



Reliability Analysis Update

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Transmission Expansion Advisory Committee

May 9, 2023

- On April 26, 2023, the NJBPU notified PJM of its public policy requirements for offshore wind and has requested that PJM open a competitive proposal window to solicit onshore and offshore project proposals that address New Jersey’s public policy needs.
- The [order](#) contains more information about this request.
- The NJBPU requests PJM to plan for injections of power into the Deans⁽¹⁾ 500 kV substation on the PJM system between 2032 and 2040 as summarized below.
- As of the date of the order, this information will be reflected in the PJM planning process.

Location	State	Transmission Owner	MW MFO	MW Energy	MW Capacity	Notification Date	Requested In-Service Date
Deans 500 kV	NJ	PSEG	3,500 ⁽²⁾	3,500 ⁽²⁾	3,356.50 ⁽²⁾	4.26.2023	2032-2040

Notes: (1) Alternative cost-effective POI proposals while meeting NJ State Policy goal will be invited through solicitation. (2) Transmission proposals will be solicited for up to 3500 MWs of capability.

M-3 Process

Baseline Reliability Projects



M-3 Process Solutions Meeting Study File Submittal Requirements

- M-3 Process - Transmission Owner created process approved by the FERC
 - Described in [PJM Transmission Owners Attachment M-3 Process Guidelines v0.2](#) Section 3.2.3 “Review of Potential Solutions”
 - Presented at a TO Hosted PC Special Session August 28, 2018
- Solution Meeting – submittal requirements **15 days** prior to meeting

	Activity	Timing	Day	Who	How
1	Send Solutions Meeting slides and, for proposed solution, modeling information (contingency files, IDEV, etc.) to PJM	15 days before Solutions Meeting	-15	TOs and Stakeholders	E-mail to PJM
2	Finalizes Solutions Meeting slides (i.e., adds diagrams, etc.)	Upon receipt of slides, prior to posting date	>-10	PJM	Revises supplied slides
3	Post Solutions Meeting slides	10 days before Solutions Meeting	-10	PJM	Web posting of meeting materials
4	Solutions Meeting		0	All	

- Short Circuit files are considered modeling information

Changes to Existing Projects

Baseline Reliability Projects

- **Scope Clarification (administrative update):**
 - A portion of the Windsor to Clarksville Subproject b3737.40 scope was modified to reconductor one span (0.1 mile) of the C1017 (Clarksville-Windsor) 230 kV in lieu of creating a paired conductor path between Clarksville and Windsor.
 - A portion of the Windsor to Clarksville Subproject b3737.41 (Upgrade all terminal equipment at Windsor 230 kV and Clarksville 230 kV) previously included both PSEG and JCPL scope of work. This sub-ID was broken up into 2 sub-IDs to reflect both TOs' scope of work (PSEG scope remains with .41 sub-ID, while JCPL scope was transferred to new .59 sub-ID).
 - The b3737.48 scope of work to build a new North Delta-Graceton 230 kV line by rebuilding the existing Cooper-Graceton 230 kV line to double circuit previously included both PECO and BGE scope of work. This sub-ID was broken up into 2 sub-IDs to reflect both TOs' scope of work (PECO scope remains with .48 sub-ID, while BGE scope was transferred to new .56 sub-ID).

- **JCPL Zone Updates:**
 - Additional Project Scope:
 - Remove the existing E83 Line 115 kV (not in-service) to accommodate the new 500kV/230kV lines (approximately 7.7 miles) **(b3737.53)** - \$8.47M
 - Remove the existing H2008 Larrabee-Smithburg No. 2 230 kV to accommodate the new 500kV/230kV lines **(b3737.54)** - \$8.47 M
 - Middlesex Substation 230kV - Replace the 2000A Circuit Switcher at Middlesex Switch point for the Lake Nelson I1023 230kV exit **(b3737.55)** - \$0.53 M
 - Updated Project Costs:
 - Rebuild approximately 0.8 miles of the D1018 (Clarksville-Lawrence 230 kV) line (b3737.27) cost increase from \$11.45 M to \$14.58 M
 - Reconductor Red Oak A-Raritan River 230 kV (b3737.33) cost increase from \$11.05 M to \$12.53 M
 - Reconductor small section of Raritan River-Kilmer I 230 kV (b3737.35) cost increase from \$0.2 M to \$27.3 M

- **PSEG Zone Updates:**

- Cost to Install the new 345/230 kV transformer at Linden 345 kV, and relocate Linden-Tosco 230 kV (b3737.38) has increased from \$24.92M to \$35.30M.
- Cost to upgrade inside plant equipment at Lake Nelson I 230 kV (b3737.42) has increased from \$3.80M to \$4.80M.
- Cost to upgrade Kilmer W – Lake Nelson W 230 kV (b3737.43) has increased from \$0.16M to \$0.57M.
- Cost to upgrade Lake Nelson – Middlesex – Greenbrook W 230 kV (b3737.44) has increased from \$0.12M to \$0.58M.

- **PECO Zone Updates:**

- PECO's project scope to replace four 63 kA circuit breakers "205", "235", "225" and "255" at Peach Bottom 500 kV with 80 kA (b3737.51) is no longer needed due to a case correction, resulting in a total project decrease of \$5.6 M.

- **MAOD's Project Updates:**
 - Costs to construct the Larrabee Collector Station AC switchyard, and procure and prepare land adjacent to the AC switchyard (b3737.22) have increased from \$121.1 M to \$193.3 M. Includes costs that were explicitly excluded from MAOD's original estimate, that are required for the project.
 - Additional cost and scope for MAOD Pre-build Infrastructure evaluation study
 - Pre-build Infrastructure scope is intended so that either an Offshore wind developer, or other entity selected by NJBPU, construct the necessary duct banks and access cable vaults for other Offshore wind generators, to fully utilize the Larrabee Tri-Collector Solution.
 - The NJBPU approved that MAOD perform a Pre-build Infrastructure evaluation study in alignment with requirements in [Attachment 10](#) of the NJBPU Solicitation Guidance Document (SGD).
 - The deliverables for this study will be a desktop study, updated cable routes and cross-section diagrams, detailed scope, schedule and cost estimates for the pre-build infrastructure.
 - Study cost estimate is \$290K, and targeted for completion by June 2, 2023.
- **NJ SAA Project Total Cost Increase:** \$1,064.36 M → \$1,191.70 M

Appendix

Baseline Reliability Projects

Assumption Reference: 2020 RTEP assumption

Model Used for Analysis: 2021 SAA Proposal Window cases

Proposal Window Exclusion: None

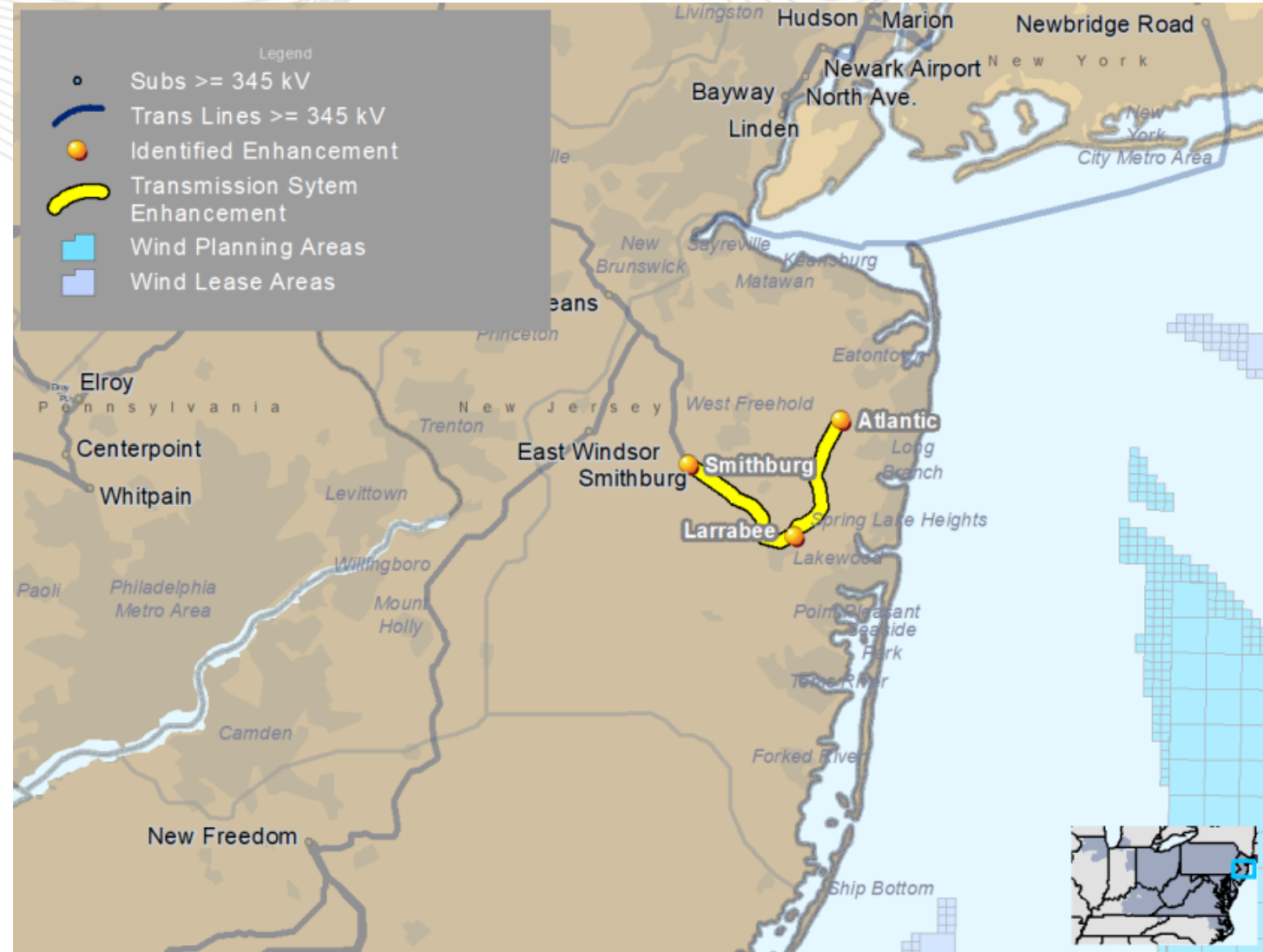
Problem Statement:

PJM solicited project proposals to build the necessary transmission to meet New Jersey's goal to facilitate the delivery of a total of 6,400 MW of offshore wind.

Recommended Solution: Option 1b – Proposal 453 (Partial)

- Larrabee Substation - Reconfigure substation (b3737.1) - \$4.24
- Larrabee Substation - 230 kV equipment for direct connection (b3737.2) - \$4.77 M
- Lakewood Generator Substation - Update relay settings on the Larrabee 230 kV line (b3737.3) - \$0.03 M
- B54 Larrabee-South Lockwood 34.5 kV line transfer (b3737.4) - \$0.31 M
- Larrabee Collector Station-Larrabee 230 kV new line (b3737.5) - \$7.52 M

Required IS Date (b3737.1-.5): 6/1/2029



Assumption Reference: 2020 RTEP assumption

Model Used for Analysis: 2021 SAA Proposal Window cases

Proposal Window Exclusion: None

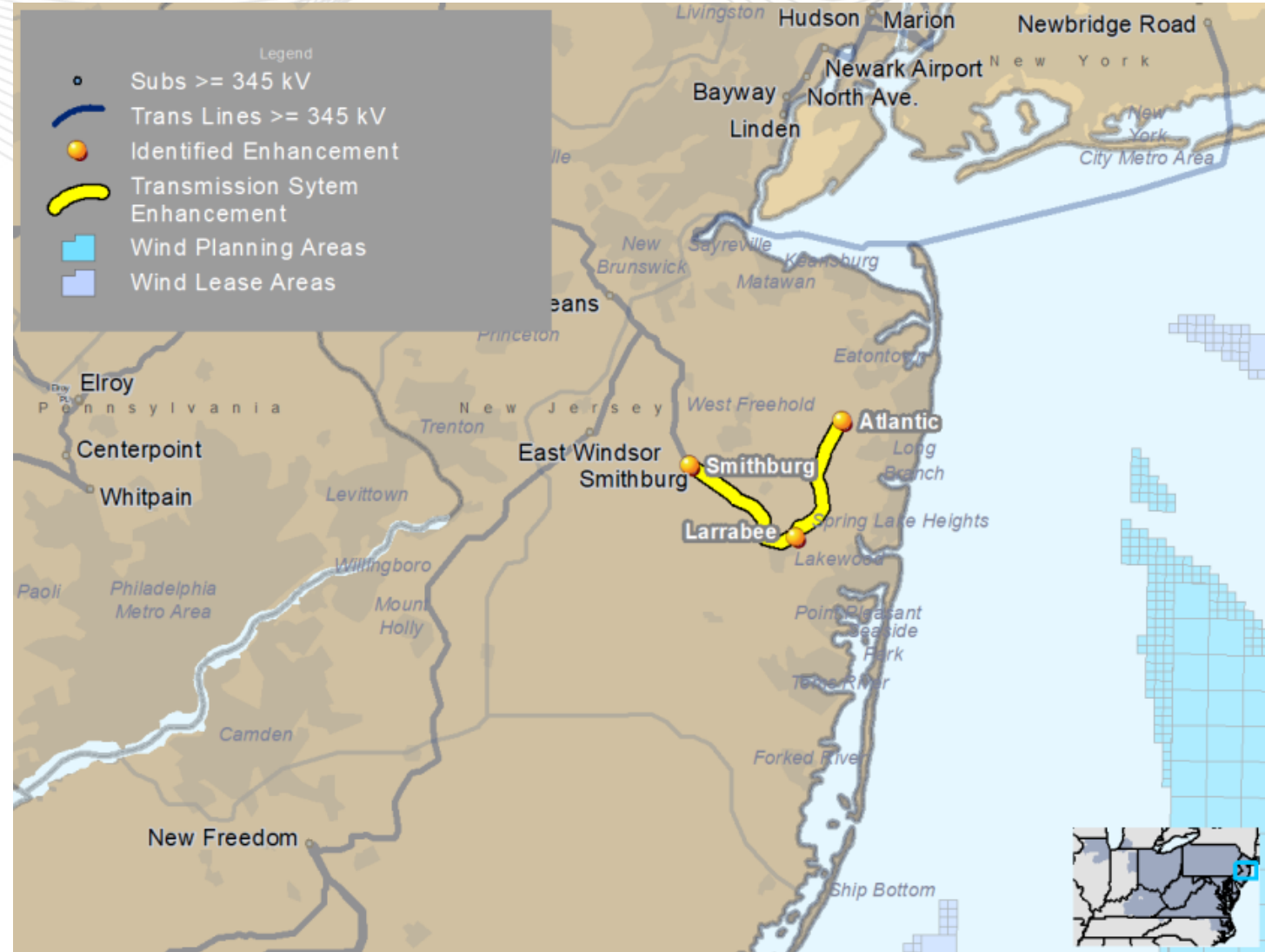
Problem Statement:

PJM solicited project proposals to build the necessary transmission to meet New Jersey's goal to facilitate the delivery of a total of 6,400 MW of offshore wind.

Recommended Solution: Option 1b – Proposal 453 (Partial)

- Larrabee Collector Station-Smithsburg No. 1 500 kV line (new asset). New 500 kV line will be built double circuit to accommodate a 500 kV line and a 230 kV line. (b3737.6) - \$150.35 M
- Rebuild G1021 Atlantic-Smithsburg 230 kV line between the Larrabee and Smithsburg substations as a double circuit 500kV/230kV line (b3737.7) - \$62.85 M
- Smithsburg substation 500 kV expansion to 4 breaker ring (b3737.8) - \$68.25 M
- Rebuild Larrabee-Smithsburg No. 1 230 kV (b3737.32) - \$44.77 M
- Remove the existing E83 Line 115 kV (not in-service) to accommodate the new 500kV/230kV lines (approximately 7.7 miles) (b3737.53) - \$8.47M
- Remove the existing H2008 Larrabee-Smithsburg No. 2 230 kV to accommodate the new 500kV/230kV lines (b3737.54) - \$8.47 M

Required IS Date (b3737.6-.8 & .32): 12/31/2027

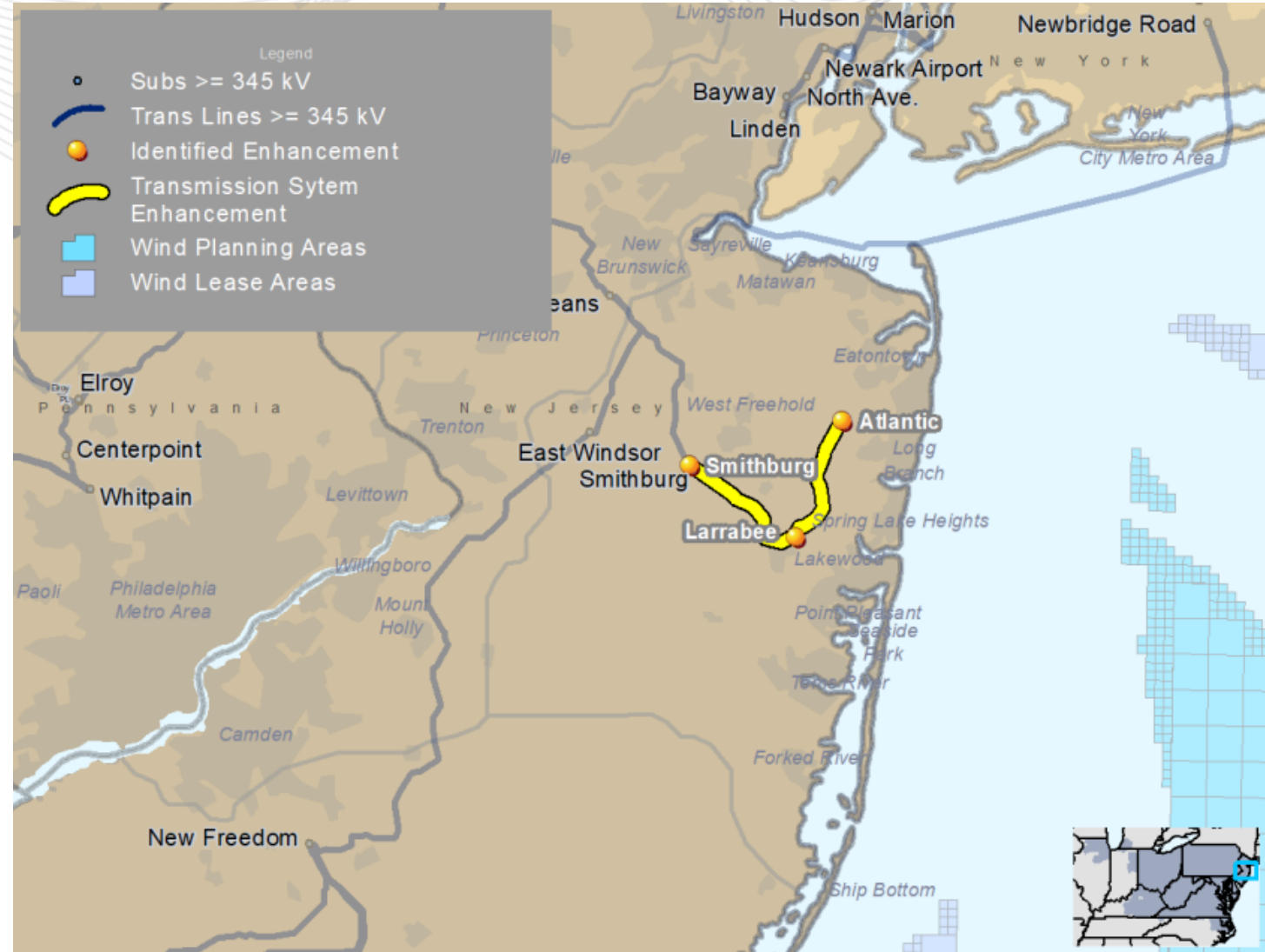


Recommended Solution (cont.): Option 1b – Proposal 453 (Partial)

- Larrabee substation upgrades (b3737.9) - \$0.86 M
- Atlantic 230 kV Substation - Convert to double-breaker double-bus (b3737.10) - \$31.47 M
- Freneau Substation - Update relay settings on the Atlantic 230 kV line (b3737.11) - \$0.03 M
- Smithburg Substation - Update relay settings on the Atlantic 230 kV line (b3737.12) - \$0.03 M
- Oceanview Substation - Update relay settings on the Atlantic 230 kV lines (b3737.13) - \$0.04 M
- Red Bank Substation - Update relay settings on the Atlantic 230 kV lines (b3737.14) - \$0.04 M
- South River Substation - Update relay settings on the Atlantic 230 kV line (b3737.15) - \$0.03 M
- Larrabee Substation - Update relay settings on the Atlantic 230 kV line (b3737.16) - \$0.03 M
- Atlantic Substation - Construct a new 230 kV line terminal position to accept the generator lead line from the offshore wind Larrabee Collector Station (b3737.17) - \$4.95 M
- G1021 (Atlantic-Smithburg) 230 kV upgrade (b3737.18) - \$9.68 M
- R1032 (Atlantic-Larrabee) 230 kV upgrade (b3737.19) - \$14.5 M
- New Larrabee Collector Station-Atlantic 230 kV line (b3737.20) - \$17.07 M
- Larrabee-Oceanview 230 kV line upgrade (b3737.21) - \$6 M

Required IS Date (b3737.9-.21): 6/1/2030

Estimated Cost (b3737.1-.21 & .32 & .53-.54): ~~\$427.82 M~~ \$444.76 M





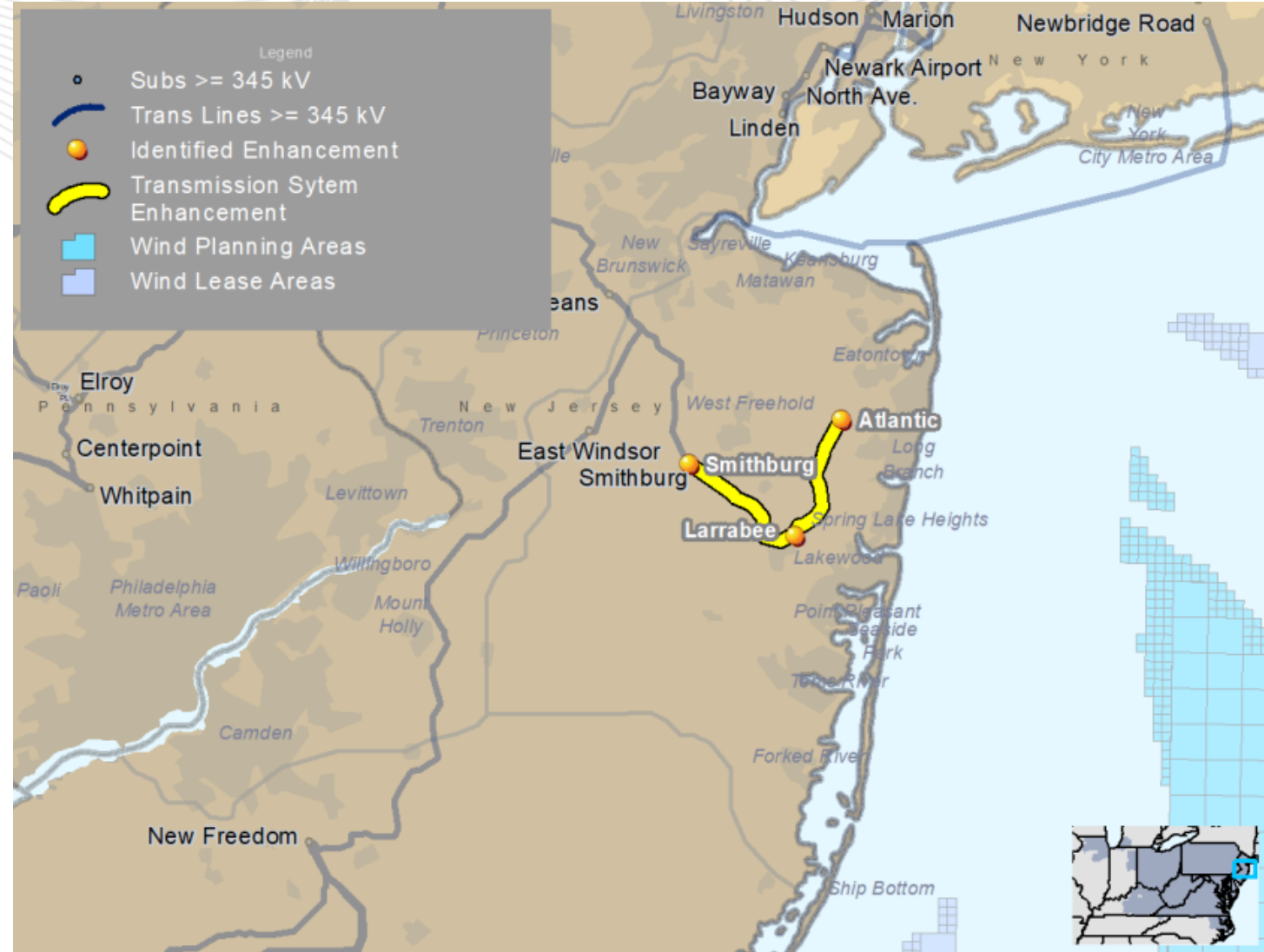
JCPL Transmission Zone: Baseline NJ SAA Project

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Larrabee-Smithburg No. 1 230 kV	650/817/785/943
Larrabee-Smithburg No. 2 230 kV	678/813/805/929
Atlantic-Larrabee 230 kV	913/1147/1116/1352
Larrabee-Oceanview 230 kV	709/869/805/1031
Larrabee-Smithburg No. 1 230 kV	650/817/785/943

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Larrabee-Smithburg 230 kV	709/869/805/1031
Atlantic-Larrabee 230 kV	1104/1273/1106/1390
Larrabee-Oceanview 230 kV	1104/1273/1106/1339
Larrabee-Smithburg No. 1 230 kV	1136/1311/1139/1379
Larrabee Collector-Atlantic 230 kV	1260/1447/1259/1523
Larrabee Collector-Larrabee 230 kV	1418/1739/1610/2062
Larrabee Collector-Smithburg No. 1 500 kV	3678/4541/4262/5503



Recommended Solution (cont.): Option 2 – Proposals 551 (Partial)

- Construct the Larrabee Collector Station AC switchyard, composed of a 230 kV 3 x breaker and a half substation with a nominal current rating of 4000 A and four single phase 500/230 kV 450 MVA autotransformers to step up the voltage for connection to the Smithburg substation.
- Procure land adjacent to the AC switchyard, and prepare the site for construction of future AC to DC converters for future interconnection of DC circuits from offshore wind generation. Land should be suitable to accommodate installation of 4 individual converters to accommodate circuits with equivalent rating of 1400 MVA at 400 kV. (b3737.22)

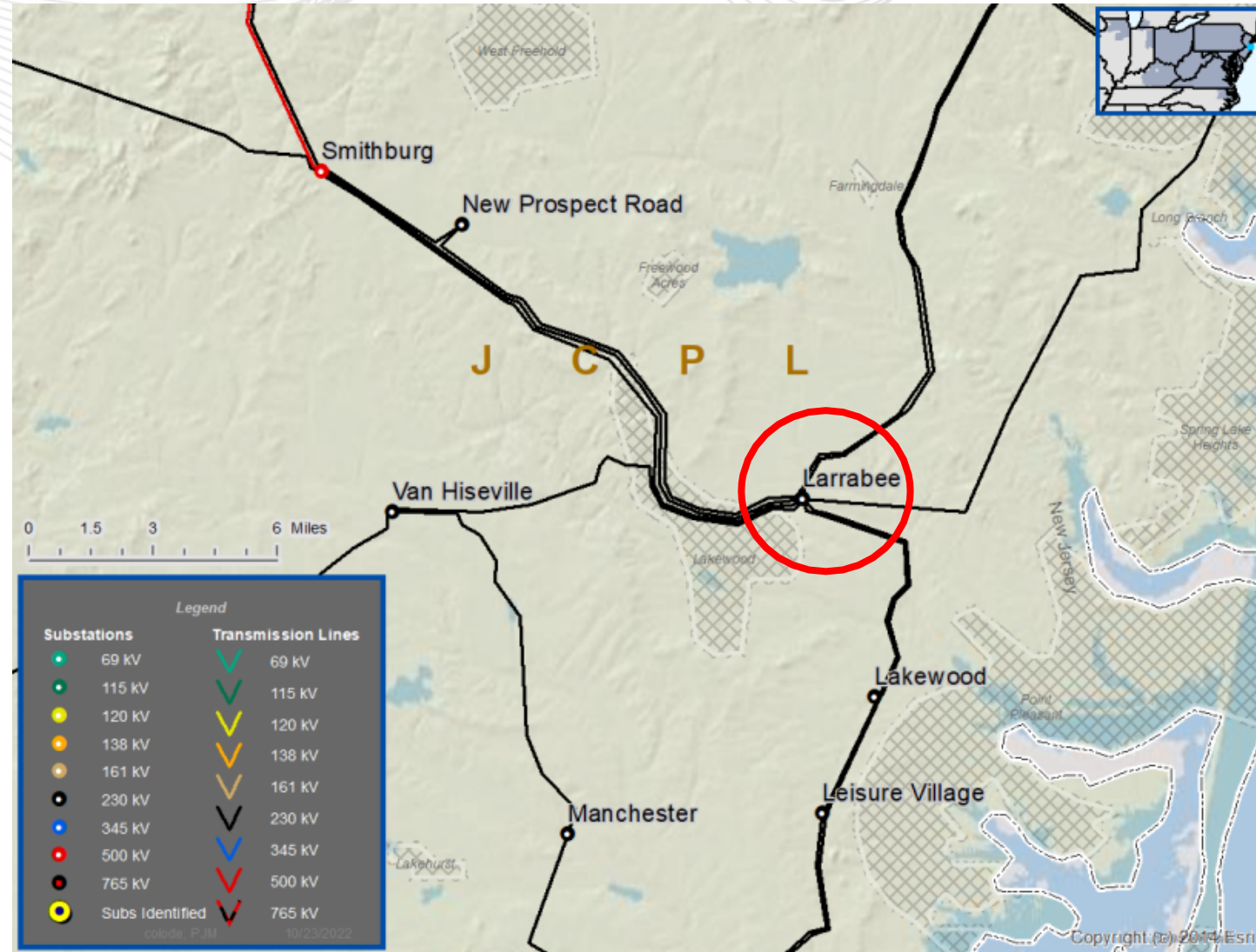
Required IS Date (b3737.22): 12/31/2027

Estimated Cost (b3737.22): ~~\$121.10 M~~ **\$193.3 M**

- Perform a Pre-build Infrastructure evaluation study in alignment with the NJBPU Solicitation Guidance Document requirements.

Required Completion Date: 6/2/2023

Estimated Cost: \$0.29M



Criteria: Summer & Winter Generator Deliverability

Problem Statement:

The Richmond-Waneeta 230 kV line is overloaded for an N-1 outage, and the Cardiff-Lewis 138 kV, Lewis No. 2-Lewis No. 1 138 kV and Cardiff-New Freedom 230 kV lines are overloaded for N-2 outages.

Recommended Solution: Option 1a – Proposal 127 (Partial)

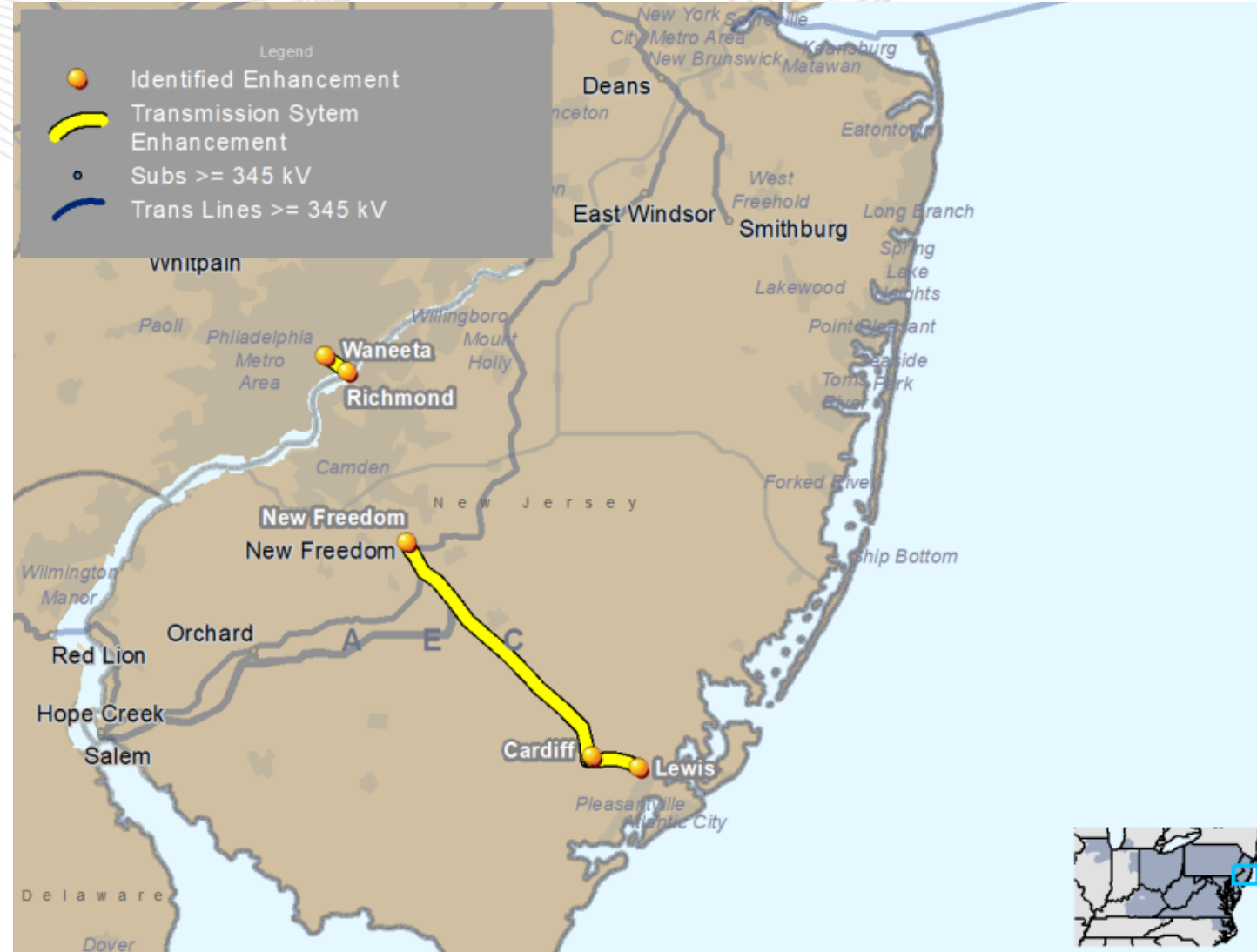
- Rebuild the underground portion of Richmond-Waneeta 230 kV (b3737.23)

Required IS Date (b3737.23): 6/1/2029

- Upgrade Cardiff-Lewis 138 kV by replacing 1590 kcmil strand bus inside Lewis substation (b3737.24)
- Upgrade Lewis No. 2-Lewis No. 1 138 kV by replacing its bus tie with 2000 A circuit breaker (b3737.25)
- Upgrade Cardiff-New Freedom 230 kV by modifying existing relay setting to increase relay limit (b3737.26)

Required IS Date (b3737.24-.26): 4/30/2028

Estimated Cost (b3737.23-.26): \$16.9 M

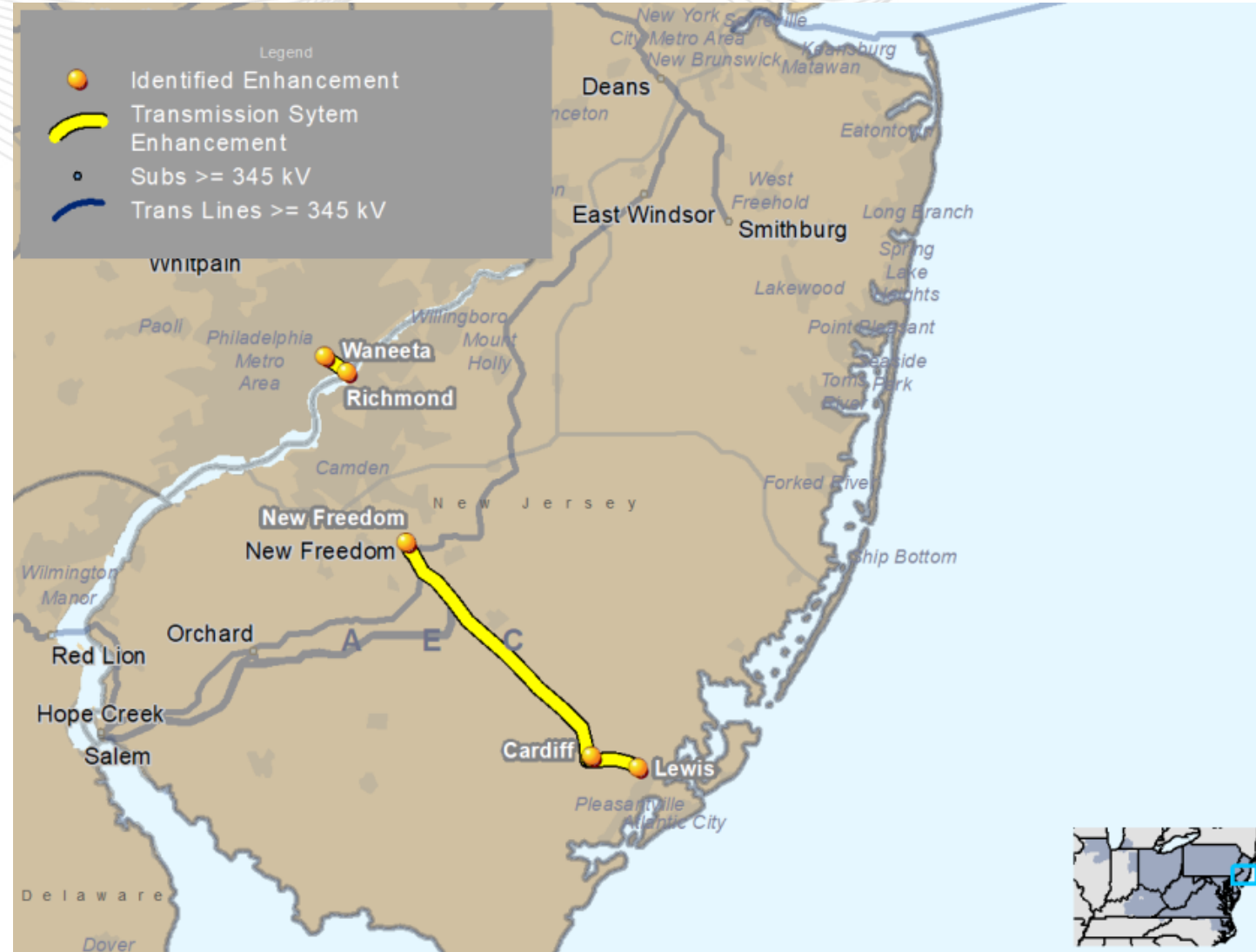


Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Richmond-Waneeta 230 kV	760/1180/803/1201
Cardiff-Lewis 138 kV	315/400/449/543
Lewis No. 2-Lewis No. 1 138 kV	286.8/286.8/286.8/286.8
Cardiff-New Freedom 230 kV	650/692/692/692

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Richmond-Waneeta 230 kV	1098/1247/1150/1299
Cardiff-Lewis 138 kV	377/478/451/478
Lewis No. 2-Lewis No. 1 138 kV	478/478/478/478
Cardiff-New Freedom 230 kV	650/804/748/906



Criteria: Summer & Winter Generator Deliverability

Problem Statement:

The Clarksville-Lawrence 230 kV, Kilmer I-Lake Nelson I 230 kV, Smithburg-Windsor 230 kV, Smithburg-Deans 500 kV lines and Smithburg 500/230 kV No. 1 and No. 2 transformers are overloaded for N-2 outages.

Recommended Solution: Option 1a – Proposal 17 (Partial)

- Rebuild approximately 0.8 miles of the D1018 (Clarksville-Lawrence 230 kV) line between Lawrence substation (PSEG) and structure No. 63 (b3737.27) - ~~\$11.45 M~~ **\$14.58M**
- Reconductor Kilmer I-Lake Nelson I 230 kV (b3737.28) - \$4.42 M

Required IS Date (b3737.27-.28): 6/1/2029

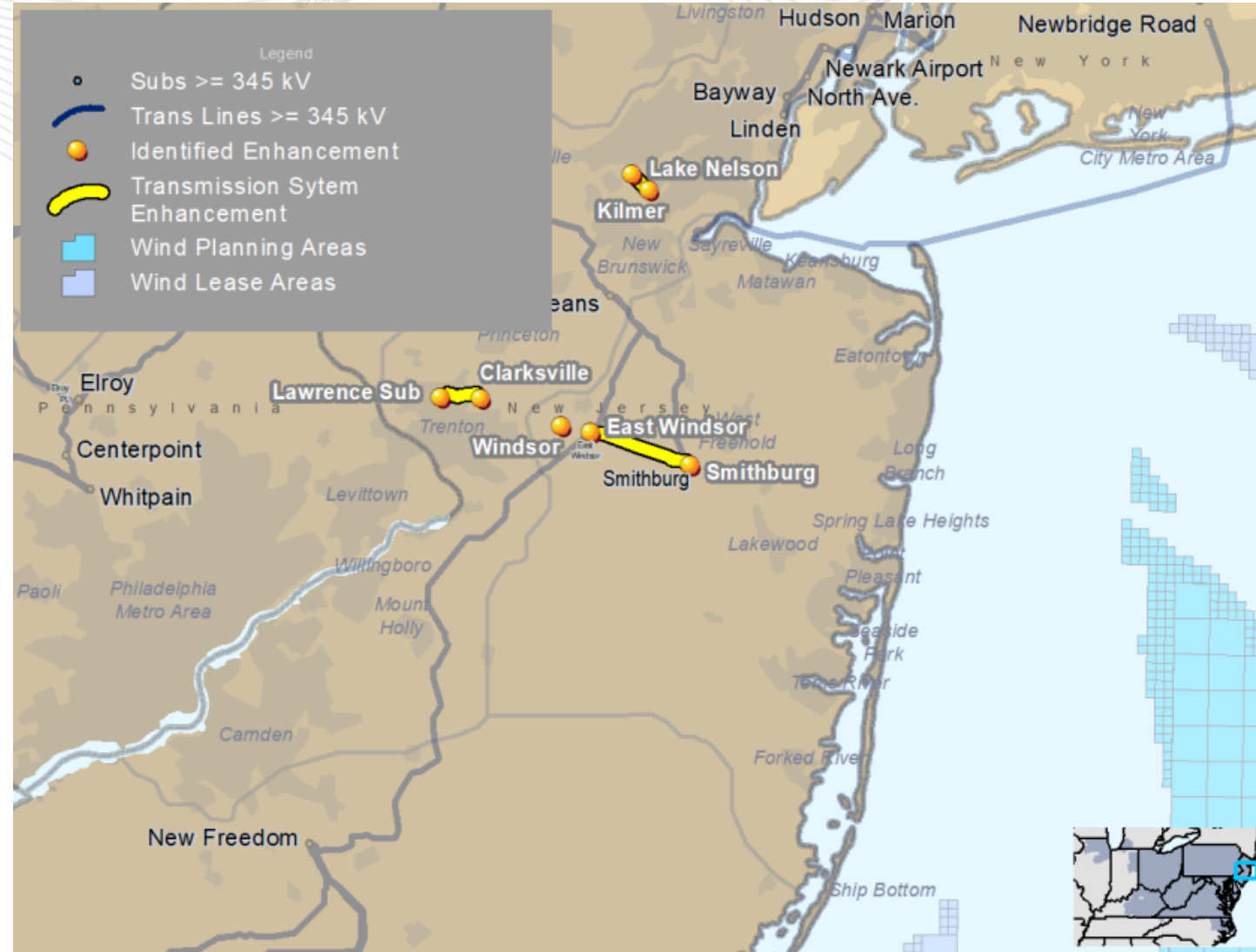
- Convert the six-wired East Windsor-Smithburg E2005 230 kV line (9.0 mi.) to two circuits. One a 500 kV line and the other a 230 kV line (b3737.29) - \$206.48 M

Required IS Date (b3737.29): 12/31/2028

- Add third Smithburg 500/230 kV transformer (b3737.30) - \$13.4 M

Required IS Date (b3737.30): 12/31/2027

Estimated Cost (b3737.27-.30): ~~\$235.75 M~~ **\$238.88 M**





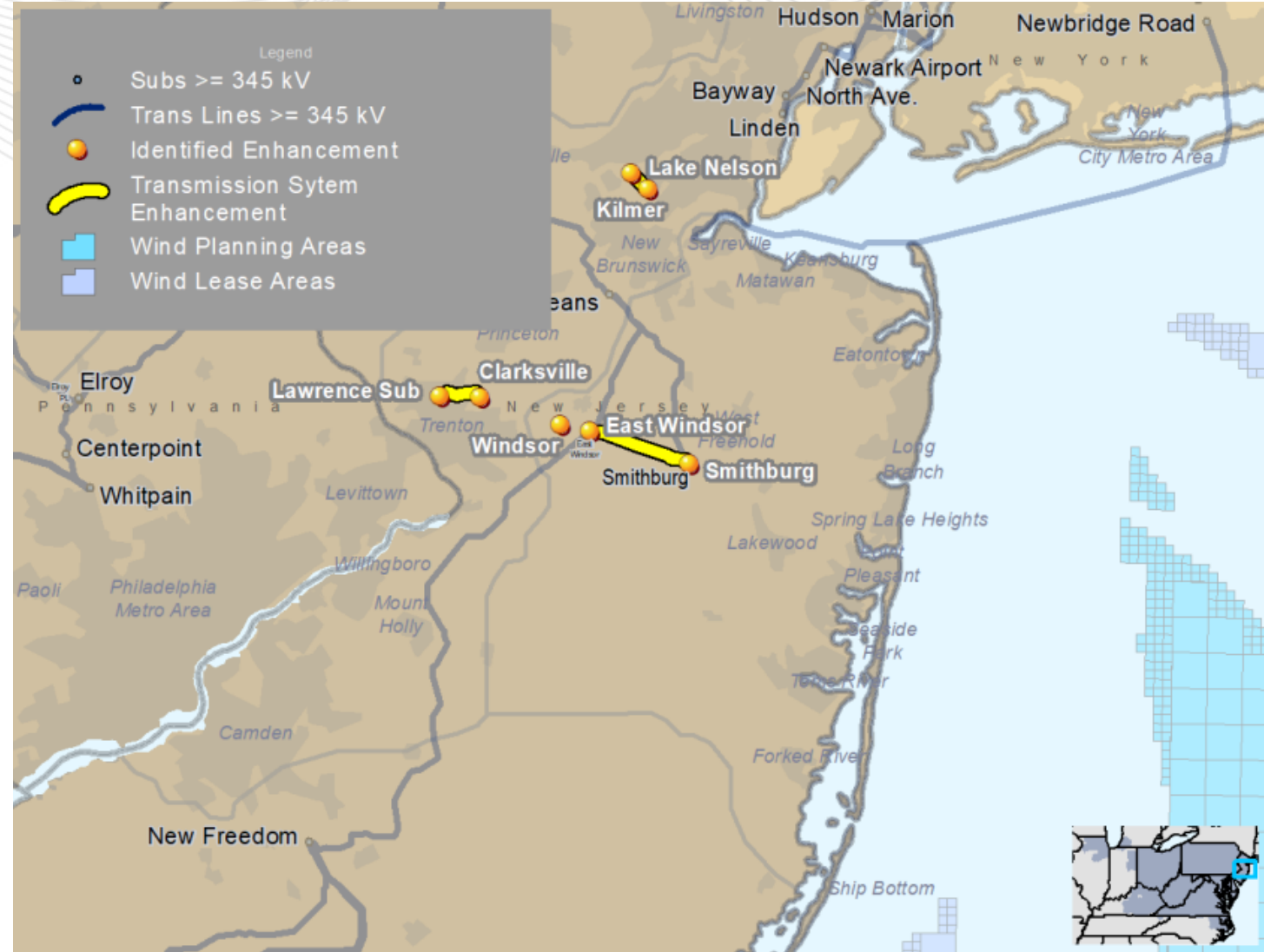
JCPL Transmission Zone: Baseline NJ SAA Project

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Clarksville-Lawrence 230 kV	709/869/805/1031
Kilmer I-Lake Nelson I 230 kV	709/869/805/1031

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Clarksville-Lawrence 230 kV	1140/1387/1342/1495
Kilmer I-Lake Nelson I 230 kV	1136/1311/1139/1379
Smithburg-East Windsor 500 kV	3678/4541/4262/5503
Smithburg 500/230 kV Transformer	1034/1287/1036/1451





JCPL Transmission Zone: Baseline NJ SAA Project

Criteria: Winter Generator Deliverability

Problem Statement:

The Lake Nelson I-Middlesex 230 kV line is overloaded for an N-1 outage.

Recommended Solution: Option 1a – Proposal Email 12/30/21

- Additional reconductoring required for Lake Nelson I-Middlesex 230 kV (b3737.31) - \$3.3 M
- **Middlesex Substation 230kV - Replace the 2000A Circuit Switcher at Middlesex Switch point for the Lake Nelson I1023 230kV exit (b3737.55) - \$0.53 M**

Required IS Date (b3737.31): 6/1/2029

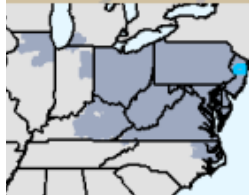
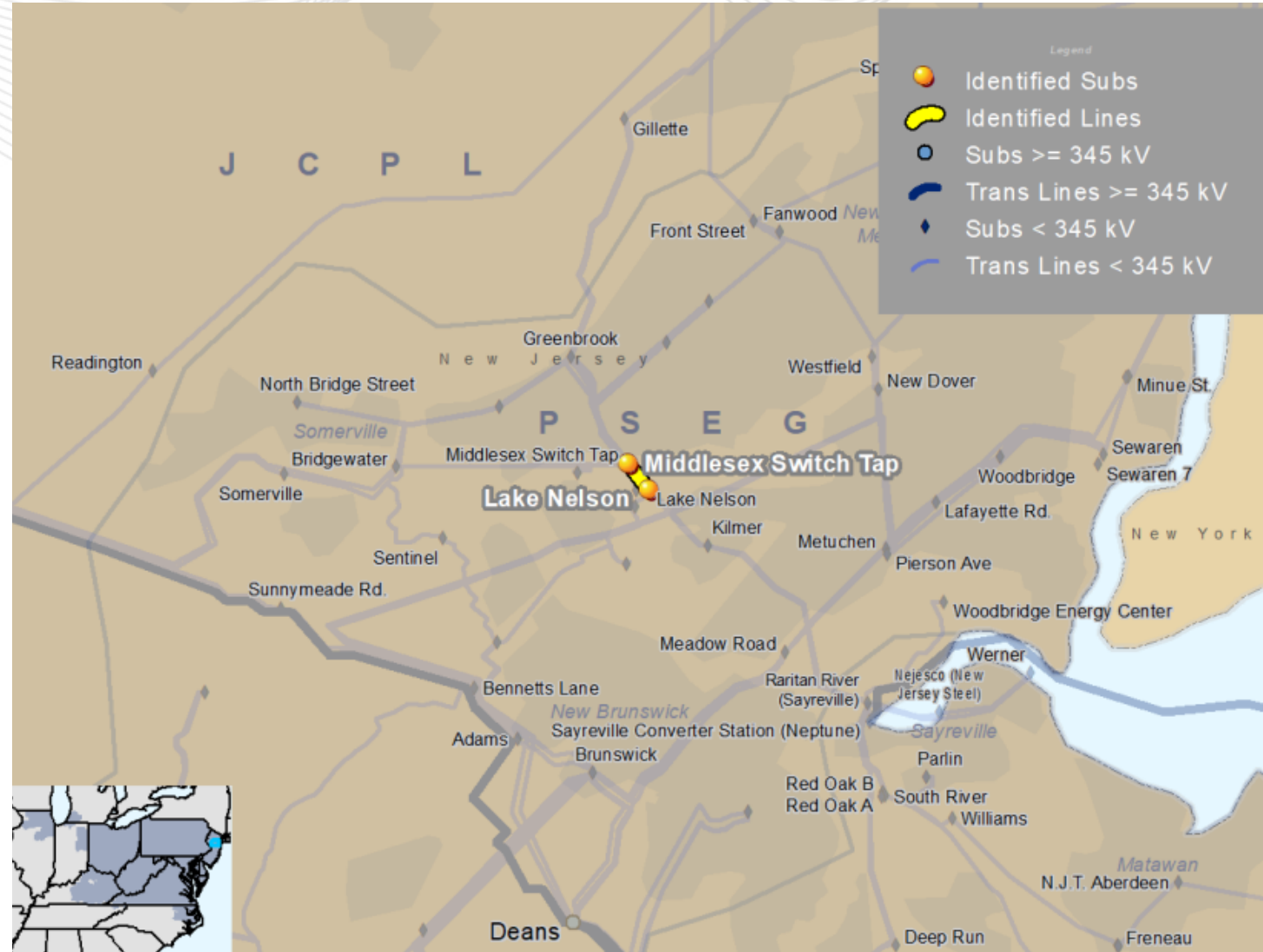
Estimated Cost (b3737.31): ~~\$3.3 M~~ **\$3.83 M**

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Lake Nelson I-Middlesex 230 kV	709/819/797/819

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Lake Nelson I-Middlesex 230 kV	1114/1285/1116/1352



Criteria: Summer & Winter Generator Deliverability

Problem Statement:

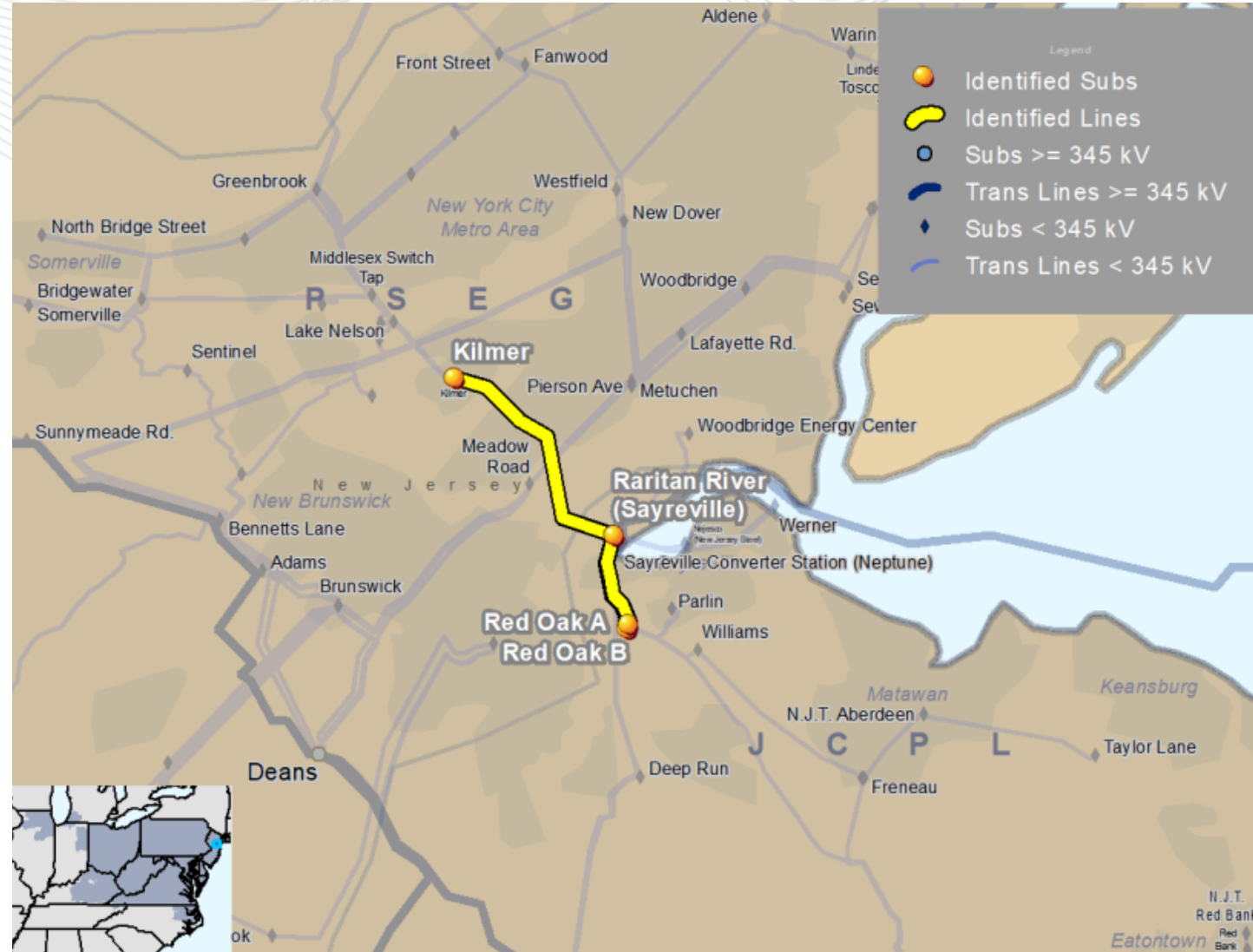
The Raritan River-Kilmer I 230 kV line is overloaded for an N-1 outage, and the Raritan River-Kilmer W 230 kV, Red Oak A-Raritan River 230 kV and Red Oak B-Raritan River 230 kV lines are overloaded for N-2 outages.

Recommended Solution: Option 1a – Proposal Email 2/11/2022

- Reconductor Red Oak A-Raritan River 230 kV (b3737.33) - ~~\$11.05 M~~ **\$12.53 M**
- Reconductor Red Oak B-Raritan River 230 kV (b3737.34) - \$3.9 M
- Reconductor small section of Raritan River-Kilmer I 230 kV (b3737.35) - ~~\$0.2 M~~ **\$27.3 M**
- Replace substation conductor at Kilmer and reconductor Raritan River-Kilmer W 230 kV (b3737.36) - \$25.88 M

Required IS Date (b3737.33-.36): 6/1/2029

Estimated Cost (b3737.33-.36): ~~\$41.03 M~~ **\$69.61**

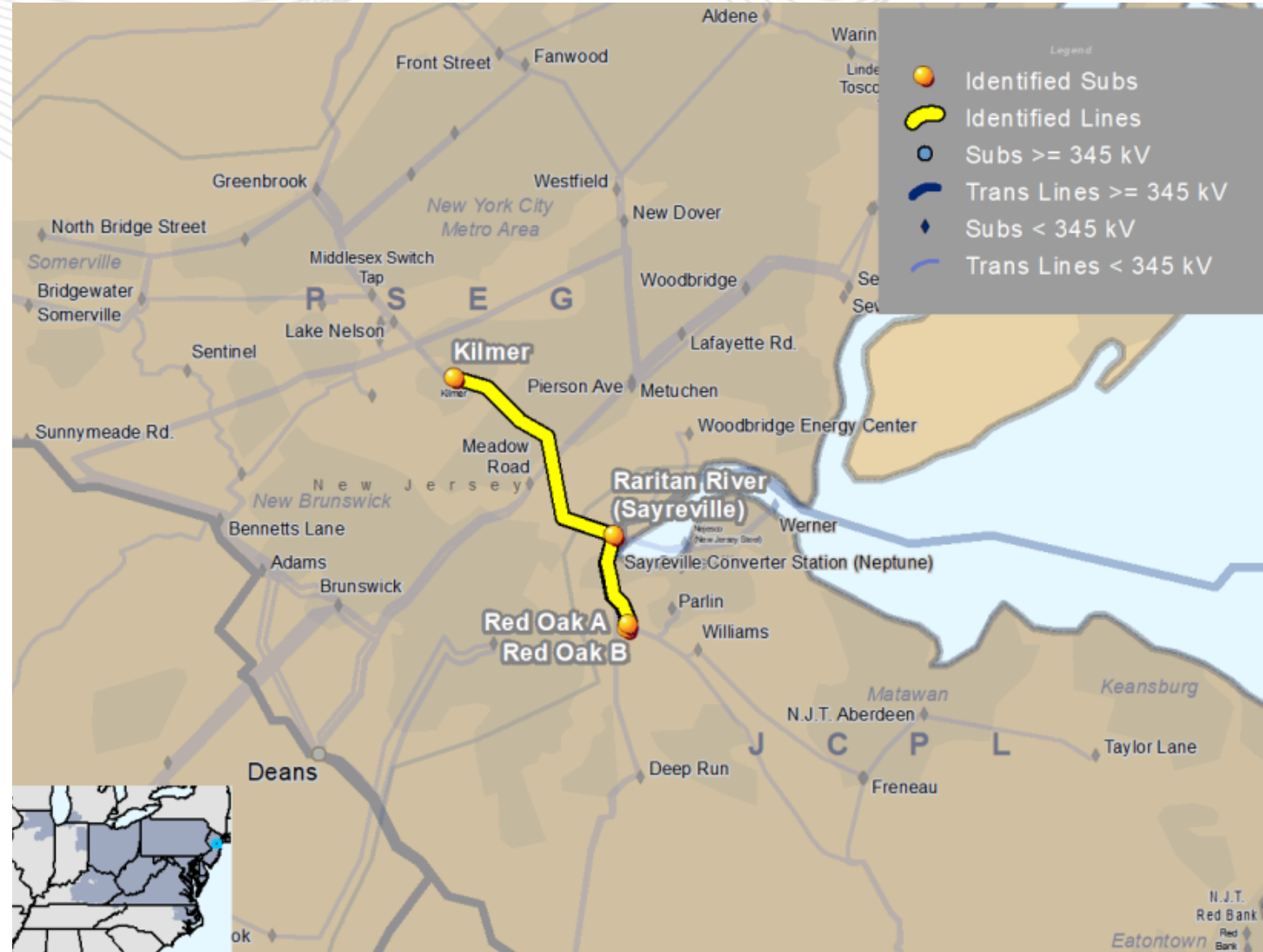


Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Raritan River-Kilmer I 230 kV	709/869/805/1031
Raritan River-Kilmer W 230 kV	650/817/785/943
Red Oak A-Raritan River 230 kV	709/869/805/1031
Red Oak B-Raritan River 230 kV	709/869/805/1031

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Raritan River-Kilmer I 230 kV	1156/1334/1158/1403
Raritan River-Kilmer W 230 kV	1156/1334/1158/1403
Red Oak A-Raritan River 230 kV	1156/1334/1158/1403
Red Oak B-Raritan River 230 kV	1156/1334/1158/1403





LS Power in DPL & PSEG Transmission Zones: Baseline NJ SAA Project

Criteria: Winter Generator Deliverability

Problem Statement:

The Hope Creek-LS Power Cable East 230 kV No. 1 and No. 2 lines are overloaded for an N-1 outage, and the LS Power Cable East-LS Power Silver Run 230 kV line is overloaded for an N-2 outage.

Recommended Solution: Option 1a – Proposal 229

- Add a third set of submarine cables, rerate the overhead segment, and upgrade terminal equipment to achieve a higher rating for the Silver Run-Hope Creek 230 kV line (b3737.37)

Required IS Date (b3737.37): 6/1/2029

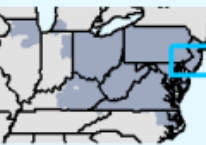
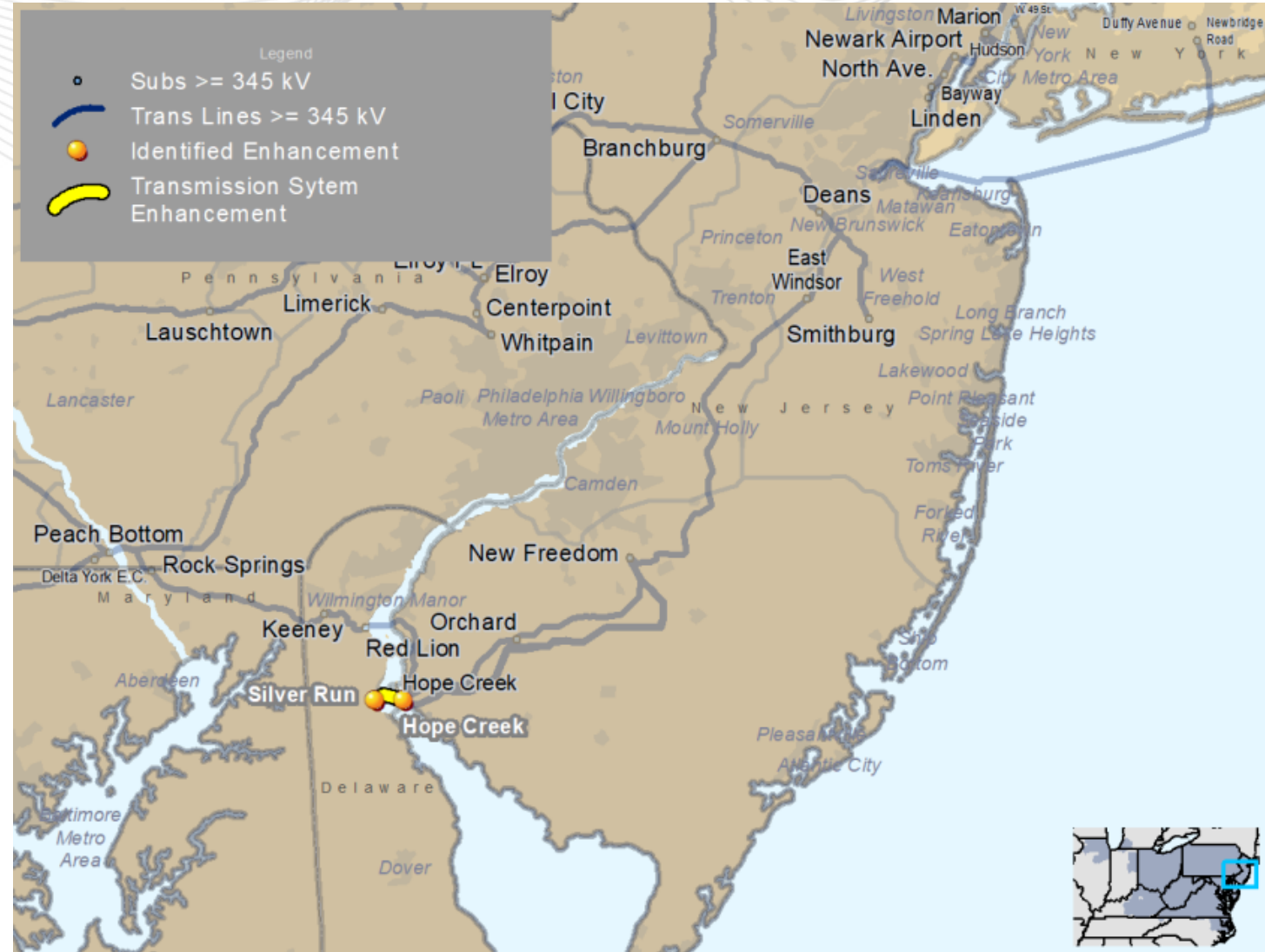
Estimated Cost (b3737.37): \$61.2 M

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Hope Creek-LS Power Cable East 230 kV No. 1 and No. 2	470/575/470/575
LS Power Cable East-LS Power Silver Run 230 kV	940/1150/940/1150

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Hope Creek-Silver Run 230 kV	1364/1614/1364/1614





PSEG & JCPL Transmission Zone: Baseline NJ SAA Project

Criteria: Summer Generator Deliverability

Problem Statement:

The Linden-Tosco 230 kV and Windsor-Clarksville 230 kV lines are overloaded for N-2 outages.

Recommended Solution: Option 1a – Proposal 180 (Partial)

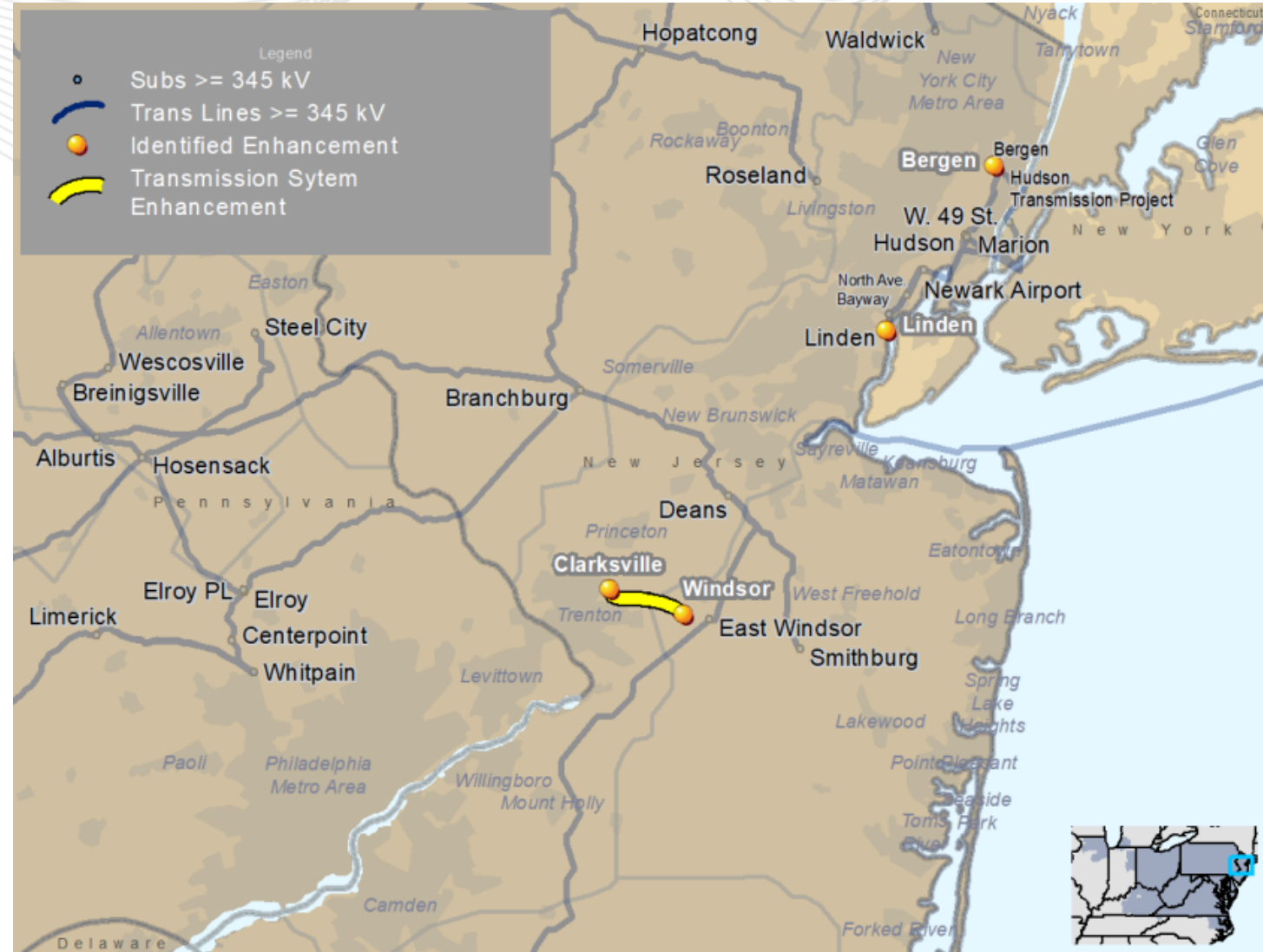
- Linden Subproject: Install a new 345/230 kV transformer at the Linden 345 kV Switching Station, and relocate the Linden-Tosco 230 kV (B-2254) line from the Linden 230 kV to the existing 345/230 kV transformer at Linden 345 kV (b3737.38) - \$24.92 M **\$35.3 M**
- Bergen Subproject: Upgrade the Bergen 138 kV ring bus by installing a 80 kA breaker along with the foundation, piles, and relays to the existing ring bus, install breaker isolation switches on existing foundations and modify and extend bus work (b3737.39) - \$5.53

Required IS Date (b3737.38-.39): 12/31/2027

- Windsor to Clarksville Subproject: ~~Create a paired conductor path between Clarksville 230 kV and JCPL Windsor Switch 230 kV~~ **Reconductor one span of the C1017 (Clarksville-Windsor) 230kV line from structure #126 to Windsor Substation with double bundled 1590 ACSR conductor, approximately (0.1) mile.** (b3737.40) - \$4.28 M **\$1.72 M**
- Windsor to Clarksville Subproject: Upgrade all terminal equipment at Windsor 230 kV and Clarksville 230 kV ~~as necessary to create a paired conductor path between Clarksville and JCPL East Windsor Switch 230 kV~~ (b3737.41) - \$1.49 M
- **Windsor to Clarksville Subproject: Upgrade terminal equipment at Windsor 230 kV (b3737.59) - \$1.58 M**

Required IS Date (b3737.40-.41, 59): 6/1/2029

Estimated Cost (b3737.38-.41, 59): ~~\$36.22 M~~ **\$45.62 M**





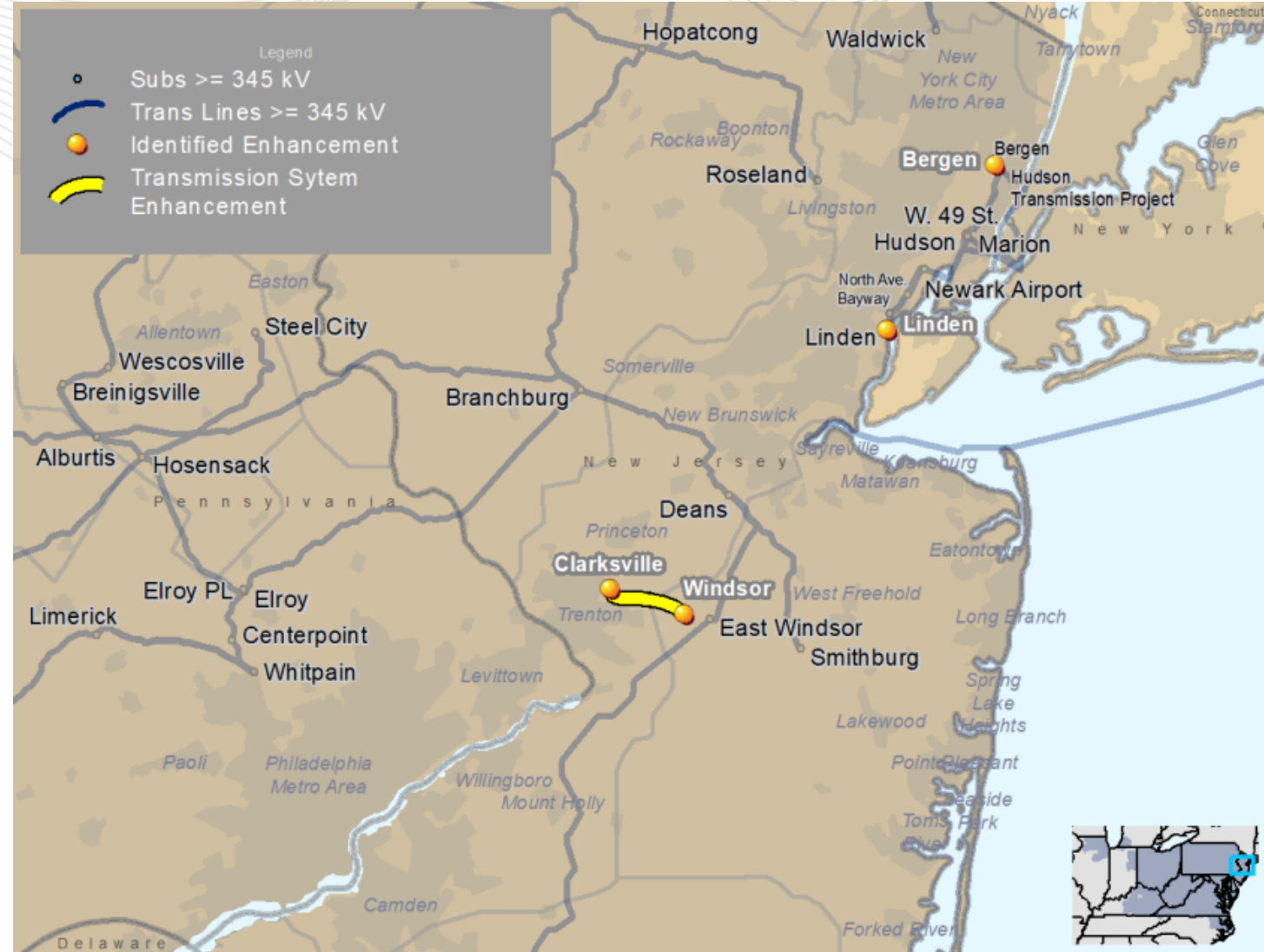
PSEG & JCPL Transmission Zone: Baseline NJ SAA Project

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Windsor-Clarksville 230 kV	678/813/805/929

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
New Linden 345/230 kV transformer	913/1080/999/1143
Windsor-Clarksville 230 kV	1356/1626/1610/1858



Criteria: Summer & Winter Generator Deliverability

Problem Statement:

The Kilmer-Lake Nelson I and W 230 kV lines are overloaded for an N-1 and an N-2 outage, and the Lake Nelson-Middlesex-Greenbrook W 230 kV line is overloaded for an N-1 outage.

Recommended Solution: Option 1a – Proposal Email 2/4/2022 & 3/11/2022

- Upgrade inside plant equipment at Lake Nelson I 230 kV (b3737.42) - ~~\$3.8 M~~ **\$4.8 M**
- Upgrade Kilmer W-Lake Nelson W 230 kV line drop and strain bus connections at Lake Nelson 230 kV (b3737.43) - ~~\$0.16 M~~ **\$0.57 M**
- Upgrade Lake Nelson-Middlesex-Greenbrook W 230 kV line drop and strain bus connections at Lake Nelson 230 kV (b3737.44) - ~~\$0.12 M~~ **\$0.58 M**

Required IS Date (b3737.42-.44): 6/1/2029

Estimated Cost (b3737.42-.44): ~~\$4.08 M~~ **\$5.95 M**

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Kilmer-Lake Nelson I 230 kV	704/869/805/1031
Kilmer-Lake Nelson W 230 kV	523/679/644/804
Lake Nelson-Middlesex-Greenbrook W 230 kV	732/887/823/980





PSEG Transmission Zones: Baseline NJ SAA Project

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Kilmer-Lake Nelson I 230 kV	1378/1625/1475/1723
Kilmer-Lake Nelson W 230 kV	934/1080/999/1143
Lake Nelson-Middlesex-Greenbrook W 230 kV	934/1080/999/1143





PPL Transmission Zones: Baseline NJ SAA Project

Criteria: Winter Generator Deliverability

Problem Statement:

The Gilbert-Springfield 230 kV line is overloaded for an N-1 outage.

Recommended Solution: Option 1a – Proposal 330

- Reconductor 0.33 miles of PPL’s portion of the Gilbert-Springfield 230 kV line (b3737.45)

Required IS Date (b3737.45): 6/1/2030

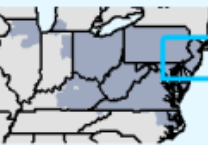
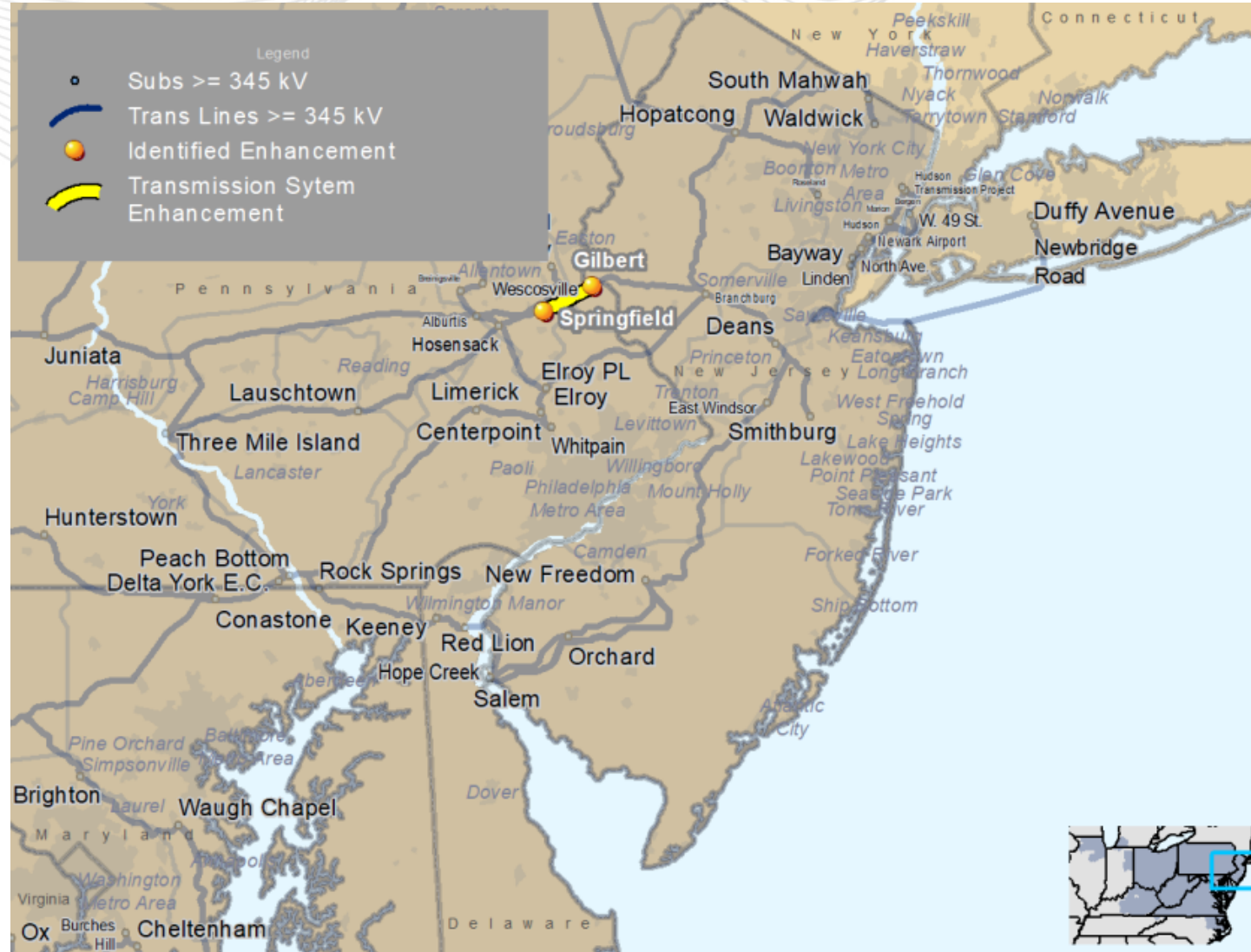
Estimated Cost (b3737.45): \$0.38 M

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Gilbert-Springfield 230 kV	647/801/746/903

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Gilbert-Springfield 230 kV	830/954/939/1087



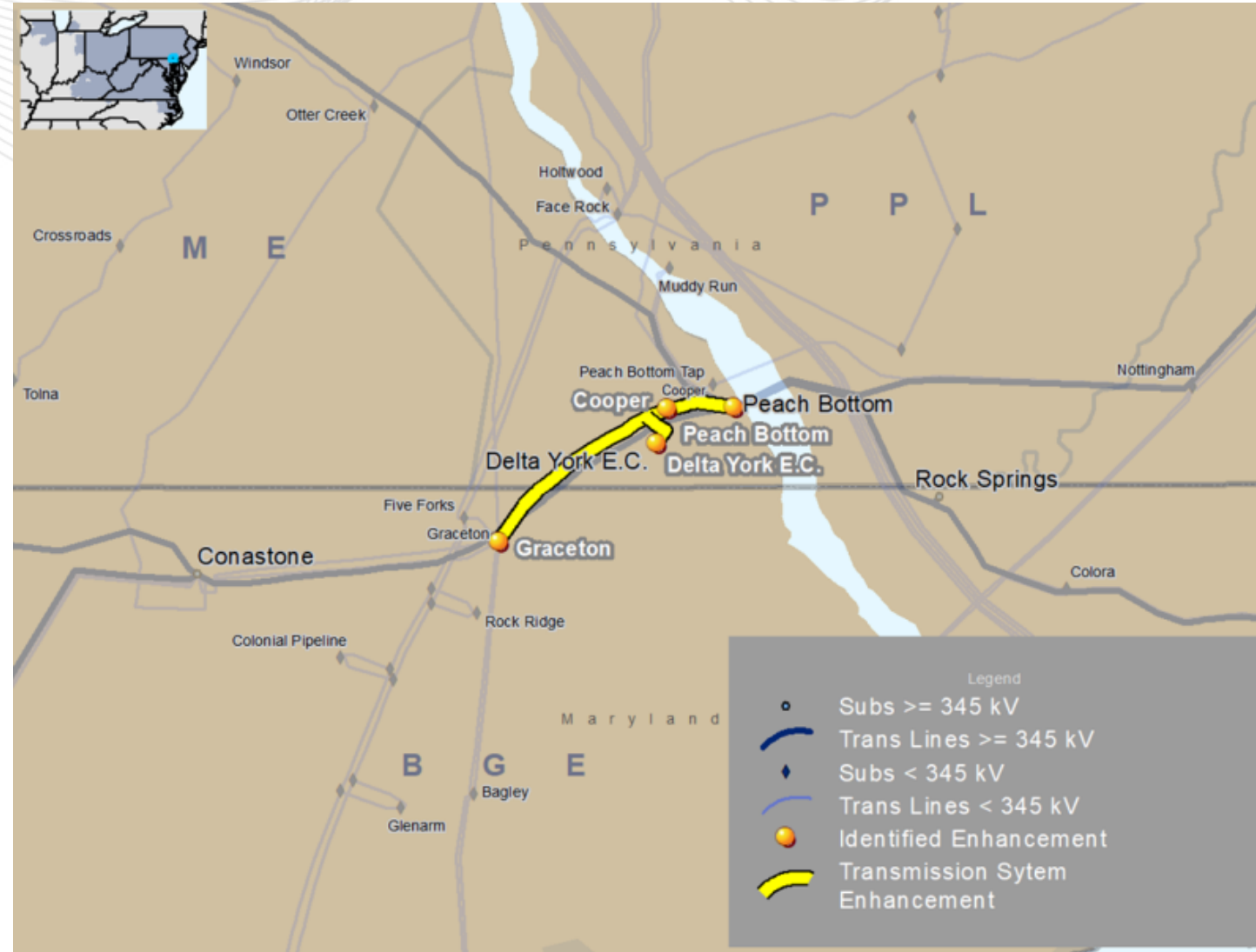
Criteria: Winter Generator Deliverability

Problem Statement:

The Peach Bottom-Conastone 500 kV, Peach Bottom-Furnace Run 500 kV, Furnace Run-Conastone 230 kV No. 1 and 2 lines and Furnace Run 500/230 kV No. 1 and 2 transformers are overloaded for N-1 outages.

Recommended Solution: Option 1a – Proposal 63

- Install a new 63 kA breaker at Graceton 230 kV substation to terminate a new 230 kV line from the new greenfield North Delta Station (b3737.46) – BGE - \$1.55 M
- Build a new greenfield North Delta station with two 500/230 kV 1500 MVA transformers and nine 63 kA breakers (four high side and five low side breakers in ring bus configuration) (b3737.47) – Transource - \$76.27 M
- Build a new North Delta-Graceton 230 kV line by rebuilding ~~6.07~~ **6.26 miles** of the existing Cooper-Graceton 230 kV line to double circuit. **Cooper-Graceton is jointly owned by PECO & BGE. This subproject is for PECO's portion of the line rebuild which is 4.1 miles.** (b3737.48) – PECO - ~~\$28.74 M~~ **\$18.82 M**
- **Build a new North Delta-Graceton 230 kV line by rebuilding 6.26 miles of the existing Cooper-Graceton 230 kV line to double circuit. Cooper-Graceton is jointly owned by PECO & BGE. This subproject is for BGE's portion of the line rebuild which is 2.16 miles. (b3737.56) - \$9.92 M**
- Bring the Copper- Graceton 230 kV line “in and out” of North Delta by constructing a new double-circuit North Delta-Graceton 230 kV (0.3 miles) and a new North Delta-Cooper 230 kV (0.4 miles) cut-in lines (b3737.49) – PECO - \$1.56 M
- Bring the Peach Bottom-Delta Power Plant 500 kV line “in and out” of North Delta by constructing a new Peach Bottom-North Delta 500 kV (0.3 miles) cut-in and cut-out lines (b3737.50) – PECO - \$1.56 M



Recommended Solution (cont.): Option 1a – Proposal 63

- ~~Replace four 63 kA circuit breakers “205”, “235”, “225” and “255” at Peach Bottom 500 kV with 80 kA (b3737.51) – PECO – \$5.6 M~~
- Replace one 63 kA circuit breaker “B4” at Conastone 230 kV with 80 kA (b3737.52) – BGE - \$1.3 M

Required IS Date (b3737.46-52): 6/1/2029

Estimated Cost (b3737.46-52): ~~\$116.58 M~~ **\$110.98 M**

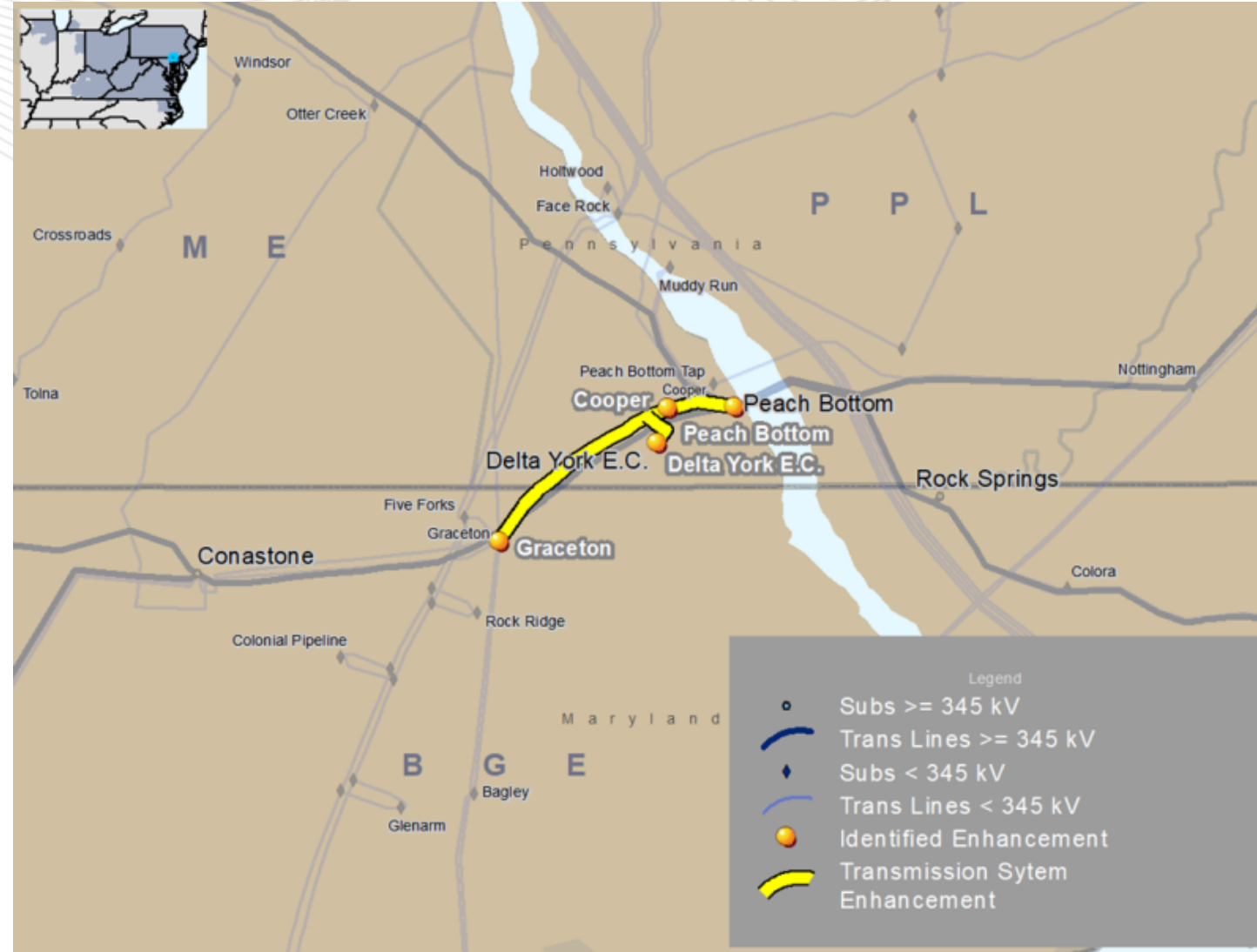
Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Peach Bottom-Delta-Delta Power Plant 500 kV	2338/2931/3062/3480
Cooper-Graceton 230 kV	463/578/521/639

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
North Delta 500/230 kV Transformers	1500/1875/1875/2025
Peach Bottom-North Delta 500 kV	2338/2931/3062/3480
North Delta-Delta Power Plant 500 kV	2338/2931/3062/3480
Cooper-North Delta 230 kV	463/578/521/639
North Delta-Graceton 230 kV No.1 & 2	1295/1863/1642/2077

Total Estimated Cost (b3737): ~~\$1,064.36 M~~ **\$1,191.70 M**



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Reliability Analysis Update



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1	May 4 th 2023	<ul style="list-style-type: none">• Original slides posted

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