

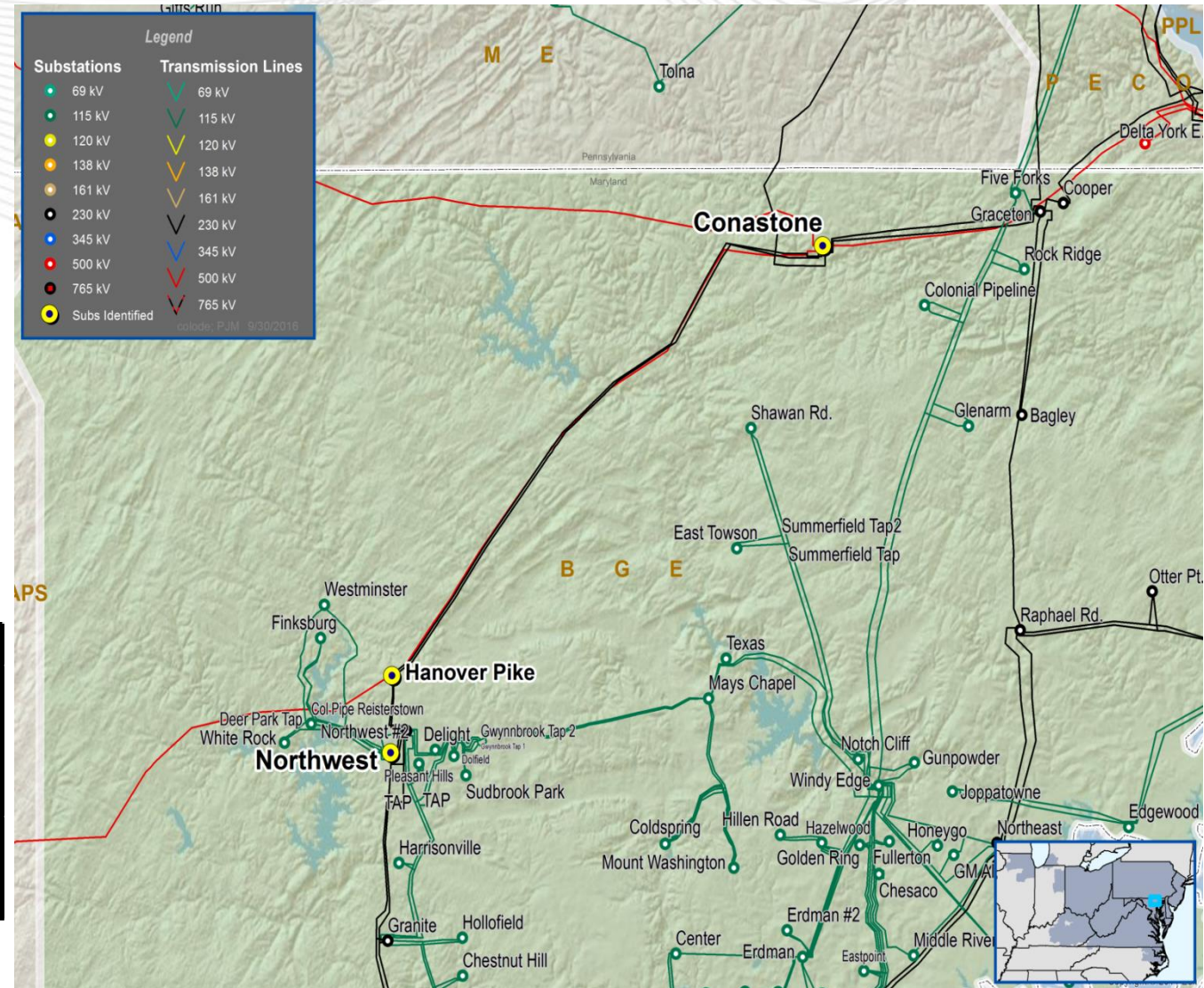


Reliability Analysis Update

Transmission Expansion Advisory
Committee
October 6, 2016

- **Update:**
 - The planned Hanover Pike facility was not included in the 2016 RTEP as a sensitivity to determine the continued need for this facility.
- **Result:**
 - The latest analysis shows, there are no RTEP violations or drivers that would require the Hanover Pike upgrade.
- **Recommendation:**
 - Cancel the Hanover Pike and related upgrades. The upgrades are no longer required.

Upgrade Id	Description	Transmission Owner
b1254.1	Rebuild the Hanover Pike - North West 230 kV circuits to separate pole-lines with bundled conductor	BGE
b1254	Build a new 500/230 kV substation (Hanover Pike)	BGE



Cost Update For B1690:

Scope:

- Build a new third 230 kV line into the Red Bank 230 kV substation from NJT Aberdeen 230 kV

Old Cost Estimate: \$ 22 M

New Cost Estimate : \$ 111 M

Reason for Cost Increase

- See next slide



- The original \$22M cost estimate was a planning level estimate for a conceptual 8 mile 230kV transmission line with an undefined route.
 - Assumptions for the transmission line included 700' spans (60 structures), typical concrete foundations, and minimal access road issues and did not include fully loaded costs.
- The current estimated project cost of \$111M includes the following:
 - The estimates have been more fully refined as FE has obtained better quotes as some preliminary engineering has been completed and costs include fully loaded costs.
- The preferred transmission line route, pending NJ BPU approval, is now 10.1 miles in length and routed along the NJ Transit railway.
 - Based on this routing, greater than 100 structures, using shorter spans, were assumed due to the curvature of the railway corridor and transmission design requirement to help maintain conductor (minimum) clearances within the 100-foot railway corridor.
 - Helical or micropile foundations are now required due to the proximity of the railway tracks. A solution developed jointly with NJ Transit to avoid major ground disturbances near the railway tracks.
 - More extensive access roads are needed along the railway corridor. Currently, the NJ Transit corridor in this area has very limited accessible areas to accommodate large construction vehicular traffic.
- Project management and construction management costs were increased based on recent NJ transmission projects which involve significant support to manage municipal, property owner, commercial, and environmental impacts.
 - In addition, project costs now include associated substation work at Taylor Lane substation and 2.1 miles of 34.5kV transmission line rearrangement work required within the NJ Transit corridor.
- Added ROW costs for acquisition of required vegetation clearing from private property owners adjoining the railway corridor.



2016 RTEP Window #3 Status

- **Status: Currently Open**
- Scope:
 - 2016 RTEP Winter Analysis
 - Baseline N-1 (thermal and voltage)
 - Generation Deliverability and Common Mode Outage
 - N-1-1 (thermal and voltage)
 - Load Deliverability (thermal and voltage)
 - 2016 RTEP Light Load Analysis
 - Baseline N-1 (thermal and voltage)
 - Generation Deliverability and Common Mode Outage
 - Short Circuit Analysis
- Window Opened: 9/30/2016
- Window Closed: 10/31/2016
 - Proposal definitions, simulation data and planning cost estimate due
- Detailed Cost due: 11/15/2016
 - Additional 15 days to develop and provide detailed cost data
 - See the window documentation for additional information



2016 RTEP Proposal Window #2 Updates and Recommendations

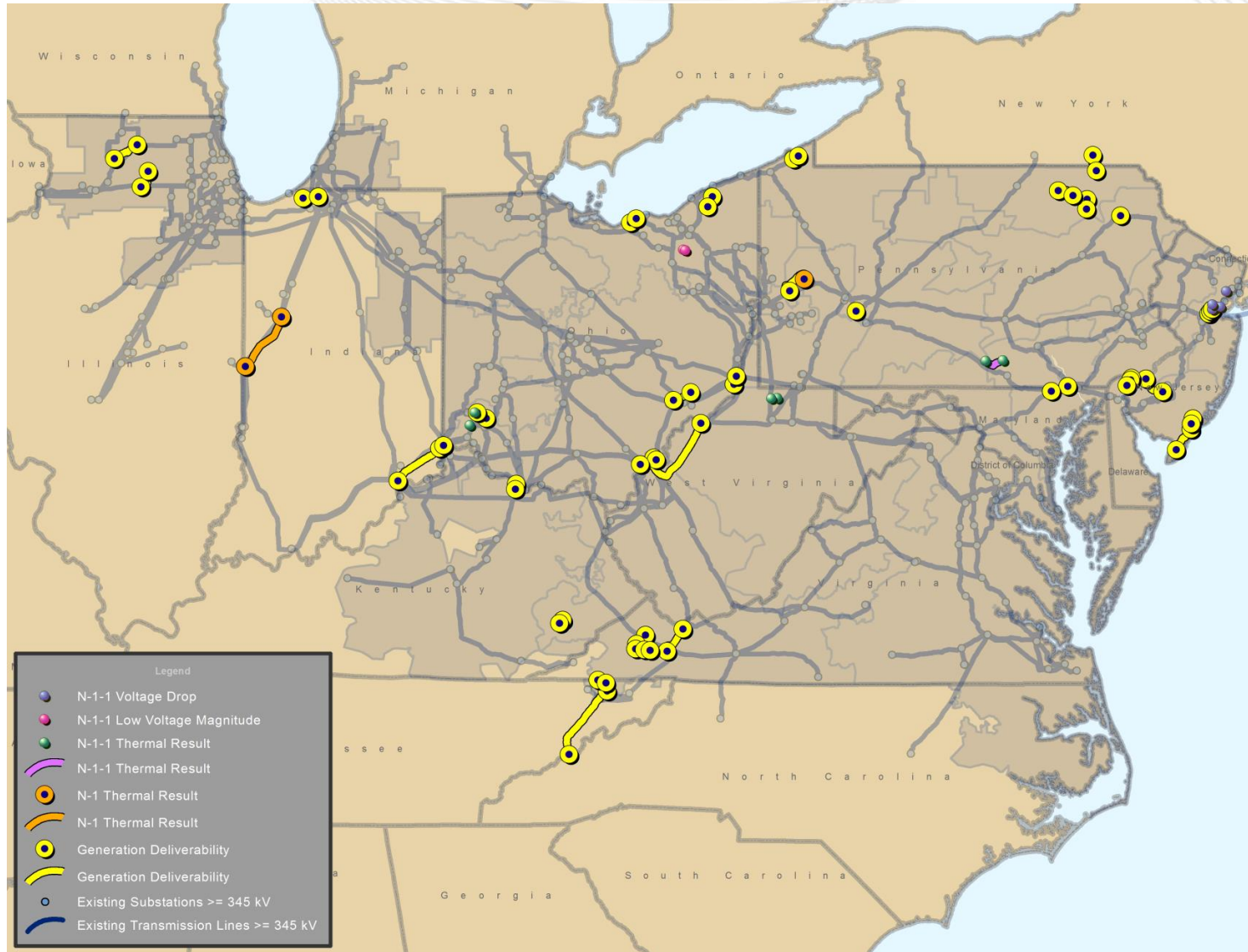
- Scope:
 - Baseline N-1 (thermal and voltage)
 - Generation Deliverability and Common Mode Outage
 - N-1-1 (thermal and voltage)
 - Load Deliverability (thermal and voltage)
- Window Opened: 6/29/2016
- Window Closed: 7/29/2016
 - Proposal definitions, simulation data and planning cost estimate due
- Detailed Cost due: 8/15/2016
 - Additional 15 days to develop and provide detailed cost data
 - See the window documentation for additional information

- 140 total flowgates

Year/Voltage	Test/kV Level*	100kV - 200kV	230kV	345kV	500kV	765kV	Total
2021 Summer	N-1 Thermal	1		2			3
	N-1 High Voltage						0
	N-1 Low Voltage						0
	N-1 Voltage Drop						0
	Gen. Deliverability & Common Mode Outage	76	9	13	3	1	102
	Load Deliv Thermal						0
	Load Deliv Voltage						0
	N-1-1 Thermal	10					10
	N-1-1 Low Voltage	2					2
	N-1-1 Voltage Drop	2	18				20
	N-1-1 Voltage Collapse						0
	Total		91	27	15	3	1

*xfmr voltage class is categorized based on low side kV

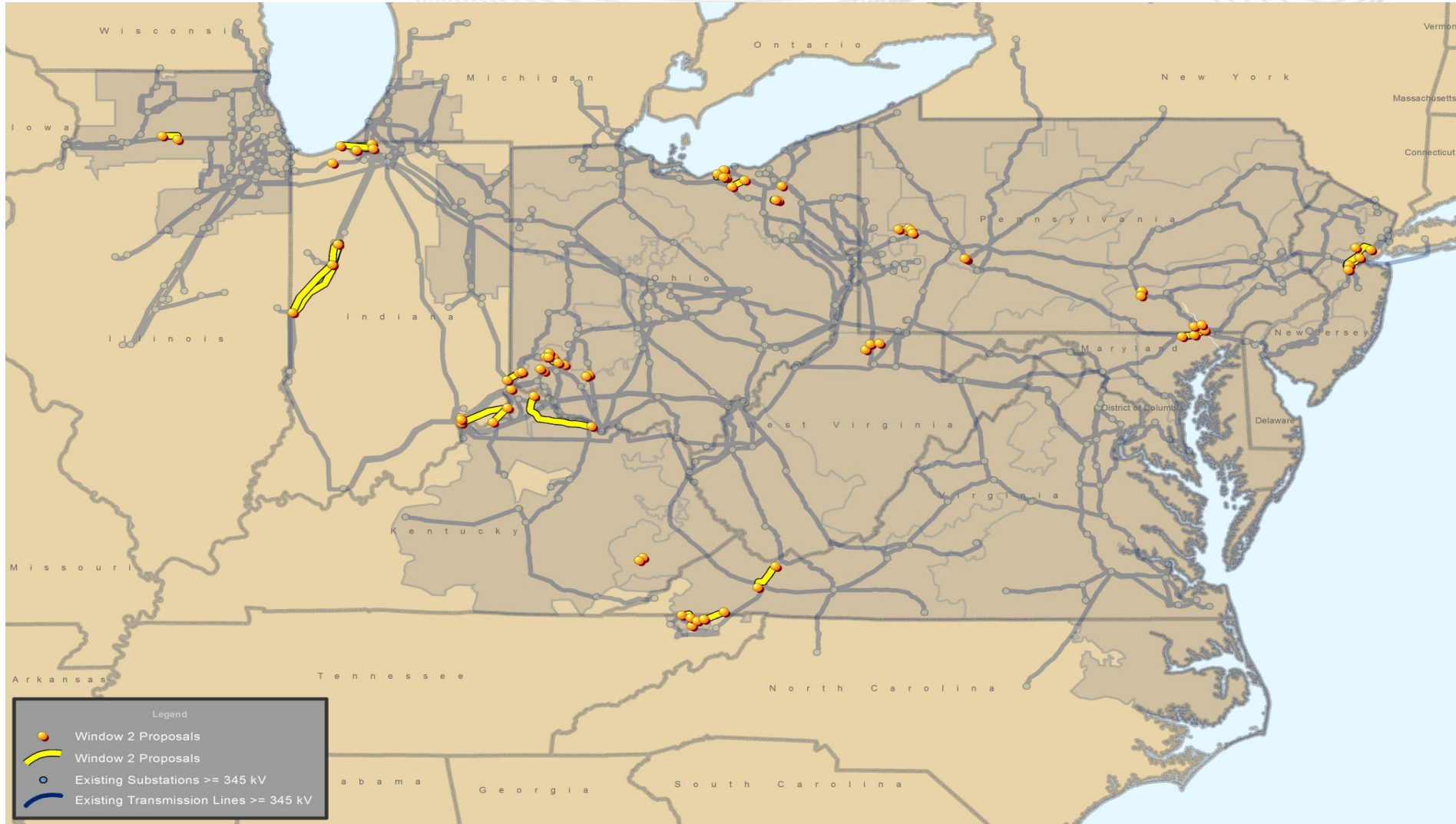
2016 RTEP Proposal Window 2 Violation Locations



- Window Opened: 6/29/2016
- Window Closed: 7/29/2016
- Additional 15 day window close for refined cost estimates: 8/15/2016
- 137 Flowgates Identified, 71 Flowgates Recommended for proposals (Remaining flowgates related to Retired Generators)
- 87 Proposals Received from 13 Entities addressing 12 TO Zones
 - 46 Greenfield
 - Cost Range \$5M - \$136.9M
 - 41 Transmission Owner Upgrades
 - Cost Range \$0.03M - \$125M

- Based on the work done to date proposals fall into the following high level categories
 1. Recommendation
 2. Retirement/At Risk related (reliability violations will be re-evaluated pending the status of the retirement/at risk generation)
 3. Technical evaluation is on-going as necessary to develop a recommended solution
 4. Overlap with Winter and Light Load violations that are posted in Window 3.
 5. Retool analysis required due to system change
 6. Canceled due to tie facilities limited by non PJM Transmission Owning entities

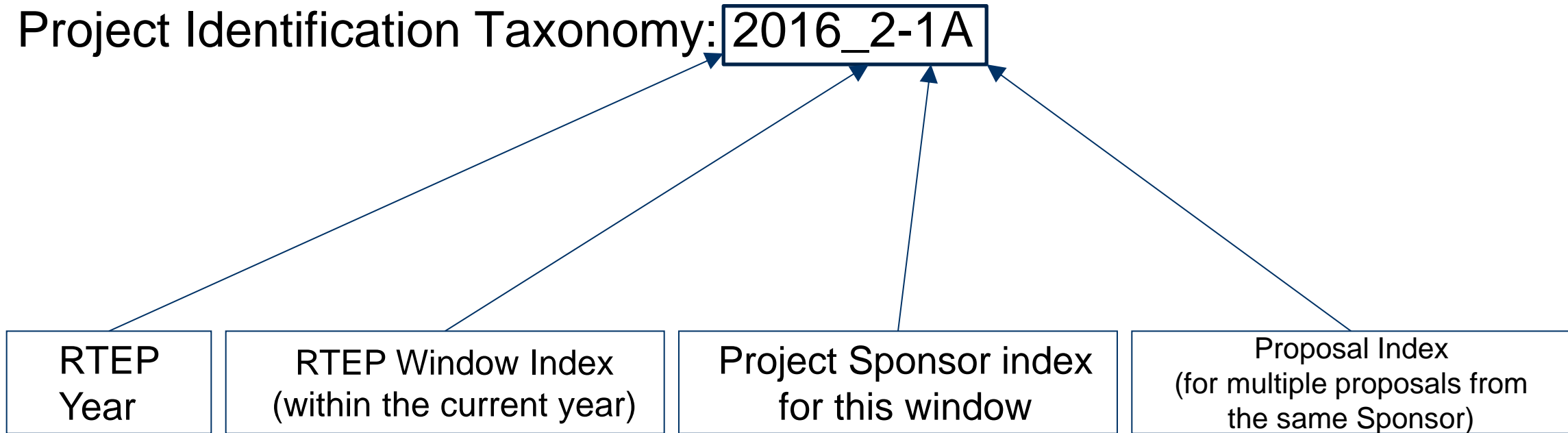
2016 RTEP Proposal Window 2 Proposal locations



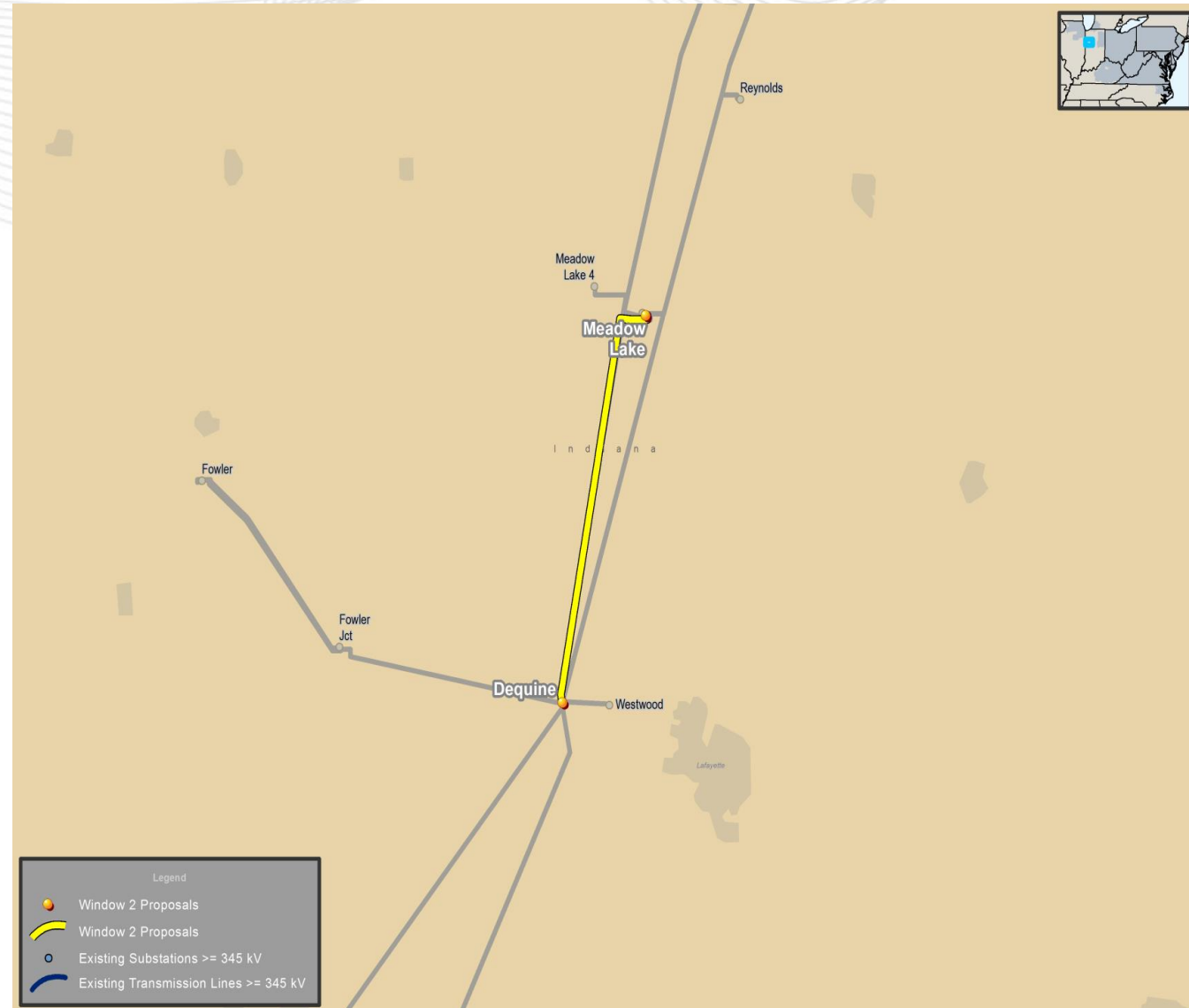
- Window Opened: 6/29/2016
- Window Closed: 7/29/2016

- Project Naming Convention

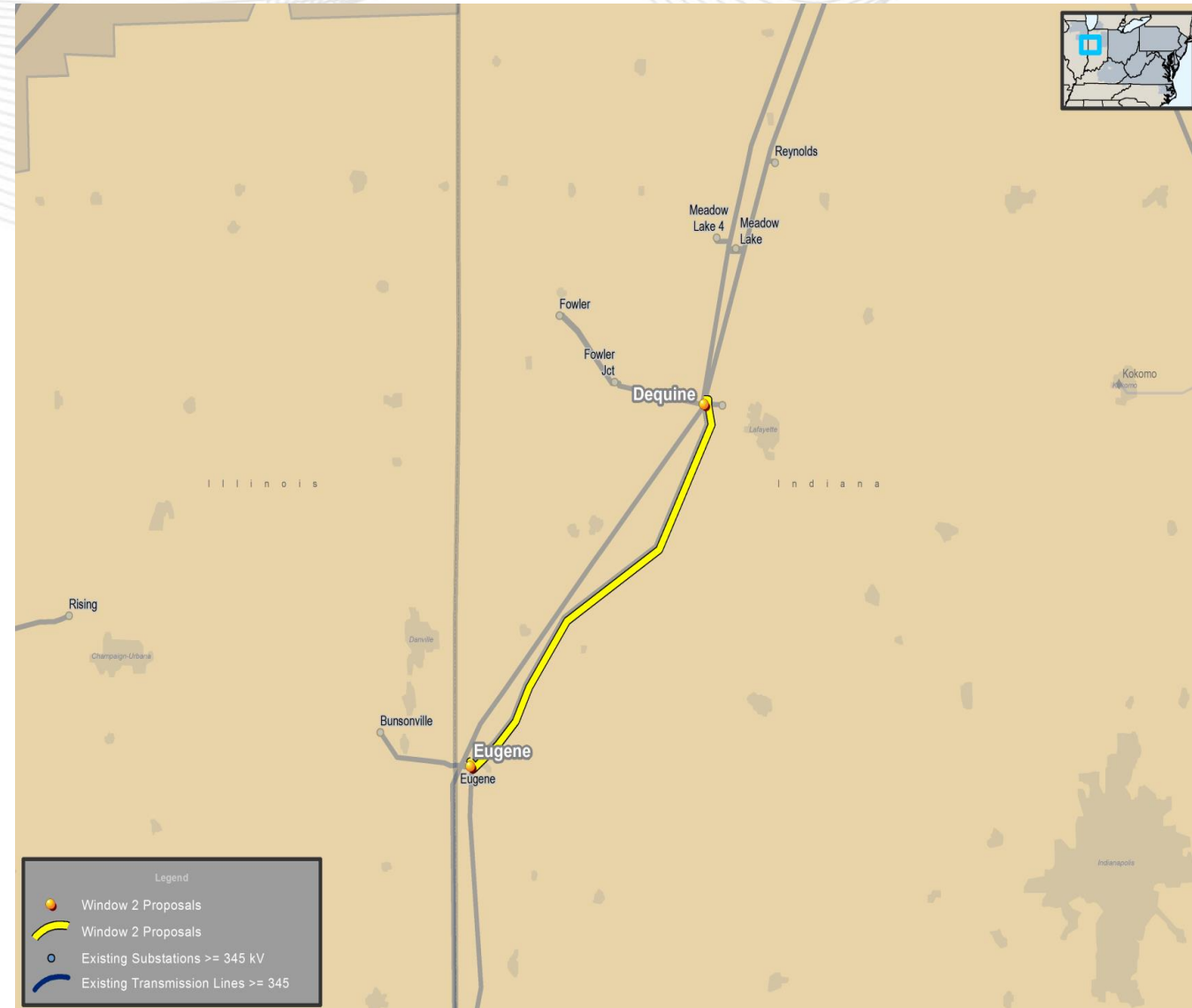
- Project Identification Taxonomy: **2016_2-1A**



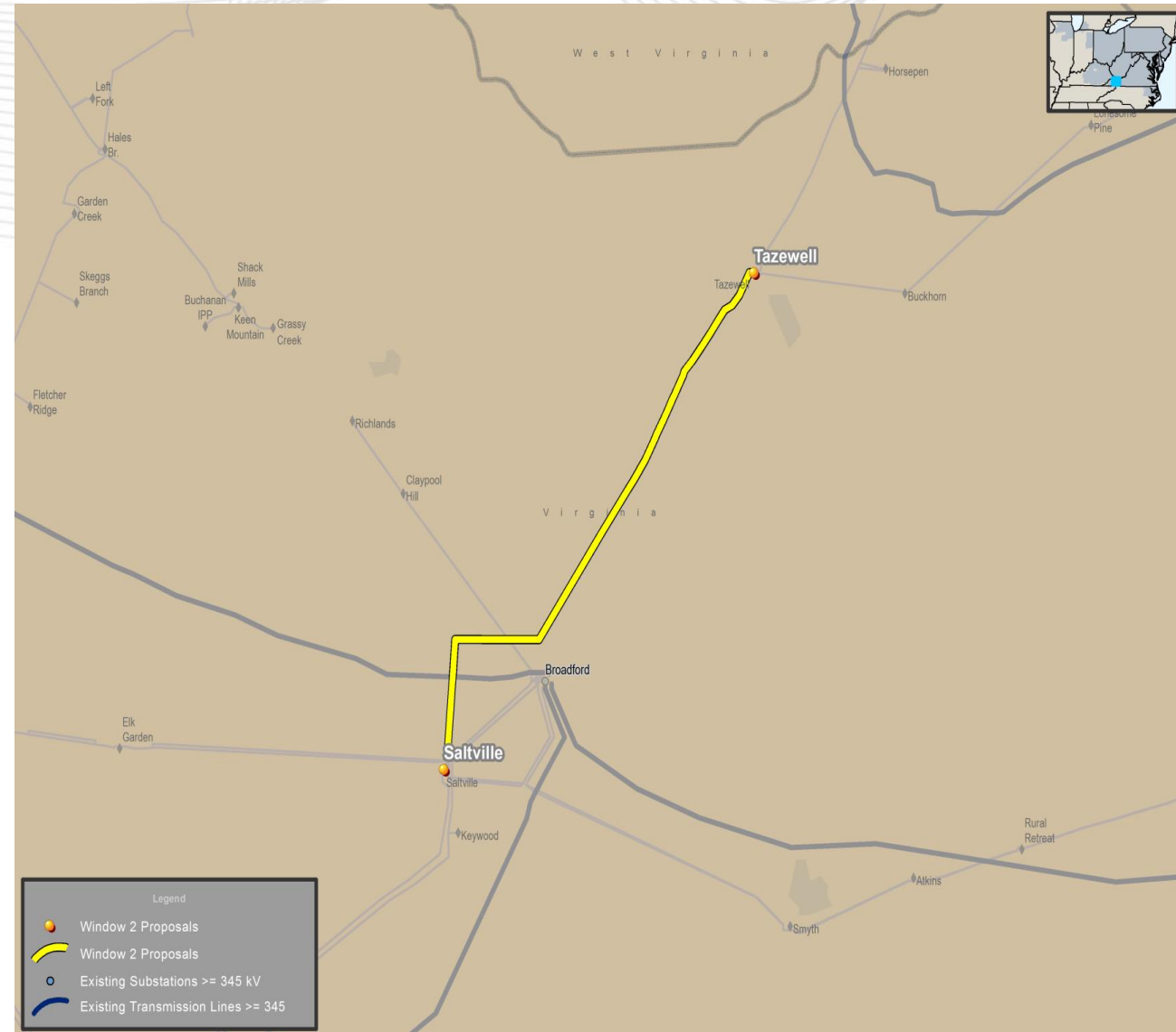
- Generation Deliverability (FG# 64):
- Dequine to Meadow Lake 345 kV circuit #2 is overloaded for loss of the Dequine to Meadow Lake 345 kV circuit #1.
- **Alternatives considered:**
 - 2016_2-7H (\$33.7 M)
 - 2016_2-7I (\$29.1 M)
 - 2016_2-7K (\$28.1 M)
 - 2016_2-7J (\$6.6 M)
 - 2016_2-7P (\$127.6M)
 - 2016_2-9I (\$80.5 M)
 - 2016_2-11C (\$102.4 M)
 - 2016_2-13G (\$136.9 M)
- **Status:**
 - Evaluation is in progress



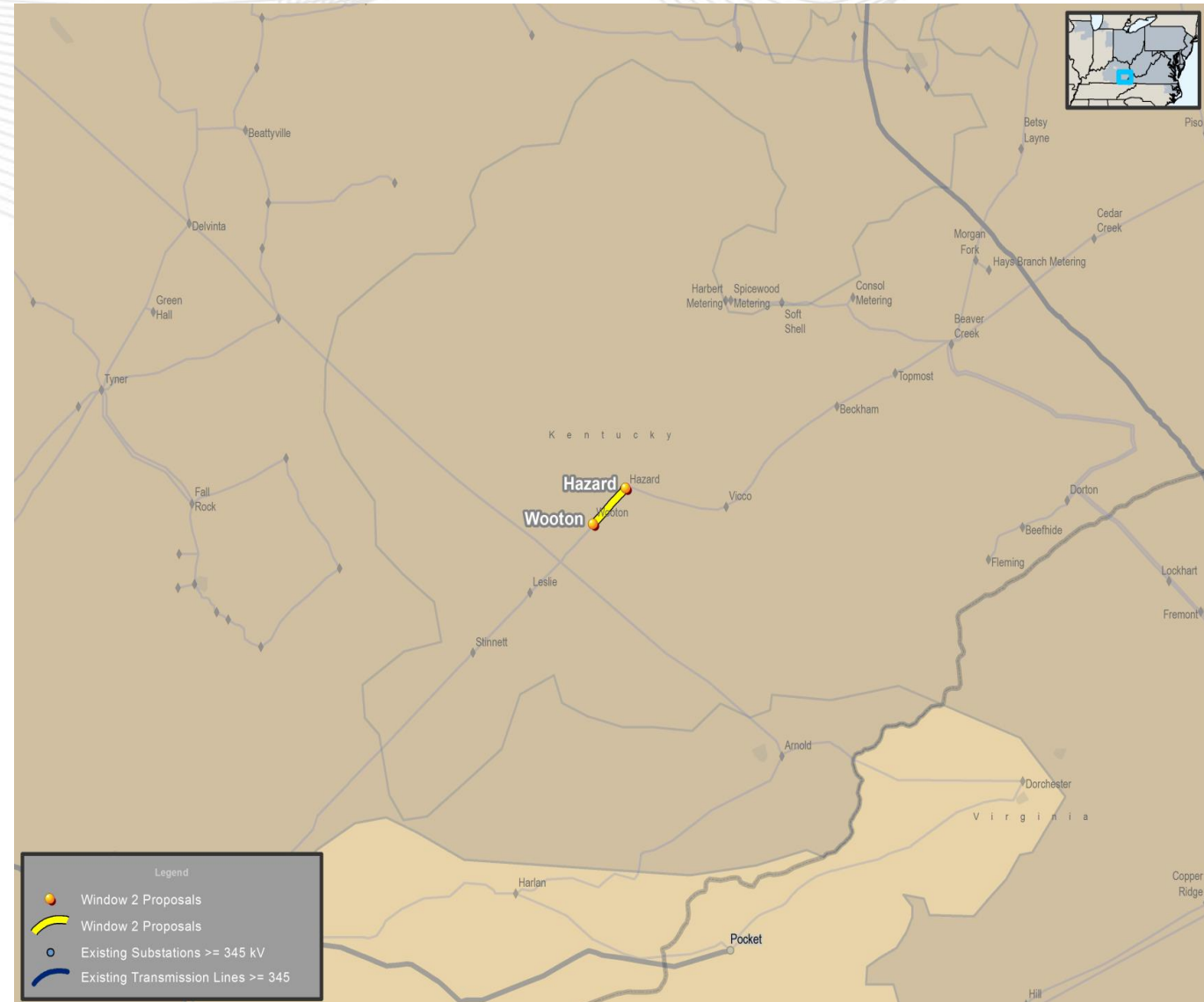
- Baseline and Generation Deliverability (FG# 101, 102 128, 130, 131,134) :
- Eugene to Dequine 345 kV circuit #1 is overloaded for several single contingencies.
- **Alternatives considered:**
 - 2016_2-6B (\$32.5 M)
 - 2016_2-7L (\$113.7 M)
 - 2016_2-7M (\$99.1 M)
 - 2016_2-7N (\$22.19 M)
 - 2016_2-7O (\$99.3M)
 - 2016_2-7P (\$127.6M)
 - 2016_2-9I (\$80.5 M)
 - 2016_2-11C (\$102.4 M)
 - 2016_2-13G (\$136.9 M)
- **Status:**
 - Evaluation is in progress



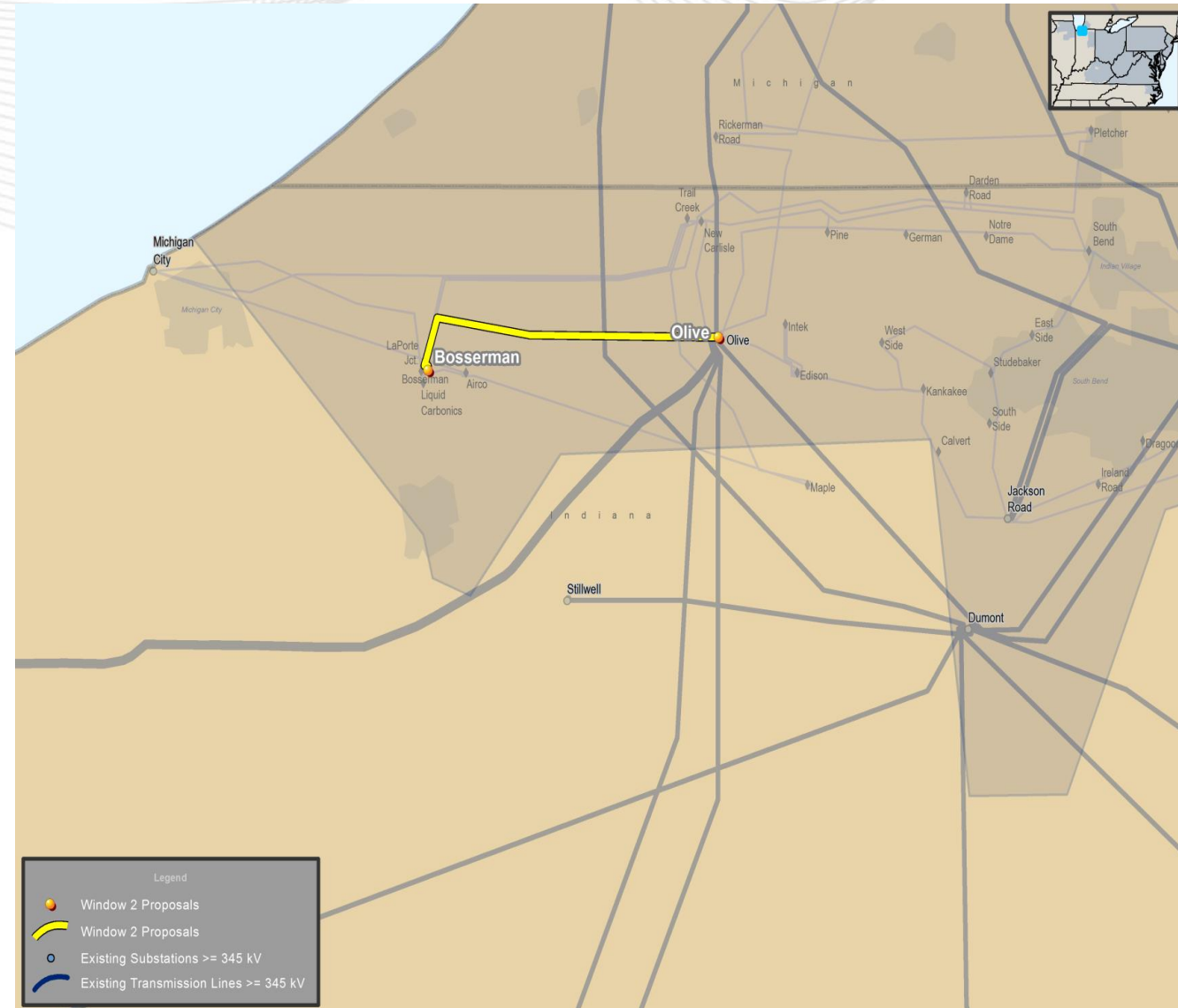
- Generation Deliverability (FG# 150) :
- Saltville to Tazewell 138 kV circuit is overloaded for the loss of the Jackson Ferry – Broadford 765 kV and Broadford 138 kV bus tie .
- **Alternatives considered:**
 - 2016_2-7E (\$0.1 M)
- **Recommendation:**
 - Perform a Sag Study of the Saltville to Tazewell 138 kV line to increase the thermal rating of the line. (2016_2-7E)
- **Estimated Project Cost: \$ 0.1 M**
- **Required IS Date: 6/1/2021**



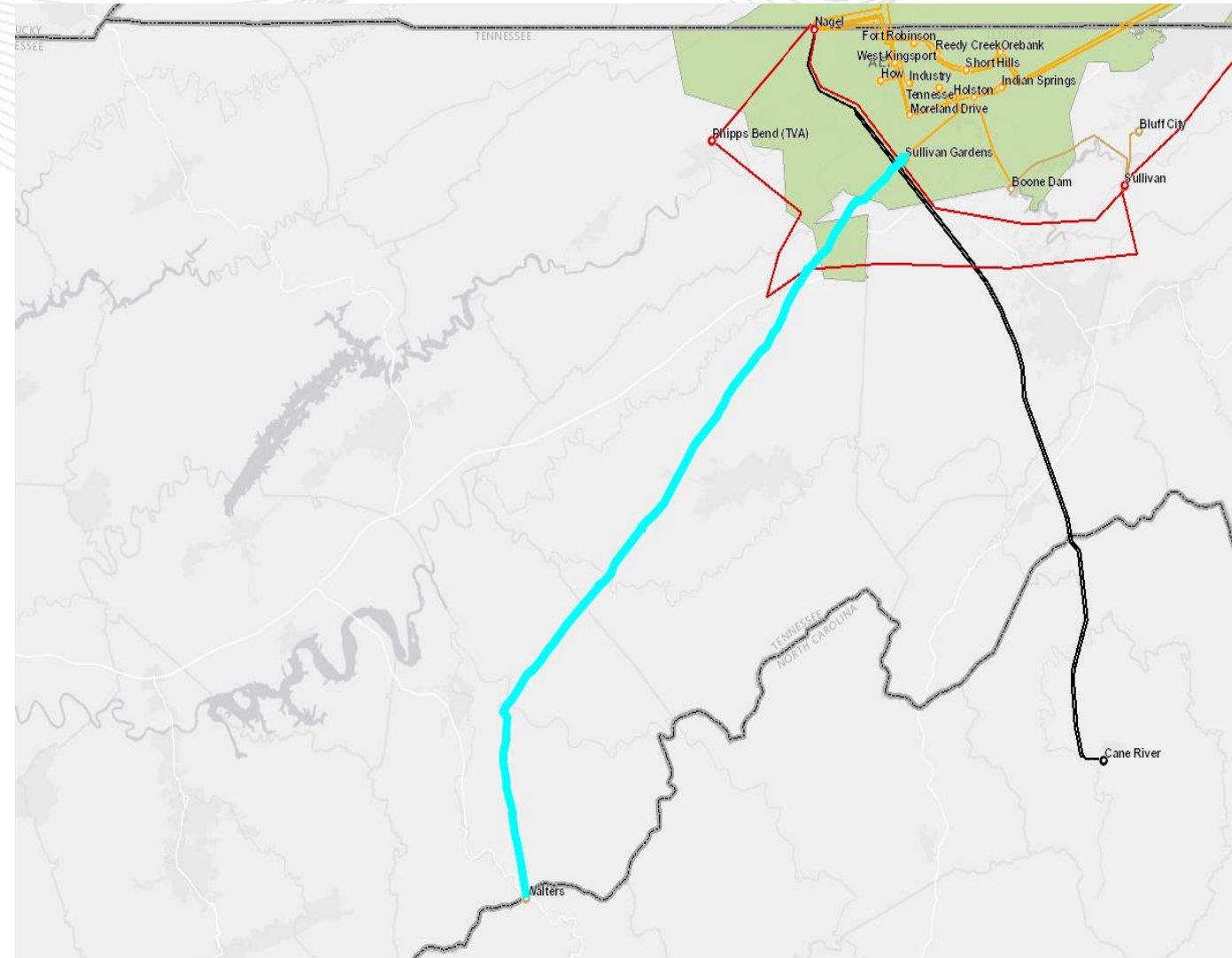
- Common Mode Outage (FG# 874, 875, 901, 902) :
- Hazard 161/138 kV transformer and Hazard to Wooten 138 kV circuit are overloaded for multiple 138 kV tower contingencies from Clinch River to Fremont/Lockhart to Dorton.
- **Alternatives considered:**
 - 2016_2-7A (\$2.3 M)
 - 2016_2-7B (\$10.45M)
- **Recommendation:**
 - Replace the Hazard 161/138 kV Transformer
 - Perform a Sag Study of the Hazard – Wooten 161 kV line to increase the thermal rating of the line. (2016_2-7A)
- **Estimated Project Cost: \$ 2.3 M**
- **Required IS Date: 6/1/2021**



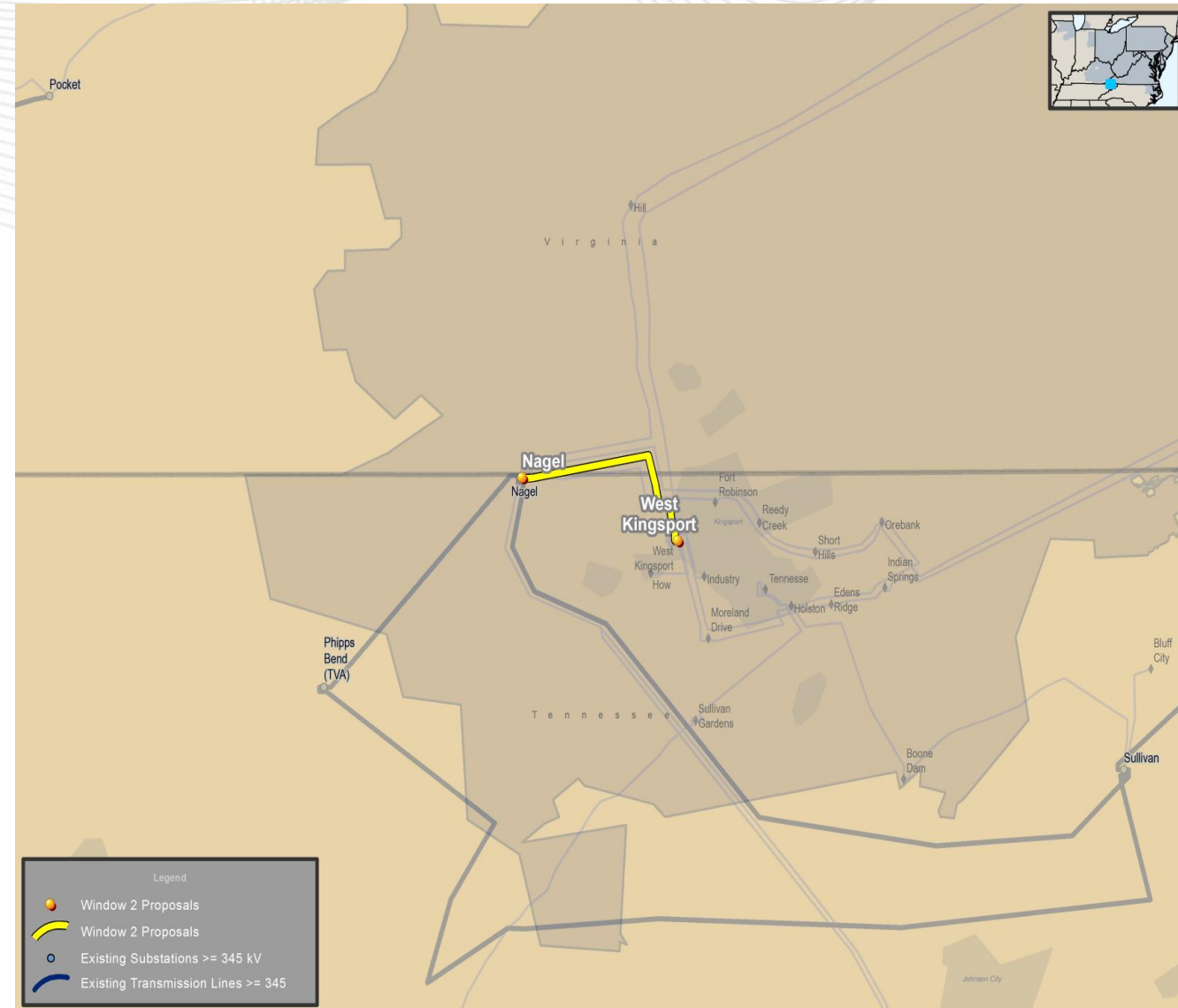
- Common Mode Outage (FG# 1141) :
- Olive to Bosserman 138 kV circuit is overloaded for line fault stuck breaker contingency loss of the New Carlisle 138 kV station.
- **Alternatives considered:**
 - 2016_2-7Q (\$0.6 M)
 - 2016_2-7R (\$24.2 M)
 - 2016_2-9E (\$15.8 M)
 - 2016_2-12A (\$5.0 M)
 - 2016_2-12B (\$95 M)
- **Status:**
 - Flowgate violation cancelled. This was found to be is a non-PJM violation.



- Common Mode Outage (FG# 307,1109,1110) :
- Sullivan to Walters 138 kV circuit is overloaded for multiple common mode contingencies.
- **Alternatives considered:**
 - 2016_2-7C (\$10.1 M)
 - 2016_2-7F (\$1.2 M)
 - 2016_2-7G (\$2.6 M)
 - 2016_2-9V (\$12.1 M)
- **Status:**
 - Flowgate violation cancelled. This was found to be is a non-PJM violation.



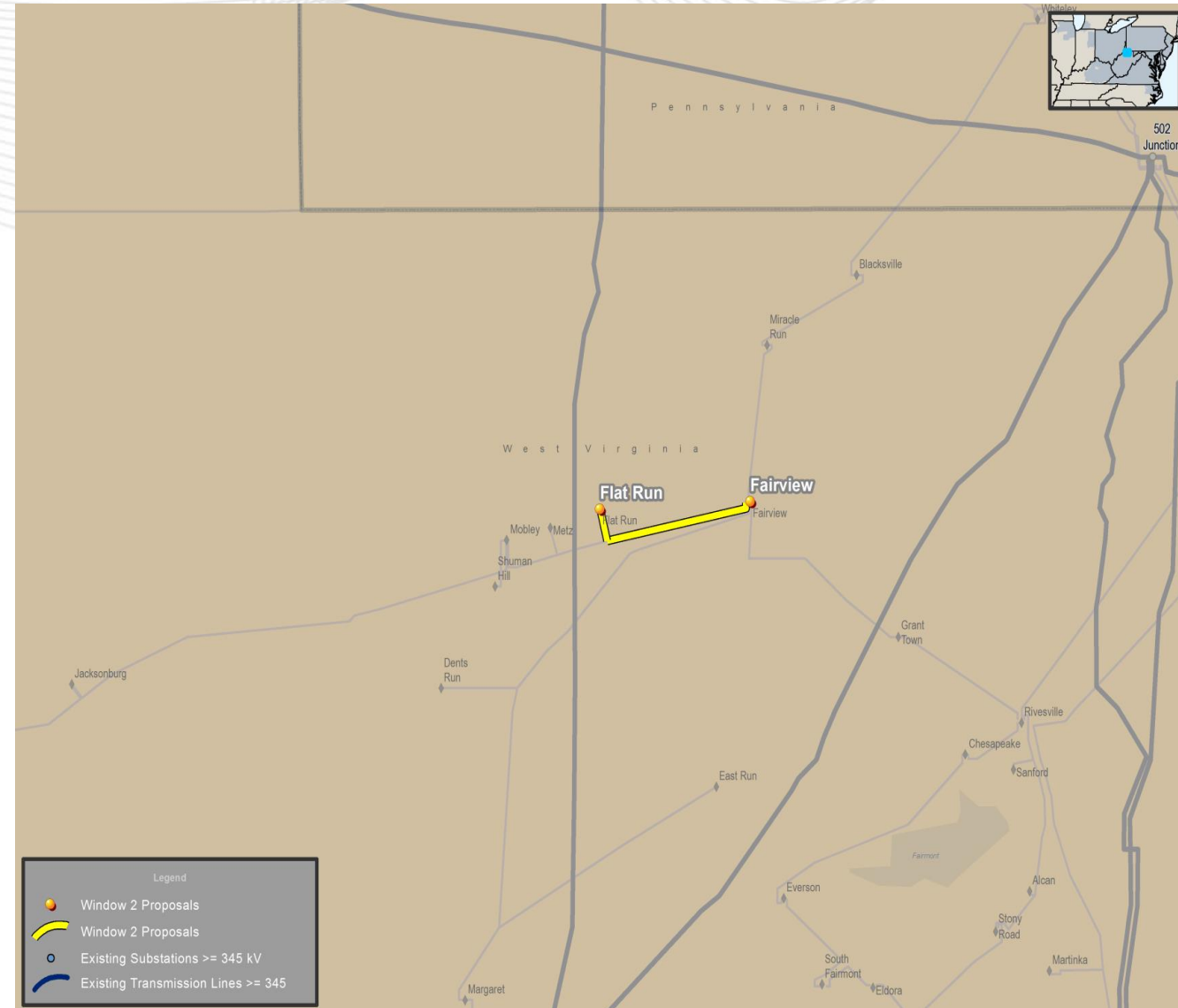
- Common Mode Outage (FG# 1152) :
- Nagel to West Kingsport 138 kV circuit is overloaded line fault stuck breaker contingency loss of the Nagel – Sullivan Gardens and Nagel – Phipps Bend 500 kV circuits.
- **Alternatives considered:**
 - 2016_2-7D (\$0.1 M)
 - 2016_2-9V (\$12.1 M)
- **Recommendation:**
 - Perform a Sag Study of Nagel to West Kingsport 138 kV line to increase the thermal rating of the line. (2016_2-7D)
- **Estimated Project Cost:** \$ 0.1 M
- **Required IS Date:** 6/1/2021



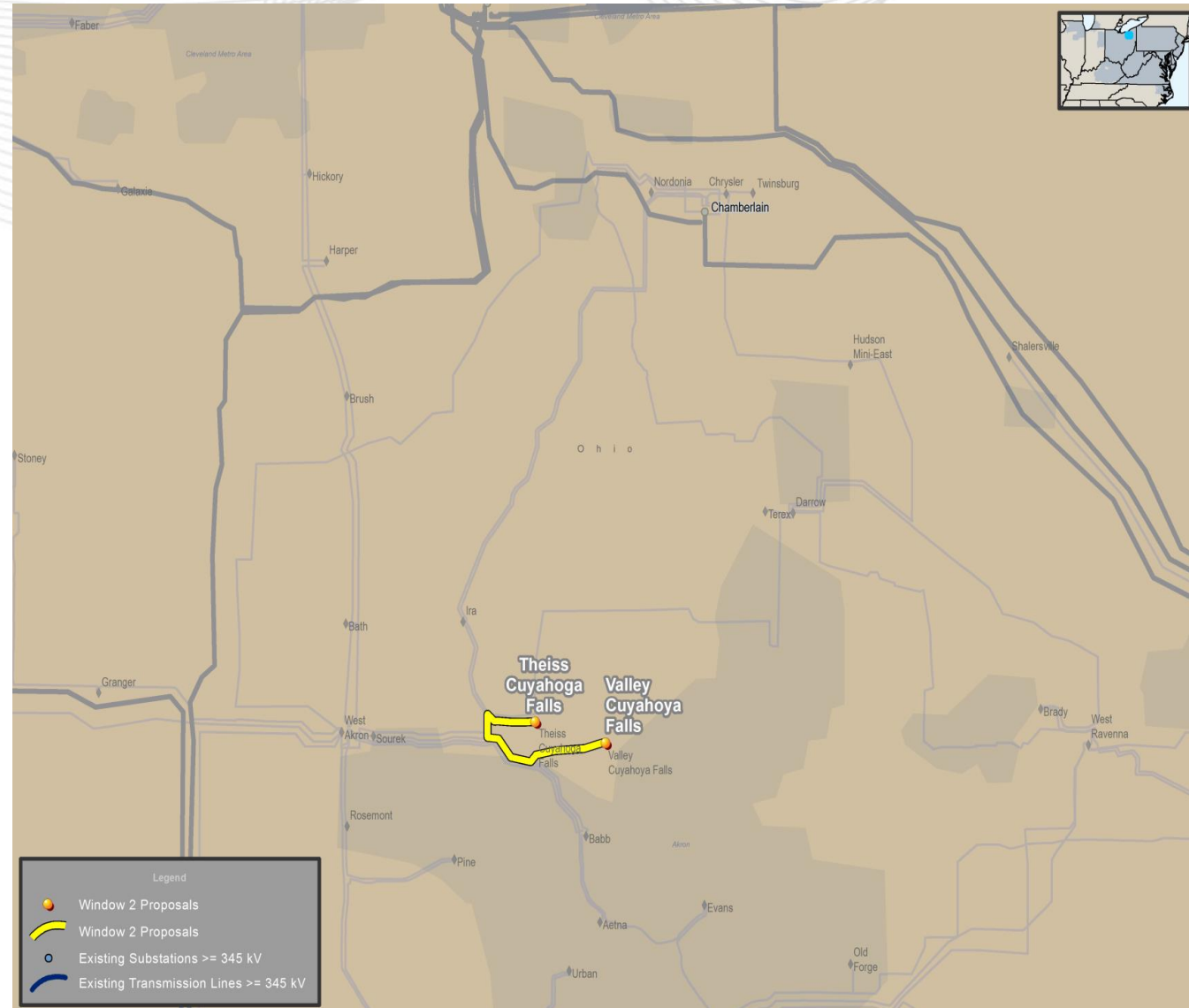


APS Transmission Zone

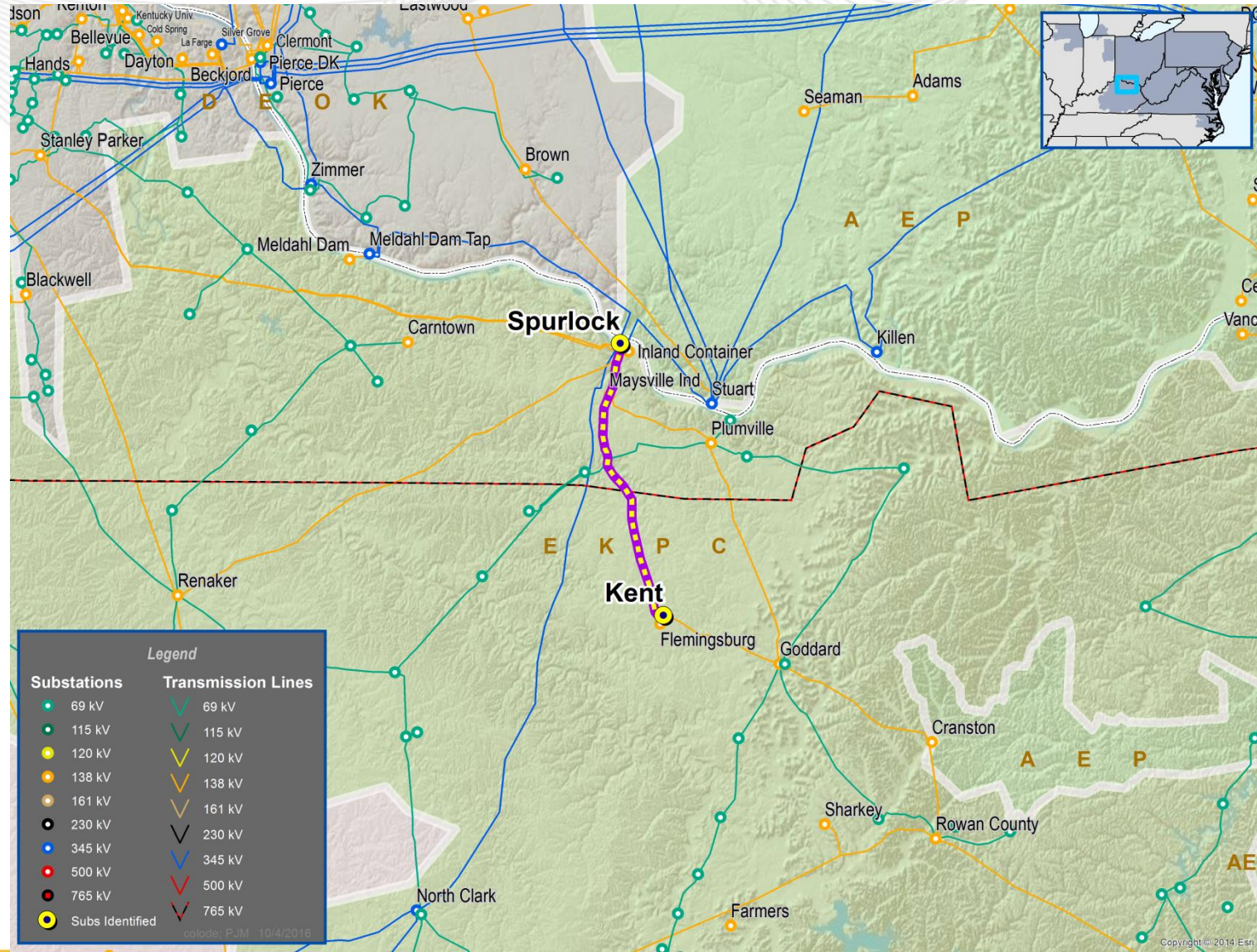
- N-1-1 Thermal (FG# N2-T2) :
- Fairview to Flat Run 138 kV circuit is overloaded for N-1-1 contingency loss of the Belmont – Middlebourne – Jacksonburg 138 kV.
- **Alternatives considered:**
 - 2016_2-8E (\$ 0.03 M)
 - 2016_2-9O (\$ 9.3 M)
- **Recommendation:**
 - Upgrade breaker risers and disconnect leads;
Replace 500 CU breaker risers and 556 ACSR disconnect leads with 795 ACSR.. (2016_2-8E)
- **Estimated Project Cost:** \$ 0.03 M
- **Required IS Date:** 6/1/2021



- N-1-1 Voltage (FG# N2-VM5, N2-VM6) :
- Low voltage violation at Valley and Theiss Road 138 kV stations for the N-1-1 contingency loss of the Chamberlain 345/138 kV transformer and the Valley – Babb 138 kV circuit .
- **Alternatives considered:**
 - 2016_2-8B (\$ 1.8 M)
 - 2016_2-8C (\$ 3.8 M)
- **Status:**
 - Evaluation is in progress



- Common Mode Outage (FG# 905, 906):
- Spurlock – Kenton 138 kV circuit is overloaded for loss of the tower lines of the Spurlock – Stuart 345KV and the Spurlock- Meldahl 345kV
- **Alternatives considered:**
 - 2016_2-3C (\$19.0 M)
 - 2016_2-3F (\$63.0 M)
 - 2016_2-5A (\$2.5 M)
- **Status:**
 - Evaluation is in progress



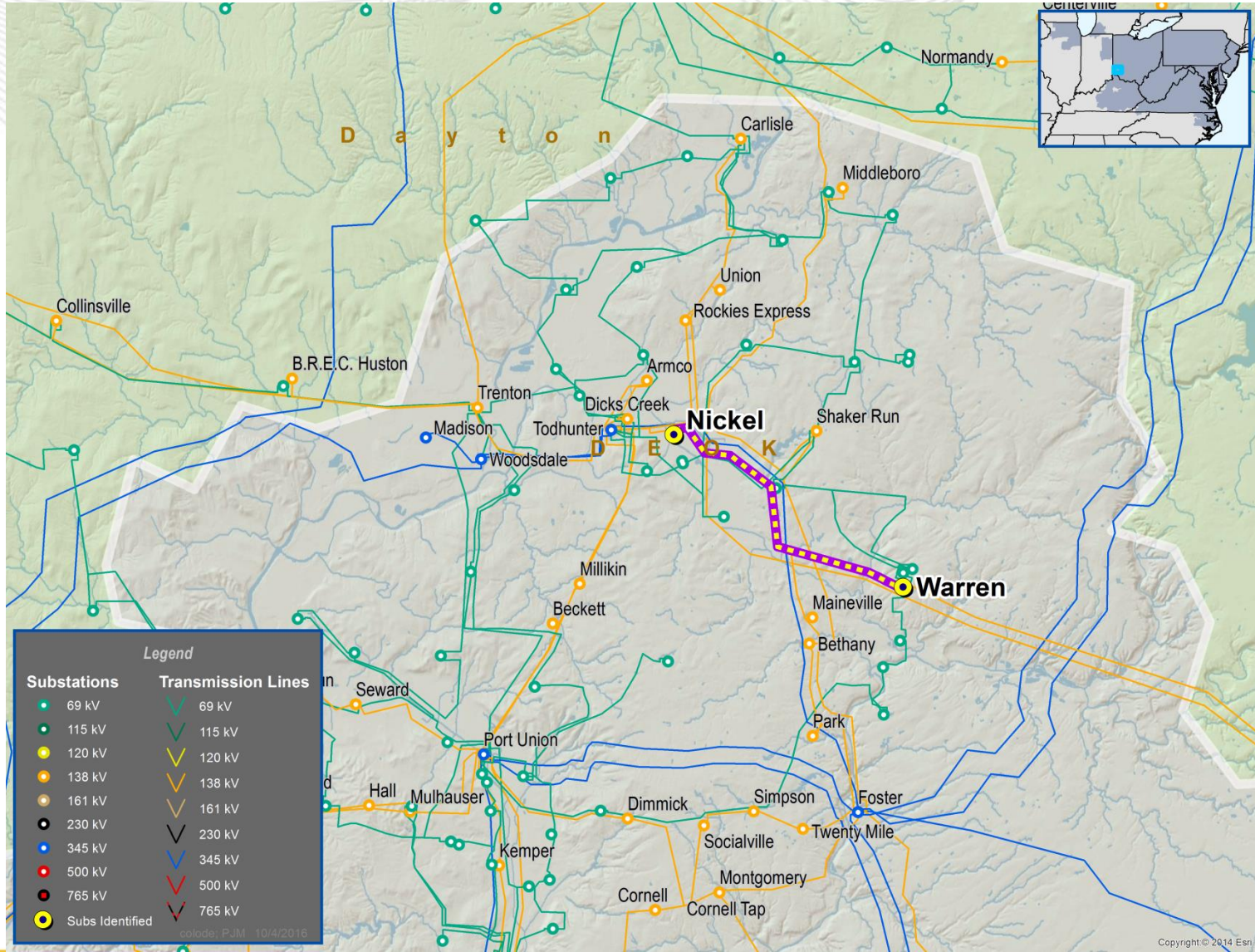
- Common Mode Outage (FG# 907):
- Nickel – Warren 138 kV circuit is overloaded for loss of the tower lines of the Todhunter – Rockies Express 138kV and the Foster- Garver 345kV

• **Alternatives considered:**

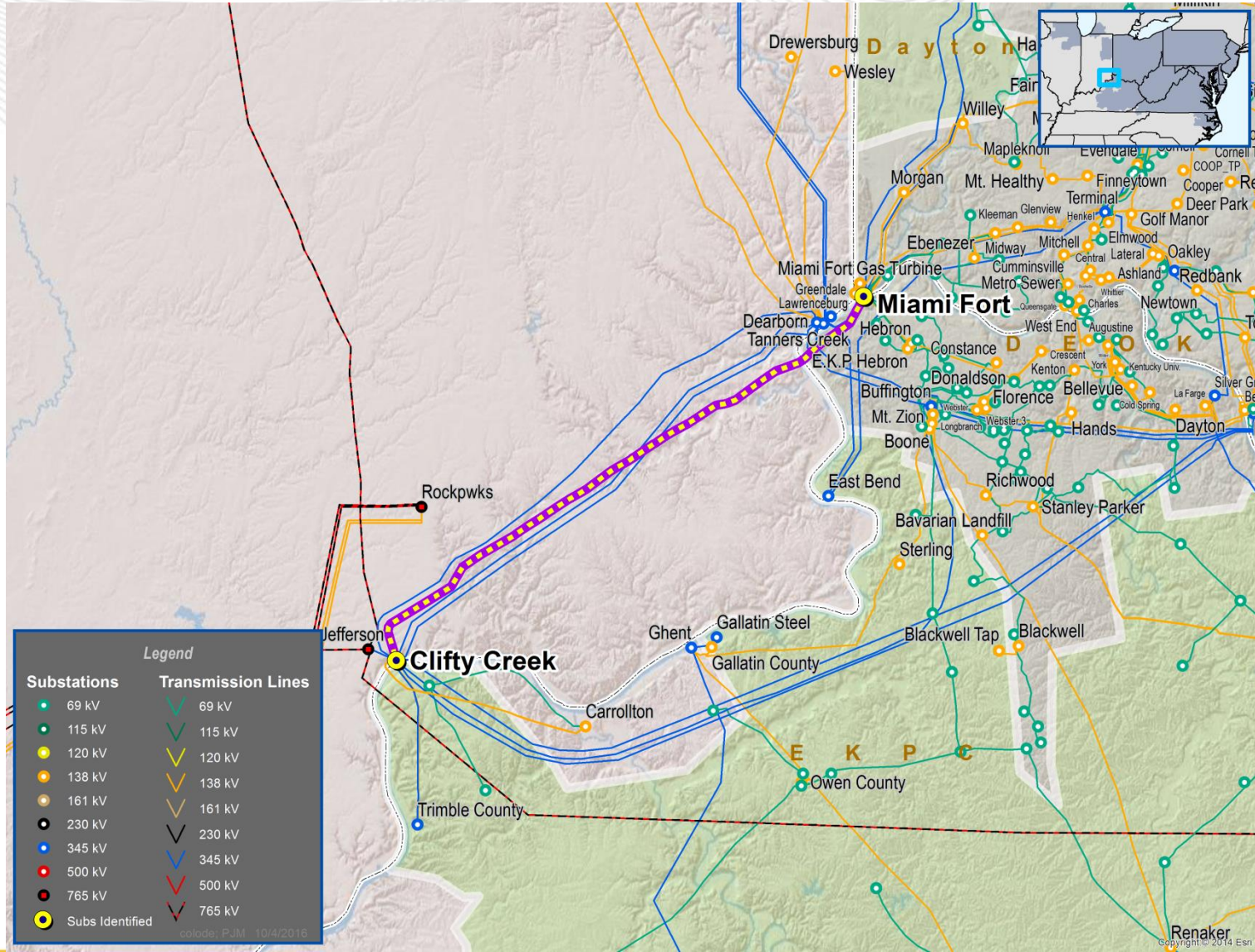
- 2016_2-1C (\$10.5 M)
- 2016_2-13I (\$11.19 M)
- 2016_2- 13J (\$14.27M)
- 2016_2-3C (\$19.0 M)
- 2016_2-3F (\$63.0 M)
- 2016_2- 6A (\$17.1M)
- 2016_2_9J (\$17.0M)
- 2016_2-10B (\$29.5M)

• **Status:**

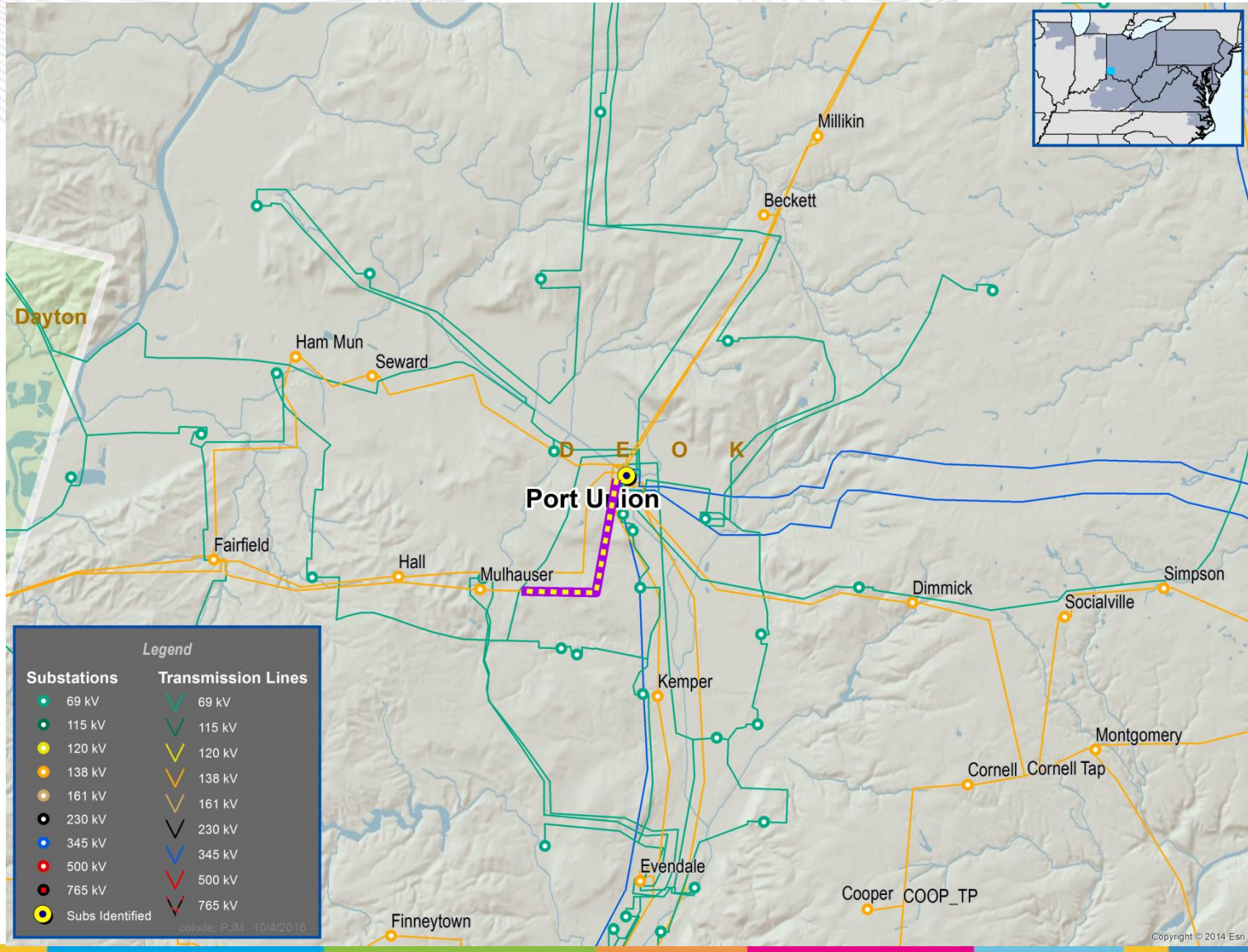
- Evaluation is in progress



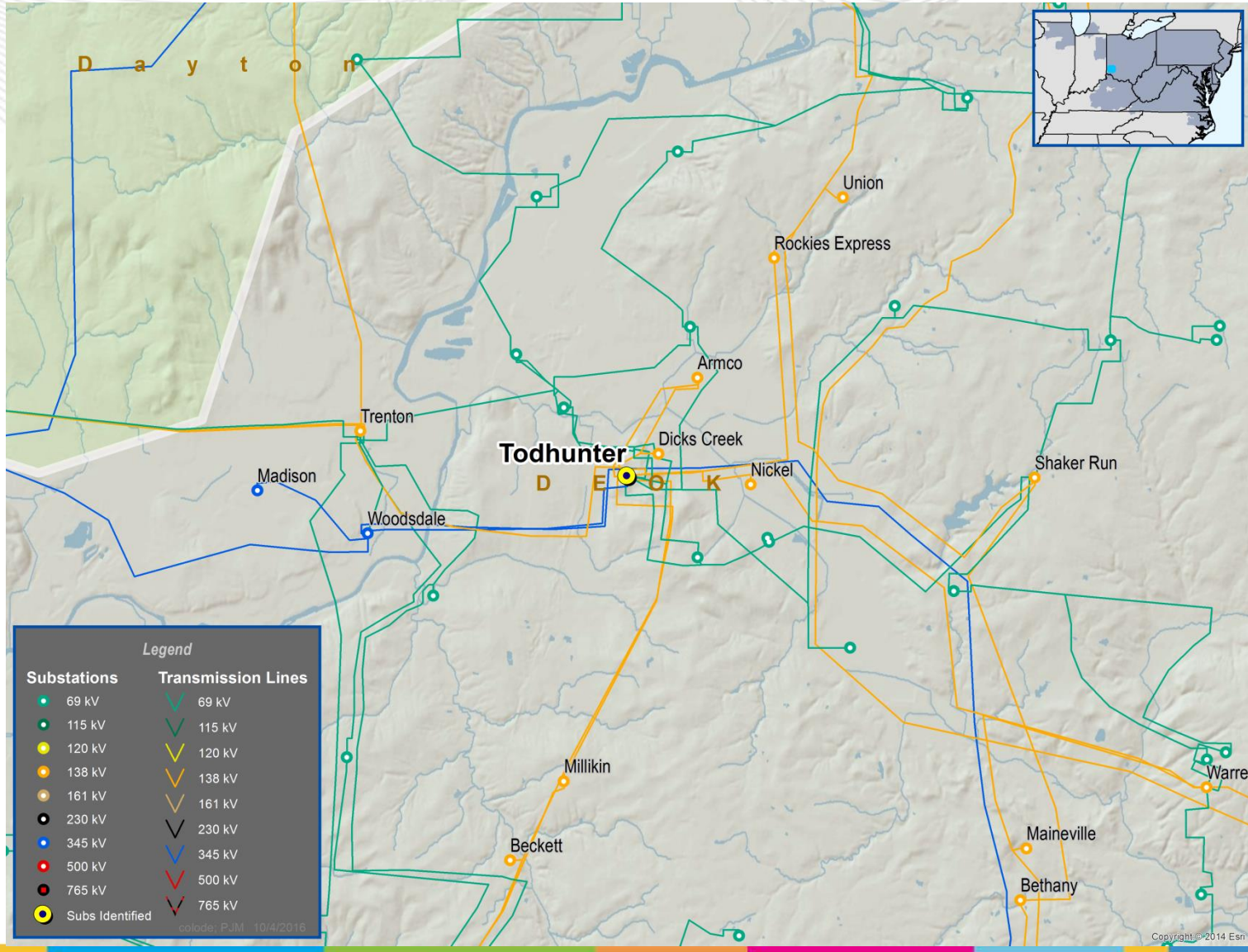
- Common Mode Outage (FG# 897, 1137):
- The Clifty Creek– Miami Fort 138 kV circuit is overloaded for multiple common model Contingencies
- **Alternatives considered:**
 - 2016_2-1B (\$1.0M)
 - 2016_2-3C (\$19.0 M)
 - 2016_2-3F (\$63.0 M)
 - 2016_2-7S (\$0.82M)
 - 2016_2-9R (\$18.7M)
 - 2016_2-9T (\$6.1M)
 - 2016_2-11D (\$44.3M)
 - 2016_2-11E (\$85.7M)
 - 2016_2-13F (\$12.4M)
- **Status:**
 - Evaluation is in progress



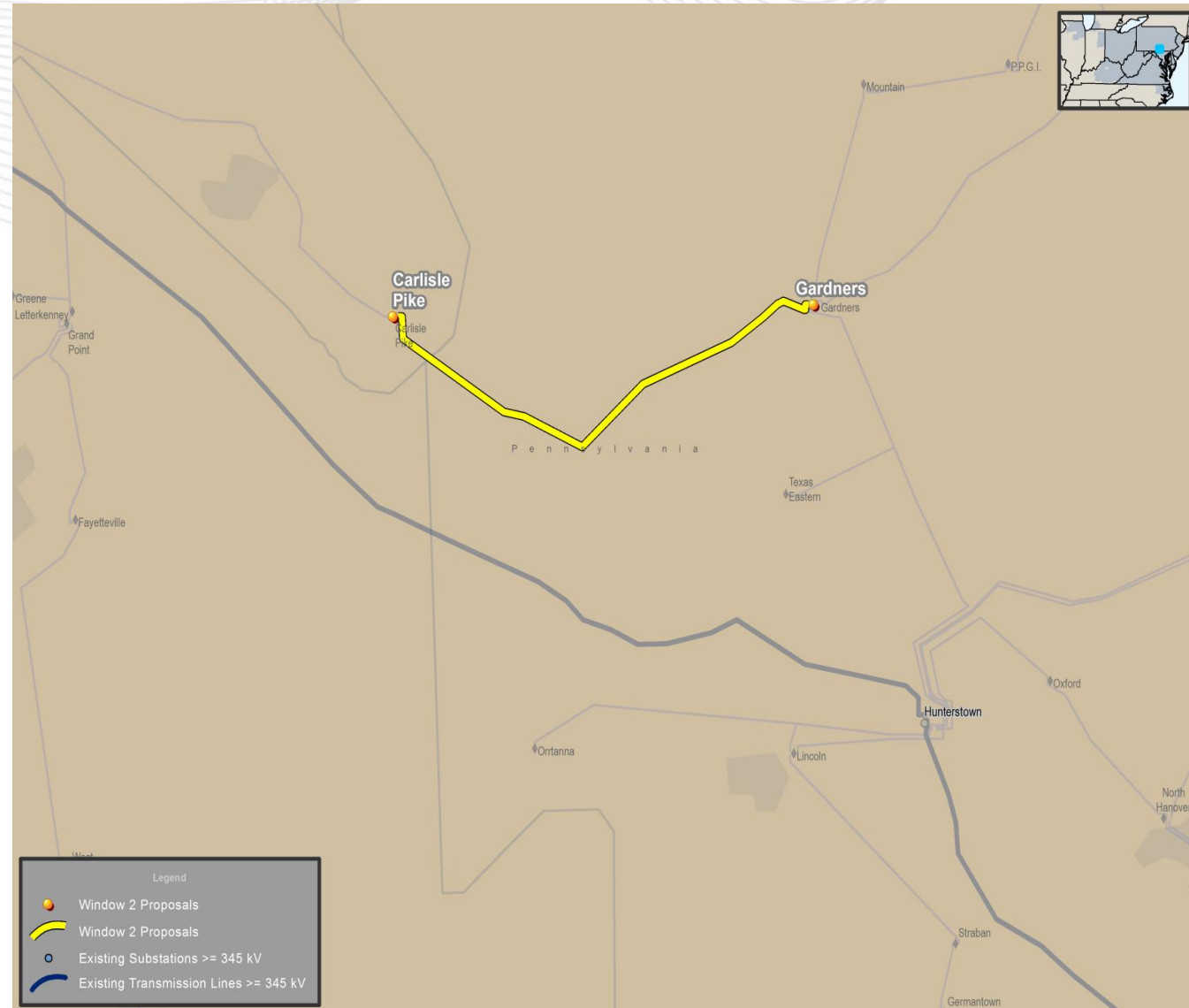
- N-1-1 Thermal Violation (FG# N2-T4, N2-T5):
- The Port Union – EPROV 138 kV circuit is overloaded for loss of the Todhunter – Rockies Express 138kV and the Foster-Garver 345kV
- **Alternatives considered:**
 - 2016_2-1D (\$2.2M)
 - 2016_2-3F (\$63.0 M)
 - 2016_2-9R (\$18.7M)
- **Status:**
 - Evaluation is in progress



- N-1-1 Thermal Violation (FG# N2-T6, N2-T7, N2-T8, N2-T9, N2-T10):
- The left one of the three Todhunter 345/138kV transformers is overloaded for loss of the any two of them
- **Alternatives considered:**
 - 2016_2-1A (\$18.7M)
 - 2016_2-3C (\$19.0M)
 - 2016_2-3F (\$63.0 M)
 - 2016_2-6A (\$17.1 M)
 - 2016_2-9J (\$17.0 M)
 - 2016_2-9R (\$18.7M)
 - 2016_2-10B (\$29.5M)
- **Status:**
 - Evaluation is in progress



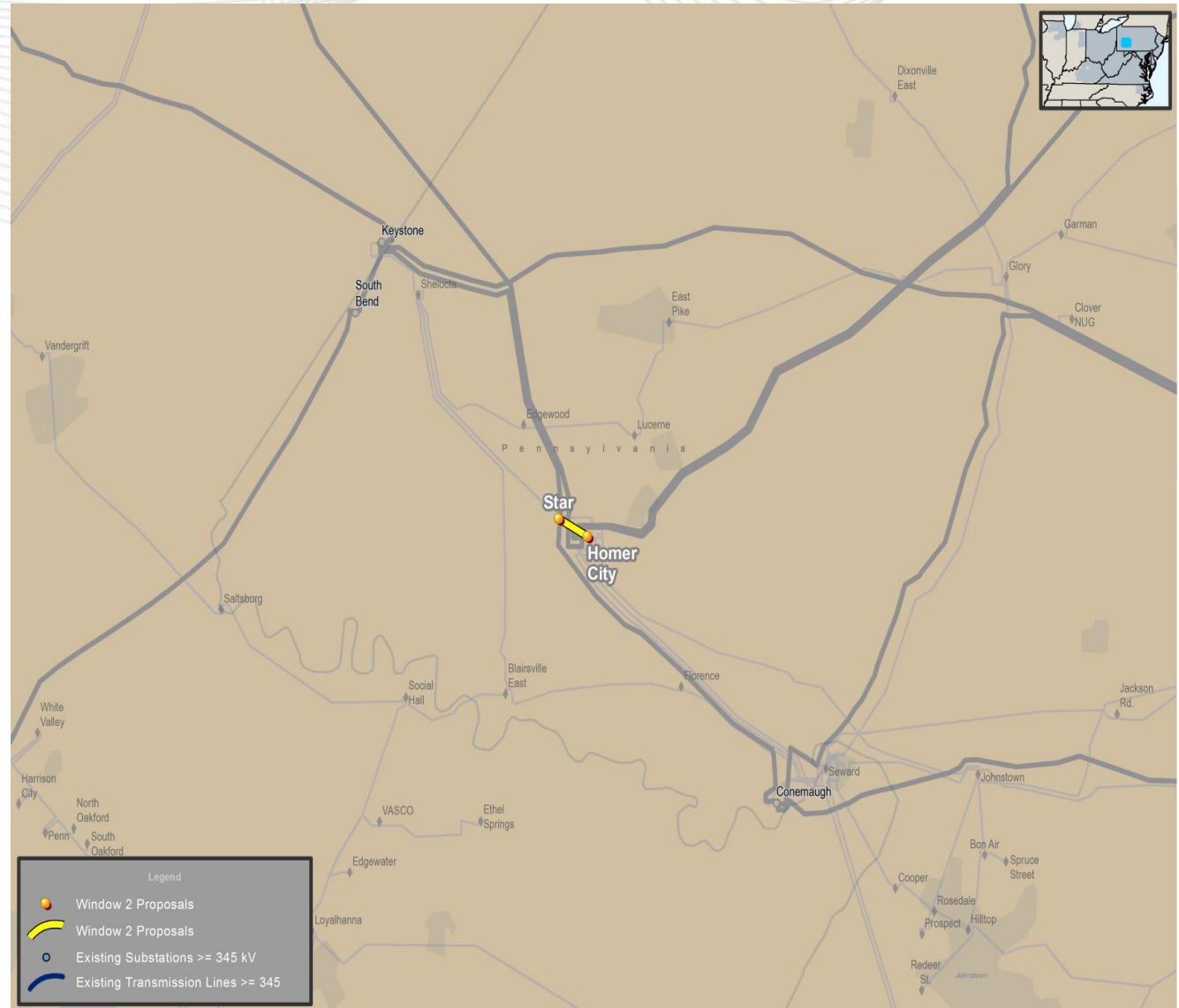
- N-1-1 Thermal (FG# N2-T1 and N2-T3) :
- Carlisle to Gardners 115 kV circuit is overloaded for N-1-1 contingency loss of the Hunterstown – Gardners and Middletown Jct. – Collins – Newberry –Round Tap 115 kV circuits.
- **Alternatives considered:**
 - 2016_2-3E (\$10 M)
 - 2016_2-8D (\$0.1 M)
 - 2016_2-9F (\$13.3 M)
 - 2016_2-9G (\$18.7 M)
- **Recommendation:**
 - Upgrade bus conductor Gardners substation. Upgrade bus conductor and adjust CT ratios at Carlisle Pike. (2016_2-8D)
- **Estimated Project Cost:** \$ 0.1 M
- **Required IS Date:** 6/1/2021



- Generation Deliverability (FG# 294, 295, 296) :
- Conastone to Peach Bottom 500 kV circuit is overload pre-contingency and for the loss of the Peach Bottom – TMI 500 kV circuit.
- **Alternatives considered:**
 - 2016_2-4A (\$2.0 M)
 - 2016_2-4B (\$7.0 M)
 - 2016_2-9A (\$12.5 M)
 - 2016_2-9B (\$19.2 M)
 - 2016_2-9P (\$26.8 M)
 - 2016_2-9Q (\$13.4 M)
- **Recommendation:**
 - Upgrade Substation Equipment at Conastone and Peach Bottom to increase facility rating to 2826 MVA normal and 3525 MVA emergency. (2016_2-4B)
- **Estimated Project Cost:** \$ 7.0 M
- **Required IS Date:** 6/1/2021



- Common Mode Outage (FG# 1026):
- The Homer City 345/230 kV transformer “S” is overloaded for a line fault stuck breaker contingency loss of the Homer City – Armstrong 345 kV circuit and Homer City 345/230 kV transformer #N.
- **Alternatives considered:**
 - 2016_2-3B (\$36 M)
 - 2016_2-8G (\$6.6 M)
 - 2016_2-9D (\$23 M)
- **Recommendation:**
 - Construct a new 345kV breaker string with three (3) 345kV breakers at Homer City and move the North autotransformer connection to this new breaker string. (2016_2-8G)
- **Estimated Project Cost: \$ 6.6 M**
- **Required IS Date: 6/1/2021**





2016 RTEP Proposal Window #2

- PJM will perform retool analysis for the following flowgates from the 2016 2nd Window.
- These facilities are impacted by:
 - A queue project that recently signed an ISA
 - The future PSEG/ConED PAR settings pending the finalization of the protocol for the ConEd interface and associated PAR settings
- PJM will perform analysis including all the changes and open window.

FG #	Fr Bus	Name	To Bus	Name	CKT	KVs	Areas	Rating	FN DC Flow	FN AC Flow	FN DC %	FN AC %	Cont Label	Cont Type	Conductor Rating (MVA)
25	200825	26MESH2REA	200706	26N.MESH2RE	3	115/230	226/226	188	232.01	231.57	123.41	123.18	'PN-P1-2-PN-230-013'	single	Transformer
29	200677	26NO MESH0	200825	26MESH2RE A	3	115/115	226/226	197	232.11	226.13	117.82	114.79	'PN-P1-2-PN-230-013'	single	Transformer
90	200675	26E.TWANDA	200924	26CANYON	1	230/230	226/226	515	580.01	553.29	112.62	107.43	Base Case	single	Rate A/B = 546/666
91	200675	26E.TWANDA	200924	26CANYON	1	230/230	226/226	615	661.97	634.55	107.64	103.18	'PL:P12:001029'	single	Rate A/B = 546/666
92	200675	26E.TWANDA	200924	26CANYON	1	230/230	226/226	615	643.47	615.27	104.63	100.04	'PL:P12:000189'	single	Rate A/B = 546/666
1042	208009	LACK	200074	LACKAW	4	230/500	229/225	1165	1344.52	1354.97	115.41	116.31	'PL:P42:101630'	breaker	Transformer
1044	208009	LACK	200074	LACKAW	3	230/500	229/225	1165	1344.52	1351.41	115.41	116.	'PL:P42:101631'	breaker	Transformer
1059	200927	26FOURMILE	200820	26ERIE SE	1	115/115	226/226	245	278.63	275.04	113.73	112.26	'PN-P2-3-PN-230-6G'	breaker	Same as basecase
1132	130807	WESTOVER115	200680	26LAUREL L	1	115/115	102/226	149	154.84	154.18	103.92	103.48	'PN-P2-3-PN-115-46G'	breaker	Rate A/B =

Immediate Need

- **PJM Criteria Violation – Load Loss Limit**

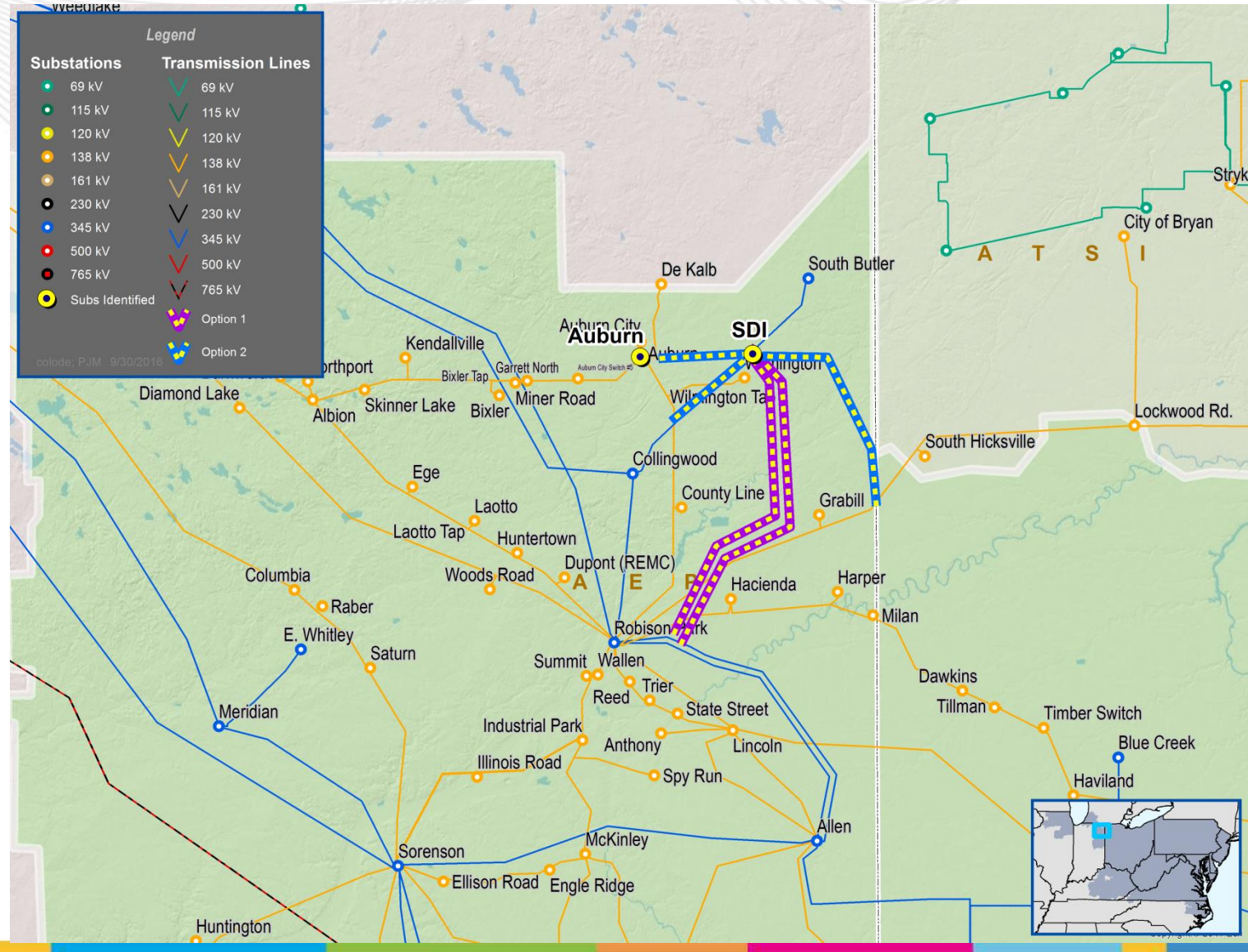
- Load model update -- Consequential Load Loss is greater than 300MW for the loss of the South Butler – Collingwood 345kV line

- **Immediate Need**

- Due to the timing of the need for the reinforcement an RTEP proposal window is infeasible

- **Alternatives Considered**

- Option 1: Construct a new 345 kV switching station near the customer (SDI); Tap the Rob Park –Allen 345 kV line and extend a new double circuit 345KV line (around 17 miles) into this new station (\$76.5M)
- Option 2: Construction a new 138 kV station, Campbell Road, tapping into the Grabill – South Hicksville 138kV line; Reconstruct sections of the Butler-N.Hicksville and Auburn-Butler 69kV circuits as 138kV double circuit and extend 138kV from Campbell Road station; Construct a new 345/138kV SDI Wilmington Station which will be sourced from Collingwood 345KV and serve the SDI load at 345KV and 138 kV respectively; 138kV circuits will be looped in-out of the new SDI Wilmington station resulting in a direct circuit to Auburn and in direct circuit to Auburn and Rob Park via Dunton Lake, and a circuit to Campbell Road; Reconnector 138kV line section between Dunton Lake – SDI Wilmington; Expand 138kV bus at Auburn (\$107.7M)



- Comparison of two Options**

	Estimated Cost (M)	Right of way Width (feet)	Additional ROW (miles)	Addresses Local Area Needs?	Ease of future area Outage Scheduling?
Option 1 (345kV double circuit)	\$ 76.5	150	~17	No	No
Option 2 (138 kV solution)	\$107.7	100	~7	Yes*	Yes

- * Local 69Kv lines built in the 1950s with wood pole construction with distribution class cross arms
- * The existing 69 kV line passes through an industrial zone and continued area industrial growth is anticipated.
- * Local wholesale distribution cooperative is also served from the 69 kV line of similar vintage and construction. This cooperative just West of this area has experienced multiple forced and momentary outages in the recent past.

Dominion End of Life – FERC 715 Criteria Violation

Problem Dominion End of Life Criteria Violation

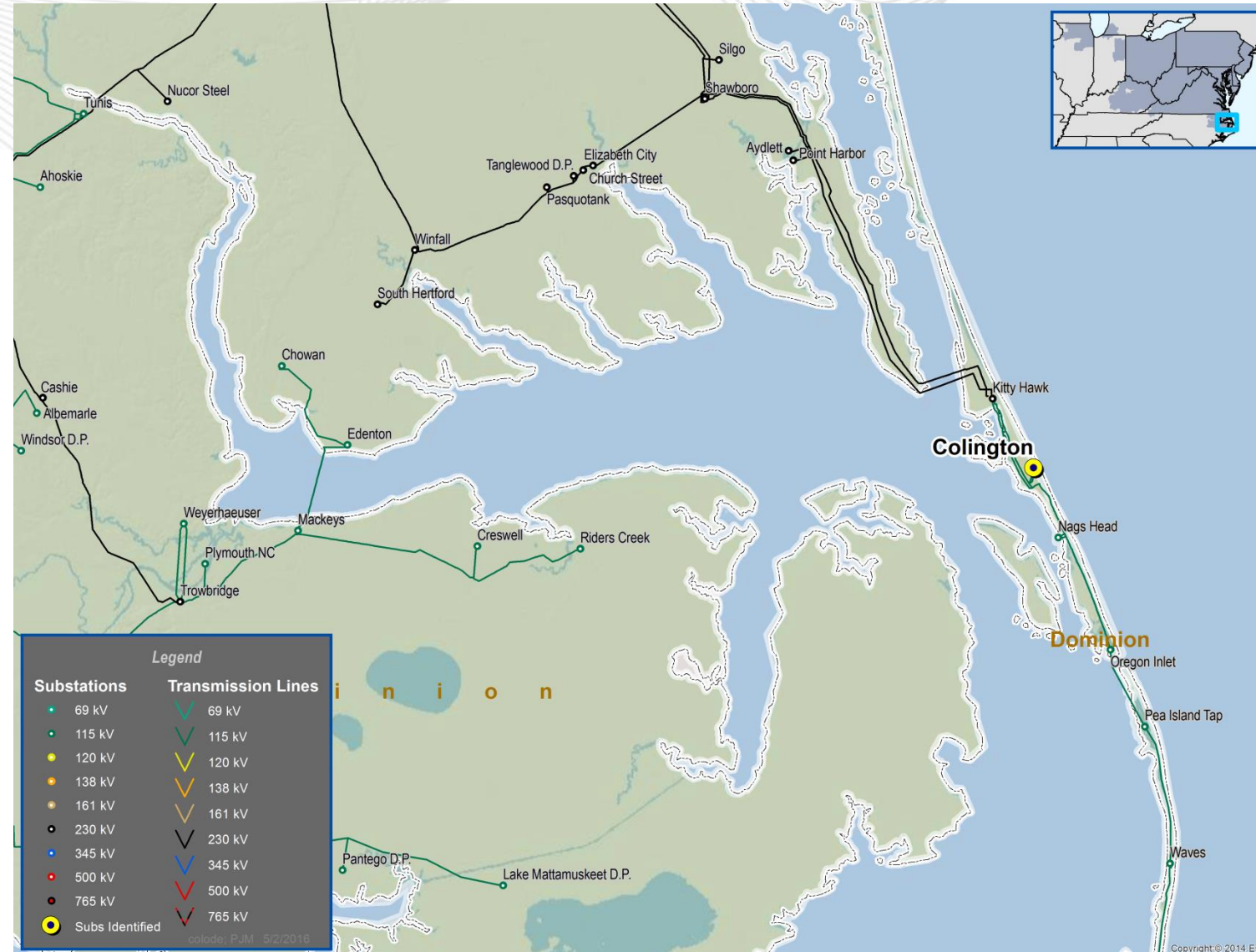
- Original SVC at its End of Life
 - Harsh Environment / High Salt Contamination has led to component corrosion
 - Cap/filters have reached end of life
 - Non-redundant design
 - Unique components with no spares

Solution

- Install a +/-125 MVar Statcom at Colington 230kV (B2757)

Estimated Project Cost: \$30 M

Projected IS Date: 06/01/2017





Dominion Transmission Zone

Problem: Dominion End of Life Criteria Violation

- The Doods - Valley 500 kV Line has reached its End of Life
- Third party evaluation:
 - Confirmed the Doods - Valley 500 kV has reached its End of Life
- PJM Reliability Assessments without the line result in Criteria violations:
 - Numerous thermal and voltage violations for various contingencies around and at Bath County, Lexington, Clifton, Lowmoor, and Doods.

Alternatives Considered

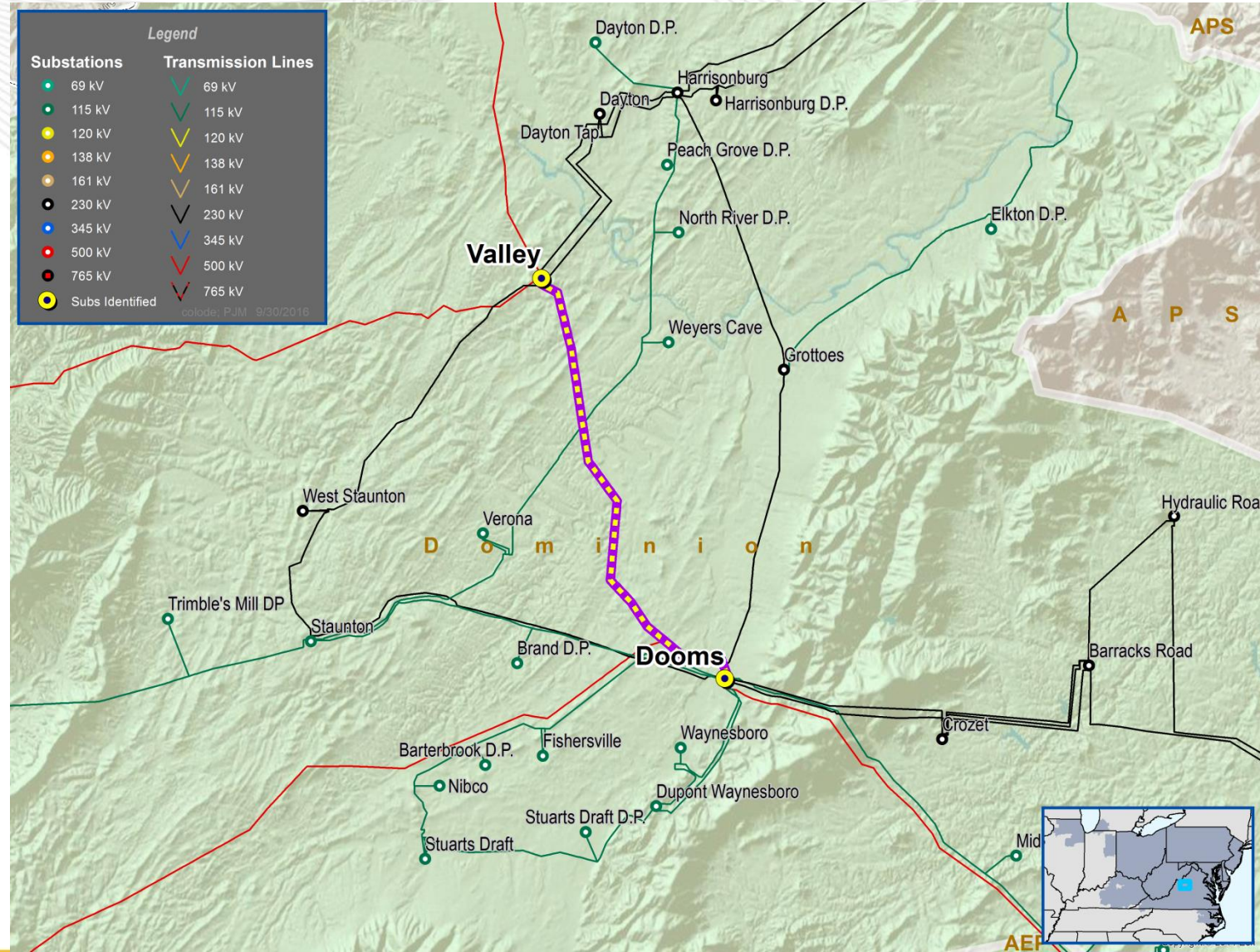
- Alternatives that would require new lines to be built were not considered.

Proposed Solution

- Rebuild Line #549 Doods – Valley 500kV (B2758)

Estimated Project Cost: \$58.16 M

Projected IS Date: 6/1/2021





Dominion Transmission Zone

Problem: Dominion End of Life Criteria Violation

- The Mt. Storm - Valley 500 kV Line has reached its End of Life
- Third party evaluation:
 - Confirmed the Mt. Storm - Valley 500 kV has reached its End of Life
- PJM Reliability Assessments without the line result in Criteria violations:
 - Numerous thermal and voltage violations for various contingencies around and at Barrack Road, Charlottesville, Bath County, Lexington, Clifton, Endless Caverns, Ox, and Possum.

Alternatives Considered

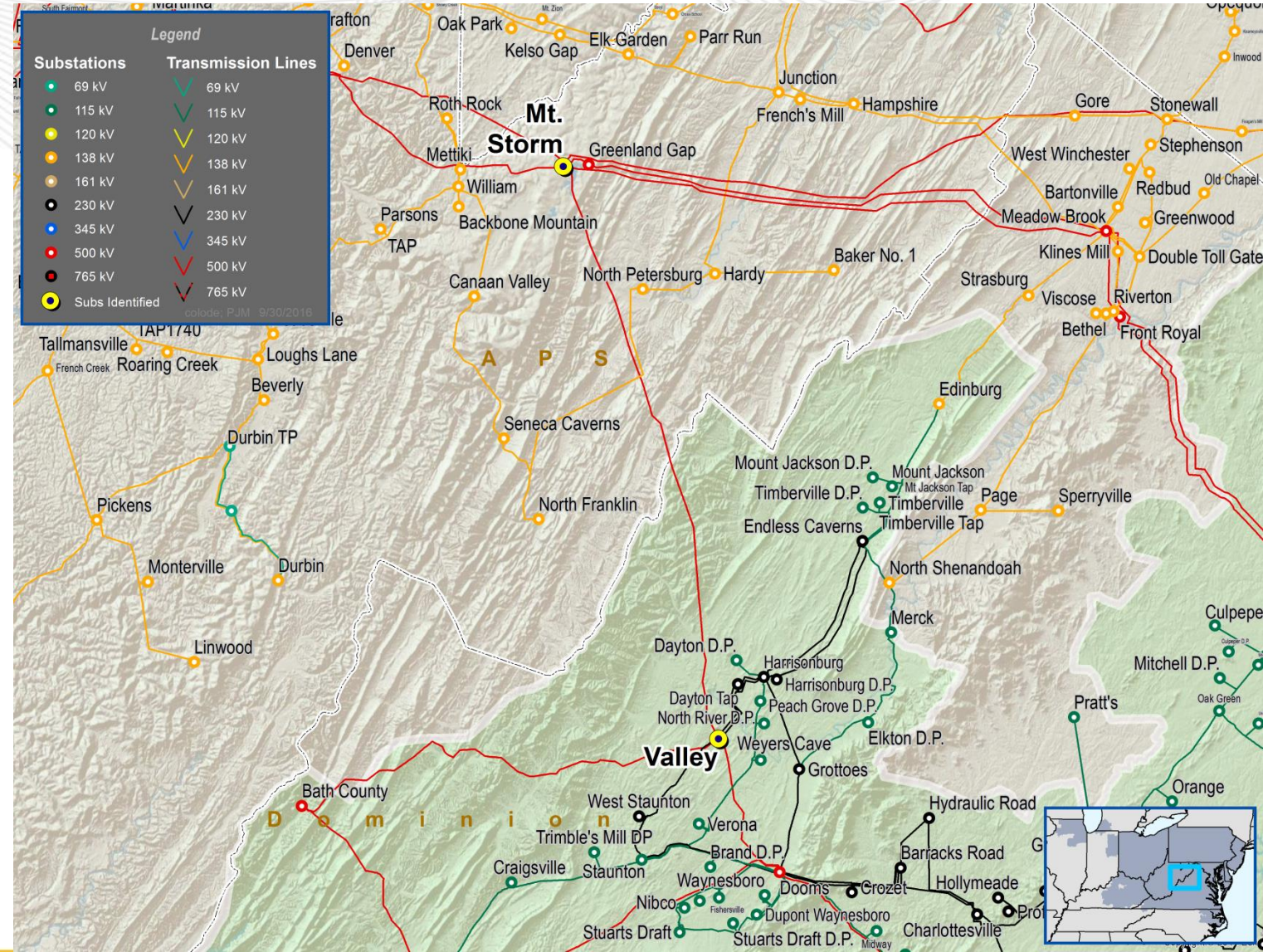
- Alternatives that would require new lines to be built were not considered.

Proposed Solution

- Rebuild Line #550 Mt. Storm – Valley 500kV (B2759)

Estimated Project Cost: \$225 M

Projected IS Date: 6/1/2021



Short Circuit Upgrades

Problem: Short Circuit

- The Ringgold 138 kV breakers '138 BUS TIE' and 'RCM0' are overstressed

Significant Driver: Market Efficiency Project 9A - West (b2743)

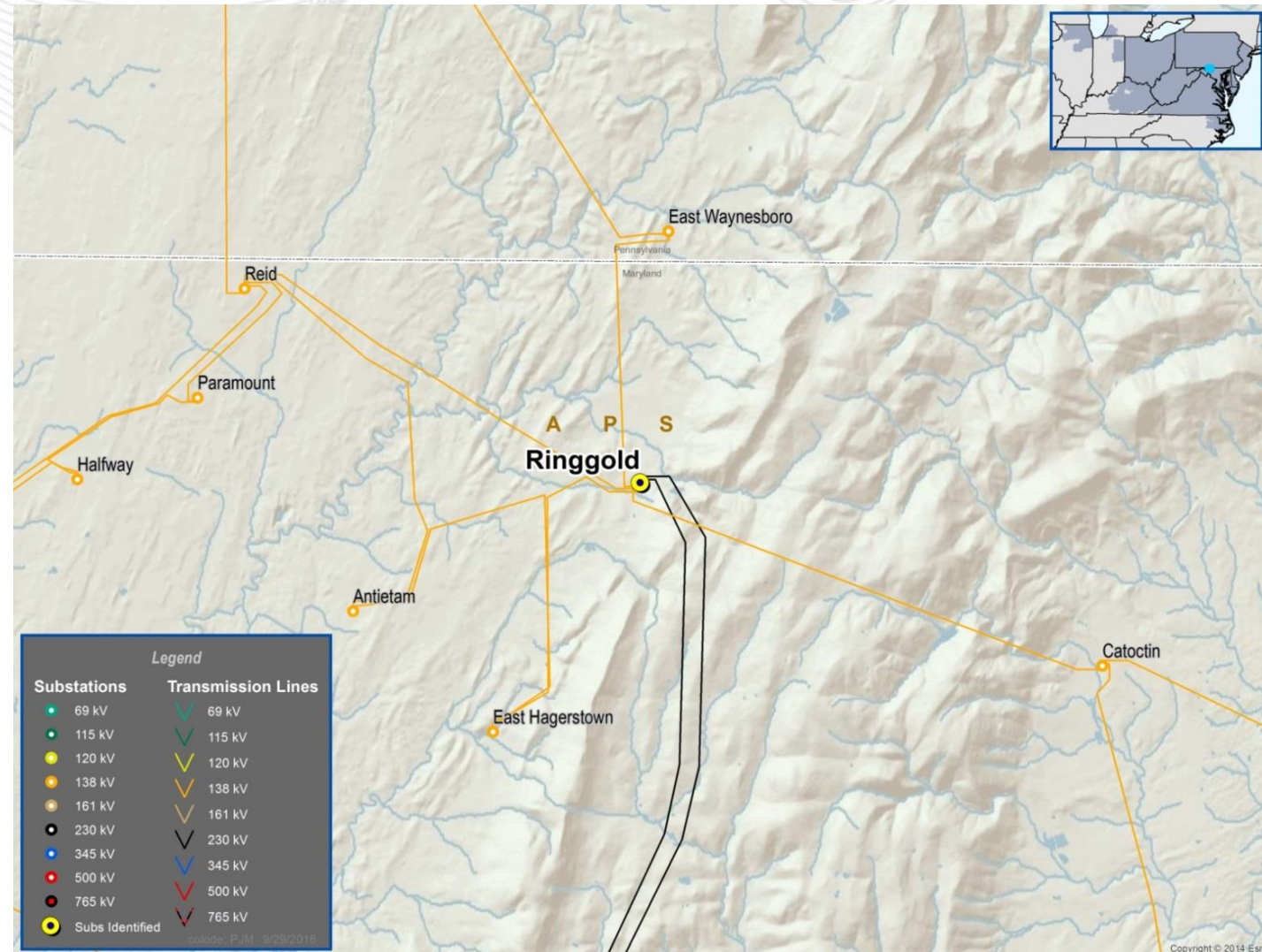
- Tap the Conemaugh - Hunterstown 500 kV line and tie in new Rice 500 kV station
- Build new 230 kV double circuit line between Rice and Ringgold 230 kV

Proposed Solution

- Replace the Ringgold 138 kV breakers '138 BUS TIE' and 'RCM0' with 40 kA breakers (b2743.8)

Estimated Project Cost: \$710 K

Required IS Date: 06/01/2020



15 Year Analysis Result



15 Year Analysis Result for 2016 RTEP

2016 RTEP 15 Year Analysis - Single Contingency Result								
Fr Bus	Fr Name	To Bus	To Name	CKT	KVs	Areas	100% Year	Comment
220963	CONASTON	220961	NWEST326	1	230/230	BGE	2031	
219110	GLOUCSTR_2	219755	CUTHBERT_4	1	230/230	PSEG	2025	
243217	05DEQUIN	243878	05MEADOW	2	345/345	AEP	2021	2016 RTEP Window 2
200675	26E.TWANDA	200924	26CANYON	1	230/230	PenElec	2021	2016 RTEP Window 2
213922	RICHMOND	214012	WANEETA3	1	230/230	PECO	2031	
219110	GLOUCSTR_2	219125	CAMDEN	1	230/230	PSEG	2030	
200064	PCHBTM1S	200004	CNASTONE	1	500/500	BGE/PECO	2030	
243221	05EUGENE	243217	05DEQUIN	1	345/345	AEP	2021	2016 RTEP Window 2
248001	06DEARB1	243233	05TANNER	Z1	345/345	206/205	2025	



15 Year Analysis Result for 2016 RTEP

2016 RTEP 15 Year Analysis - Tower Contingency Result

Fr Bus	Fr Name	To Bus	To Name	CKT	KVs	Areas	100% Year
314085	6REMNGCT	314110	6ELK RUN	1	230/230	Dominion	2029
206314	28RED OAKA	918790	AA1-098 TAP	1	230/230	JCPL	2027
918790	AA1-098 TAP	206305	28RAR RVR	1	230/230	JCPL	2027
314110	6ELK RUN	314037	6GAINSVL	1	230/230	Dominion	2030
314067	6OCCOQUN	314068	6OX	1	230/230	Dominion	2030



Artificial Island Update

- At their August 2016 meetings, the PJM Board of Managers directed PJM staff to perform a comprehensive analysis to support a future course of action
- Anticipated February 2017 recommendation to PJM Board
- PJM Evaluations Underway
 - Power System Protection & Control Team
 - Cost & Estimate Team
 - Data and Operational Analysis Team
 - Solution Space Team

RTEP Next Steps

Questions?

Email: RTEP@pjm.com

- Revision History
 - V1 – 10/3/2016 – Original Version Posted to PJM.com
 - V2 – 10/5/2016 - Added baseline IDs for slides 38-40
 - Included Ringgold breaker replacements
 - Updated slide 35 to reflect Mt. Storm- Valley 500kV line
 - Added slides 25-29
 - Update Slide 24
 - Added an Artificial Island Update
 - V3 -10/10/2016 – Add proposal 2016_2-7P into Slide #16