

WMATA Metrorail



Based on 6 routes

Headway Adherence

B-
82%

Schedule Adherence

B+
88%

Arrival Frequency

A
11 min

Data Integrity

A-
90%

SUMMARY

The system received a grade of B+ for its overall performance in December 2022. This grade reflects the combined average scores for the four metrics we compute (headway adherence, schedule adherence, arrival frequency, and data integrity) for each of the system's 6 routes.

	Peak	Off-peak	Weekend	Total
SPACING				
Bunched	0%	0%	1%	0%
Over-spaced	14%	18%	23%	18%
OFF-SCHEDULE				
Too early	5%	5%	7%	5%
Too late	4%	7%	12%	7%
HEADWAYS				
Observed	10 min	11 min	13 min	11 min
Scheduled	8 min	10 min	12 min	10 min
Goal	15 min	15 min	15 min	15 min
TRIPS				
Observed	11,258	17,097	7,452	30,657
Scheduled	11,808	18,363	9,455	34,096
Crowded	0%	0%	0%	0%

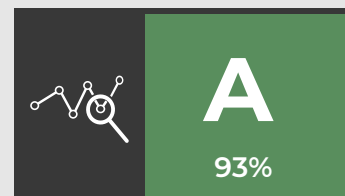
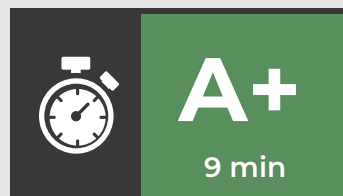
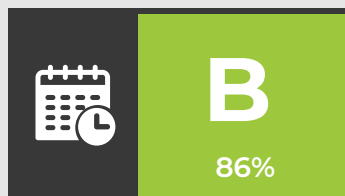
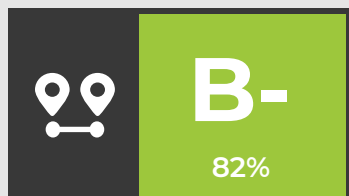


A-

ROUTE: Blue

SYSTEM: WMATA Metrorail

TL;DR:



Headway Adherence

Schedule Adherence

Arrival Frequency

Data Integrity

DETAILED BREAKDOWN:

	Peak	Off-peak	Weekend	Total
SPACING				
Bunched	1%	1%	2%	1%
Over-spaced	15%	18%	24%	18%
OFF-SCHEDULE				
Too early	4%	5%	6%	5%
Too late	5%	8%	17%	9%
HEADWAYS				
Observed	8 min	8 min	10 min	9 min
Scheduled	8 min	8 min	8 min	8 min
Goal	15 min	15 min	15 min	15 min
TRIPS				
Observed	2,958	4,664	1,981	8,291
Scheduled	3,068	4,962	2,257	8,890
Crowded	0%	0%	0%	0%

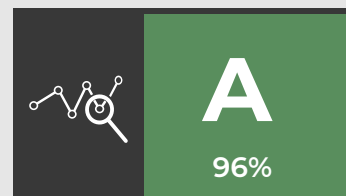
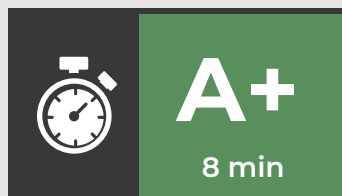
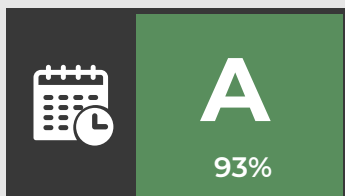
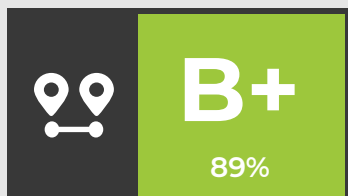


A

ROUTE: Green

SYSTEM: WMATA Metrorail

TL;DR:



Headway Adherence

Schedule Adherence

Arrival Frequency

Data Integrity

DETAILED BREAKDOWN:

	Peak	Off-peak	Weekend	Total
SPACING				
Bunched	0%	0%	0%	0%
Over-spaced	9%	10%	14%	11%
OFF-SCHEDULE				
Too early	3%	3%	4%	3%
Too late	3%	3%	5%	3%
HEADWAYS				
Observed	8 min	8 min	9 min	8 min
Scheduled	8 min	8 min	8 min	8 min
Goal	15 min	15 min	15 min	15 min
TRIPS				
Observed	2,732	4,272	1,940	7,919
Scheduled	2,778	4,430	2,098	8,252
Crowded	0%	0%	0%	0%

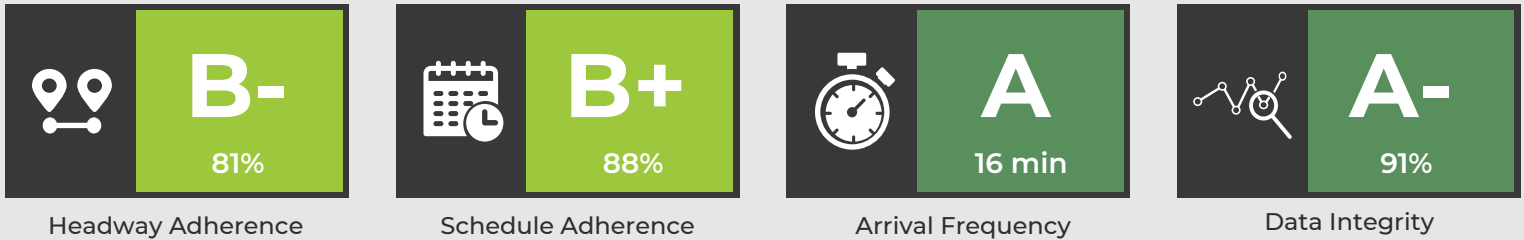


B+

ROUTE: Orange

SYSTEM: WMATA Metrorail

TL;DR:



DETAILED BREAKDOWN:

	Peak	Off-peak	Weekend	Total
SPACING				
Bunched	0%	0%	0%	0%
Over-spaced	16%	20%	22%	19%
OFF-SCHEDULE				
Too early	7%	7%	7%	7%
Too late	3%	5%	8%	5%
HEADWAYS				
Observed	15 min	15 min	17 min	16 min
Scheduled	15 min	15 min	16 min	15 min
Goal	15 min	15 min	15 min	15 min
TRIPS				
Observed	1,411	2,273	993	4,050
Scheduled	1,532	2,470	1,128	4,435
Crowded	0%	0%	0%	0%

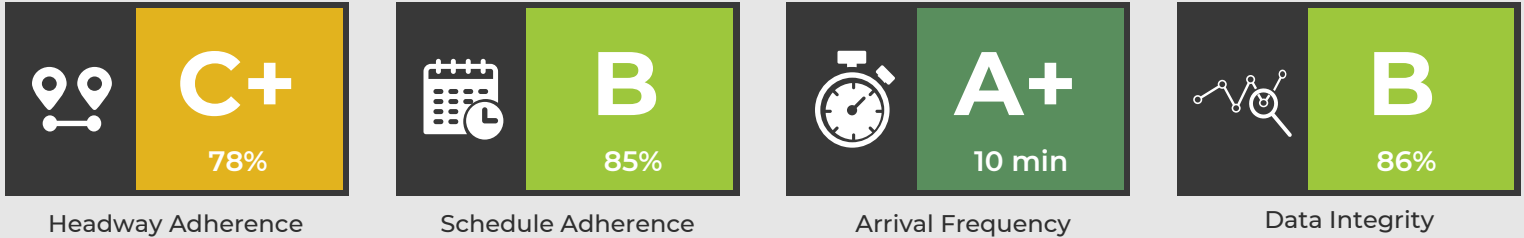


B+

ROUTE: Red

SYSTEM: WMATA Metrorail

TL;DR:



DETAILED BREAKDOWN:

	Peak	Off-peak	Weekend	Total
SPACING				
Bunched	0%	0%	0%	0%
Over-spaced	15%	23%	30%	22%
OFF-SCHEDULE				
Too early	6%	6%	15%	8%
Too late	3%	8%	11%	7%
HEADWAYS				
Observed	9 min	10 min	12 min	10 min
Scheduled	8 min	10 min	12 min	10 min
Goal	15 min	15 min	15 min	15 min
TRIPS				
Observed	2,497	3,366	1,511	6,225
Scheduled	2,708	3,828	2,011	7,268
Crowded	0%	0%	0%	0%



ROUTE: SHUTTLE

SYSTEM: WMATA Metrorail

TL;DR:



DETAILED BREAKDOWN:

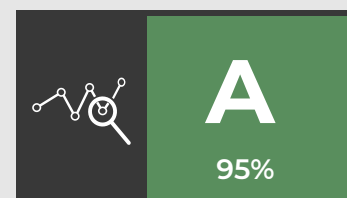
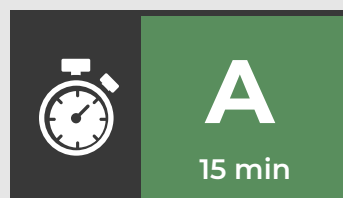
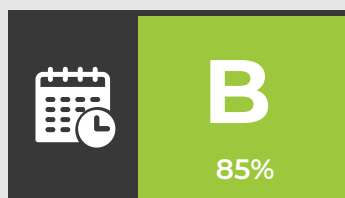
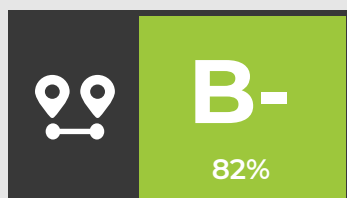
	Peak	Off-peak	Weekend	Total
SPACING				
Bunched	-- %	-- %	-- %	-- %
Over-spaced	-- %	-- %	-- %	-- %
OFF-SCHEDULE				
Too early	-- %	-- %	-- %	-- %
Too late	-- %	-- %	-- %	-- %
HEADWAYS				
Observed	-- min	-- min	-- min	-- min
Scheduled	-- min	5 min	5 min	5 min
Goal	15 min	15 min	15 min	15 min
TRIPS				
Observed	--	0	0	0
Scheduled	--	11	830	840
Crowded	-- %	-- %	-- %	-- %

B+

ROUTE: Silver

SYSTEM: WMATA Metrorail

TL;DR:



Headway Adherence

Schedule Adherence

Arrival Frequency

Data Integrity

DETAILED BREAKDOWN:

	Peak	Off-peak	Weekend	Total
SPACING				
Bunched	0%	0%	0%	0%
Over-spaced	15%	18%	24%	18%
OFF-SCHEDULE				
Too early	6%	5%	5%	5%
Too late	4%	8%	19%	9%
HEADWAYS				
Observed	15 min	15 min	16 min	15 min
Scheduled	15 min	15 min	16 min	15 min
Goal	15 min	15 min	15 min	15 min
TRIPS				
Observed	1,660	2,522	1,027	4,172
Scheduled	1,722	2,662	1,131	4,411
Crowded	0%	0%	0%	0%



PRIMARY METRICS

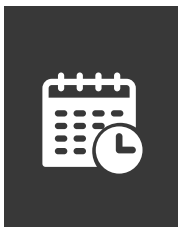
There are four primary metrics we use to compute letter grade for a given system or route: headway adherence, schedule adherence, arrival frequency, and data integrity. Each metric is assigned its own grade using a standard American 4.0 GPA grading scale¹, and the overall grade is calculated by averaging the four categories' percentile grades.



HEADWAY ADHERENCE

Percent of scheduled visits to each transit stop that occurred within 3 minutes² of the scheduled spacing window of the previous visit.

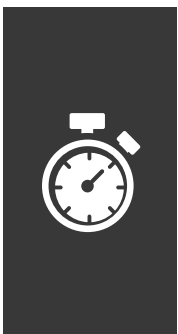
A headway adherence grade of A+ would require a value of 97% or higher.



SCHEDULE ADHERENCE

Percent of scheduled visits to each transit stop that occurred between 2 minutes early and 7 minutes late² compared to the scheduled time of the visit.

A schedule adherence grade of A+ would require a value of 97% or higher.



ARRIVAL FREQUENCY

Median observed time between scheduled transit stop visits at a given stop for a given route and trip direction.

To determine a percentile and letter grade, we compare the arrival frequency (in minutes) to the goal of 15 minutes³. Because an arrival frequency of exactly 15 minutes meets, but does not exceed, our minimum goal, this has been scaled to equate to a 93%, the minimum score necessary to receive an A. A grade of A+ requires an arrival frequency of 10 minutes or less⁴.



DATA INTEGRITY

Percent of transit trips scheduled to have been running that we observed to have actually run. A missing trip can occur when a vehicle is not running when it's scheduled to, or when a vehicle is actually running but is not reporting its position properly due to human error or equipment failure.

A data integrity grade of A+ would require a value of 97% or higher.

SECONDARY METRICS

We also compute a number of sub-metrics that offer more context about a particular grade by providing additional levels of detail. These sub-metrics are not explicitly assigned grade values, but rather are used to provide a clearer picture of overall performance.

SPACING

Bunched: Percent of scheduled visits to each transit stop that occurred within 25%⁵ of the scheduled time between the visit and the previous visit to the same transit stop. *A lower percentage is better.*

Over-spaced: Percent of scheduled visits to each transit stop that occurred more than 3 minutes later² than the scheduled time between the visit and the previous visit to the same transit stop. *A lower percentage is better.*

OFF-SCHEDULE

Too early: Percent of scheduled visits to each transit stop that occurred more than 2 minutes earlier² than the scheduled time of the visit. *A lower percentage is better.*

Too late: Percent of scheduled visits to each transit stop that occurred more than 7 minutes later² than the scheduled time of the visit. *A lower percentage is better.*

HEADWAYS

Observed: Median observed time between scheduled transit stop visits at a given stop for a given route and trip direction. *A lower number is better.*

Scheduled: Median scheduled time between transit stop visits at a given stop for a given route and trip direction. *A lower number is better.*

Goal: An ideal median time between transit stop visits. We define this as 15 minutes³ at all times of day every day, regardless of existing route configurations and other details that may make achieving this goal difficult or impossible under current conditions. This metric's purpose is to provide a baseline for comparing service levels across different transit systems, routes, and service periods.

SECONDARY METRICS

TRIPS

Observed: Number of scheduled trips that we actually observed occur. This value is proportional to Data Integrity, so in practice, this number will be smaller than the scheduled number of trips over the same time period unless Data Integrity is 100%. *A higher number is better.*

Scheduled: Number of trips that were scheduled to occur. *A higher number is better.*

Crowded: Percent of scheduled visits to each transit stop that were made by a “full” vehicle, where occupancy levels that determine “fullness” are defined by the transit agency that manages the transit system⁶. *A lower percentage is better.*
(Note that not all transit agencies report vehicle crowding levels in real time.)

All of our Secondary Metrics are broken out into service periods by time of week and day:

Peak: All scheduled transit stop visits that occurred or were scheduled to occur between 6-9am and 3-7pm⁷, Monday through Friday.

Off-peak: All scheduled transit stop visits that occurred or were scheduled to occur outside of the peak hours described above, Monday through Friday.

Weekend: All scheduled transit stop visits that occurred or were scheduled to occur on Saturdays and Sundays.

Total: All scheduled transit stop visits that occurred or were scheduled to occur across all times of week and times of day.

REFERENCES

1 Standard American 4.0 GPA grading scale:

<https://pages.collegeboard.org/how-to-convert-gpa-4.0-scale>

2 We use all the on-time performance thresholds defined by WMATA for its Metrobus service. See "Metrobus On-Time Performance" in Appendix D of WMATA's Q3 FY20 Metro Performance Report for details.

https://www.wmata.com/about/records/scorecard/upload/MetroPerformanceReport_Q3FY2020.pdf#page=48

3 We use the definition of "high frequency bus service" from the Bus Transformation Project's "Bus System Today" report.

https://bustransformationproject.com/wp-content/uploads/2019/01/20190118-Bus-System-Today_FINAL.pdf#page=22

4 We specify a 10 minute arrival frequency based on the highest tier of levels of service in transit-dependent areas as defined by the Bus Transformation Project.

https://bustransformationproject.com/wp-content/uploads/2019/02/SAP-Presentation-18-11-05_updated2.13.19.pdf#page=18

5 We use the bunching threshold defined by the Bus Turnaround Coalition that's used in all their route-level report cards. Click "See Our Methodology" at the bottom of the Bus Turnaround Coalition's "Report Cards" page for details.

<http://busturnaround.nyc/report-cards/>

6 Occupancy status, when provided, is defined by each transit agency and specified in their GTFS-RT data.

<https://developers.google.com/transit/gtfs-realtime/reference#enum-occupancystatus>

7 We use the time of day thresholds for weekdays defined by the Bus Transformation Project. See "Daily Ridership by Time of Day" on the "The Bus System and its Riders Today" page of the Bus Transformation Project's website for details.

<http://bustransformationproject.com/resources/the-bus-system-and-its-riders-today/>