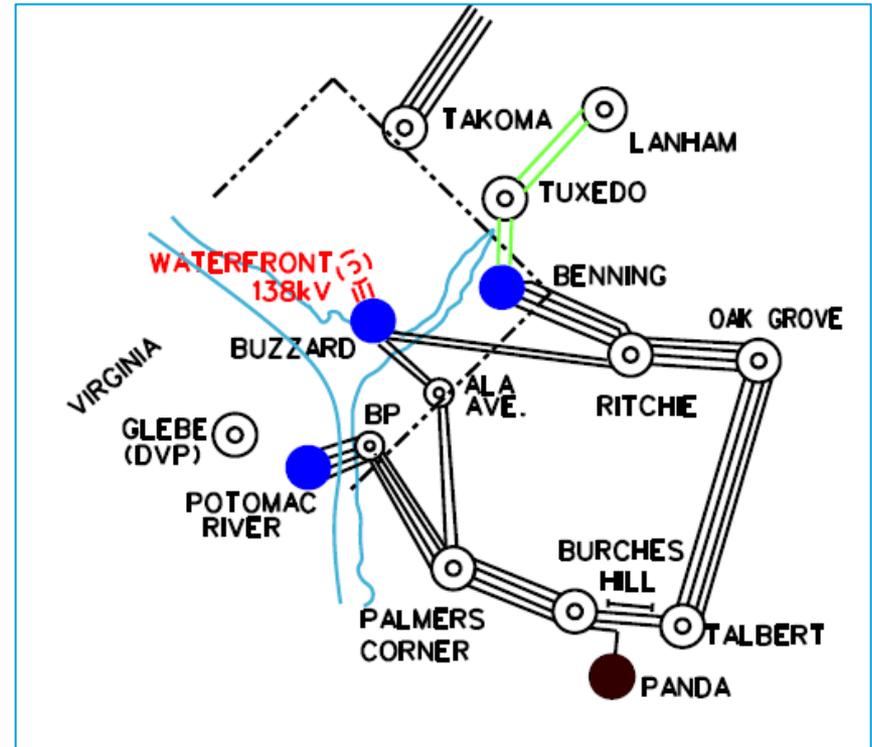


Waterfront 138/13kV New Substation

- Problem Statement
 - Needed to serve existing and future load growth in Washington, DC (SE-SW area);
 - Existing area substations do not have available feeder positions or capacity to serve predicted future load growth;
 - Mitigate risk associated with aging infrastructure (new substation will facilitate load transfer from substations constructed nearly 80 years ago).
- Proposed Solution
 - Construct new GIS 138/13kV Waterfront substation. Supply “radially” by three new 138kV circuits (using 230kV insulated cable) from Buzzard Point (0.34miles);
 - 230kV GIS switchgear (initially operated at 138kV) will be installed at Waterfront to allow eventual conversion to a 230kV “networked” supply configuration.
- Alternatives
 - Alternative 230kV transmission supplies and substation configurations and locations were considered. None of these options proved to be cost advantageous and created additional issues with respect to timing, conformance to standards, space constraints, etc.
- Estimated Cost
 - \$156M
- Scheduled In-Service Date
 - 5/31/2017
- Status
 - Construction



Mt. Vernon 230/13kV New Substation

Problem Statement

- Needed to serve existing and future load growth in Washington, DC (Mt. Vernon Triangle, Shaw, NoMa, and Northwest One neighborhoods);
- Load relief is needed at NE substation and Tenth Street, due to predicted firm capacity overloads. Expansion at the existing Northeast substation is not possible due to space constraints in getting additional feeders out;
- Increase reliability to local load by reducing the risk of a loss of load upon realization of a major corridor outage.

Proposed Solution

- Install New Mt. Vernon 230/13kV, 210 MVA substation with a 4-Bay, 14 Breaker 230kV GIS insulated High-Side-Bus;
- 230kV High-Side-Bus at Takoma with 8-Bays and 26 Breakers;
- 2 - 230kV feeders from Takoma to Mt. Vernon (6miles);
- 2 – 230kV feeders from Mt. Vernon to Waterfront (2.9miles);
- Convert Waterfront to 230kV: Install 2 – 400 MVA Phase Shifters and 2 – 100 MVAR Shunt Reactors at Waterfront.

Alternatives

- Supply Mt. Vernon and Waterfront from radial supplies: this option was inferior to the selected option as it required additional 230kV underground cable (18 vs. 20 circuit miles). The radial solution was slightly higher in cost and did not provide the level of reliability realized with the network configuration.

Estimated Cost

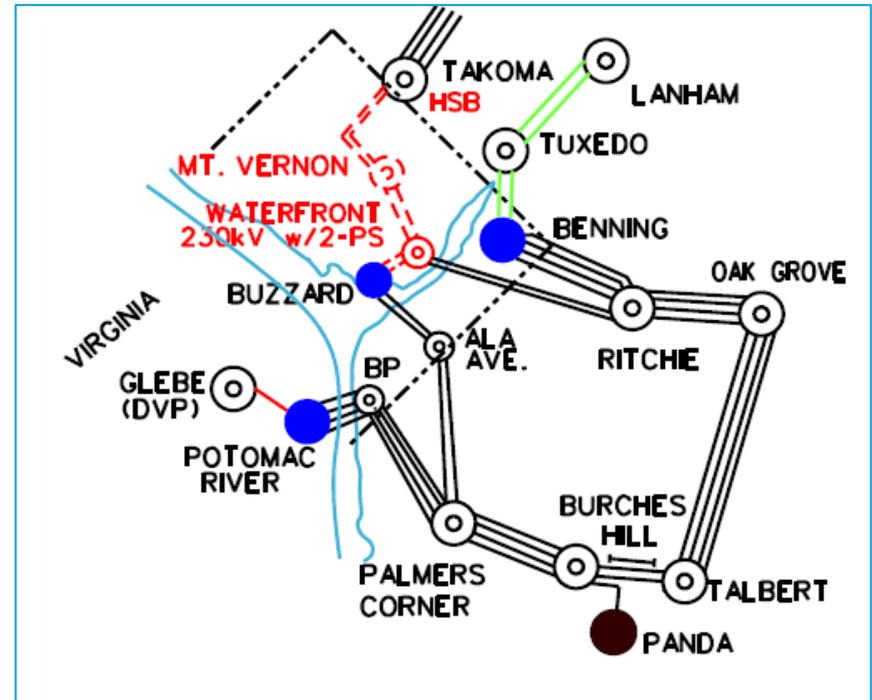
- \$337M

Scheduled In-Service Date

- 5/31/2021

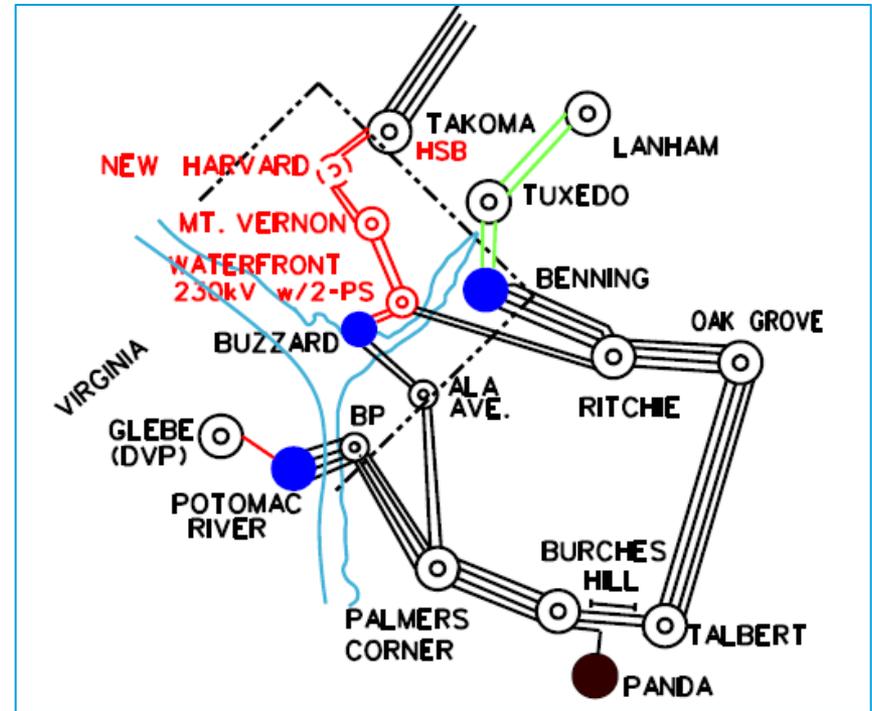
Status

- Preliminary Engineering



New Harvard 230/13kV New Substation

- Problem Statement
 - Needed to reliably serve existing and future load in Washington, DC (Columbia Heights);
 - Mitigate risk with aging infrastructure (new substation will replace vintage 1908 and 1930 substations).
- Proposed Solution
 - Intercept the two circuits that will be extended from Takoma to the new Mt. Vernon substation to supply the New Harvard 230/13kV, 210 MVA substation;
 - Build New Harvard substation with a 4-Bay, 14 Breaker 230kV GIS insulated High-Side-Bus;
 - Construction of a temporary substation adjacent to the existing Substation will be required.
- Alternatives
 - Replace aging infrastructure at Harvard (1908) and Champlain (1930) substations. These alternatives were considered inferior to the selected project because they were more costly and did not add the additional capacity which will be realized with the New Harvard substation.
- Estimated Cost
 - \$79M
- Scheduled In-Service Date
 - 5/31/2022
- Status
 - Preliminary Engineering



Additional Detail

- The previous grouping of projects constitutes an iterative plan to:
 - Reliably serve existing and future load in Washington, DC;
 - Mitigate risk associated with aging infrastructure;
 - Guard against loss of load during a major transmission corridor outage;
 - Restore redundancy that was reduced with the retirement of all generation in the District;
 - Provides the most efficient and cost effective means of addressing multiple needs in the Washington DC area.

- The proposed solution is not anticipated to impact other PJM TO's ability to schedule outages, as the impacted facilities do not support networked thru flow

- Facilities are designed with the capacity to serve existing and predicted future load growth. The 230kV network is being designed to incorporate a future substation which can be integrated into the network as needed.