



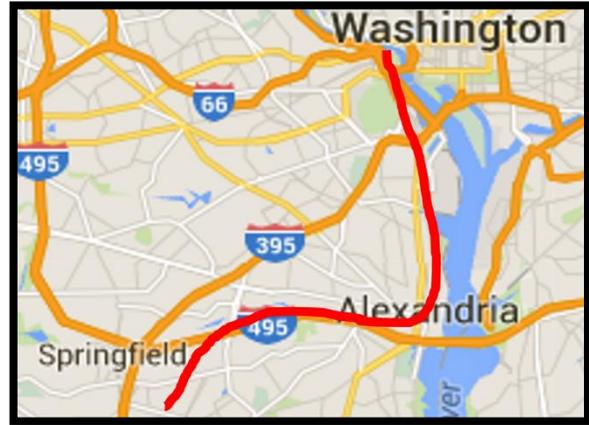
## Project Description Form – 8FF

### Basic Project Information

**Submitting Jurisdiction/Agency:** Washington Metropolitan Area Transit Authority

**Project Title:** Blue Line Traction Power Upgrades

**Project Location:** This project is one portion of Metro's system-wide traction power upgrade initiative, and is focused on the Metrorail Blue Line. The project components being submitted for NVTA funding include five Tie-Breaker Stations (TBS) and one DC Switchgear (DC Gear) installation in Northern Virginia, along the Blue Line corridor between the Pentagon Station and the Franconia-Springfield Station. Please see the attached project location maps.



This work is a subset of traction power upgrades along the entire corridor. The full Blue Line traction power upgrade project consists of seven Tie-Breaker Stations (TBS), four Traction Power Sub-Stations (TPSS), and two Direct-Current Switchgear (DC Gear) installations.

**Project Description:** Traction power upgrades incrementally improve the output of the Metrorail power system, increasing power supply in order to support consistent deployment of eight-car trains. Increasing from six to eight cars per train results in an increase in the traction power needed by each train, as well as the load put on the traction power system. This portion of Metro's system-wide traction power upgrade project will focus on the Blue Line, and includes the purchase and installation of tie breaker equipment, power substations, and direct-current gear. Metro is applying for NVTA FY17 funds to support the fabrication and installation of five Tie-Breaker Stations (TBS) and one Direct-Current Switchgear (DC Gear) installation in Northern Virginia, between the Pentagon and Franconia-Springfield Metrorail Stations.

### Project Analysis Summary\*

NVTA Quantitative Score	65.61	Rank	4
Congestion Reduction Relative to Cost Ratio (NVTA Share)	1.29	hours saved/\$	Rank 3
Congestion Reduction Relative to Cost Ratio (Total Cost)	0.25	hours saved/\$	Rank 10

\*Detailed scoring information can be found at: <http://www.thenovaauthority.org/planning-programming/fy2017-program/>

## Project Milestones

### Project Milestones by Project Phase:

- **WMATA In-house Design & Development:** November 2015 – March 2016
- **Anticipated Contract Release Date:** April 2016
- **Anticipated Bid Opening:** May 2016
- **Anticipated Notice to Proceed:** June 2016
- **Equipment Fabrication:** June 2016 – December 2016
- **Begin Installation:** December 2016
- **Finish Installation:** November 2017

## Project Cost

**Requested NVTA FY2017 Funds:** \$17,443,951

**Total Cost to Complete Project:** Revised from \$62,144,466 to \$88,625,564 to include cost of additional rolling stock.

Project Phases	Requested NVTA FY2017 Funds	Other Sources of Funding	Total Cost by Phase
Inside Engineering	\$1,141,148 (FY2017) \$726,057 (FY2018)	\$2,585,845	\$4,453,050 (FY2017-18)
Escort Support	\$1,141,098 (FY2017) \$1,347,168 (FY2018)	\$4,434,255	\$6,922,521 (FY2017-18)
Construction	\$3,838,467 (FY2017) \$4,798,083 (FY2018)	\$30,892,275	\$39,528,825 (FY2017-18)
Contract Administration	\$2,880,408 (FY2017) \$1,571,522 (FY2018)	\$6,788,140	\$11,240,070 (FY2017-18)
Other (Acquisition of rolling stock)		\$0 \$26,481,098	\$0 \$26,481,098
<b>TOTAL</b>	<b>\$17,443,951</b>	<b>\$44,700,515</b> <b>\$71,181,613</b>	<b>\$62,144,466</b> <b>\$88,625,564</b>

## Project Impacts

**What regional benefit(s) does this project offer?** Both trains and station platforms are overcrowded during peak travel periods, particularly in the system's core. This severe and worsening capacity constraint adds unexpected dwell time, reduces reliability and on-time performance, and negatively impacts the

customer experience and perceptions of Metrorail service. This situation is particularly pressing on the Blue Line, which had its service headways reduced following integration of Silver Line service through the Rosslyn Tunnel. Absent additional service capacity, this situation will only worsen as the region continues to grow. The National Capital Region is forecasted to experience a 30-percent increase in population and a 39-percent increase in jobs over the next 30 years. Comparatively rapid growth in suburban areas will add pressure to the Metrorail system's core, which is already strained. In order to accommodate forecasted growth and alleviate the system's crowding/capacity issues, Metro and its jurisdictional partners adopted the *Momentum* strategic plan. *Momentum* recommends funding and implementation of seven key capital investments by 2025, including the traction power and rolling stock needed to deploy eight-car trains on a continuous basis. Successful implementation of the eight-car service strategy will reduce severe crowding of trains and platforms, make the system safer to use, improve the rail customer experience, and reduce road congestion throughout the region by making the Metrorail system an even more attractive, comfortable, timely, and safe alternative to driving.

**How will the project reduce congestion?** The Metro System serves approximately 1.2 million trips every day, and over 700,000 of those boardings are on Metrorail. Metrorail is the indispensable backbone of the region's transportation network and anchors the region's growth and economic competitiveness. On an average weekday, over 78,000 people board the system at stations along the corridor between Rosslyn and Franconia-Springfield; 78,000 people who might otherwise add their trips to the region's already overburdened roads and highways, particularly those connecting Northern Virginia and the District of Columbia. Implementing full eight-car train service on the Blue Line will not only alleviate intense rush-hour crowding on trains and platforms, it may also draw drivers from congested corridors like I-95, I-395, US 1, and I-66.

Running 100-percent eight-car trains consistently throughout Metrorail's peak travel periods will also greatly reduce the excessive crowding currently experienced by Blue Line customers. Under current capacity and power constraints, Metro can only deploy eight-car trains for 50% of peak-hour Blue Line trips. This has produced intense crowding in the morning and evening peak periods, with every peak train carrying near Metro's established threshold for crowded conditions of 100 people per car (PPC) between Arlington and Rosslyn, then exceeding that threshold into crush loads of 115 PPC through the Rosslyn Tunnel and Foggy Bottom Station. The figure below illustrates crowded Metrorail segments during peak periods. Metro may not be able to increase service frequency on the Blue Line without additional tunnel and track infrastructure that alleviates congestion on the shared Blue/Orange/Silver corridor, but the ability to operate eight-car trains for each peak-period trip will help alleviate excessive crowding on trains and platforms. That congestion relief will in turn help reduce dwell times at stations.



**Reference:**

[https://public.tableau.com/views/CNEWSAlphaEffectsonLineLoad/EffectofCNEWS?:embed=y&:display\\_count=yes&:showTabs=y](https://public.tableau.com/views/CNEWSAlphaEffectsonLineLoad/EffectofCNEWS?:embed=y&:display_count=yes&:showTabs=y)

**How will the project increase capacity?** With Metro operating 100-percent eight-car trains (the longest consist possible), trains entering the region’s core (downtown DC and eastern Arlington County) could accommodate approximately 35,000 more passengers per hour during rush hour. This is the equivalent of building 18 new lanes on highways into Washington, D.C.

In order to implement 100-percent eight-car trains, certain preliminary improvements to the system must be made, including the traction power system. The existing Metrorail traction power system consists of mainline and rail yard traction power substations (TPSS) and tie-breaker stations (TBS), as well as associated cabling and third rails. The traction power elements currently in place along the Blue Line corridor are capable of continuously powering six-car trains, as well as occasional eight-car consists during limited periods, but do not produce or conduct enough power to operate eight-car trains on a continuous and consistent basis.

**How will the project improve auto and pedestrian safety?** Reduced congestion and additional capacity on Metrorail will increase its attractiveness to choice riders, resulting in a higher transit mode share and reduced vehicle-miles of auto travel (VMT). As a general rule, lower VMT results in fewer auto crashes, thereby improving safety.

**How will the project improve regional connectivity?** As a capacity upgrade to an existing rail corridor, this project will not expand *physical* access to additional activity centers. However, by expanding capacity,

reducing congestion, and providing a more comfortable customer experience, it will create more room and reason for new riders to use the corridor, and in doing so expand their access and mobility to all the activity centers along the corridor between Springfield, Rosslyn, Downtown DC, and Largo Town Center.

**How will the project improve bicycle and pedestrian travel options?** Metro allows customers to bring bicycles on board trains outside of peak travel hours, and provides bike parking at most stations. Reducing crowding on trains and platforms opens additional capacity to bike-and-ride passengers, which in turn greatly expands their travel shed. That travel shed can be expanded even farther via Metrobus connections at Blue Line stations. In general, providing more customer carrying capacity on Metrorail expands accessibility and travel options for bicyclists and pedestrians, as well as providing a safer option for longer trips.

**How will the project improve the management and operation of existing facilities through technology applications?** One component of the eight-car train program is returning Metrorail operations to Automated Train Control (ATC), which is proven to provide more efficient and timely travel, smoother stops, and safer spacing between trains.

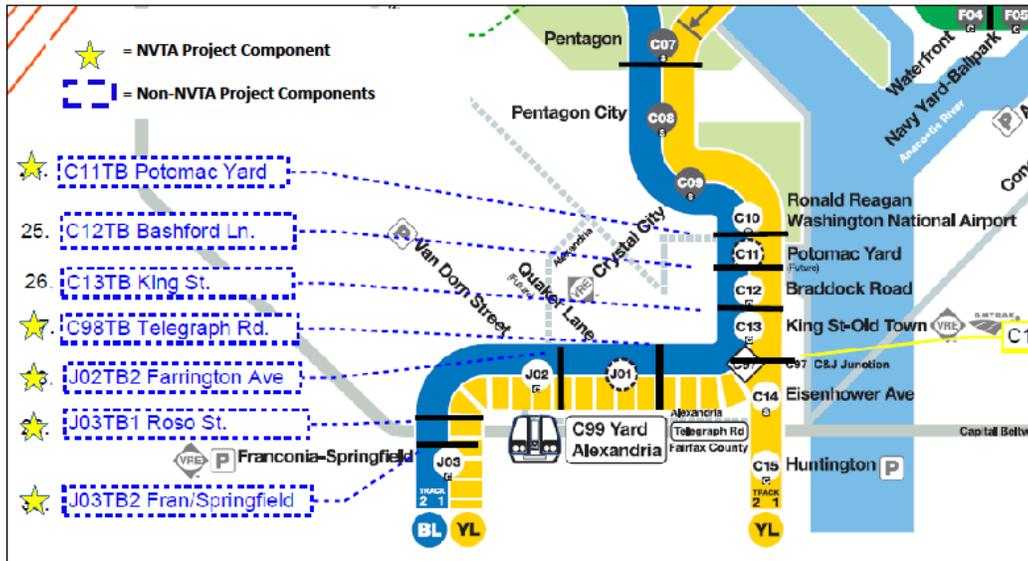
### **Additional Information in Support of This Project**

Momentum Strategic Plan - <http://www.wmata.com/momentum/momentum-full.pdf>

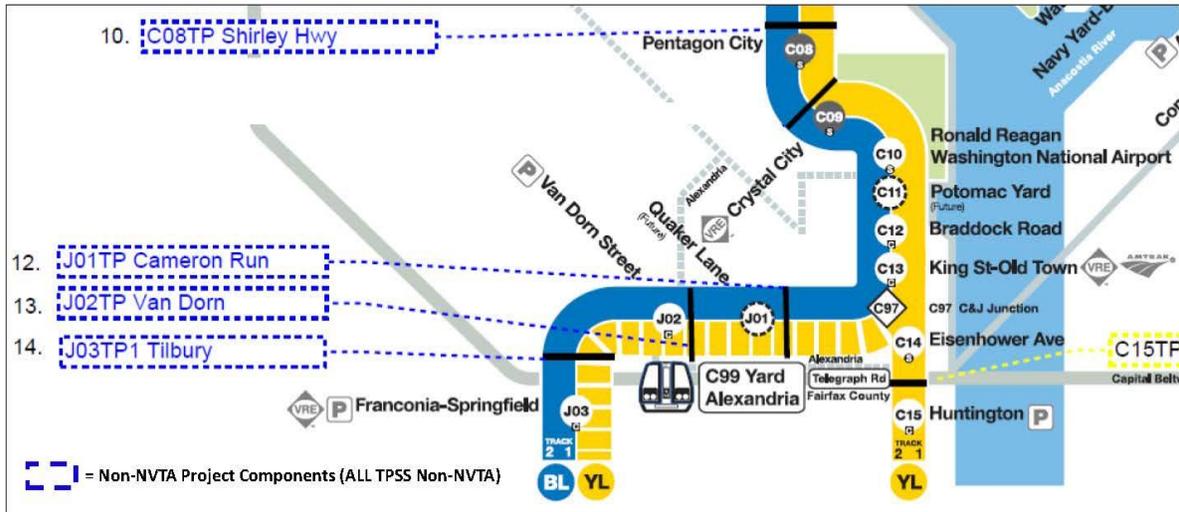
Specific benefits of full 8-car trains can be found here: <http://www.wmata.com/momentum/metro2025-1-longest-trains.pdf>

Fiscal Year 2016 Annual Budget - [http://www.wmata.com/about\\_metro/docs/Proposed%20Fiscal%20Year%202015%20Annual%20Budget.pdf](http://www.wmata.com/about_metro/docs/Proposed%20Fiscal%20Year%202015%20Annual%20Budget.pdf)

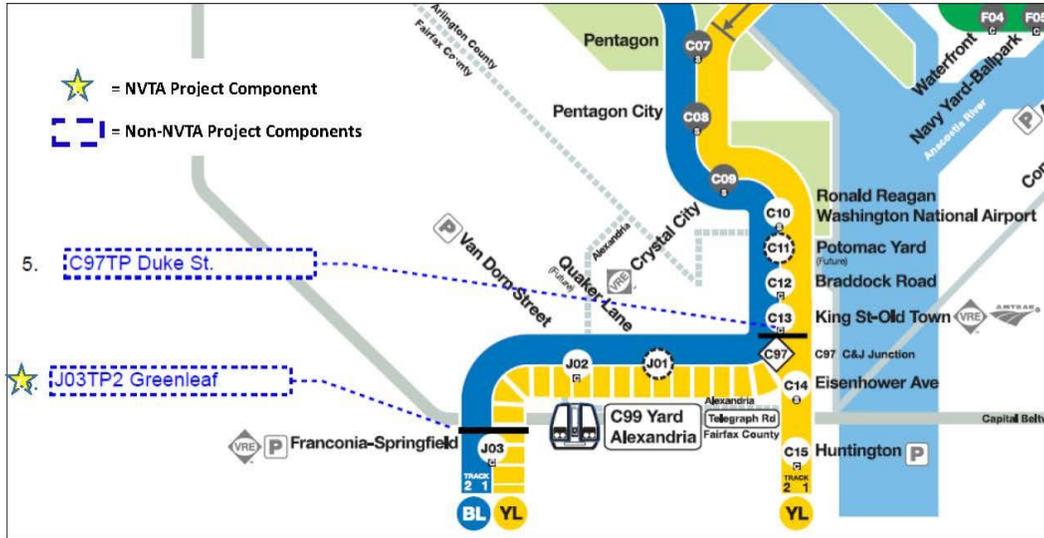
## Blue Line Traction Power Upgrades Tie-Breaker Station (TBS) Locations



## Blue Line Traction Power Upgrades Traction Power Sub-station (TPSS) Locations



## Blue Line Traction Power Upgrades Direct-Current Switch Gear (DC Gear) Locations



## Blue Line Traction Power Upgrades Eight-Car Trains and Traction Power Components

