



# Reliability Analysis Update

Subregional RTEP Committee  
PJM West  
July 21, 2017



# Baseline Reliability and Supplemental Project First Review

## Supplemental Project

### Problem Statement:

Customer Service –A customer requested to have all of Duquesne Light’s equipment removed from their site to safely shut down their electrical facilities.

### Potential Solutions:

Duquesne Light’s and the customer’s equipment must be removed from the J&L Furnace, J&L Midland, and Beaver Valley substation. The Beaver Valley-J&L Midland (Z-33) 138kV and J&L Midland-Midland (Z-36) 138kV circuits will be jumpered together. Protection at each substation will be modified as needed.

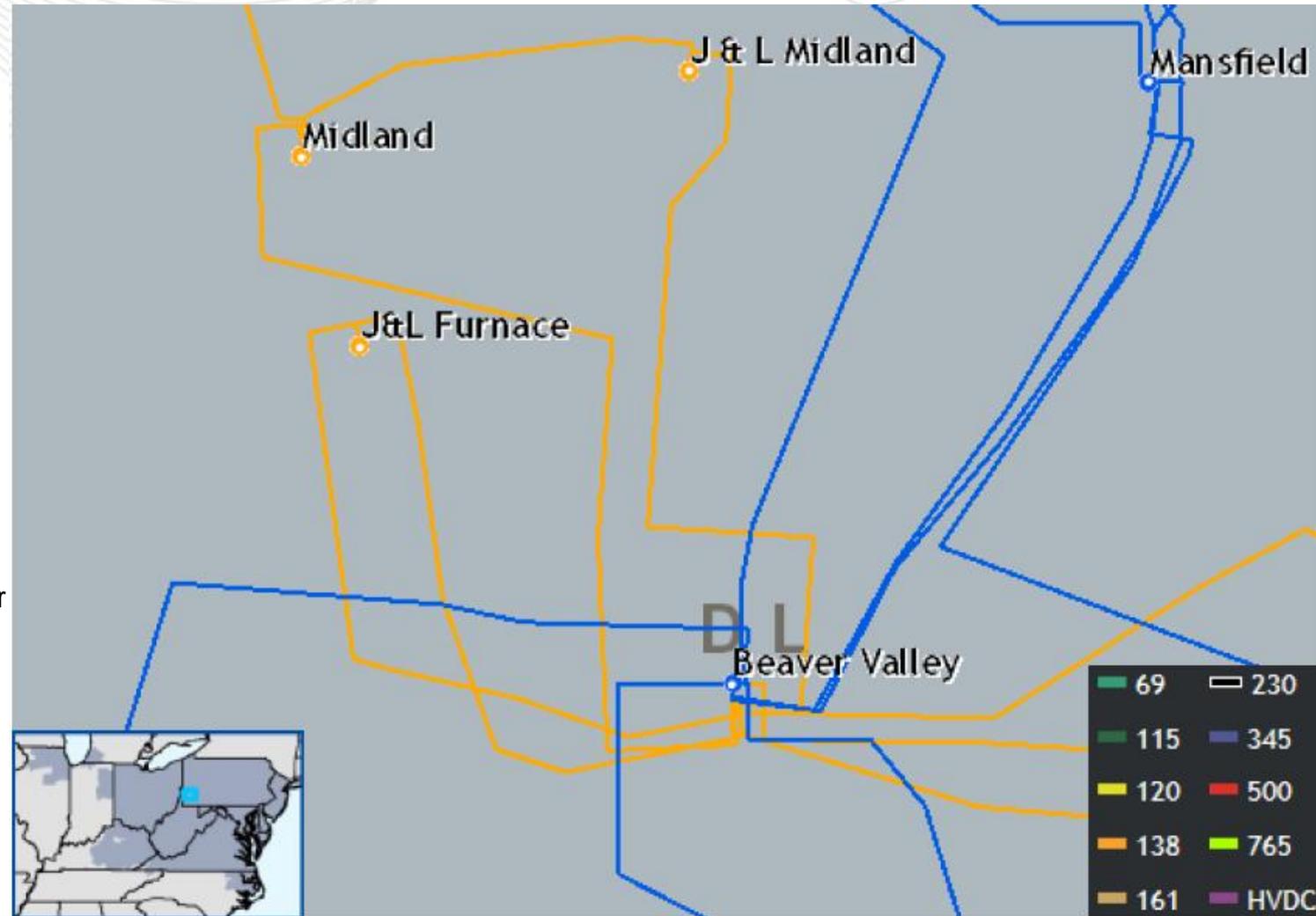
### Alternatives:

No alternatives were reviewed as the customer requested to disconnect their service.

**Estimated Project Cost:** \$1.85M

**Project ISD:** 1/31/2018

**Status:** Engineering



## Supplemental Project

### Problem Statement:

At Beckford, previous retired units fed six 138 kV buses. Now the primary sources for those buses are the two 345/138 kV transformers at Pierce. This project will eliminate having both sources from Pierce being connected to the same termination structure at Beckford with each source connected in a single-bus single-breaker configuration. The feeder will be moved to a different structure and connected to the former Unit 4 position. Each feeder will then be connected in a double-bus double-breaker configuration. This will eliminate the operational restrictions of having each feeder being capable of only feeding one bus and the common mode outage of losing both sources from Pierce. Drivers: operational flexibility, reliability.

### Potential Solutions:

Relocate one feeder to a different structure feeding a different set of buses. Connect both feeders in a double-bus double-breaker arrangement.

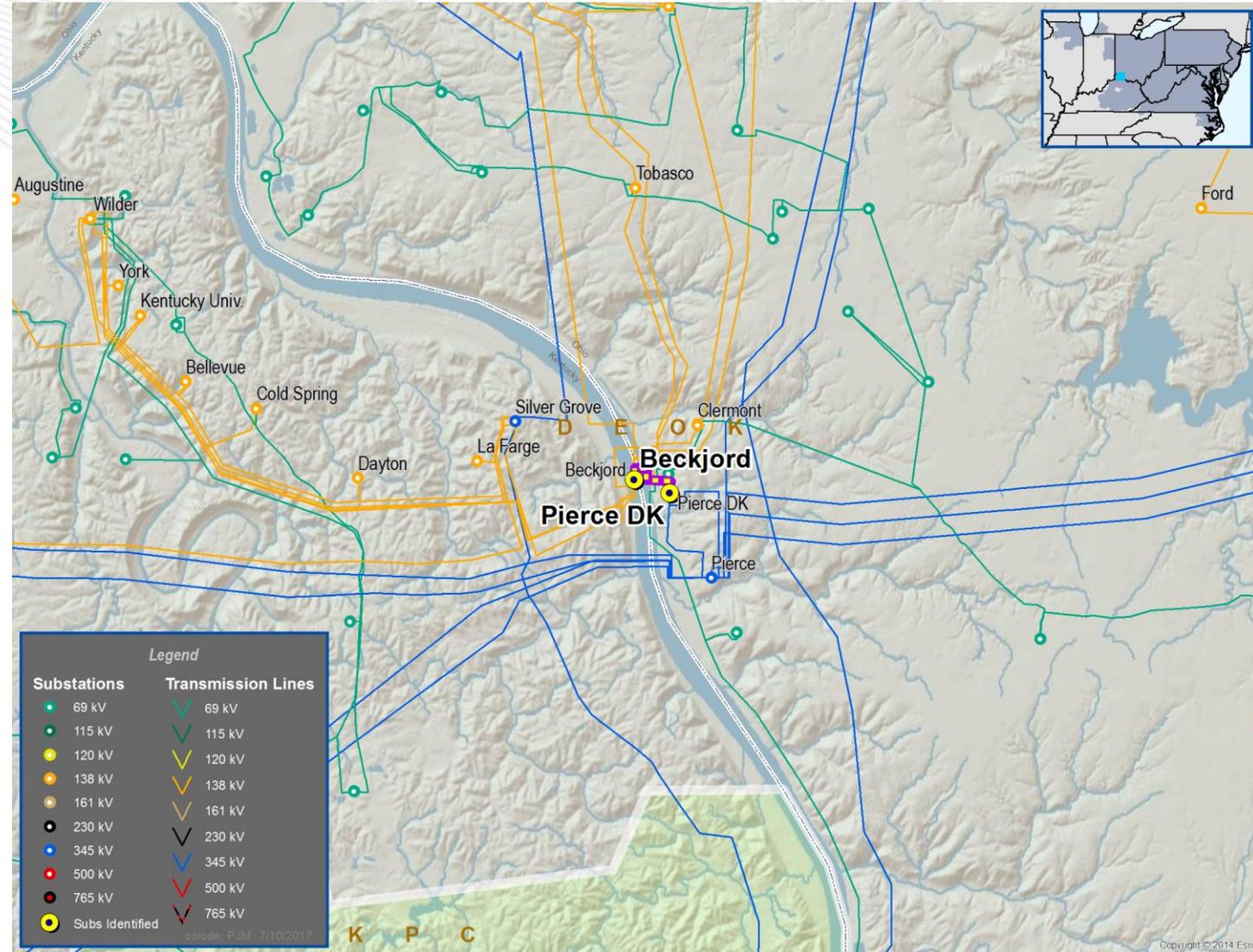
### Alternatives:

No alternatives were reviewed.

**Estimated Project Cost:** TBD

**Project ISD:** 12/31/2020

**Status:** Planning





# Previously Presented Baseline and Supplemental Projects Second Review



## TO Criteria Violations and Baseline Project Cost Change

Previously Presented: 6/30/2017 SRTEAC

### Problem Statement:

B2414 (Presented on 11/4/2013 SRTEAC): Build the 2nd Summer Shade EKPC - Summer Shade TVA 161 kV circuit; Required IS Date: 6/1/2018

The original Cost: \$4.6M ; The new cost: \$15.9M - with further evaluation, a new station will need to be built.

Overload of the Summer Shade 161-69 kV transformer for the loss of the Barren County 161-69 kV transformer in 6/1/2020, which will be solved by baseline project B2710 (Presented 11/5/2015 TEAC): Upgrade the Summer Shade bus and CT associated with the 161/69 kV transformer #1. The Original Cost: \$0.075M

However, the transformer will show up again in 2022 winter. Further upgrades will be needed which include Upgrade CT associated with Summershade 161-69kv transformer to at least 190 MVA Winter LTE; upgrade 1 1/4" IPS bus associated with Summershade 161/69kv transformer to 2" or larger ( Estimated Cost of \$0.35M); In 2023 winter, the transformer will be overloaded again. The solution will be to add a second 161-69 kV Transformer at Summer Shade. Estimated Cost - \$1.68 Million

Overload of the Barren county 161-69 kV transformer for the loss of the Summershade - Summershade Jct. 69 kV Line is first identified for 2018 summer. The least cost fix is to replace the Barren County 161-69 kV Xfmr- (Estimated Cost of \$1.6 Million); The transformer will be further overloaded in 12/1/2020, and the fix will be to Increase overcurrent relay at Barren Co 161-69kv transformer to at least 145 MVA Winter LTE (Estimated Cost of \$0). In 2024 winter, the transformer will be overloaded again and the fix will be to upgrade Barren Co 69kv CT associated with 161/69kv transformer from 800/5 CT to 1200/5 CT. (Estimated Cost \$0.01M)

Overload of the Summer Shade Jct. - Summer Shade 69 kV Line for the loss of the Barren County - Summer Shade 161 kV Line is first identified for 2018 summer. The fix is to increase the Maximum Operating Temperature of the Summer Shade Jct. - Summer Shade 69 kV Line to 302°F (Estimated Cost of \$0.1M). The line is further overloaded in 2020 winter and the fix will be to upgrade the Summer Shade 69kV bus and Jumpers Associated with the Summer Shade-Summer Shade Jct 69 KV line section and reconductor the Summer Shade - Summer Shade Jct.69 KV line section (0.15 miles) using 795 MCM ACSR (Estimated Cost of \$0.35M).

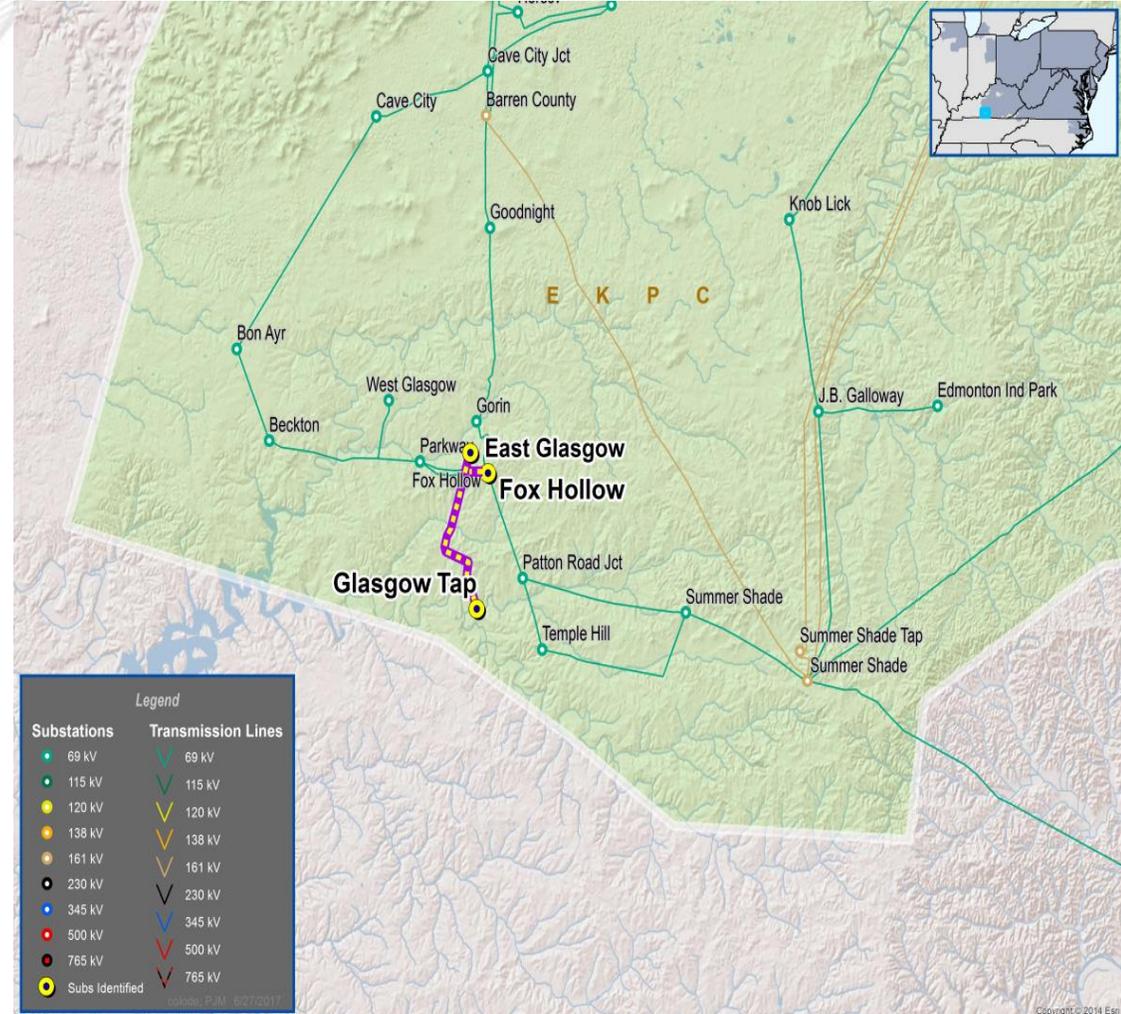
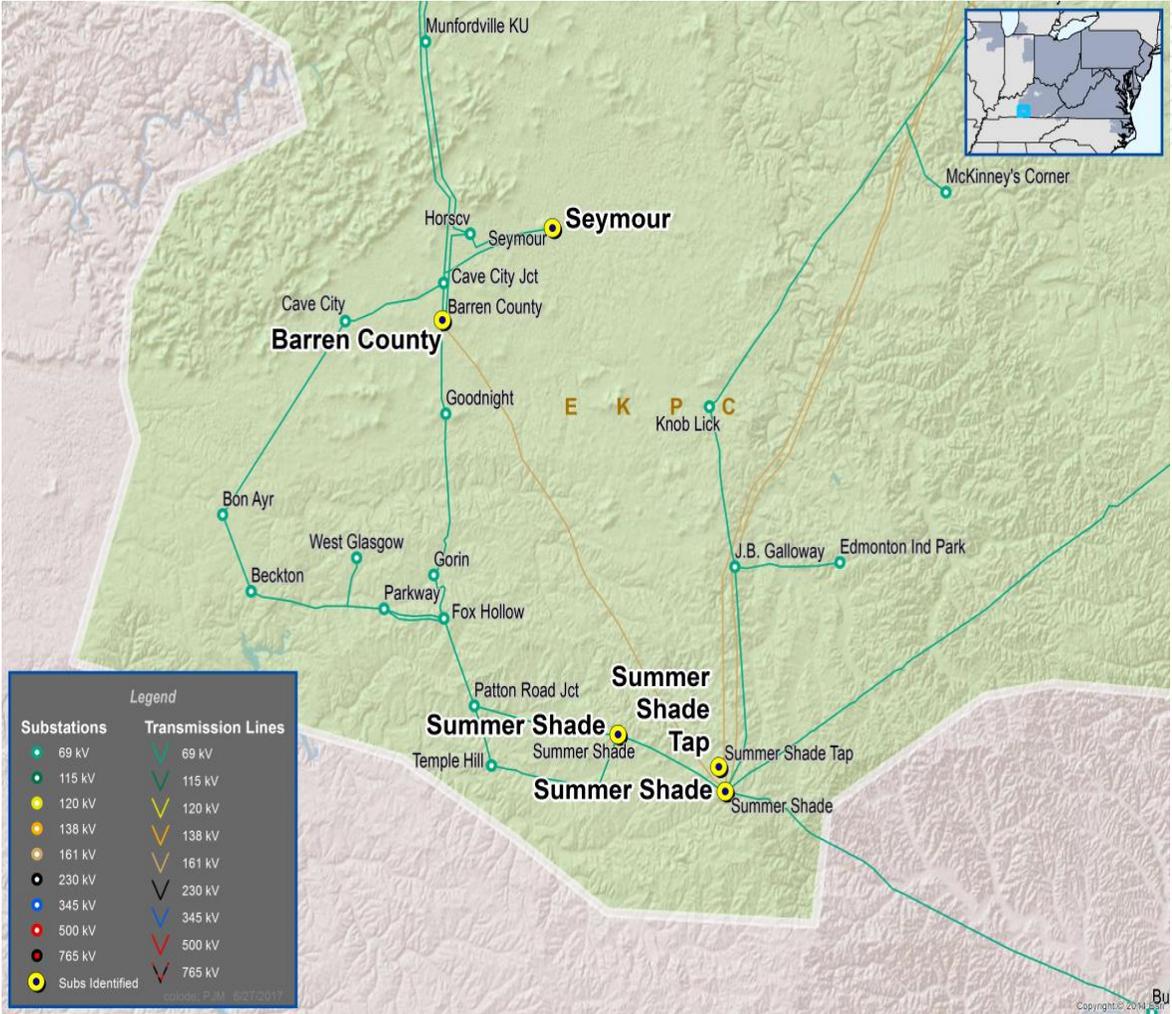
Low voltage at Seymour 69KV for the loss of the Barren County 161-69 kV transformer in 2024 winter. The fix is to Install a 20MVAR cap bank at Fox Hollow 69 kV (Estimated Cost -\$0.365M)

Rebuild 9.55 mi Temple Hill - Summershade Jct. 69kV line section 9.55 miles) using 556.6 MCM ACTW. Estimated Cost - \$6M

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# Previously Presented: 6/30/2017 SRTEAC





## TO Criteria Violations and Baseline Project Cost Change Previously Presented: 6/30/2017 SRTEAC

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### Alternative considered:

Continue B2414 with new estimated cost of \$15.9M

Continue B2710 with estimated Cost: \$0.075M

In 2022 winter, upgrade CT associated with Summershade 161-69kv transformer to at least 190 MVA Winter LTE; upgrade 1 1/4" IPS bus associated with Summershade 161/69kv transformer to 2" or larger - Estimated Cost of \$0.35M

In 2023 winter, add a second 161-69 kV Transformer at Summer Shade. Estimated Cost - \$1.68 Million;

In 2018 summer, replace the Barren County 161-69 kV Xfmr- Estimated Cost of \$1.6 Million;

In 2020 winter, increase overcurrent relay at Barren Co 161-69kv transformer to at least 145 MVA Winter LTE. Estimated Cost of \$0;

In 2024 winter, upgrade Barren Co 69kv CT associated with 161/69kv transformer from 800/5 CT to 1200/5 CT. Estimated Cost \$0.01M;

In 2018 summer, Increase the Maximum Operating Temperature of the Summer Shade Jct. - Summer Shade 69 kV Line to 302°F. Estimated Cost of \$0.1M; T

In 2020 winter, upgrade the Summer Shade 69kV bus and Jumpers Associated with the Summer Shade-Summer Shade Jct 69 KV line section and reconductor the Summer Shade - Summer Shade Jct.69 KV line section (0.15 miles) using 795 MCM ACSR. Estimated Cost of \$0.35M;

In 2024 winter, install a 20MVAR cap bank at Fox Hollow 69 kV. Estimated Cost -\$0.365M. And rebuild 9.55 mi Temple Hill - Summershade Jct. 69kV line section 9.55 miles) using 556.6 MCM ACTW. Estimated Cost - \$6M

### Recommended Solution:

New TVA 161kV Interconnection to TVA's East Glasgow Tap-East Glasgow 161 KV line section (~1 mile due West of Fox Hollow). Add Fox Hollow 161/69 KV 150 MVA transformer. Construct new Fox Hollow-Fox Hollow Jct 161 KV line section using 795 MCM ACSR (~1 mile) and new 161kV switching station at point of interconnection with TVA. (B2921)

Cancel B2414 and B2710

**Estimated Cost:** \$18.1M

**Required IS Data:** 6/1/2018

**Status:** Scoping



## Baseline Cost Change (B2753.1-10)

### Previously Presented: 6/30/2017 SRTEAC

#### Original Scope and Cost (was presented in 7/26/2016 and 3/9/2017 SRTEAC, 12/15/2016 TEAC ):

George Washington Station – Replace existing 138kV yard with GIS 138kV breaker and a half yard in existing station footprint. Install 138kV revenue metering for new IPP connection. (N5076.1/B2753.1) --AEP

Dilles Bottom Station – Replace Dilles Bottom 69/4kV Distribution station as breaker and a half 138kV yard design including AEP Distribution facilities but initial configuration will constitute a 3 breaker ring bus. (N5076.2/B2753.2) --AEP

Holloway Station – Connect two 138kV 6-wired ckts from “Point A” (currently de-energized and owned by First Energy) in ckt positions previously designated Burger #1 & Burger #2. Install interconnection settlement metering on both circuits exiting Holloway station.

(N5076.3/B2753.3) --AEP

Holloway-”Point A” FE “Burger-Cloverdale No.2” 138kV Line – 6 wire “Burger-Cloverdale No. 2” 138kV Line for double capacity and connect at Holloway and “Point A” (N5076.4/B2753.4)--FE

Holloway -”Point A” FE “Burger-Longview” 138kV Line – 6 wire “Burger-Longview” 138kV Line for double capacity and connect at Holloway and “Point A” (N5076.5/B2753.5)--FE

Dilles Bottom -”Point A”138kV Line - Build dbl ckt 138kV line from Dilles Bottom to “Point A”. Tie each new AEP ckt in with a 6 wired line at Point A. This will create a Dilles Bottom-Holloway 138kV ckt and a George Washington-Holloway circuit. (N5076.6/B2753.6) --AEP

Dilles Bottom-Bellaire and Moundsville-Dilles Bottom 69kV Lines - Retire line sections south of First Energy 138kV line corridor, near “Point A”. Tie George Washington-Moundsville 69kV ckt to George Washington-West Bellaire 69kV ckt (N5076.7/B2753.7) –AEP

Washington-Dilles Bottom 69kV Line – Rebuild existing line as dbl ckt 138kV from George Washington to Dilles Bottom. One circuit will cut into Dilles Bottom initially and the other will go past with future plans to cut in. (N5076.8/B2753.8) –AEP

Remove/Open Kammer 345/138 kV transformer #301 (b2753.9/N5076.9)

Complete sag study mitigation on the Muskingum – Natrium 138 kV line(b2753.10/N5076.10)

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## Baseline Cost Change (B2753.1-10)

### Previously Presented: 6/30/2017 SRTEAC

Original Scope and Cost (was presented in 7/26/2016 and 3/9/2017SRTEAC, 12/15/2016 TEAC ):

**Cost Sharing Approach:** The interconnection project was to share \$24.5614M of the cost (their ISA commitment) and the Baseline would assume the remainder

**Cost Sharing Update:** The interconnection project withdrew, the project is still needed. The baseline cost portion will now be 100% of the required project cost.

Required IS Date: 1/1/2019

Original Split Cost	
B2753.1: \$0M	N5076.1: \$24M
B2753.2: \$9M	N5076.2: \$0M
B2753.3: \$2M	N5076.3: \$0M
B2753.4: \$0.25M	N5076.4: \$0M
B2753.5: \$0.25M	N5076.5: \$0M
B2753.6: \$5M	N5076.6: \$0M
B2753.7: \$4.96M	N5076.7: \$0.5614M
B2753.8: \$3.56M	N5076.8: \$0M
B2753.9: \$0M	N5076.9: \$0M
B2753.10: \$2.8M	N5076.10: \$0M

New Split Cost	
B2753.1: \$22.32M	N5076.1: Cancelled
B2753.2: \$9M	N5076.2: Cancelled
B2753.3: \$2M	N5076.3: Cancelled
B2753.4: \$0.25M	N5076.4: Cancelled
B2753.5: \$0.25M	N5076.5: Cancelled
B2753.6: \$5M	N5076.6: Cancelled
B2753.7: \$5.52M	N5076.7: Cancelled
B2753.8: \$3.56M	N5076.8: Cancelled
B2753.9: \$0M	N5076.9: Cancelled
B2753.10: \$2.8M	N5076.10: Cancelled

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**Baseline Cost Change (B2753.1-10)**  
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**Previously Presented: 6/30/2017 SRTEAC**

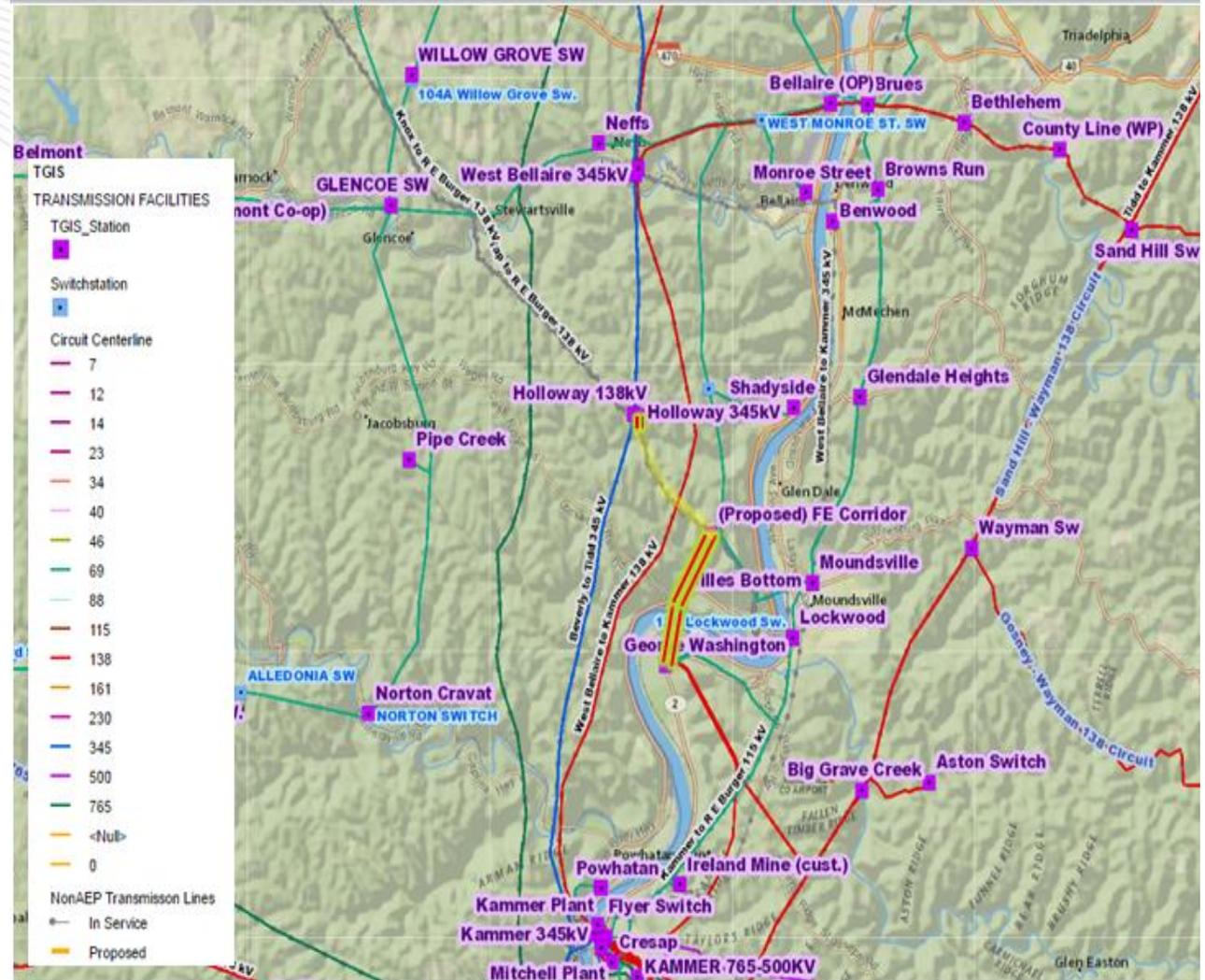
**Reasons for the Cost Change:**

Queue projects Y3-068 / Z2-048 have been withdrawn.  
 The shared cost of \$24.761M now is transferred to  
 Baseline B2753.1-10.

B2753.1 New Scope: George Washington Station –  
 Replace existing 138kV yard with GIS 138kV  
 breaker and a half yard in existing station  
 footprint. (Due to the withdrawal of the  
 interconnection request, there is no need for  
 the revenue metering for new IPP connection)

**New Estimated Cost: \$50.7M**

**New Required IS Date: 5/31/2020**



# Questions?

Email: [RTEP@pjm.com](mailto:RTEP@pjm.com)



# Revision History

7/12/2017 – Original version posted to PJM.com