



2024 MISO Identified Regional Issues & Planned Solution near the MISO-PJM Seam

Supplemental material for *MISO-PJM Annual
Issues Review IPSAC Meeting*

March, 25, 2024

Notes



- This presentation provides an overview of significant MISO MTEP transmission projects near the MISO-PJM seam which have either been approved in MTEP22 Appendix A or proposed MTEP23
- It is not a comprehensive review of all planned projects in MISO. For a complete list of projects see the following Public Documents
 - MTEP23 Report (notably, Appendix A)
 - [MTEP23 Report \(misoenergy.org\)](https://www.misoenergy.org/MTEP23-Report)
 - MTEP Projects Under Evaluation Status Report
 - [Project Lists and Status Reports \(misoenergy.org\)](https://www.misoenergy.org/Project-Lists-and-Status-Reports)
 - Planning Advisory Committee (PAC) Materials
 - [MISO Planning Advisory Committee \(misoenergy.org\)](https://www.misoenergy.org/MISO-Planning-Advisory-Committee)
 - Subregional Planning (SPM) Materials
 - [Subregional Planning Meeting \(misoenergy.org\)](https://www.misoenergy.org/Subregional-Planning-Meeting)

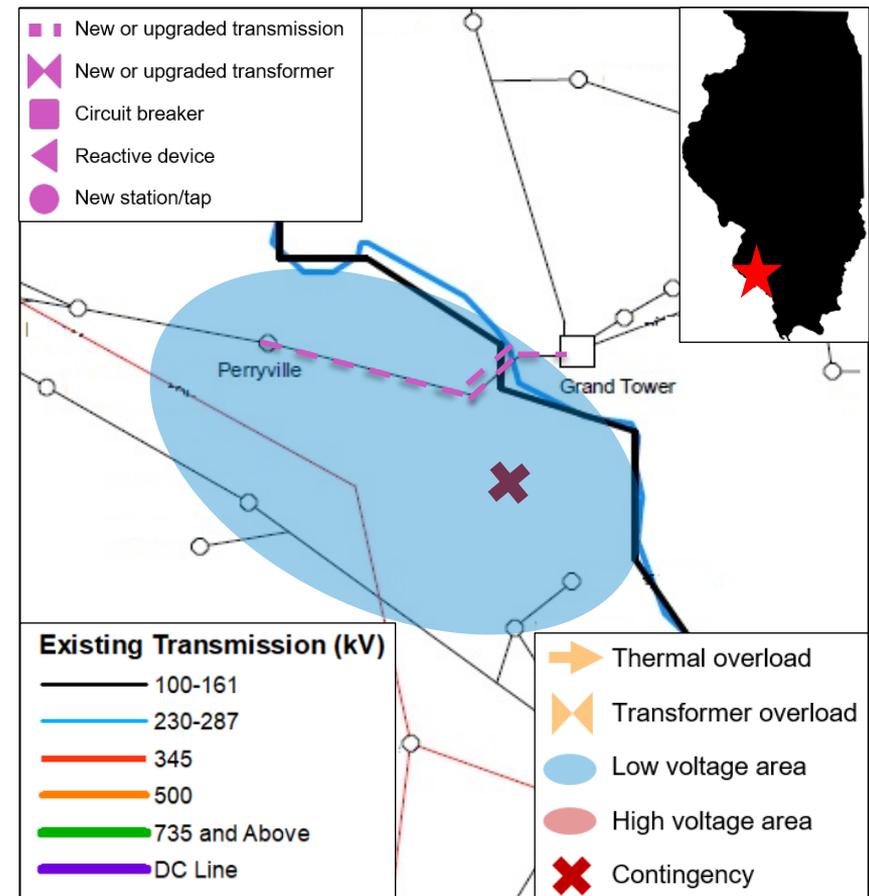
MTEP 23 Approved Project Highlights

MISO East and Central Subregion

AmerenIL

New Seminary-Wittenberg-Grand Tower 138 kV line solves TPL issues

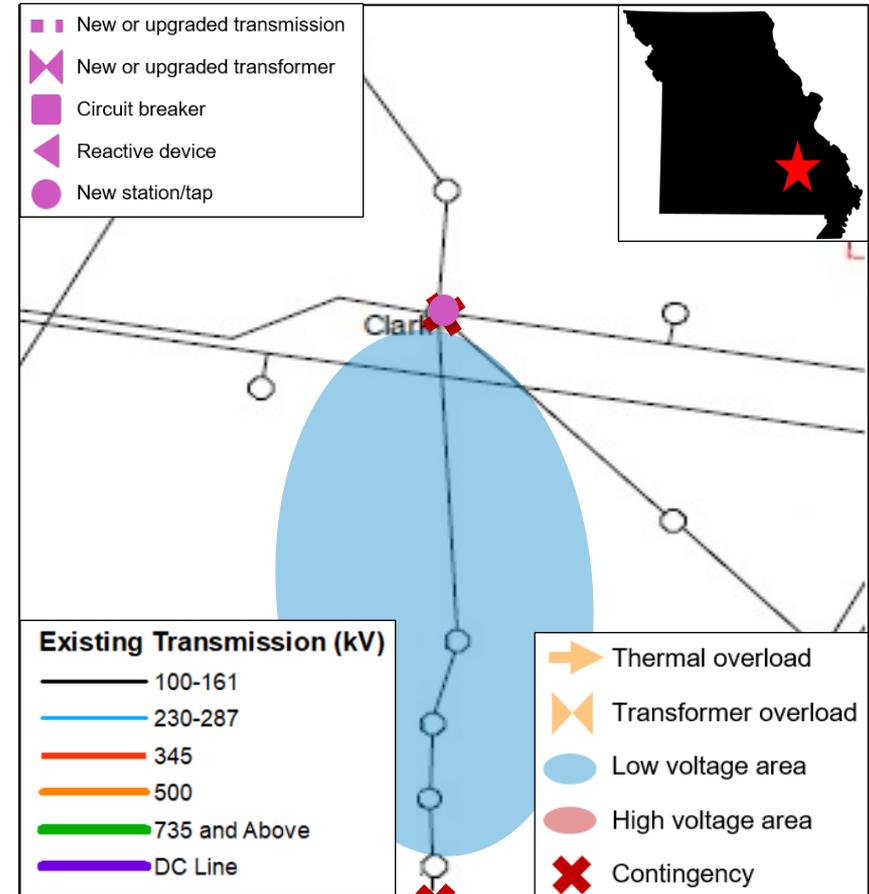
- **P23846 - Baseline Reliability Project**
- **Project description**
 - This project will include building a new Perryville (Seminary) - Wittenberg - Grand Tower 138 kV line.
- **System Need**
 - *TPL Issue:* mitigate multiple TPL low voltage violations and thermal violations as identified within MTEP22.
- **Estimated Cost:** \$125.9 M
- **Expected ISD:** December 31, 2026
- **Target Appendix:** A in MTEP23
- **Update:** Cost increase to include double circuit river crossing for future 345 kV capability.



AmerenMO

Rebuild Clark 138/161 kV Substation to 138 kV BAAH solves P6-2-2 issue

- **P22869 - Baseline Reliability Project**
- **Project description**
 - Rebuild Clark 138/161 kV Substation to have a 138 kV BAAH bus with 8 positions (4 existing lines, 2 Transformers, bring in another line) and a 161 kV ring bus with 6 positions (2 existing lines, 2 Transformers, and new line position to Viburnum).
- **System Need**
 - *P6-2-2 Event*: causes TPL low voltage violations.
- **Estimated Cost: \$44.4 M**
- **Expected ISD: December 1, 2027**
- **Target Appendix: A in MTEP23**



Duke Energy (DEI)

Upgrade [DEI] Bedford 138kV Bus 9 solves P6-1-1 thermal overload

- **P23406 - Baseline Reliability Project**

- **Project description**

- Increase [DEI] Bedford 138kV Bus 9 facility rating to 511 MVA.

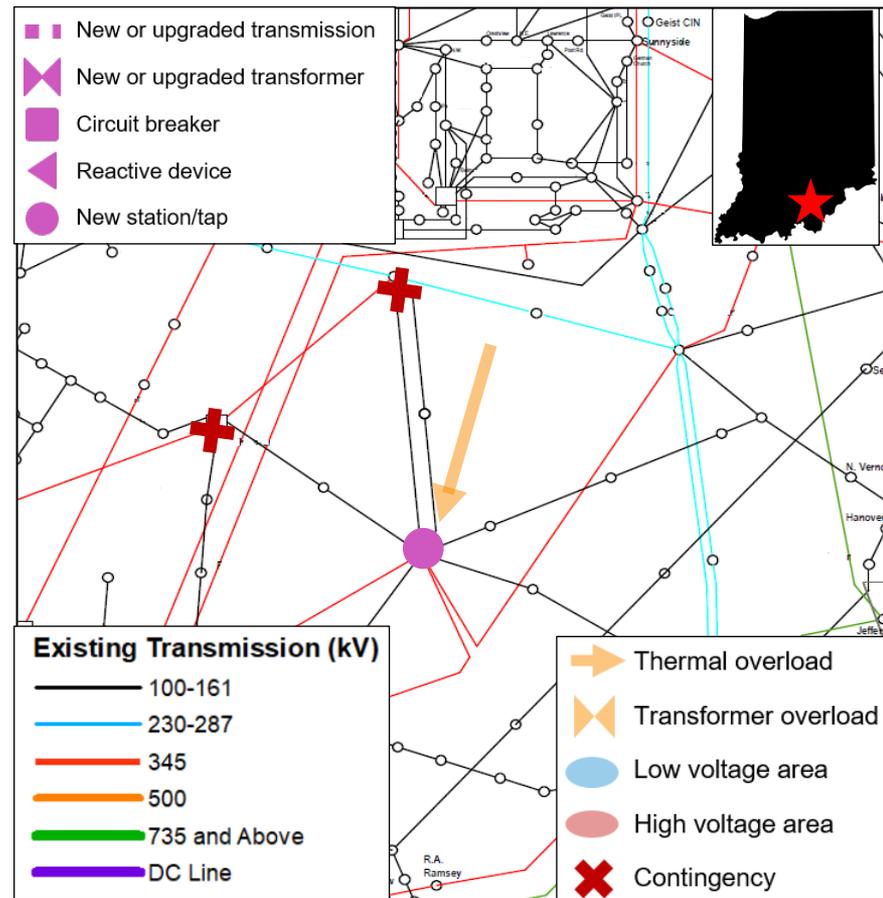
- **System Need**

- P6-1-1 event, [DEI] Bedford—[DEI] Bedford bus section #3 138kV line is overload to 102% loading for outages of BES element pairs based on MTEP22 analysis.

- **Estimated Cost: \$0.53 M**

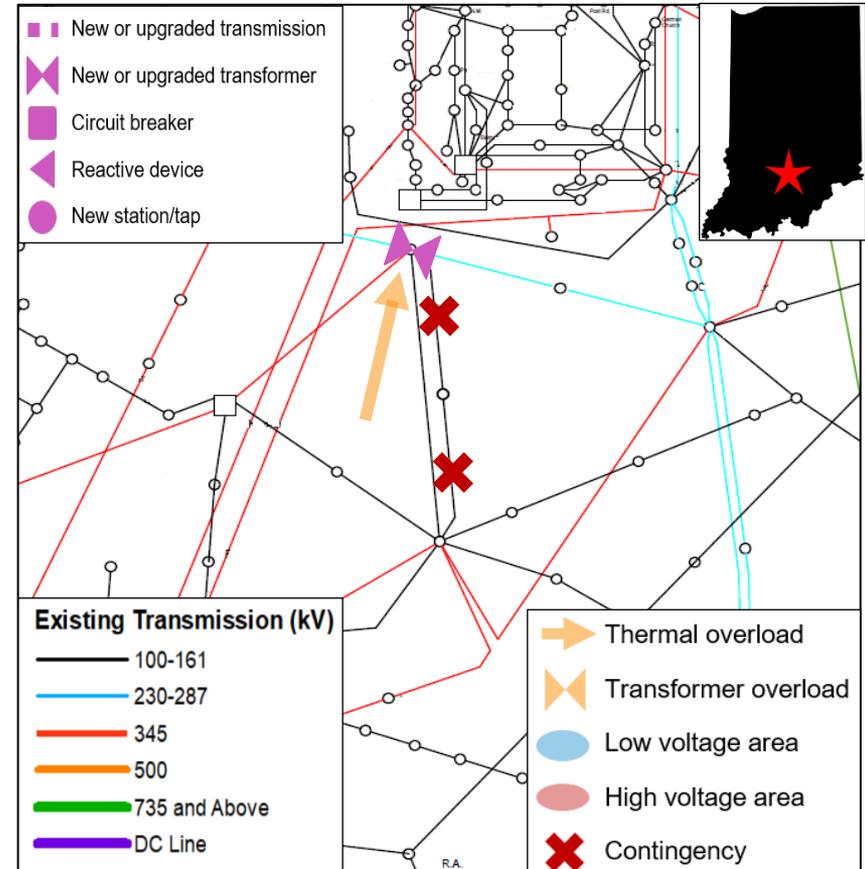
- **Expected ISD: June 1, 2027**

- **Target Appendix: A in MTEP23**



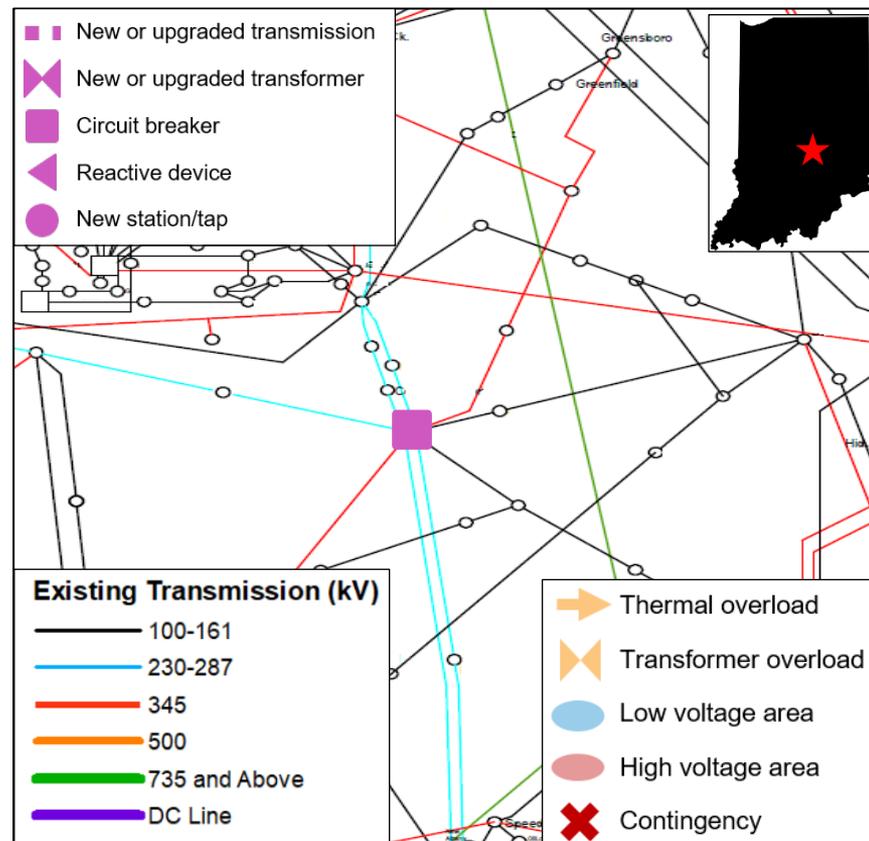
Upgrade [DEI] Bloomington 230/138kV transformer solves P6-1-1 thermal overload

- **P23407 - Baseline Reliability Project**
- **Project description**
 - Increase [DEI] Bloomington 230/138kV transformer facility rating to 165 MVA.
- **System Need**
 - P6-1-1 event, [DEI] Bloomington 230/138kV transformer is overload to 105% loading for outages of BES element pairs based on MTEP22 analysis.
- **Estimated Cost: \$0.39 M**
- **Expected ISD: June 1, 2024**
- **Target Appendix: A in MTEP23**



Upgrade [DEI] Columbus 345kV Substation Breaker solves a short circuit issues

- **P23861 - Baseline Reliability Project**
- **Project description**
 - Replace (3) 138kV CBs on transformer Banks 1, 2, and 3 with higher fault interrupting capacity at [DEI] Columbus 345kV substation.
- **System Need**
 - DEI 2022 short circuit study identifies the replacement of these three 138 kV CBs at Columbus 345kV substation as required by TPL 001.
- **Estimated Cost: \$1.5M**
- **Expected ISD: December 31, 2026**
- **Target Appendix: A in MTEP23**



Upgrade [DEI] Bedford—[DEI] Bedford 138kV Bus Tie line solves P6-1-1 thermal overload

- **P23862 - Baseline Reliability Project**

- **Project description**

- Increase [DEI] Bedford bus section #1—[DEI] Bedford bus section #2 138kV facility rating to 747 MVA

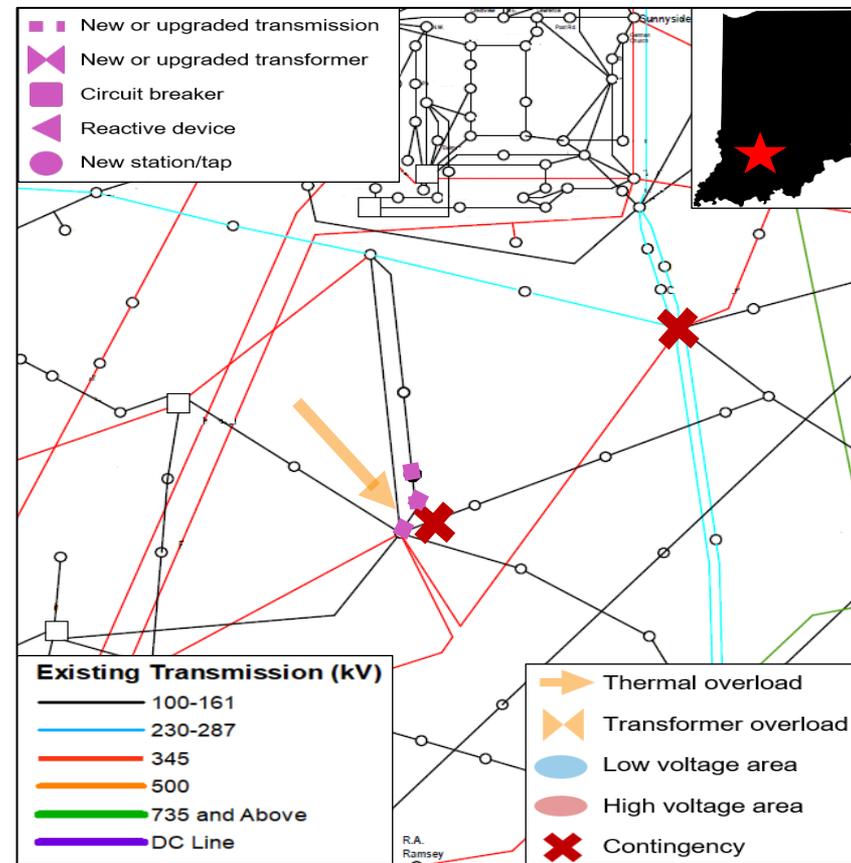
- **System Need**

- P6-1-1 event, [DEI] Bedford bus section #1—[DEI] Bedford bus section #2 138kV line is overloaded to 101% loading for outages of BES element pairs based on MTEP22 analysis.

- **Estimated Cost: \$0.7M**

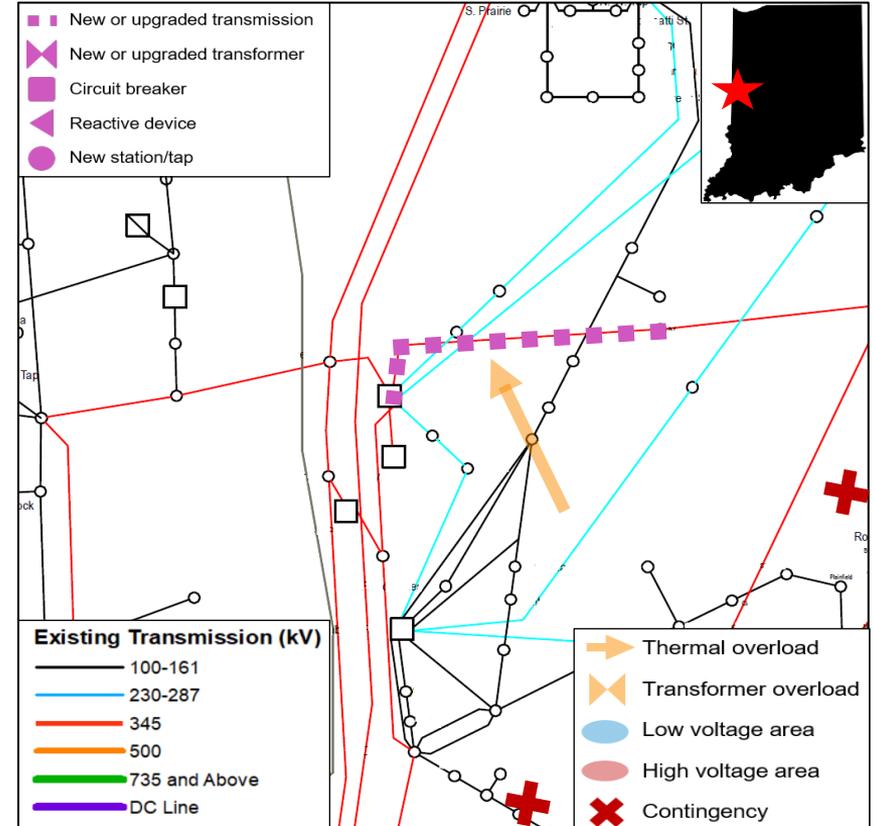
- **Expected ISD: April 1, 2032**

- **Target Appendix: A in MTEP23**



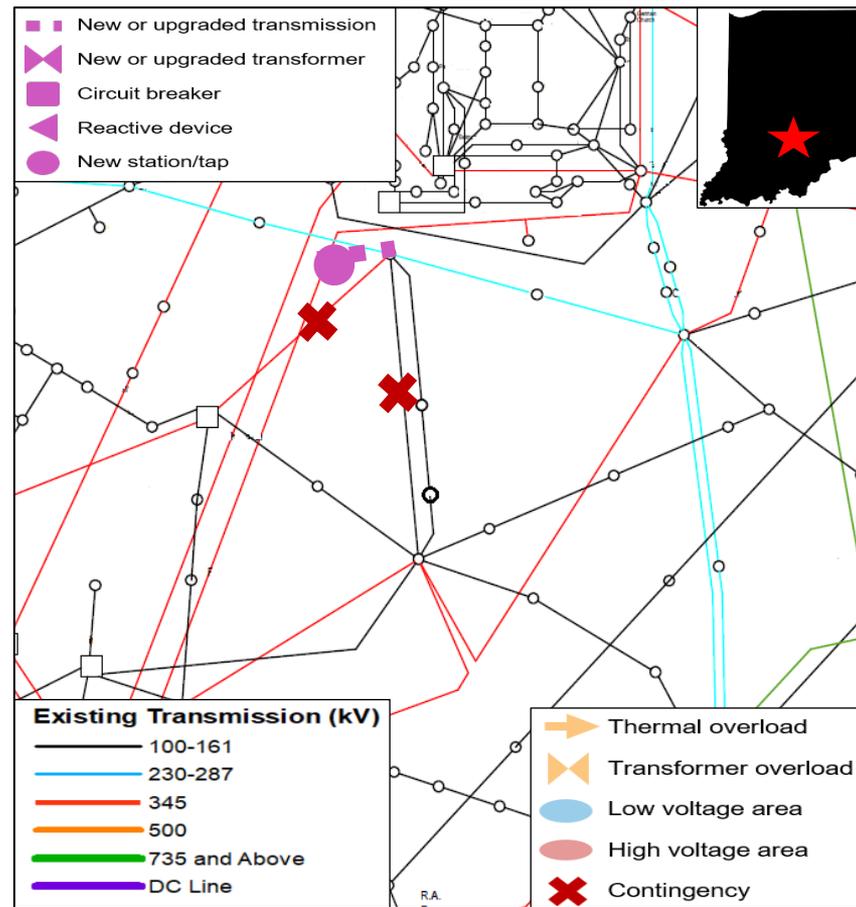
Upgrade [DEI] Cayuga—[DEI] Nucor 345kV line solves P6-1-1 thermal overload

- **P23863 - Baseline Reliability Project**
- **Project description**
 - Increase [DEI] Cayuga—[DEI] Nucor 345kV facility rating to 1347MVA
- **System Need**
 - P6-1-1 events, [DEI] Cayuga—[DEI] Nucor 345kV line is overloaded to 101% loading for the outages of BES element pairs based on MTEP22 analysis.
- **Estimated Cost: \$0.32M**
- **Expected ISD: April 1, 2027**
- **Target Appendix: A in MTEP23**



New [DEI] Bloomington Area 138kV Source solves P6-1-1 thermal overload

- **P23864 - Baseline Reliability Project**
- **Project description**
 - Construct new [DEI] Bloomington 345/138kV substation on the west side of Bloomington with 138kV line to [DEI] Bloomington Rogers St.
- **System Need**
 - P6-1-1 events, MTEP22 result has shown multiple lines and transformer overload
- **Estimated Cost: \$44.5M**
- **Expected ISD: June 1, 2028**
- **Target Appendix: A in MTEP23**



IPL Projects

Replace [IPL] Southwest 138kV #6 Breaker solves a short circuit issues

- **P23568 - Baseline Reliability Project**

- **Project description**

- Replacement of one (1) 138kV breaker at [IPL] Southwest #6.

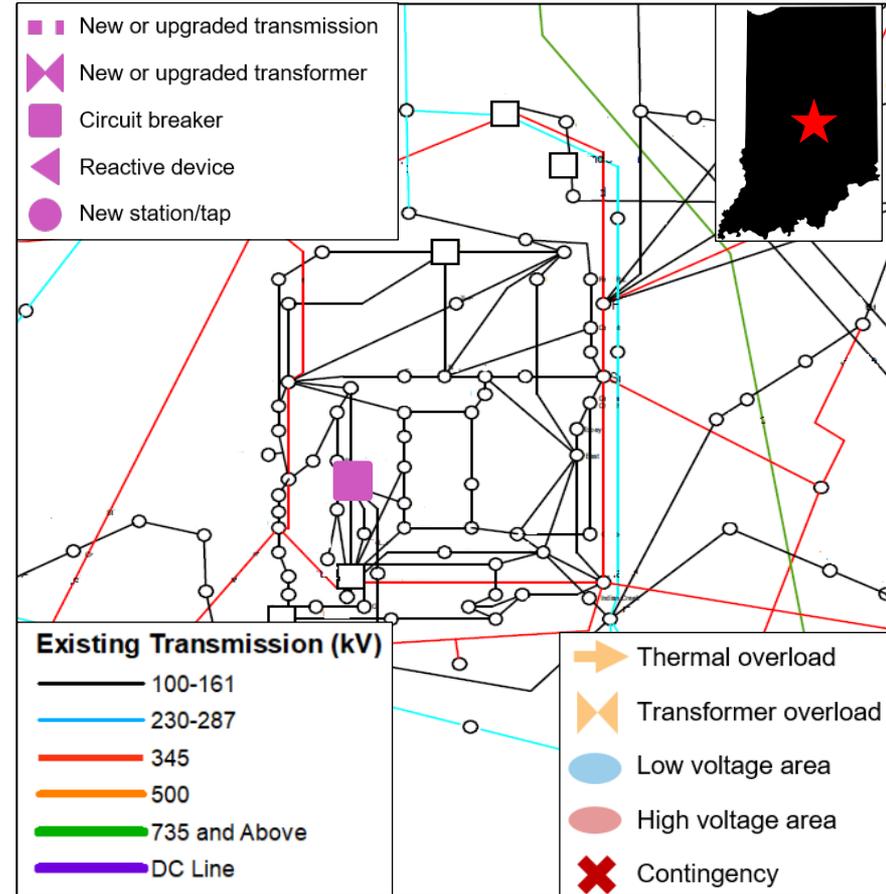
- **System Need**

- Breaker fault violation at [IPL] Southwest 138 kV for outages of BES elements in MTEP22 Short circuit analysis.

- **Estimated Cost: \$0.90M**

- **Expected ISD: December 31, 2025**

- **Target Appendix: A in MTEP23**



Reconfigure [IPL] Rockville 138kV solves spare equipment thermal overload

- **P23825 - Baseline Reliability Project**

- **Project description**

- Conversion of [IPL] Rockville 138kV substation to a ring bus configuration

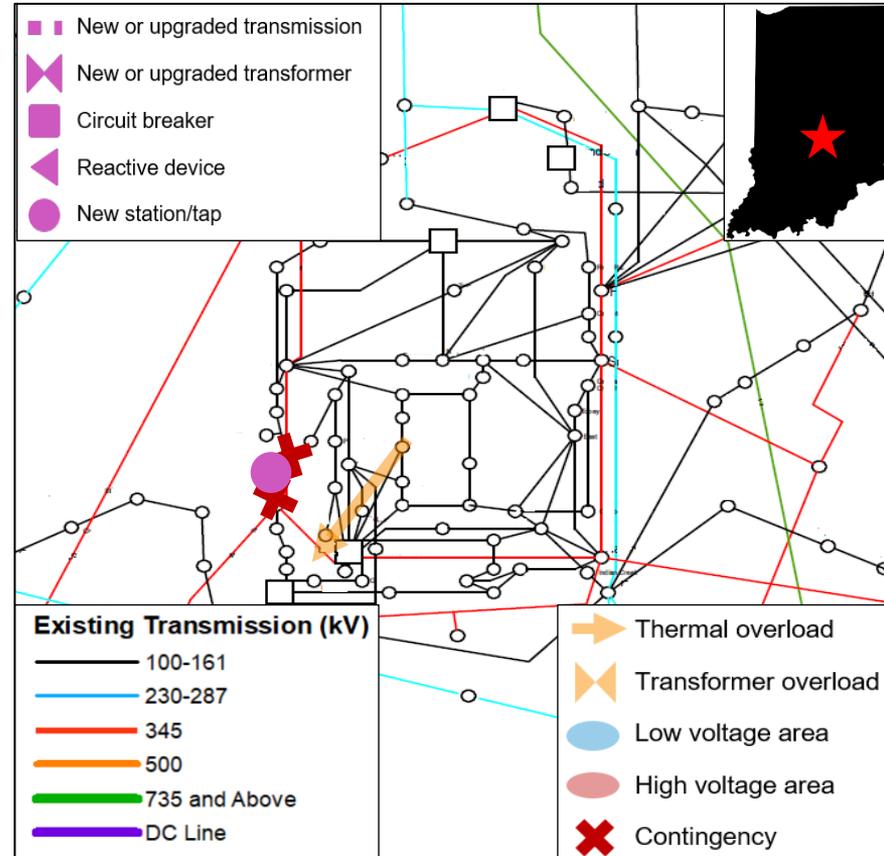
- **System Need**

- Long-Lead Time equipment unavailability of [IPL] Thompson Substation and Internal Breaker Fault of [IPL] Rockville Substation.
- Spare equipment event, Multiple BES lines overload up to 109% loading based on MTEP22 analysis

- **Estimated Cost: \$8.5M**

- **Expected ISD: December 1, 2024**

- **Target Appendix: A in MTEP23**



ITCT

ITCT- 23700 Horn - Trenton Channel 120 kV Rebuild – Project Justification

- **Baseline Reliability Project**

- **Project description**

- Rebuild the Horn – Trenton Channel 120 kV circuit. Upgrade station equipment at Trenton Channel position HG.

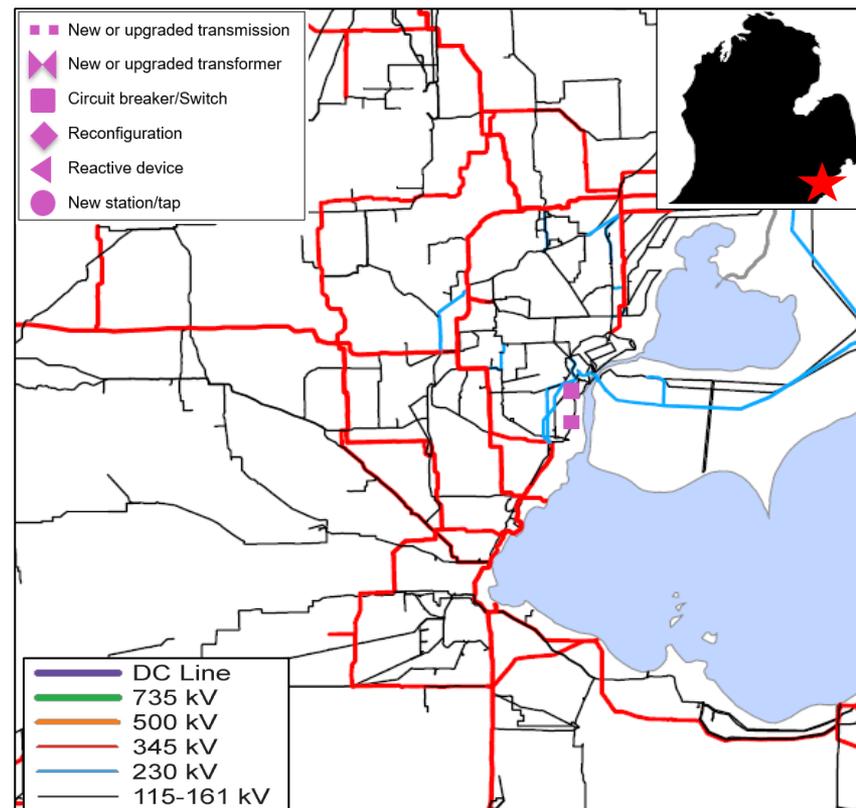
- **System Needs**

- The 120kV circuits from Trenton Channel to Riverview (through Horn and Jefferson) overloads for shutdown-plus-contingencies..

- **Estimated Cost: \$5M**

- **Expected ISD: 6/01/2027**

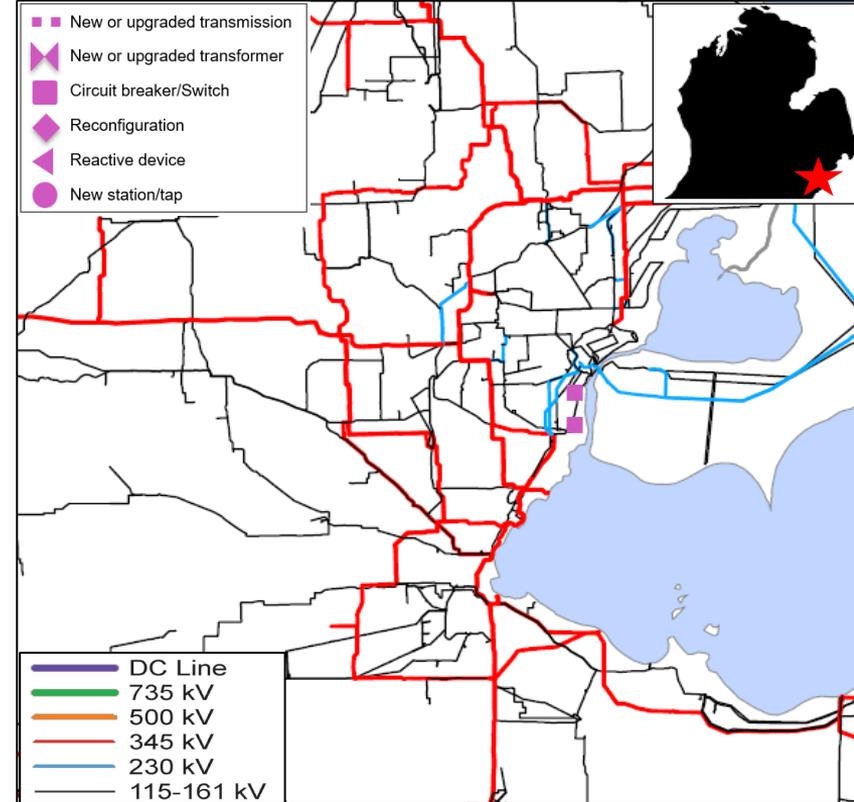
- **Target Appendix: A in MTEP23**



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ITCT 21725 - Horn - Trenton Channel 120 kV Sag Remediation – Project Justification

- **Baseline Reliability Project**
- **Project description**
 - Fully remediate the sag on the Horn – Trenton Channel 120 kV circuit up to the conductor limit. Upgrade station equipment at Trenton Channel position HG.
- **System Needs**
 - The Horn – Trenton Channel 120 kV circuit is projected to be overloaded for P6 contingency during peak and off-peak load conditions. The identified overloaded equipment on this circuit is the sag limit and station equipment at Trenton Channel.
- **Estimated Cost: \$0.32M**
- **Expected ISD: 12/31/2026**
- **Target Appendix: A in MTEP23**



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ITCT – 23828 Hurst 120 kV 33.3 MVAR Capacitor – Project Justification

- **Baseline Reliability Project**

- **Project description**

- Install a 33.3 MVAR capacitor at bus 102, position HJ, with a new 120 kV, 40 kA synchronous breaker and associated disconnect switch. Install a 3000 A, 40 kA breaker at position HK on the Hurst – Genoa 120 kV circuit.

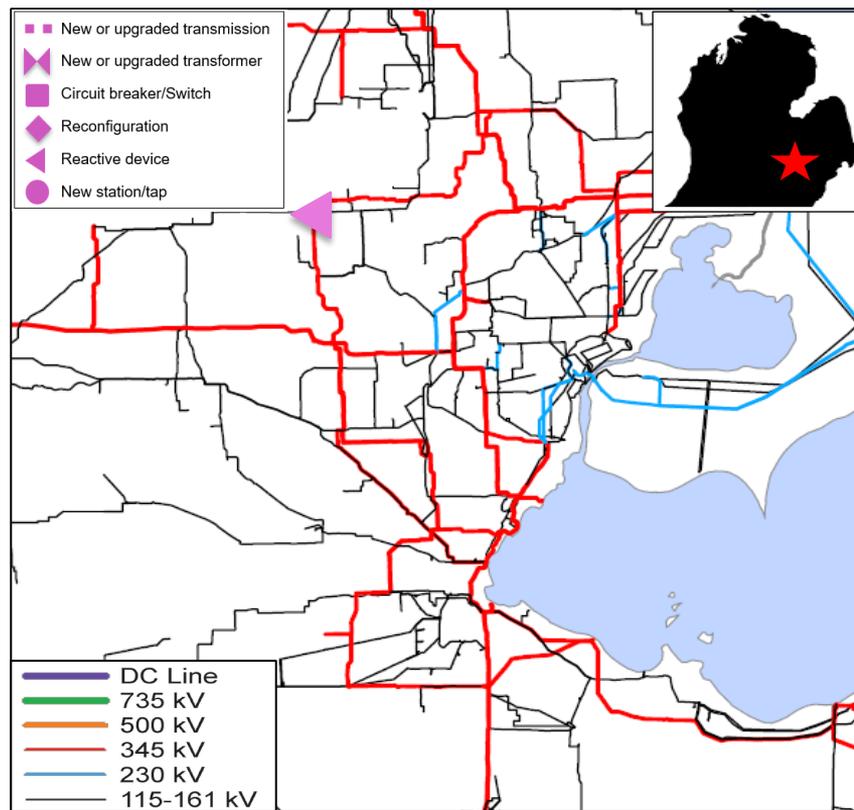
- **System Needs**

- This project is the alternative to the project P#15887 Durant 120 kV 33.3 MVAR Capacitor. The Durant buses are projected to experience low voltages for a shutdown-plus-contingency that takes out Genoa – Madrid 120 kV and Durant – Placid 120 kV lines.

- **Estimated Cost: \$3M**

- **Expected ISD: 06/01/2025**

- **Target Appendix: A in MTEP23**



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ITCT-15872 Brownstown-Monroe #2 345 kV Sag Remediation

– Project Justification

- **Baseline Reliability Project**

- **Project description**

- Remediate the sag on the Brownstown - Monroe #2 345 kV line to at least 1400 MVA and upgrade switches at Monroe "FT" and "FM" positions.

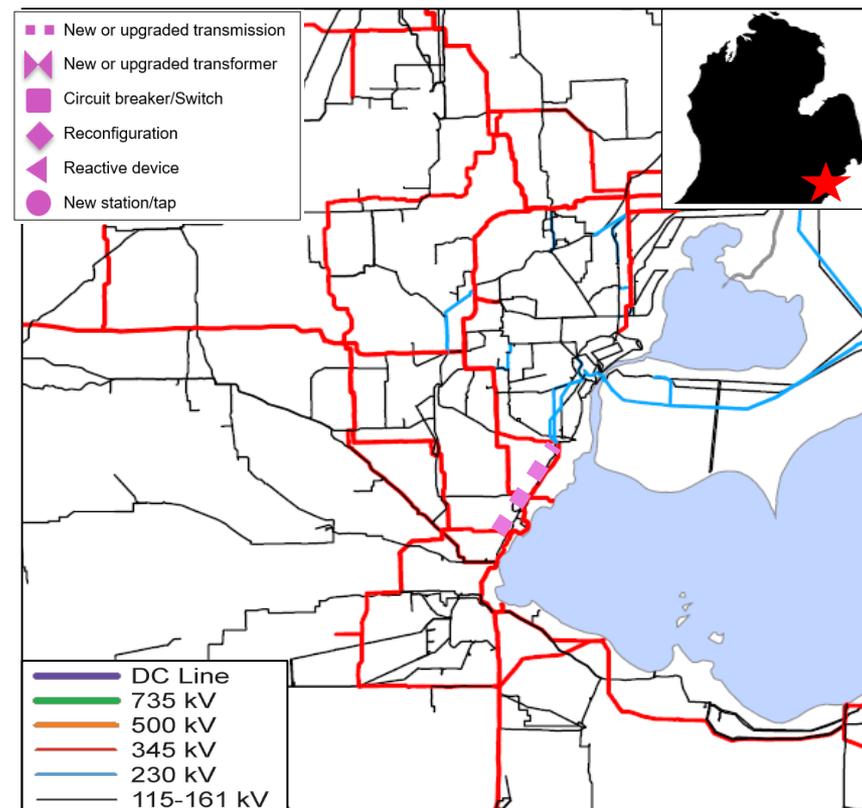
- **System Needs**

- The Brownstown – Monroe #2 345 kV circuit is projected to be marginally overloaded. The identified overloaded equipment on this circuit is the sag limit. The thermal violation only occurs at peak in the 5 and 10 year cases.

- **Estimated Cost: \$2.6M**

- **Expected ISD: 06/31/2026**

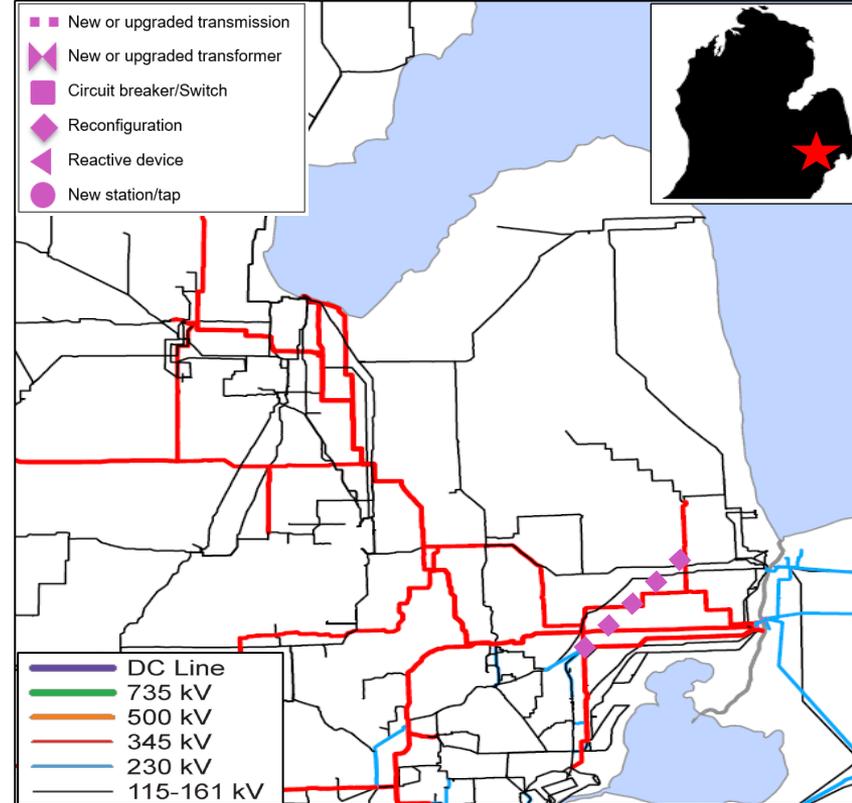
- **Target Appendix: A in MTEP23**



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ITCT - 23711 Blackfoot - Fitz 345 kV Sag Remediation – Project Justification

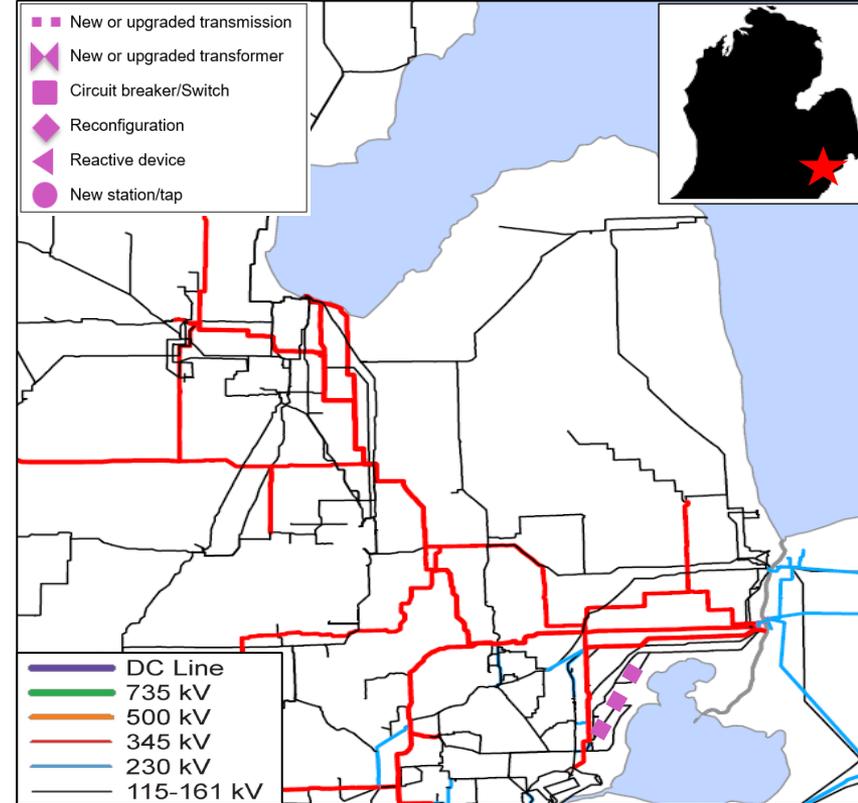
- **Baseline Reliability Project**
- **Project description**
 - Remediate the sag limit on the Fitz - Blackfoot 345 kV circuit up to a minimum summer emergency rating of 1053 MVA.
- **System Needs**
 - The Fitz - Blackfoot 345 kV circuit is expected to overload in shoulder peak case with Ludington pumping for P6 and P7 contingencies.
- **Estimated Cost: \$1M**
- **Expected ISD: 12/31/2026**
- **Target Appendix: A in MTEP23**



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ITCT – 23697 Beck - Stephens 120 kV Sag Remediation – Project Justification

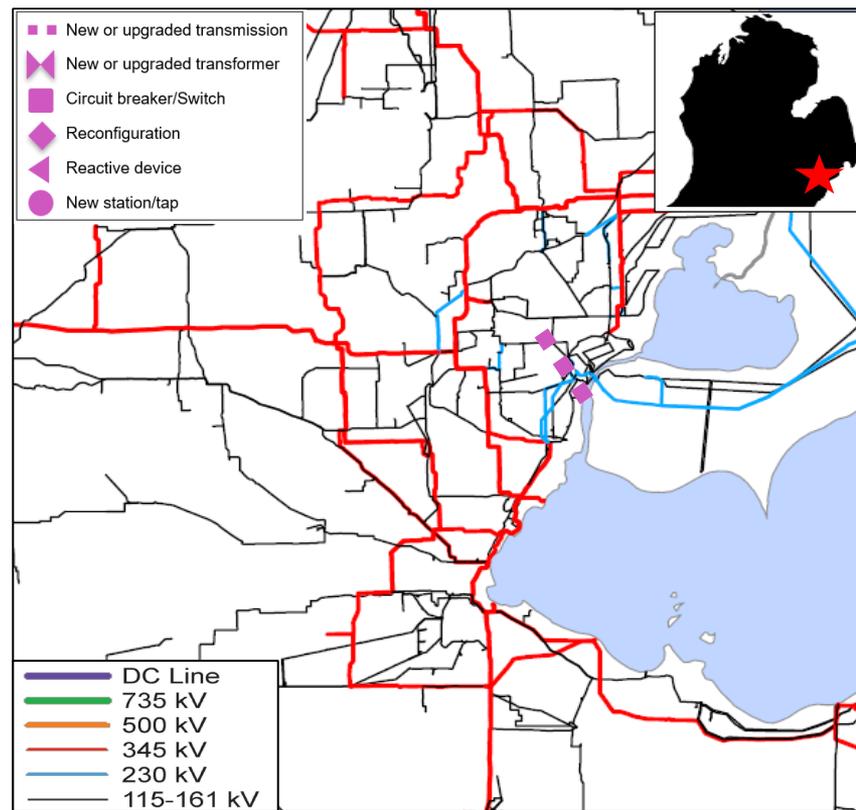
- **Baseline Reliability Project**
- **Project description**
 - Remediate the sag limit on the Beck - Stephens 120 kV circuit up to a minimum summer emergency rating of 242 MVA.
- **System Needs**
 - The Beck - Stephens 120 kV circuit is expected to marginally overload for a P24 contingency.
- **Estimated Cost: \$0.5M**
- **Expected ISD: 12/31/2026**
- **Target Appendix: A in MTEP23**



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ITCT – 23742 D4849A Station Equipment Upgrade – Project Justification

- **Baseline Reliability Project**
- **Project description**
 - Replace multiple equipment and add a switch at D4849 position P.
- **System Needs**
 - The Baxter-Dig 4849A-Dig 42 Tap line is projected to marginally overload for peak load contingencies.
- **Estimated Cost:** ~\$0.35M
- **Expected ISD:** 06/01/2027
- **Target Appendix:** A in MTEP23



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ITCT – 23759 Cut Midas - Wabash 120 kV into Fitz – Project Justification

- **Baseline Reliability Project**

- **Project description**

- Cut the Midas - Wabash 120 kV circuit into the Fitz 120 kV Substation. Increase the sag limit on the new Fitz - Wabash 120 kV circuit up to a minimum summer emergency rating of 249 MVA.

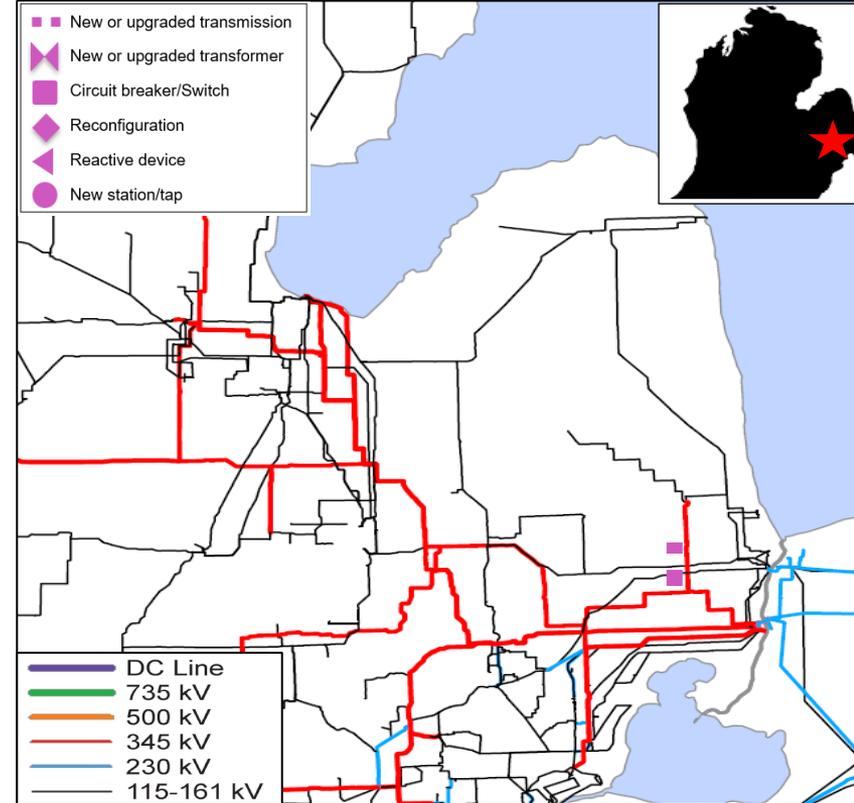
- **System Needs**

- P6 contingencies around Bunce Creek 120 kV Substation overload nearby circuits in the area under shoulder peak conditions and peak conditions with ITCT exporting power to IESO through the Bunce Creek phase shifter.

- **Estimated Cost: \$15M**

- **Expected ISD: 06/01/2027**

- **Target Appendix: A in MTEP23**



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METC

METC – 15752 Redstone – Tittabawassee 138 kV Rebuild – Project Justification

- **Baseline Reliability Project**

- **Project description**

- Rebuild ~13.4 miles of the ~21.5 mile-long Redstone – Tittabawassee 138 kV line from 336 ACSR to 1431 ACSR using future double-circuit construction with OPGW.

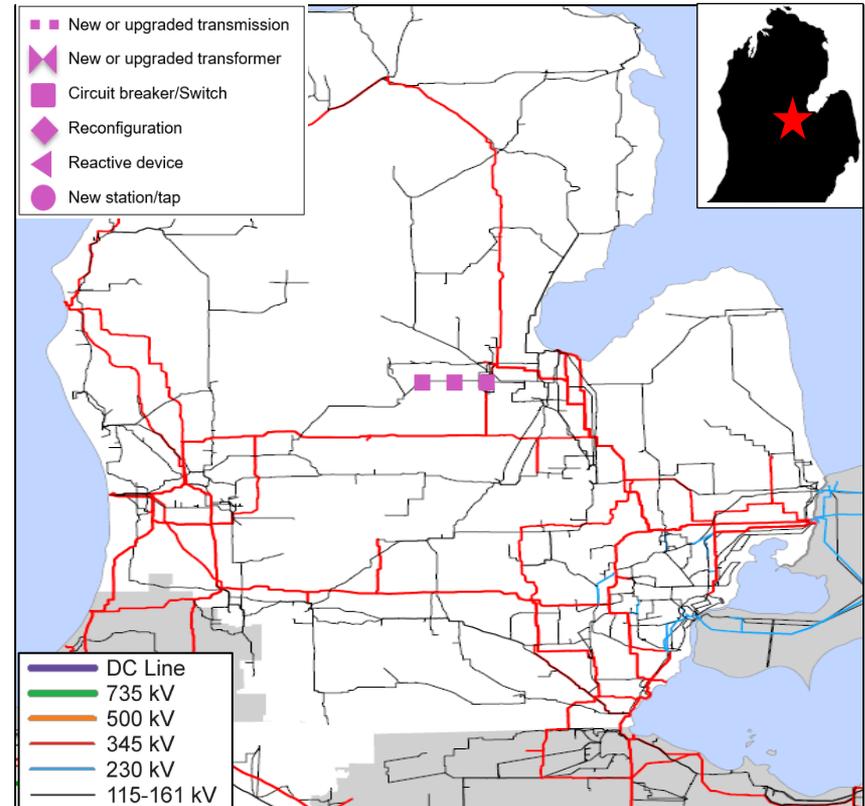
- **System Needs**

- The Redstone - Tittabawassee 138 kV line was shown as overloaded in MISO's MTEP22 Generator Deliverability study. METC's 2022 internal assessment also identified this overload for various contingencies, including N-1.

- **Estimated Cost: \$22.2M**

- **Expected ISD: 06/01/2027**

- **Target Appendix: A in MTEP23**



METC – 23695 Cornell - Claremont #1 138 kV Remove Sag Limit – Project Justification

- **Baseline Reliability Project**

- **Project description**

- Remove the sag limit on the 138kV the Cornell - Claremont 1 138kV line up to the conductor's limit.

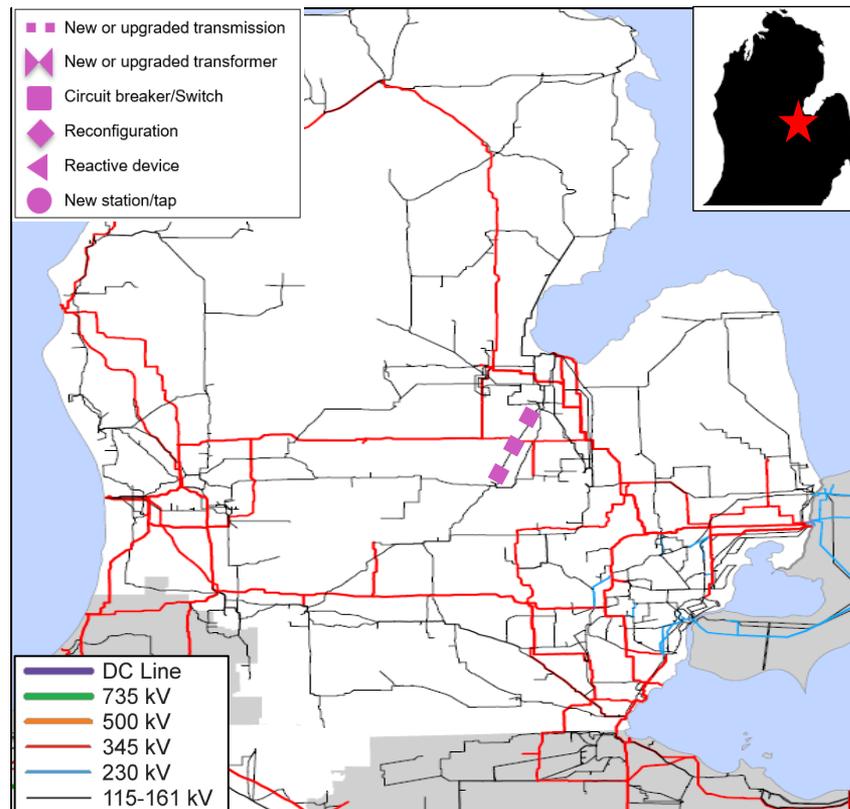
- **System Needs**

- The Cornell – Claremont 1 138kV circuit is projected to overload for contingencies. The identified overloaded equipment on this circuit is the sag limit. The thermal violations are found on off-peak pumping condition.

- **Estimated Cost: \$4M**

- **Expected ISD: 12/31/2026**

- **Target Appendix: A in MTEP23**



METC – 23696 Cornell - Tihart 138kV Sag Remediation – Project Justification

- **Baseline Reliability Project**

- **Project description**

- Remediate sag on the Bennington - Cornell 138 kV circuit. Remediate sag on the Bennington – Scenic Lake 138 kV circuit. Remediate sag on the Scenic Lake – Van Atta 138 kV circuit.

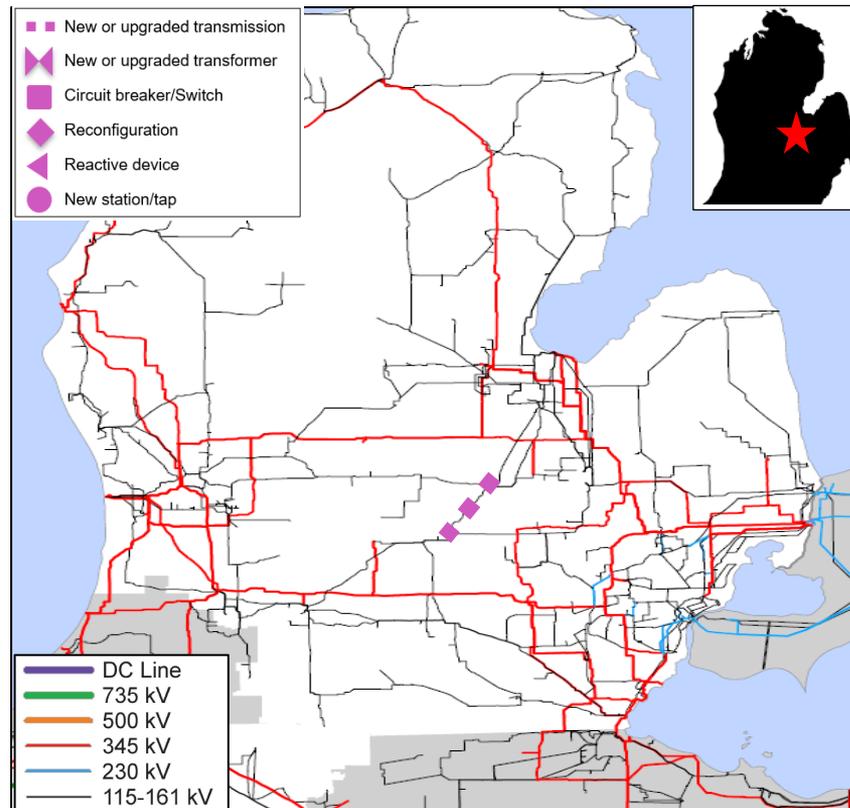
- **System Needs**

- The Cornell – Tihart 138kV circuit is projected to overload for contingencies. The identified overloaded equipment on this circuit is the sag limit. The thermal violations are found on off-peak pumping condition.

- **Estimated Cost: \$2.8M**

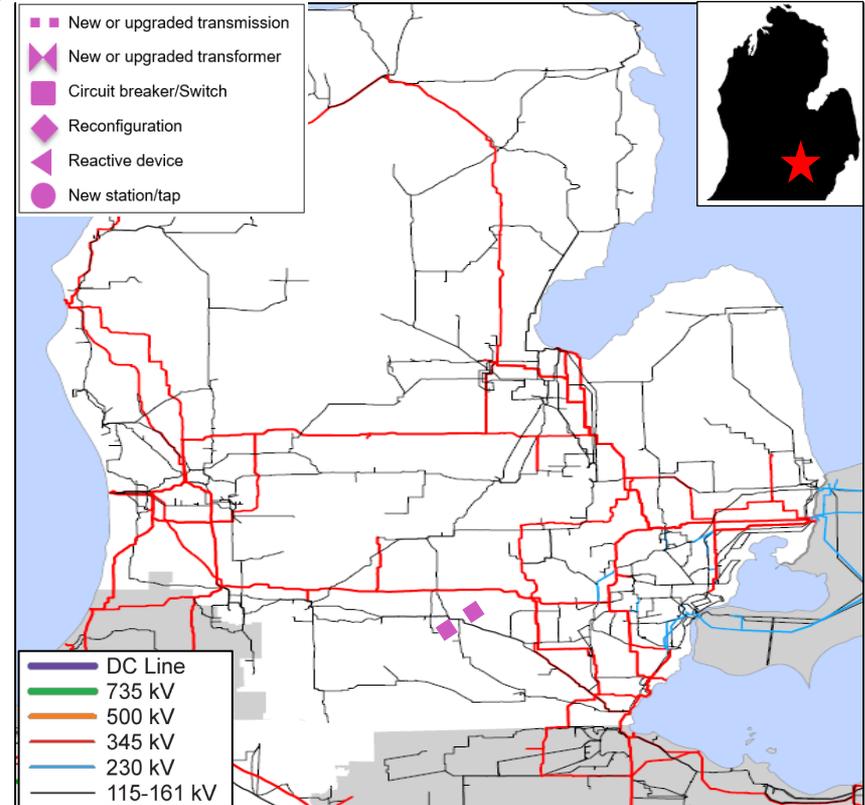
- **Expected ISD: 12/31/2026**

- **Target Appendix: A in MTEP23**



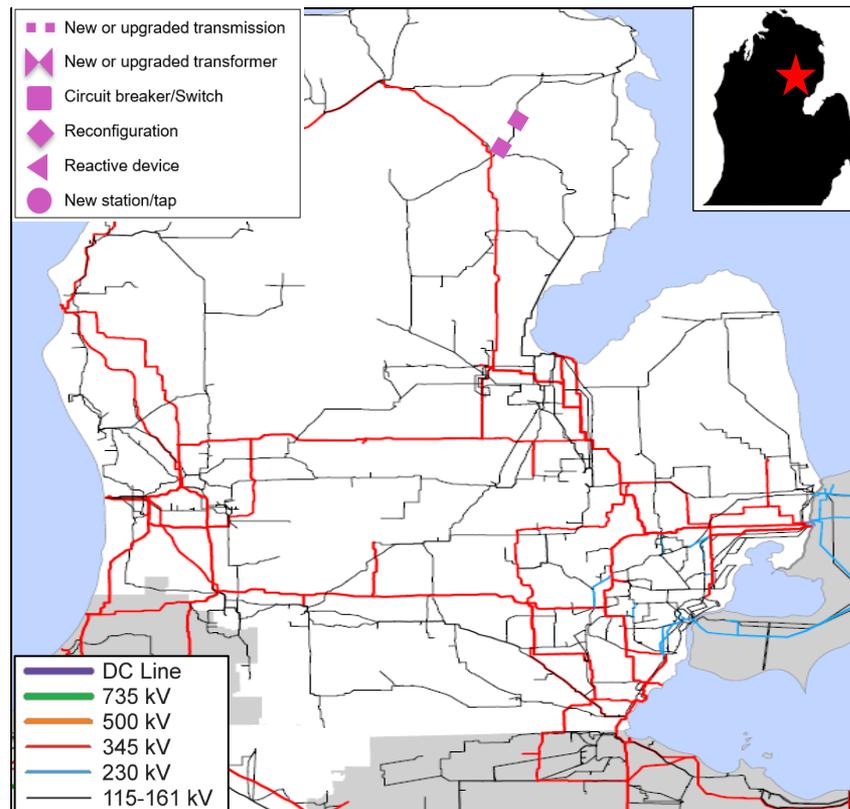
METC – 23698 Blackstone 138 kV Station Equipment Upgrades POS 500 – Project Justification

- **Baseline Reliability Project**
- **Project description**
 - Replace entirety of 2-4/0 CU Blue and White buses and all 2-4/0 CU conductor of pos 500 at Blackstone substation with new conductor capable of handling at least 431 MVA.
- **System Needs**
 - Blackstone Pos 500 is expected to overload in the 70% off-peak case for P6 contingencies.
- **Estimated Cost: \$0.47M**
- **Expected ISD: 12/31/2026**
- **Target Appendix: A in MTEP23**



METC – 23704 Abbe Jct - Mio 138kV Sag Remediation – Project Justification

- **Baseline Reliability Project**
- **Project description**
 - Remediate sag on the 266.8 ACSR to meet or exceed 106 MVA (445 A) on the Abbe Jct. – Mio Dam section of the Airport – Mio Dam 138 kV circuit.
- **System Needs**
 - Able to Mio Dam 138 kV line is projected to be overloaded for category P6 contingencies in off-peak and pumping condition.
- **Estimated Cost: \$1.7M**
- **Expected ISD: 12/31/2026**
- **Target Appendix: A in MTEP23**



METC – 23709 Campbell – Blendon 138kV Loop Into Tyler– Project Justification

- **Baseline Reliability Project**

- **Project description**

- Loop the Campbell - Blendon 138kV line into Tyler to create Campbell - Tyler and Tyler - Blendon 138kV lines. Install (3) new breakers at Tyler and OPGW from Port Sheldon to Campbell.

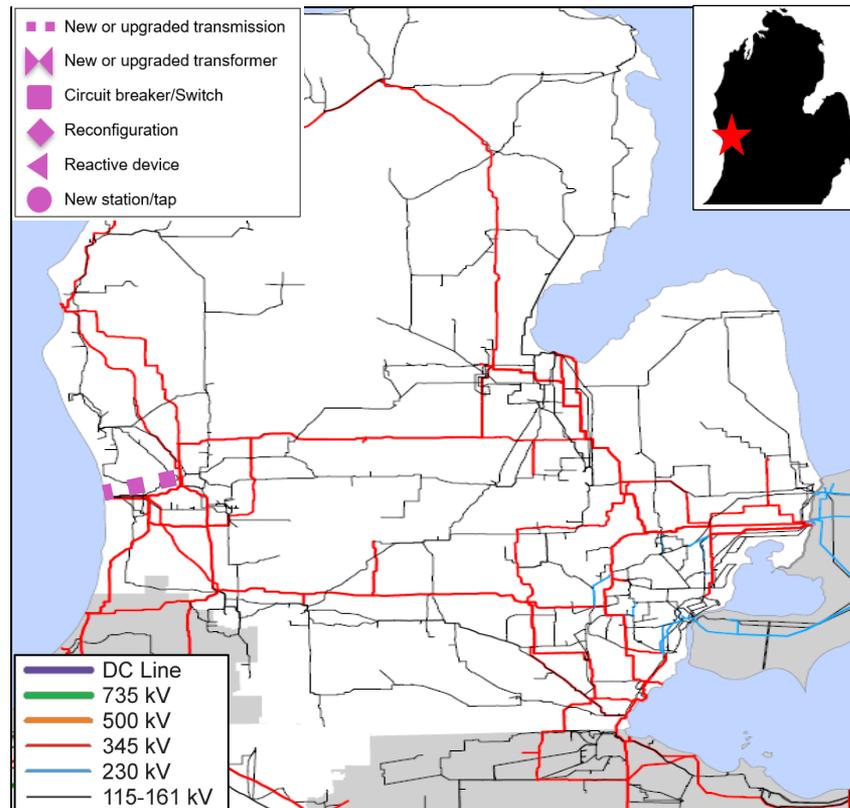
- **System Needs**

- The Campbell - Tyler 138kV #1 line is project to overload for the P6 contingencies during peak and off-peak condition.

- **Estimated Cost: \$6.92M**

- **Expected ISD: 06/01/2027**

- **Target Appendix: A in MTEP23**



METC – 23713 Stover - Van Tyle 138kV Six Wire

– Project Justification

- **Baseline Reliability Project**

- **Project description**

- Install approximately 20 miles using 954 ACSR conductor on the Stover – Van Tyle 138kV line on the adjacent and six-wire the entire circuit with this adjacent. String this circuit with 230kV standard and operate at 138kV. Jumpers will be required on both sides of the PTS switches and every 2.5 miles. Replace the steel ground wire with second OPGW

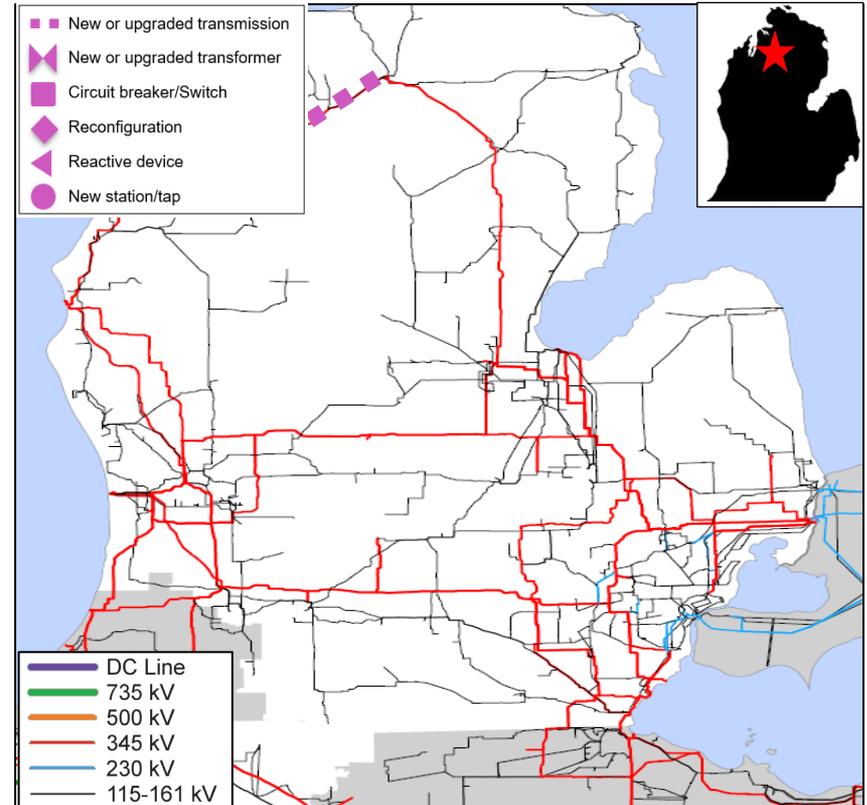
- **System Needs**

- Stover - Van Tyle 138 kV line is projected to be overloaded for category P3 and P6 contingencies in off-peak and pumping condition.

- **Estimated Cost: \$18M**

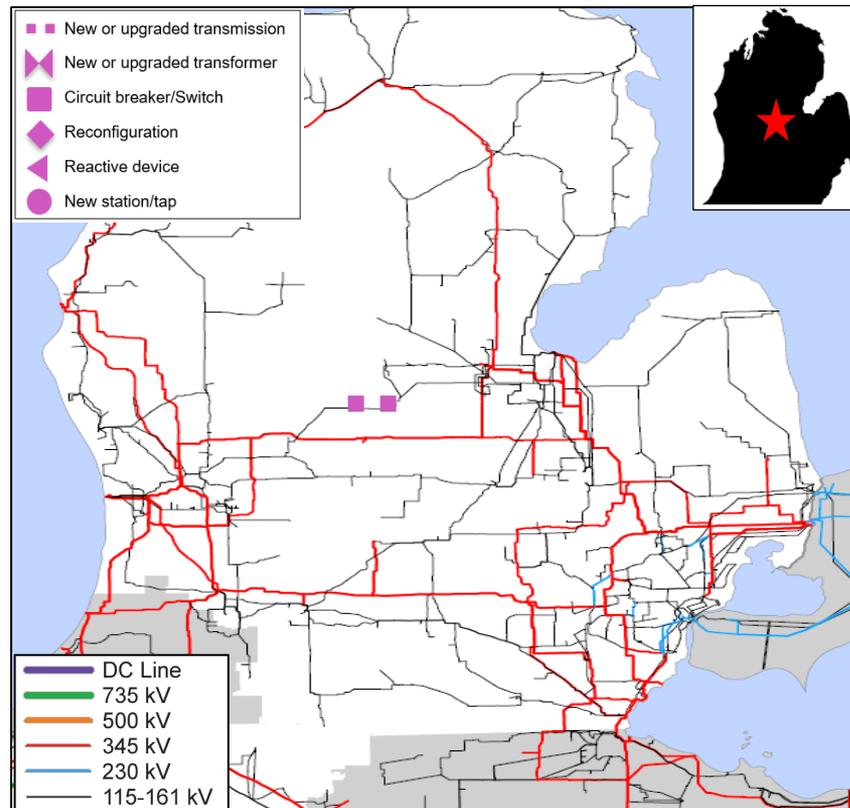
- **Expected ISD: 06/01/2027**

- **Target Appendix: A in MTEP23**



METC – 23743 Deja Junction - Vestaburg 138 kV Rebuild – Project Justification

- **Baseline Reliability Project**
- **Project description**
 - Rebuild 4.3 miles section between Deja Jct. and Vestaburg of the Eureka - Vestaburg 138kV line.
- **System Needs**
 - The Deja Jct. - Vestaburg section of the Eureka - Vestaburg 138kV circuit are projected to overload for various contingencies. The identified overloaded equipment on this circuit is the conductor. The thermal violation is only found on off peak pumping condition.
- **Estimated Cost: \$8.8M**
- **Expected ISD: 06/01/2027**
- **Target Appendix: A in MTEP23**



METC – 23807 Alma - Vestaburg 138 kV Reconductor – Project Justification

- **Baseline Reliability Project**

- **Project description**

- Reconductor from Vestaburg to structure #2W8472 (~16.24 miles) from 954 ACSR to 954 ACSS. Also, upgrade 1590 SAC buses and 1200A switches at Alma position “477” to at least 455 MVA for summer emergency rating.

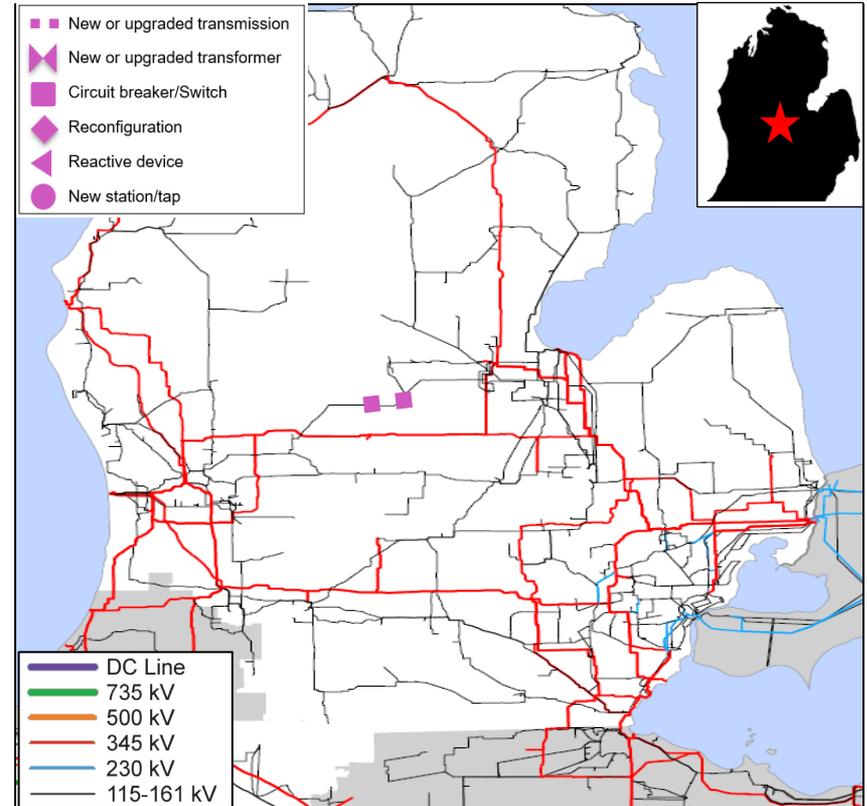
- **System Needs**

- The Alma-Vestaburg 138 kV circuit is projected to overload for various contingencies, including N-1 in METC's 2022 internal assessment.

- **Estimated Cost: \$16.7M**

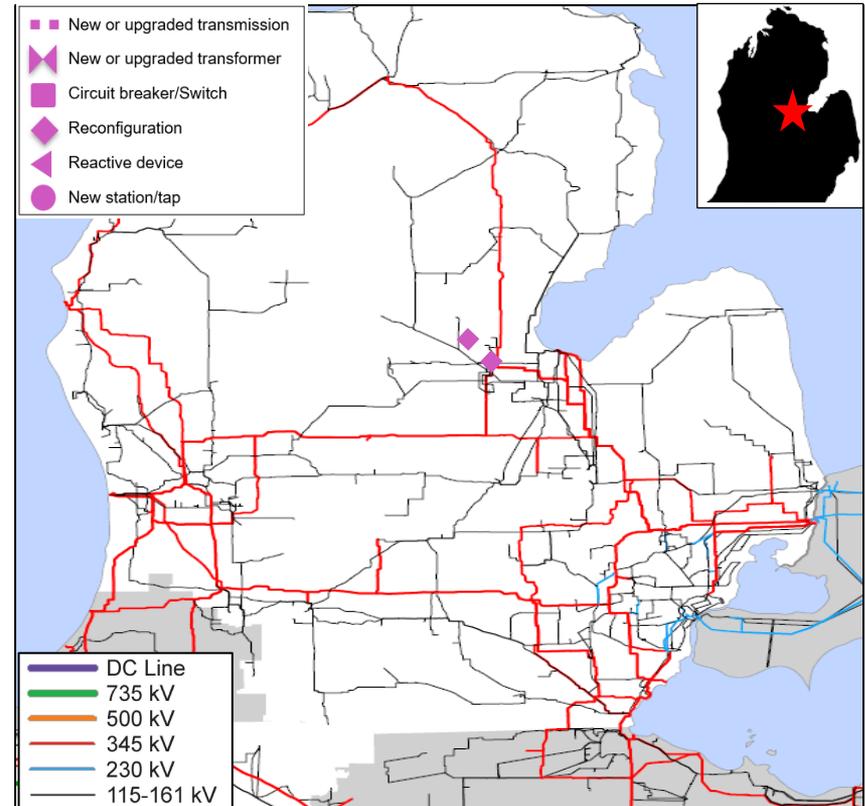
- **Expected ISD: 06/01/2027**

- **Target Appendix: A in MTEP23**



METC – 23830 MCV 138 kV Station Equipment Upgrade – Project Justification

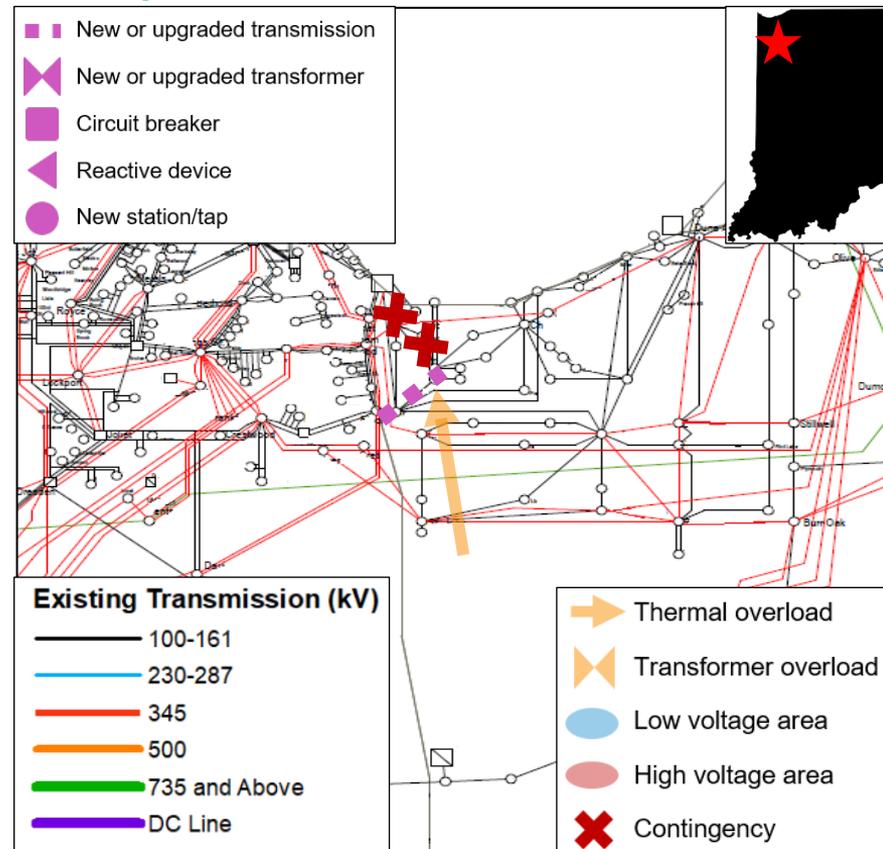
- **Baseline Reliability Project**
- **Project description**
 - Upgrade thermal relay at position "3141" to at least 620 MVA.
- **System Needs**
 - The bus-tie section at MCV position "3141" is projected to overload in METC's internal assessment under P21 contingencies.
- **Estimated Cost: \$0.19M**
- **Expected ISD: 12/31/2026**
- **Target Appendix: A in MTEP23**



NIPSCo Projects

Upgrade [NIPS] Roxanna—[NIPS] Mittal Steel Indiana Harbor West 138kV line solves multiple thermal overload

- **P23471 - Baseline Reliability Project**
- **Project description**
 - Reconductor 2 miles of the [NIPS] Roxanna—[NIPS] Mittal 2 138kV over head Conductor.
- **System Need**
 - Multiple events, [NIPS] Roxanna—[NIPS] Mittal Steel Indiana Harbor West-2 138kV line overloaded to 125% loading for outages of BES elements based on MTEP22 analysis.
- **Estimated Cost: \$5.65 M**
- **Expected ISD: May 31, 2025**
- **Target Appendix: A in MTEP23**



Upgrade [NIPS] Leesburg 138kV Substation solves P2-3 thermal overload

- **P23472 - Baseline Reliability Project**

- **Project description**

- Eliminate common breaker at [NIPS] Leesburg substation.

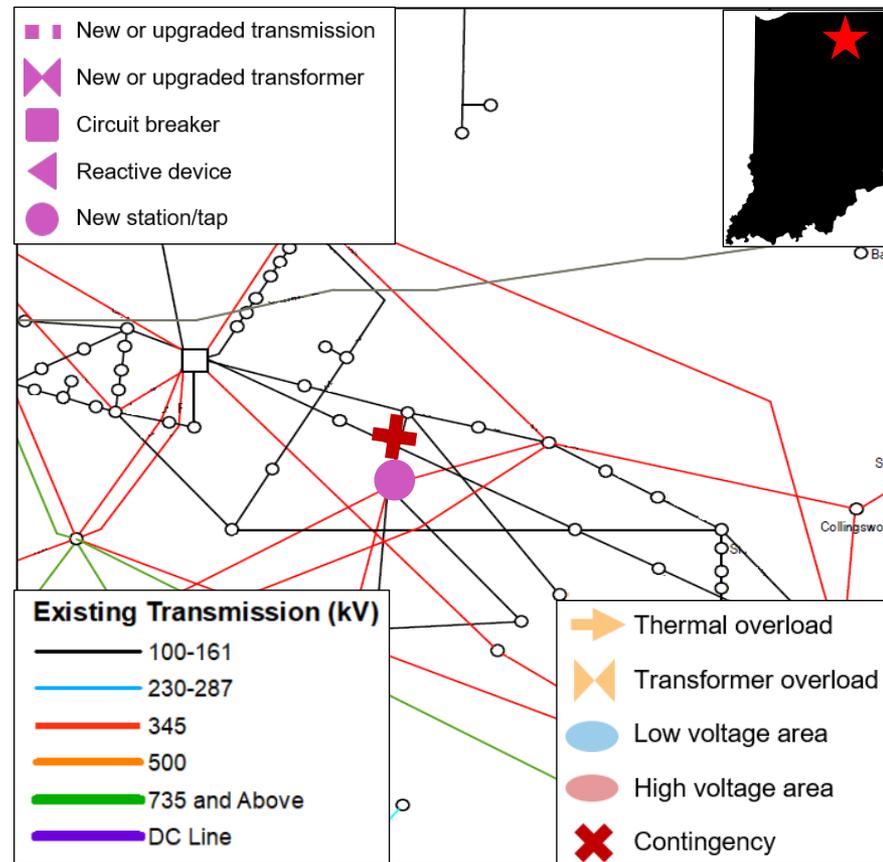
- **System Need**

- P2-3 event, voltage drop on BES buses and thermal overload at [NIPSCO] Goshen Junction—[NIPSCO] Forrest G. Hiple 138kV line to 116% loading for outages of BES element based on MTEP22 analysis.

- **Estimated Cost: \$2.4M**

- **Expected ISD: December 31, 2025**

- **Target Appendix: A in MTEP23**



MTEP 24 Projects and Issues Under Review

MISO East and Central Subregion

Preliminary projects and issues are detailed in 1st Subregional planning meeting (SPM) materials

- East Subregional SPM 1: February 7, 2024
 - [East Subregional Planning Meeting \(ESPM\) - February 7, 2024 \(misoenergy.org\)](https://misoenergy.org)
- Central Subregional SPM 1: February 5, 2024
 - [Central Subregional Planning Meeting \(CSPM\) - February 5, 2024 \(misoenergy.org\)](https://misoenergy.org)
- MTEP24 powerflow models released March 2024. Please see MISO modeling page for updates.
 - [Planning Modeling \(misoenergy.org\)](https://misoenergy.org)