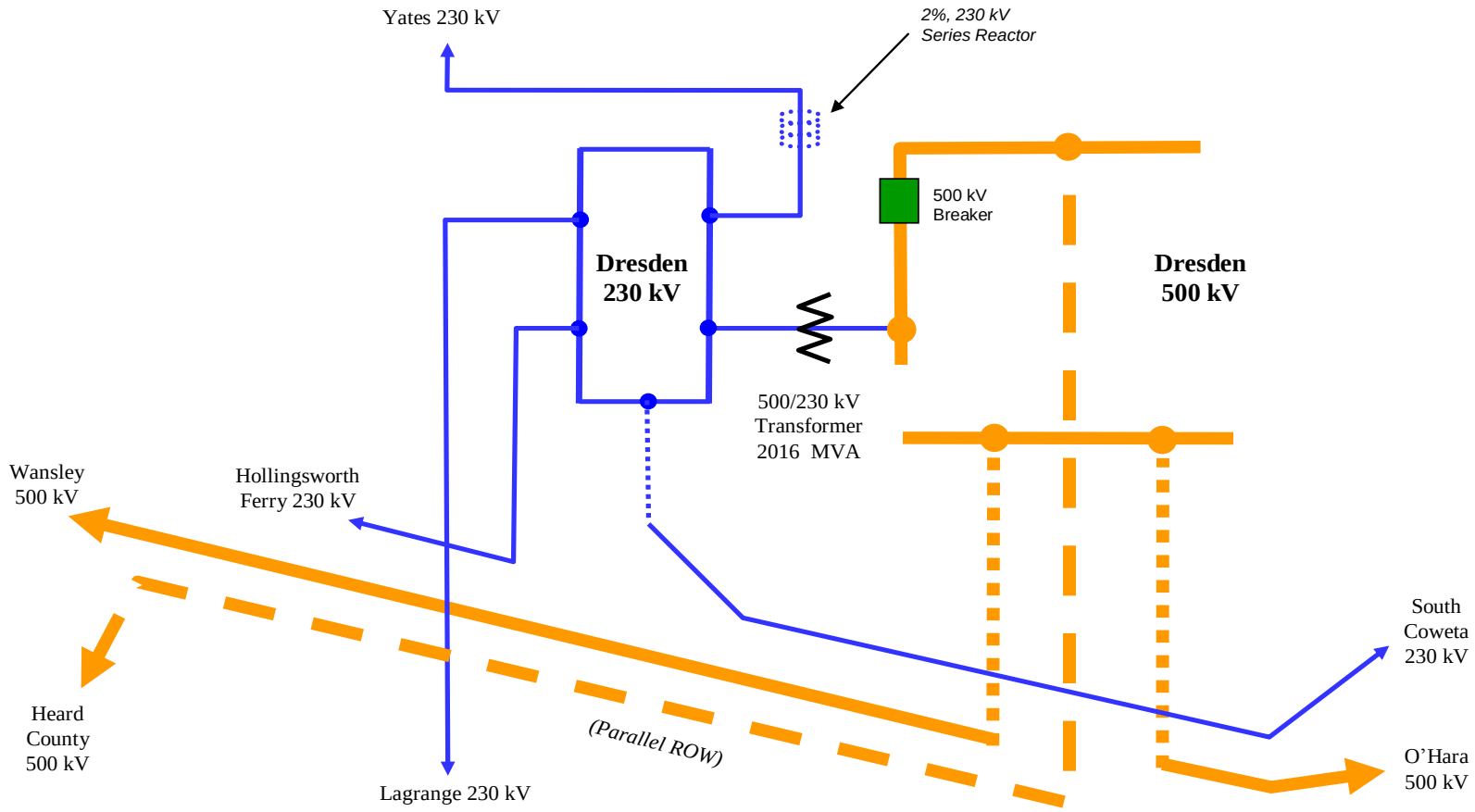
Diagram 4



Plan B1

Dresden 500/230 kV Substation with Wansley – O'Hara 500 kV Line Looped through Dresden (w/o interconnection) to Facilitate 500 kV Line Crossing Via the Dresden 500 kV Buswork (Parallel 500 kV ROW)

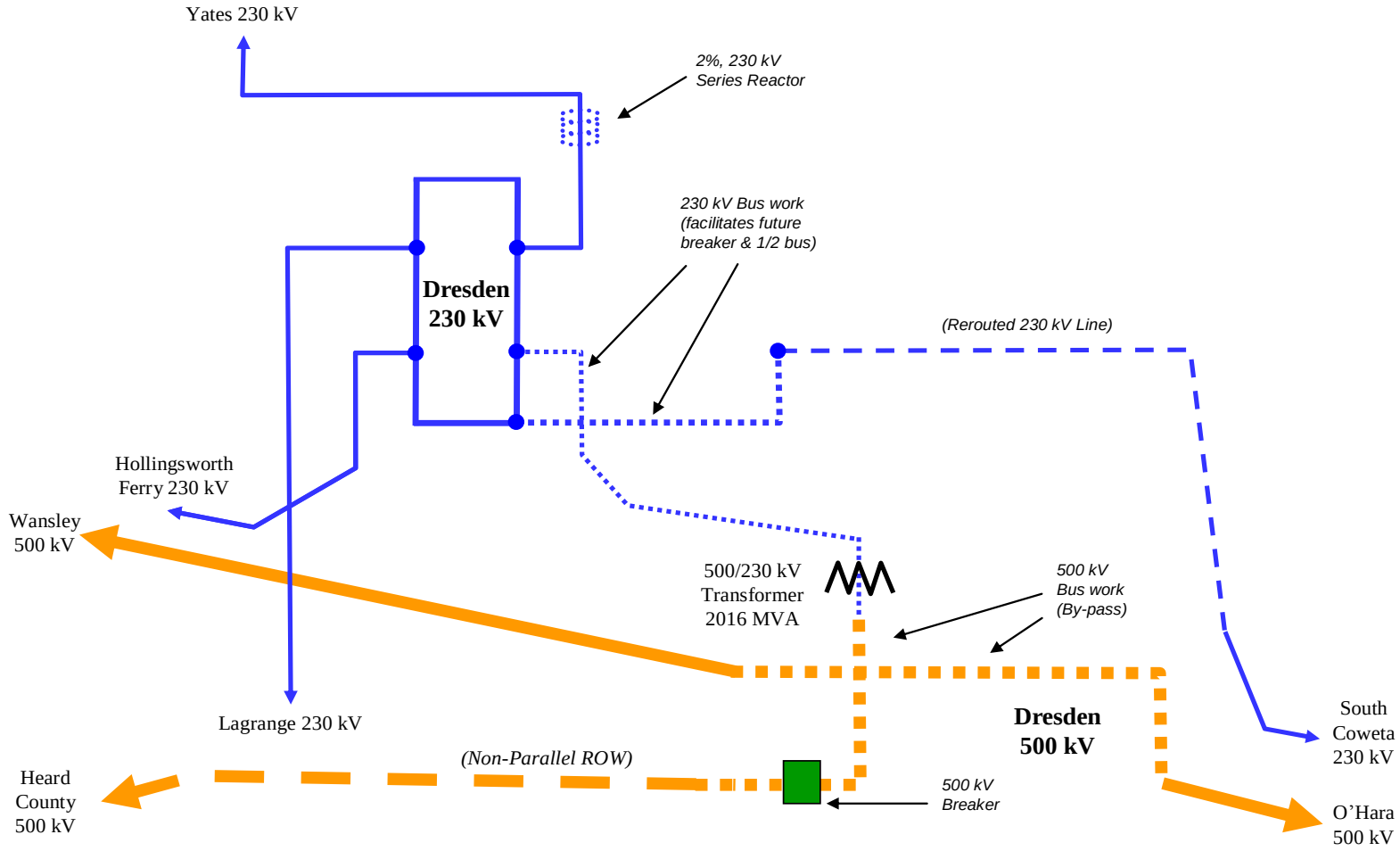
Diagram 5



Plan B2 (Preferred Alternative)

Dresden 500/230 kV Substation with Wansley – O'Hara 500 kV Line
Looped through Dresden (w/o interconnection) to Facilitate 500 kV Line Crossing
Via the Dresden 500 kV Buswork (Non-Parallel 500 kV ROW)

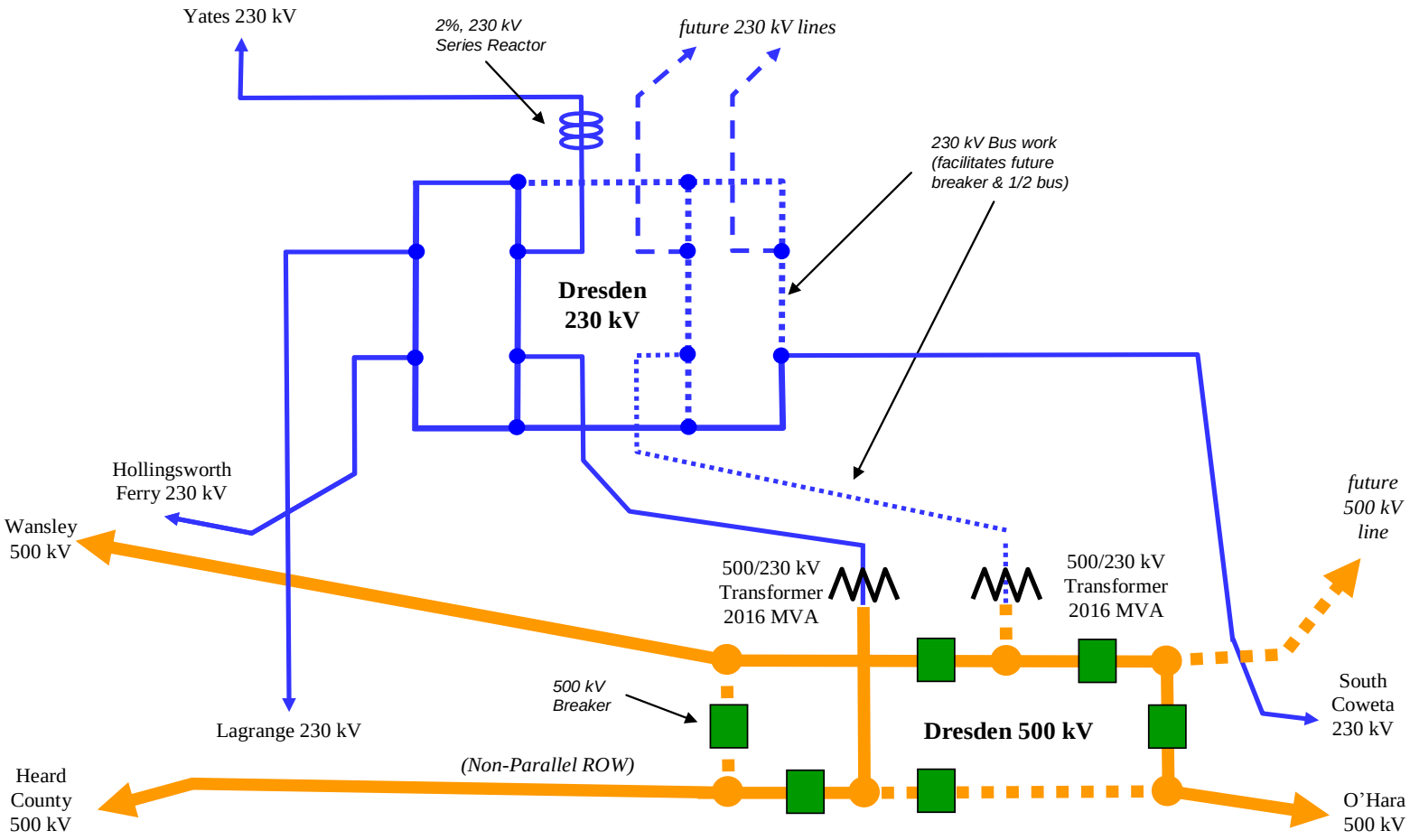
Diagram 6



Conceptual Future Expansion of Plan B2

Dresden 500/230 kV Substation with Wansley – O'Hara 500 kV Line Looped into Dresden (Non-Parallel 500 kV ROW)

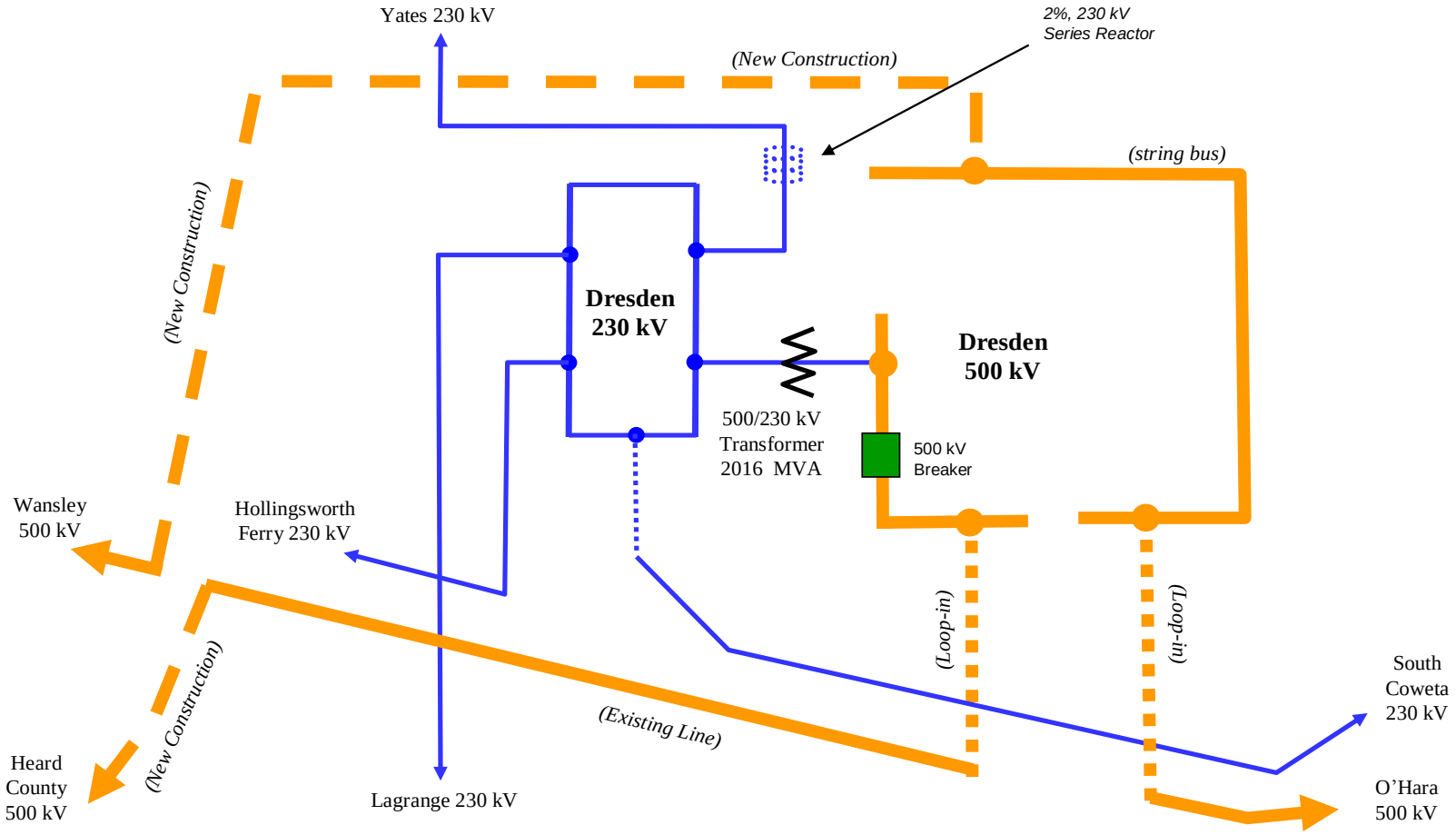
Diagram 7



Plan C

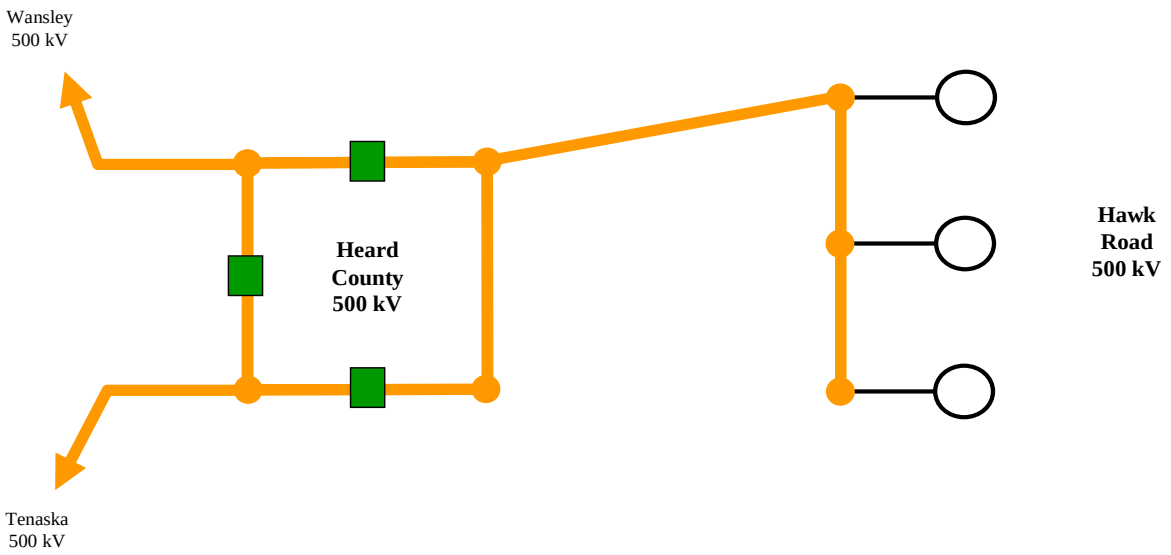
Dresden 500/230 kV Substation with existing Wansley – O'Hara 500 kV Line Reconfigured to Avoid Crossing with new Dresden - Heard County 500 kV Line

Diagram 8



Existing Heard County and Hawk Road 500 kV Substations

Diagram 9



2014 Heard County and Hawk Road 500 kV Substations

Dresden – Heard County 500 kV Line terminated at existing "northeast" bay
Hawk Road 500 kV connection re-terminated at previously empty bay

Diagram 10