



Georgia Ave & 30s Line Evaluation

Final Report

December 2009



DISTRICT DEPARTMENT OF TRANSPORTATION

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1 Introduction

The Washington Metropolitan Area Transit Authority (WMATA) has implemented two service and line management restructuring initiatives since 2007 that have become a model for subsequent restructuring initiatives in other high ridership corridors throughout the regional transit system. The first initiative, implemented in March 2007, was Metro Extra service in the Georgia/7th Street corridor (Route 79). This initiative included both service and line management changes along the 70s Line (this initial Metro Extra service has since been replicated in other corridors within the District of Columbia). The second initiative was the 30s Line restructuring, which was implemented in June 2008. This initiative also involved both service and line management changes (the 30s Line provides service in the Wisconsin Avenue and Pennsylvania Avenue corridors). Running way and traffic management improvements were also recommended for both corridors.

Given the importance of these two initiatives relative to the number of riders impacted (the 30s line and 70s Line are, respectively, the highest and second highest ridership lines in the WMATA system) and the fact that the initiatives' are models for subsequent restructuring efforts, WMATA has implemented an evaluation process to determine how effective the changes on the two lines have been.

The specific purpose of the evaluation process is twofold:

- To assess progress on each of the restructuring goals that were identified in the original 79 Service Plan and the Metrobus 30s Line Study. This progress assessment was done by comparing “before implementation” and “post-implementation” data for a series of evaluation criteria related to each goal. A summary of the restructuring goals and the evaluation criteria used to determine how well these goals have been met is summarized below in Table 2-1 for the 30s Line and Table 2-2 for the 70s Line.
- Use the results of the goal progress evaluation to identify additional service, line management, traffic management, and running way improvements that will be required to address shortfalls in goal progress.

The remainder of this document is structured as follows:

- **Section 2 - Evaluation Methodology** – this section outlines the evaluation framework that was used to evaluate progress on the restructuring goal for each line. These evaluation results were then used to identify any shortfalls in goal achievement, which in turn became the foundation for identifying additional service, line management, traffic management, and running way recommendations to address these shortfalls.
- **Sections 3 and 4 - Evaluation Results Summary** – These sections contain a summary of the evaluation results for the 30s and 70s Lines. As noted, these results provided the foundation for identifying additional service, line management, traffic management, and running way recommendations to address remaining issues on the two lines.
- **Section 5 - Service and Line Management Recommendations** – The ultimate intent of the evaluation of the two lines was to identify issues that remain after the implementation of the restructurings so that those issues could be addressed. This section outlines the service, line management, traffic management, and running way improvement recommendations that have been proposed to address the issues and shortfalls identified during the evaluation process. Each recommendation contains an estimated cost to implement.

2 Evaluation Methodology

As noted, the framework for the evaluation of the changes on the two lines was the original restructuring goals for each line and a series of evaluation criteria related to each goal that are being used to determine how effectively each goal has been met. The actual steps in the evaluation process are outlined below.

- Based on the original restructuring goals, the project team developed a series of evaluation criteria for each goal that would allow for measurement of progress on the goal since the restructuring/new service implementation. Progress was assessed by comparing “before-implementation” and “post-implementation” data for each evaluation criterion and assessing changes in the data between the two time periods.

Evaluation criteria by goal is summarized below in Tables 2-1 (30s Line) and 2-2 (70s Line).

- The team undertook a detailed data analysis in order to complete the comparative assessment of each evaluation criterion for the time period before restructuring and the time period after restructuring. This comparative analysis identified changes in each evaluation criterion (for instance changes in travel speeds) between the before and after condition and was the foundation for identifying improvement or deterioration in each evaluation criterion. This before and after comparison was used to determine progress on each restructuring goal, which in turn was used to identify remaining issues on each line. The remaining issues identified are used as the foundation for the development of additional service, line management, traffic management and running way improvement recommendations.
- Based on the analysis in previous steps, additional service, line management, traffic management, and running way recommendations were identified. A cost estimate and proposed implementation time frame for each recommended improvement was also developed. These recommended improvements are the subject of Section 5 below.

Table 2-1: 30s Line Restructuring Goals

Goal	Evaluation Criteria Used to Measure Effectiveness in Meeting Goal	Method of Measuring Evaluation Criteria
Improve Schedule Adherence/Maintain Headway Separation	<ol style="list-style-type: none"> 1. Bus Bunching and Headway Separation 2. On-Time Performance 3. Driver and Supervisor Feedback 	<ol style="list-style-type: none"> 1. Bus bunching measured as % of buses arriving at evaluated stop within 2 minutes of each other 2. On-time performance based on WMATA standards – early trip departs 2 minutes ahead of schedule at stop, on time trip is 2 minutes ahead of schedule to 7 minutes late, late is more than 7 minutes late 3. Qualitative assessment of driver responses to questions regarding schedule issues on route.
Reduce Travel Times and Improve Travel Speeds	<ol style="list-style-type: none"> 1. Bus Travel Time 2. Bus Travel Speed 3. Scheduled Transit Travel Times 	<ol style="list-style-type: none"> 1. Actual bus travel time between time points, derived from WMATA ridechecks. 2. Actual bus travel speed between time points, derived from WMATA ridechecks. Speeds were calculated based on travel time between time points, divided by distance between time points. 3. Scheduled transit travel times derived from public timetables.
Reduce Overcrowding	<ol style="list-style-type: none"> 1. Passenger Loads Per Trip 	<ol style="list-style-type: none"> 1. Measured as the load on each trip at key stops along the route. Data comes from stationary load checks compiled by WMATA.
Enhance Customer Experience	<ol style="list-style-type: none"> 1. Driver/Supervisor Comments 2. Customer Comments 3. Bus Stop Improvements and Amenities 	<ol style="list-style-type: none"> 1. Qualitative assessment of driver responses to questions regarding training and operating environment. 2. Assessment of customer comments received from WMATA Customer Service Department. Comments from January 2008 through August 2009 were evaluated. 3. Identified the number of stop improvements made as part of DDOT/Clear Channel bus stop improvement initiative. Compared against # of stops identified as deficient in original restructuring study.

Goal	Evaluation Criteria Used to Measure Effectiveness in Meeting Goal	Method of Measuring Evaluation Criteria
Maintain Productivity and Efficiency	<ol style="list-style-type: none"> 1. Daily Ridership 2. Ridership by Stop 3. Passenger Boardings per Revenue Hour 4. Passenger Boardings per Trip 5. Cost per Boarding 6. Changes in Fare Payment Type 	<ol style="list-style-type: none"> 1. Daily ridership on each route as collected from WMATA farebox reports. 2. Boardings and alightings by stop as collected from WMATA ridechecks and consultant completed ridechecks done for this evaluation. 3. Total monthly ridership divided by monthly revenue hours of service, by route (May 2008 and May 2009). 4. Monthly ridership divided by monthly trips, by route (May 2008 and May 2009). 5. Monthly ridership divided by monthly cost (based on cost per platform hour). May 2008 and May 2009. 6. Fare payment type from WMATA farebox reports.

Table 2-2: Georgia Avenue/7th Street Corridor Restructuring Goals

Goal	Evaluation Criteria Used to Measure Effectiveness in Meeting Goal	Method of Measuring Evaluation Criteria
Improve Schedule Adherence/Maintain Headway Separation	<ol style="list-style-type: none"> 1. Bus Bunching and Headway Separation 2. On-Time Performance 3. Driver and Supervisor Feedback 	<ol style="list-style-type: none"> 1. Bus bunching measured as % of buses arriving at stop within 2 minutes of each other 2. On-time performance based on WMATA standards – early trip departs 2 minutes ahead of schedule at stop, on time trip is 2 minutes ahead of schedule to 7 minutes late, late is more than 7 minutes late 3. Qualitative assessment of driver responses to questions regarding schedule issues on route.
Reduce Travel Times and Improve Travel Speeds	<ol style="list-style-type: none"> 1. Bus Travel Time 2. Bus Travel Speed 3. Scheduled Transit Travel Times 	<ol style="list-style-type: none"> 1. Actual bus travel time between time points, derived from WMATA ridechecks. 2. Actual bus travel speed between time points, derived from WMATA ridechecks. Speeds were calculated based on travel time divided by distance between time points. 3. Scheduled transit travel times, derived from public timetables.
Reduce Overcrowding	<ol style="list-style-type: none"> 1. Passenger Loads Per Trip 	<ol style="list-style-type: none"> 1. Measured as the load on each trip at key stops along the route. Data comes from stationary load checks completed by WMATA.
Enhance Customer Experience	<ol style="list-style-type: none"> 1. Driver/Supervisor Comments 2. Customer Comments 3. Bus Stop Improvements and Amenities 	<ol style="list-style-type: none"> 1. Qualitative assessment of driver responses to questions regarding training and operating environment. 2. Assessment of customer comments received from WMATA Customer Service Department. Comments from January 2007 through August 2009 were evaluated. 3. Identified the number of stop improvements made as part of DDOT/Clear Channel bus stop improvement initiative.

Goal	Evaluation Criteria Used to Measure Effectiveness in Meeting Goal	Method of Measuring Evaluation Criteria
Maintain Productivity and Efficiency	<ol style="list-style-type: none"> 1. Daily Ridership 2. Ridership by Stop 3. Passenger Boardings per Revenue Hour 4. Passenger Boardings per Trip 5. Cost per Boarding 6. Changes in Fare Payment Type 	<ol style="list-style-type: none"> 1. Daily ridership on each route as collected from WMATA farebox reports. 2. Boardings and alightings by stop as collected from WMATA ridechecks and consultant completed ridechecks done for this evaluation. 3. Total monthly ridership divided by monthly revenue hours of service, by route (May 2006, May 2007, May 2008 and May 2009). 4. Monthly ridership divided by monthly trips, by route (May 2006, May 2007, May 2008 and May 2009). 5. Monthly ridership divided by monthly cost (based on cost per platform hour). May 2006, May 2007, May 2008 and May 2009. 6. Fare payment type from WMATA farebox reports.
Achieve an Appropriate Balance of Service Between Northern and Southern Portions of Route	<ol style="list-style-type: none"> 1. Level of Service on Different Portions of Route, Relative to Demand 	<ol style="list-style-type: none"> 1. Number of trips on each section of the route, as collected from the public timetable.

3 Summary Evaluation Results by Restructuring Goal – 30s Line

Outlined first in this section is a brief summary of the changes in service on the 30s Line that occurred as a result of the 30s Line restructuring, followed by a summary of the evaluation results, by restructuring goal and evaluation criteria.

3.1 Service Changes on 30s Line as Part of Restructuring

The current 30s line (Routes 31, 32, 34, 36, 37, 39, M6) has the highest ridership of any Metrobus line (with close to 20,000 weekday riders) and provides an important link between Southeast and Northwest Washington. However, because of its popularity and heavy traffic along its route, it has historically suffered from passenger crowding, bus bunching, poor schedule adherence and delays.

Between June 2007 and May 2008, WMATA, in partnership with the District Department of Transportation (DDOT), completed the Metrobus 30s Line Study, which identified and evaluated a comprehensive set of potential strategies for improving the 30s line service. Following extensive public involvement and technical analysis, the study developed a range of both short-term and long-term recommendations to improve service, line management, stops and facilities, customer information, safety and security, and traffic operations on the Line. Many of the recommendations from the restructuring study were implemented in June 2008, though longer term recommendations still wait to be implemented. The new redesigned and enhanced 30s line was primarily targeted to improve service reliability, travel times, overcrowding, and the overall transit experience of customers.

Prior to the service changes the 30s line consisted of Routes 30, 32, 34, 35, 36, and M6. All routes (except the M6) served the same corridor, running from the Friendship Heights Metro Station at the District of Columbia/Montgomery County, border along Wisconsin Avenue to Georgetown, then roughly along Pennsylvania Avenue (with a few diversions around the White House and Capitol Building) into Southeast, where each route continued to a different terminus. Route 30 terminated at Eastern Market (serving as a short-turn service for the 30s corridor), Route 32 served Naylor Road and terminated at the Southern Avenue Metro Station, Route 34 served Naylor Road and terminated at the Naylor Road Metro Station, and Routes 35 and 36 served Branch Avenue and terminated at the Naylor Road Metro Station. Route M6 operated from Potomac Avenue Metro Station along Pennsylvania Avenue to Fairfax Village, where it provided a loop service.

In June 2008, the 30s line underwent a complete service restructuring, as follows:

- Routes 30 and 35 were eliminated
- Route 34 was truncated at Eastern Market Metro Station (and later extended in December 2008 to Archives/Navy Memorial Metro Station as a modification to the original service recommendation)
- Two limited stop routes, 37 and 39 were introduced. The 37 runs between Friendship Heights and Downtown Washington via Wisconsin and Massachusetts Avenues. The 39 runs between the Naylor Road Metro station and Downtown via Southern Avenue and Pennsylvania Avenue
- A new local service along Wisconsin Avenue, Route 31, was implemented to more effectively serve trips along Wisconsin Avenue. This service runs between Friendship Heights and Foggy Bottom
- Routes 32 and 36 were retained. These routes continue to provide service along the entire corridor between Friendship Heights and Southeast. Route 32 serves the Southern Avenue Metro Station, with access to the station via Naylor Road; Route 36 serves the Naylor Road Metro Station, with access via Branch Avenue. Select trips on Routes 32 and 36 short-turn at the Foggy Bottom Metro Station.

- Implementation of supervisors dedicated to managing just the 30s Line. This dedicated supervision was implemented as part of the overall restructuring implementation in June 2008 but was removed in May 2009 for budgetary reasons.

The before and after 30s Line route configuration is shown below in Figures 3-1 and 3-2, respectively.

Figure 3-1: 30s Line Route Configuration before Restructuring

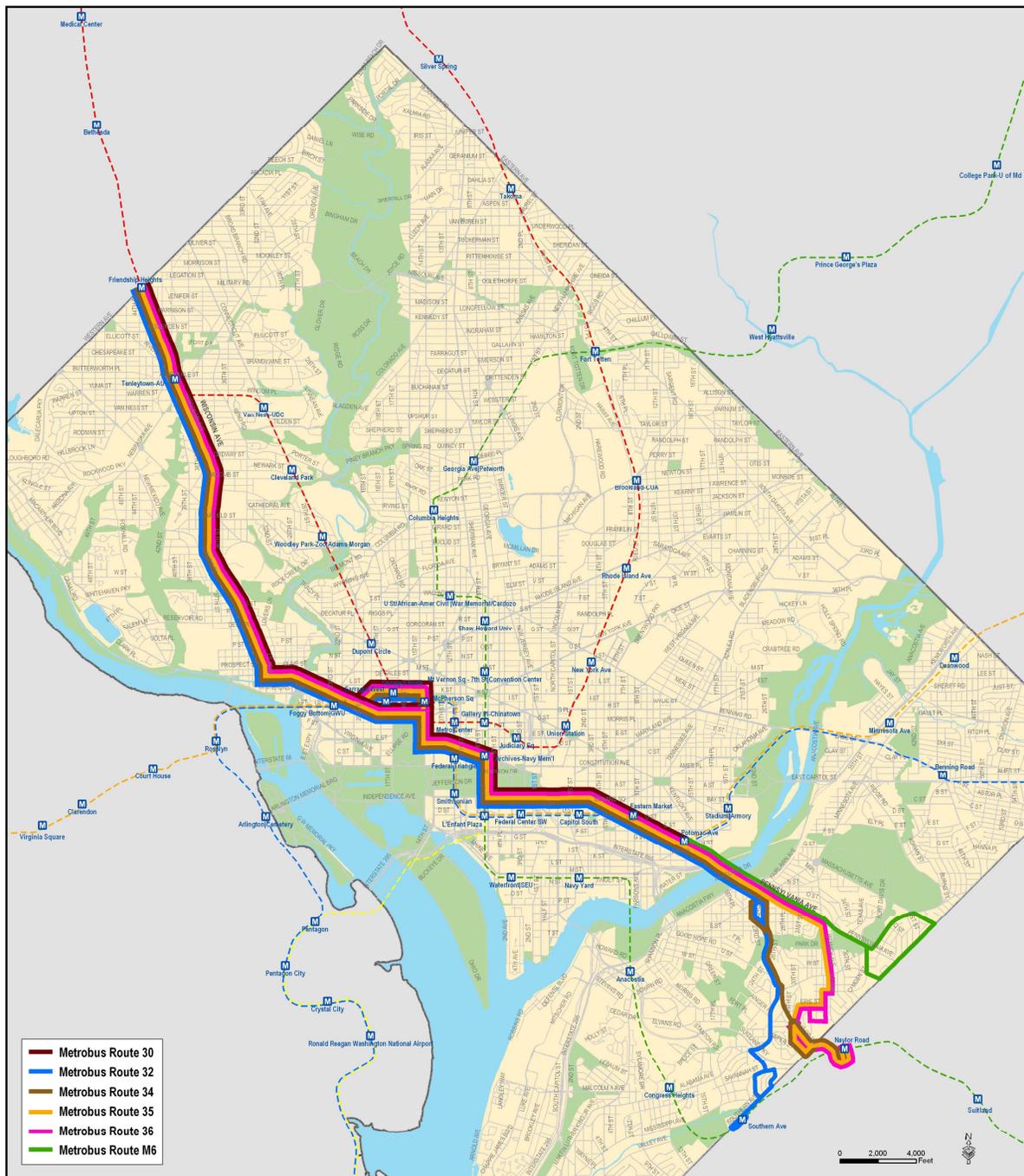
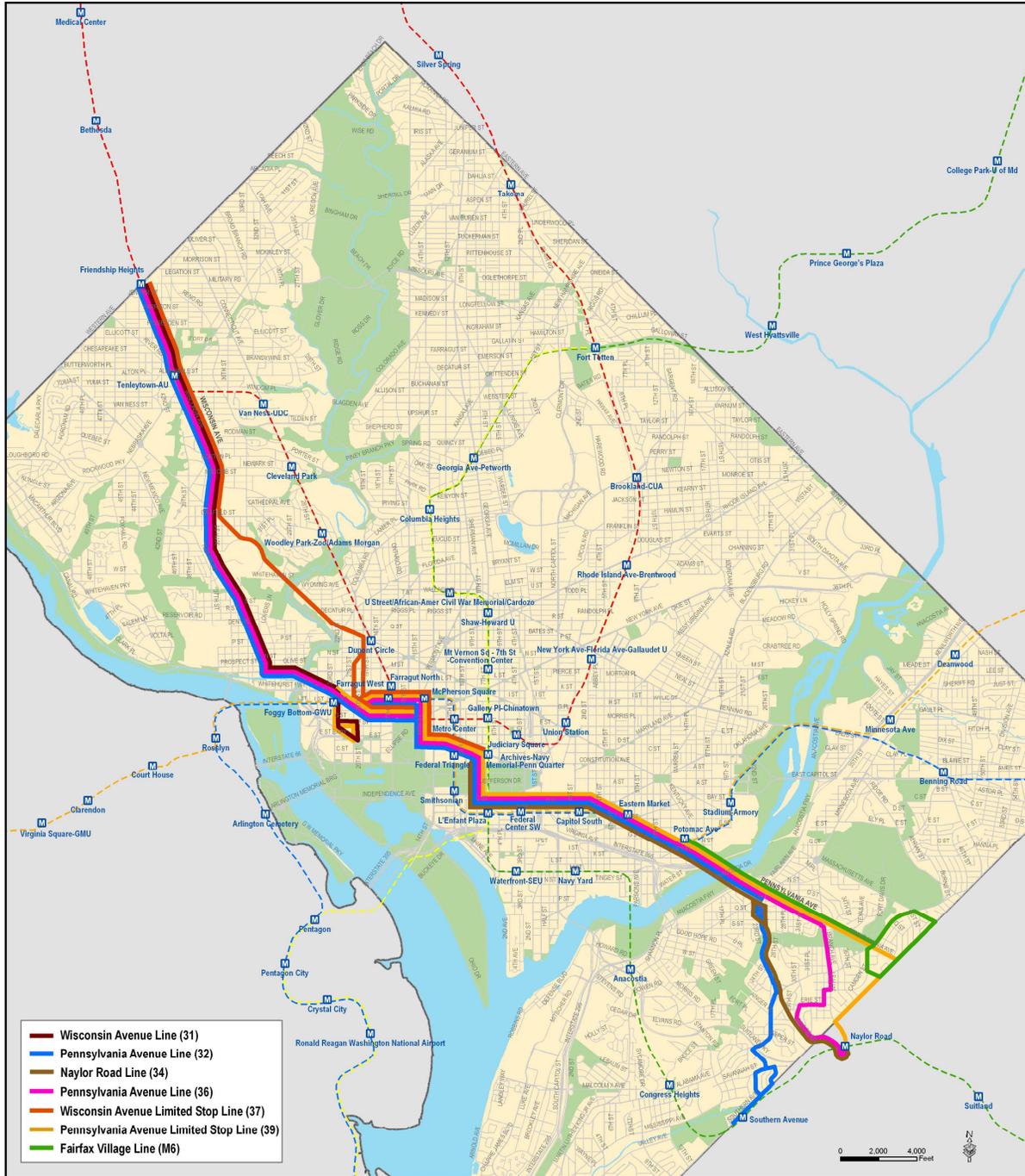


Figure 3-2: 30s Line Route Configuration after Restructuring



3.2 30s Line Evaluation Results – Progress on Restructuring Goals

Table 3-1 below summarizes progress on each 30s Line restructuring goal, including whether the goal has been met and the reasons for the conclusions.

Table 3-1: 30s Line Goal Achievement Summary

Restructuring Goal	Has the Goal Been Met?	Analytic Framework/Reason for Conclusion
1. Improve Schedule Adherence, Maintain Headway Separation	Partially	<ol style="list-style-type: none"> 1. Based on data collected from the WMATA NextBus system bus bunching has decreased. This can be partially attributed to the separation of services so not all routes go the entire length of the corridor. 2. On-time performance has declined along the trunk portion of the line in the eastbound direction while on-time performance in the westbound direction has improved.
2. Reduce Travel Times and Improve Travel Speeds	Partially	<ol style="list-style-type: none"> 1. Implementation of the 37 and 39 limited-stop services resulted in scheduled travel time savings relative to the local services (Routes 31-36). 37 service results in a 26% scheduled run savings relative to the 32/36 service. The 39 service results in 25% savings relative to the 36 service (Friendship Heights to Archives, Naylor Road to Farragut Square). 2. Actual bus travel speeds and times have not improved and in some instances have actually declined.
3. Reduce Overcrowding	Partially	<ol style="list-style-type: none"> 1. Analysis of average load data (the average of the load on an individual trip over a number of days) for individual trips collected from stationary load checks show that there is not excessive crowding in either the pre or post condition in either the AM or PM peak based on available data. Based on this available data, average loads on only a few trips in either period exceed the WMATA load standard of 48 passenger per bus (40' vehicle). Data also shows that average loads do not differ dramatically between pre and post condition. 2. When evaluating load data for individual trips on individual days, there are instances of crowding on individual days, though as noted, on average few trips experience crowding. The difference between crowding on individual days versus no major crowding on average indicates that crowding is not likely based on inadequate capacity but more likely line management issues and inefficient use of capacity related to uneven headway separation and schedule adherence issues.
4. Maintain Productivity and Efficiency	No	<ol style="list-style-type: none"> 1. Productivity, as measured by boardings per revenue hour, decreased on the local services (Routes 31-36) by 4.4% between May 2008 and May 2009 but increased on Route M6 by 26.8%. Passengers per trip, similarly, have decreased on Routes 31-36 by 26.8% and increased on Route M6 by 23.4%. 2. Cost per boarding, the measure used to evaluate efficiency, increased for the 30s routes combined between May 2008 and May 2009 by 4.99%, indicating a decline in efficiency.

Restructuring Goal	Has the Goal Been Met?	Analytic Framework/Reason for Conclusion
5. Enhance Overall Customer Experience	Partially	<ol style="list-style-type: none"> 1. There have been improvements at 37 bus stops in the corridor through the District contract with Clear Channel. 21 additional bus stops are slated for improvements in 2009 (this is out of 171 stops identified as having no shelter or broken shelter in the original restructuring study). The same set of bus stop elements, including a new shelter, shelter pad, a shelter bench and increased space for passenger information were installed at each improved stop. 2. Metro Express branding was not used on the 37 and 39 when first implemented. This appears to have hurt recognition and knowledge of the routes based on feedback from public meetings. 3. The detailed customer information program (up-to-date schedules, more clearly marked stops, maps) developed in original restructuring study has been implemented. 4. There is continued negative customer feedback regarding schedule adherence, drivers, travel time, and connectivity of some services.

4 Summary Evaluation Results by Restructuring Goal – 70s Line

Outlined first in this section is a brief summary of the changes in service on the 70s Line that occurred as a result of the restructuring, followed by a summary of the evaluation results, by restructuring goal and evaluation criteria.

4.1 Service Changes on 70s Line as Part of Restructuring

Prior to the service changes recommended in the original “Metro Extra Service Plan – Georgia Avenue/7th Street Corridor”, the Georgia Avenue/7th Street Corridor was served by two local services, the 70 and 71. The routes shared a common trunk along Georgia Avenue and 7th Street between Silver Spring and downtown. South of downtown the two routes served different terminals in the Buzzard’s Point section of Southwest Washington DC. Currently the service configuration on the 70s Line is as follows:

- Route 70 primarily serves 7th Street and Georgia Avenue between its terminus at the Silver Spring Metro Station and the corner of Half and O Streets, SW (although alternating trips terminate at 9th Street and Constitution Avenue, NW).
- Route 71 operates a service similar to Route 70, but provides weekday, peak period service beyond Route 70’s southern terminus to Buzzard’s Point at Half and Water Streets, SW.
- Route 79 provides all-day limited stop service along the Georgia Avenue/7th Street corridor between the Silver Spring Metro Station and the Archives/Navy Memorial Metro Station. Current peak period headways are 8 minutes and off-peak headways are 12 minutes.

With the implementation of the 79 service in 2007, the Georgia Avenue/7th Street corridor became a pioneer in the WMATA system for the implementation of a limited stop service supplemented by Transit Signal Priority (TSP). The implementation of the recommendations in the original Metro Extra Service Plan also included reducing the amount of local 70/71 service that runs through downtown to Southwest Washington, thus balancing the amount of capacity provided south of downtown with rider demand in this area. The restructuring implementation also involved the use of dedicated supervisors to proactively manage the 79 service. These dedicated supervisors were removed for budgetary purposes in September 2008.

The before and after restructuring route configuration of the 70s Line is shown in Figures 4-1 and 4-2 below.

Figure 4-1: 70s Line Route Configuration before Restructuring

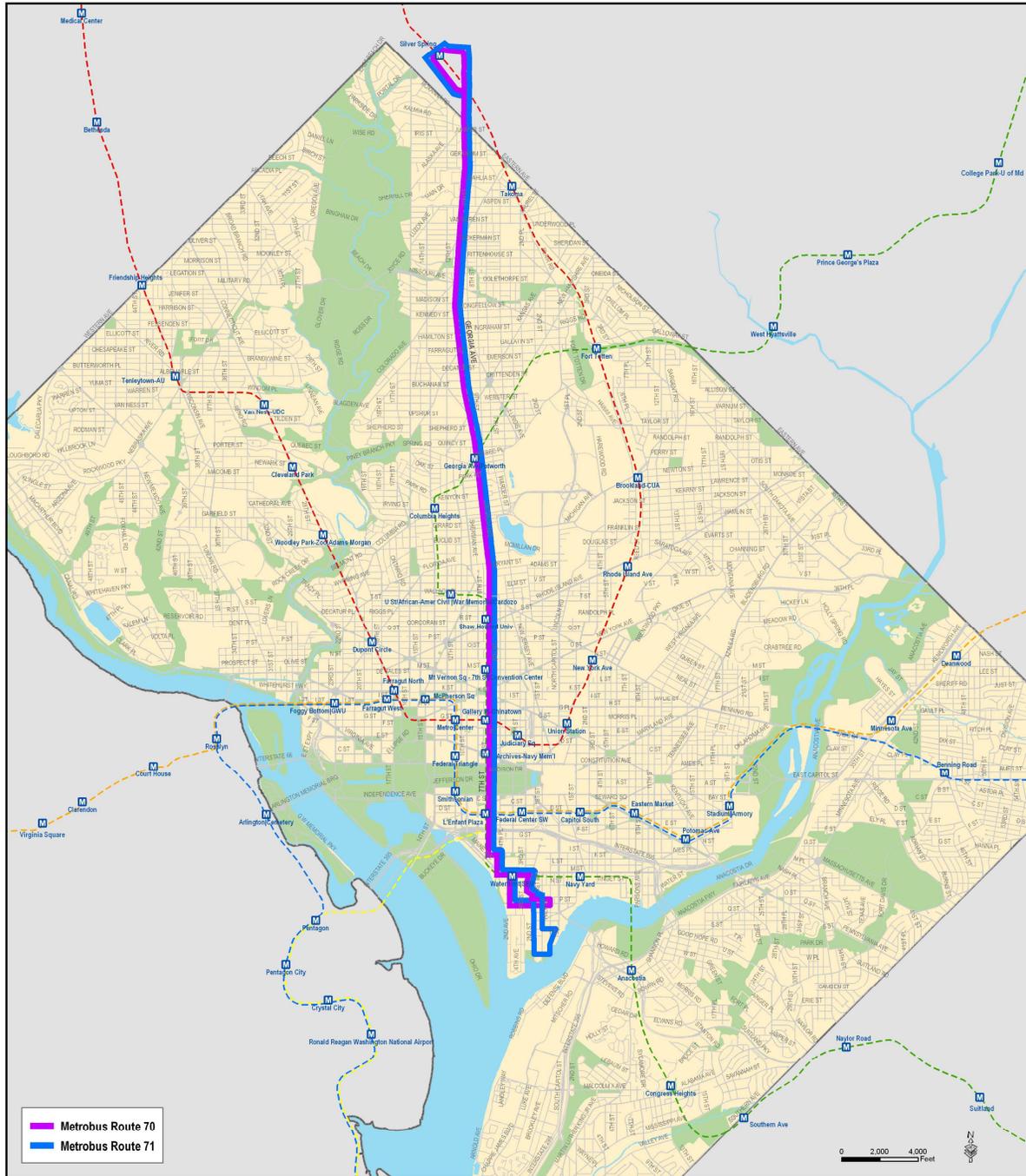
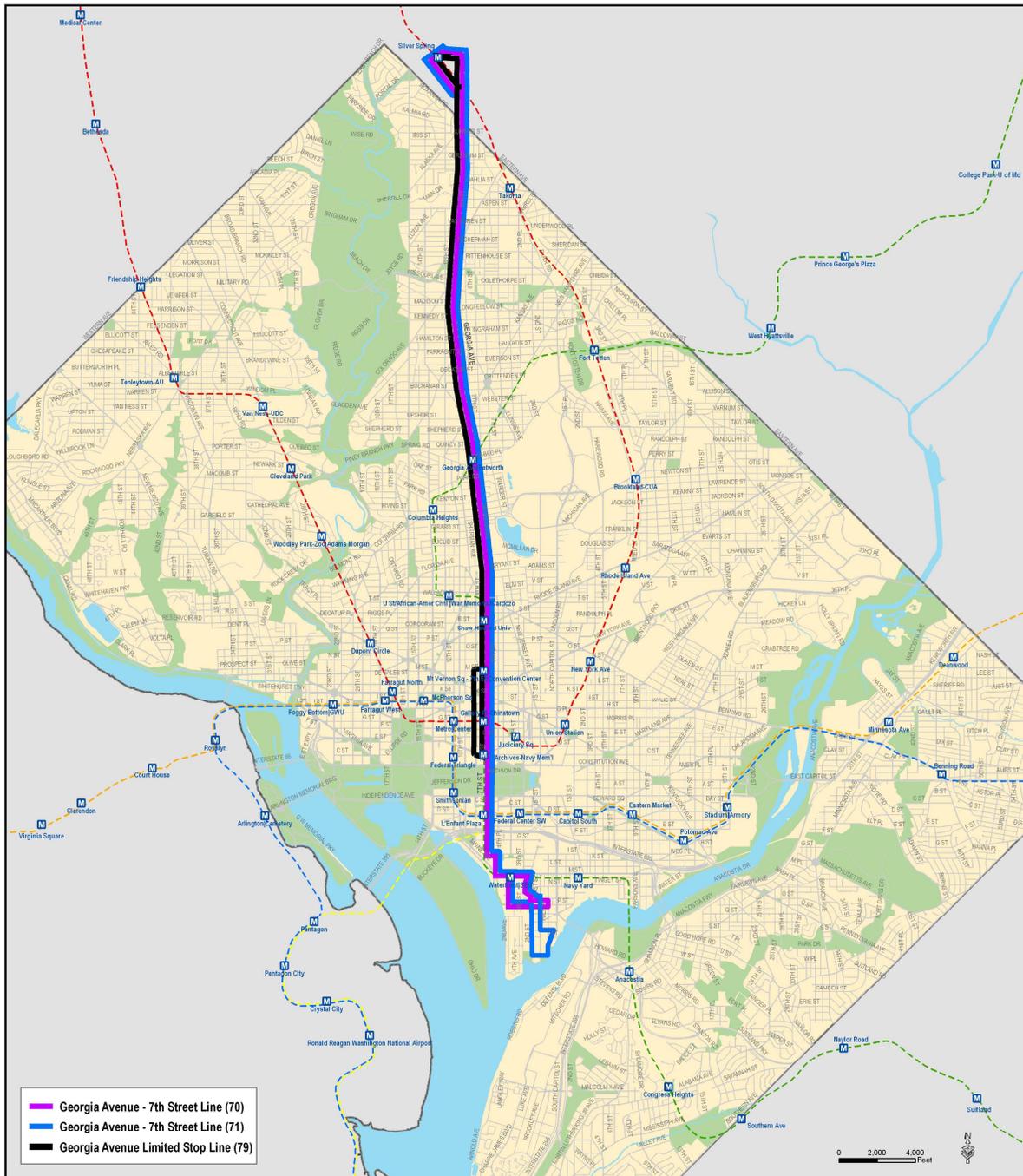


Figure 4-2: 70s Line Route Configuration after Restructuring



4.2 70s Line Evaluation Results – Progress on Restructuring Goals

Table 4-1 below summarizes progress on each 70s Line restructuring goal, including whether the goal has been met and the reasons for the conclusions.

Table 4-1: 70s Line Goal Achievement Summary

Restructuring Goal	Has the Goal Been Met?	Analytic Framework/Reason for Conclusion
1. Improve Schedule Adherence, Maintain Headway Separation	Partially	<ol style="list-style-type: none"> 1. Overall, on-time performance has remained steady on the 70 and 71 local services in both directions, based on WMATA AVL reports. 2. WMATA AVL Reports also shows the 79 service has reasonable on-time performance, with on-time performance deteriorating as service nears the final terminal in the peak direction. 3. On-time performance on the 79 service has marginally declined between the time when dedicated supervisors were assigned to the route and the time when the dedicated supervisors were removed. 4. Field checks show that there are still significant headway separation issues, with great variability in trip arrivals at key stops along the route. This leads to an inefficient deployment of capacity along the route. 5. Bus bunching is minimal on the local 70 and 71 routes. Some bunching does occur on the 79 route.
2. Reduce Travel Times and Improve Travel Speeds	Partially	<ol style="list-style-type: none"> 1. Implementation of 79 service results in scheduled travel time savings relative to the 70-71 (Silver Spring to Archives) of 11 minutes during the morning peak. This results in a scheduled savings of 22%. 2. Actual travel speeds in the corridor have not improved and in some instances have actually declined. 3. A review of the Transit Signal Priority System along Georgia Avenue, completed by WMATA, showed that the system has had very little impact in improving travel times or speeds. 4. A one lane traffic operation between Florida Avenue and Mount Vernon Square continues to hurt running times and overall service reliability.
3. Reduce Overcrowding	Partially	<ol style="list-style-type: none"> 1. Analysis of average load data (load data for individual trips averaged over a number of days of data) for individual trips collected from stationary load checks show that there is not excessive crowding on 70 and 71 trips in either the pre or post condition based on available data. 2. Trip by trip data based on stationary load checks for the 79 service does show crowding on the 79 service in the AM Peak. 3. Supplemental field data checks show crowding in the peak period on the 79 route. During the busiest hour of the peak period ridership demand for service exceeds available capacity. 4. Customer comments regarding crowding were prevalent in the pre-condition and crowding continues to be a customer concern based on feedback received in the post-implementation public outreach effort. When evaluating load data for individual trips on individual days, there are instances of crowding on individual days, though as noted, on average few trips experience crowding. The difference between crowding on individual days versus no major crowding on average indicates that crowding is not likely based on inadequate capacity but more likely line management issues and inefficient use of capacity related to uneven headway separation and schedule adherence issues.

Restructuring Goal	Has the Goal Been Met?	Analytic Framework/Reason for Conclusion
4. Attain an Appropriate Balance of Service between Northern and Southern Portions of Route	Yes	1. Service has been reduced to Buzzard's Point, where there was excess capacity relative to demand. The introduction of the 79 route has provided additional capacity along the northern portion of the corridor.
5. Maintain Productivity and Efficiency	No	<ol style="list-style-type: none"> 1. Productivity, as measured by boardings per revenue hour has decreased on the 70-71 local service by 21.5% between 2006 and 2009 but increased on the 79 service by 3.6% between 2007 and 2009, reflecting that people are moving from the 70 and 71 to the 79 service. 2. Productivity as measured by passengers per trip has declined on the 70 and 71 routes between 2006 and 2009 by 22.1%. Boardings per trip have increased on the 79 service by 67.3% between May 2007 and May 2009. 3. Cost per boarding, the measure used to evaluate efficiency, increased on the 70 and 71 local routes between May 2006 and May 2009 by 28.8%. Cost per passenger on the 79 Route declined between May 2007 and 2009 by 15.3% and cost per passenger on the combined 70s Line increased between 2007 and 2009 by 5.97%.
6. Enhance Customer Experience	Partially	<ol style="list-style-type: none"> 1. There was improved customer communication through the Route 79 service branding, new stops, and updated schedule information. 2. There have been improvements at 28 stops in the corridor through the District contract with Clear Channel. 11 additional stops are slated for improvements in 2009 (out of approximately 120 stops without a shelter prior to implementation). The same set of bus stop elements, including a new shelter, shelter pad, a shelter bench and increased space for passenger information were installed at each improved stop. 3. There is continued negative customer feedback regarding schedule reliability, crowding, and unfriendly driver behavior.

5 Recommendations

This section contains a summary of the different service, line management, and running way recommendations designed to address the issues identified during the evaluation process described in the previous sections. Outlined below in Section 5.1 and 5.2 are the recommendations for the 30s Line and 70s Line respectively. Each set of recommendations are further structured by proposed implementation time frame.

5.1 30s Line Improvement Recommendations

Outlined below in Table 5-1 is a summary of recommendations, including costs, for implementation on the 30s Line, further structured by proposed implementation time frame. The Table includes the issues that are meant to be addressed by the recommendation. Following the summary table is a more detailed description of each proposed recommendation.

Table 5-1: 30s Line Service and Line Management Recommendations Summary

Recommended for Implementation in the Short-Term (1-2 Years)

Recommendation	Anticipated Benefits	Cost
<p>1. Re-instate dedicated field supervisors</p> <ul style="list-style-type: none"> a. Friendship Heights – all day – 2 full time equivalents (stationary) b. Southern Avenue/Naylor Road – AM and PM peak – 1 full time equivalent (stationary) c. Roving along Wisconsin and at Virginia Avenue Terminal– AM and PM peak – 1 full time equivalent d. Roving along Pennsylvania and at Federal Triangle Terminal – AM and PM peak – 1 full time equivalent. 	<ul style="list-style-type: none"> 1. Helps to address schedule adherence and reliability issues that still exist on the line. 2. Enhances the customer experience through more reliable service. 	\$400,000 (annual cost)
<p>2. Expedite running way improvements recommended in original restructuring study.</p> <ul style="list-style-type: none"> a. Most important focus – begin design and impact studies for recommendations in the original study. Locations include Sousa Bridge/Barney Circle, Pennsylvania Avenue SE between Branch Ave. SE and Sousa Bridge, and Branch Ave. SE/Pennsylvania Avenue SE intersection. 	<ul style="list-style-type: none"> 1. Helps to address slow travel times and travel speeds. 2. Helps to address schedule adherence and reliability issues, including poor headway separation. 3. Enhances customer experience through faster and more reliable trips. 	\$100,000 (one time cost)
<p>3. Implement major marketing campaign on 37 and 39 service (specific to the 37 and 39 lines but part of a larger effort for all limited stop services – cost for 37 and 39 routes only)</p>	<ul style="list-style-type: none"> 1. Increases knowledge of the 37 and 39 services, hopefully leading to greater utilization of services. 	\$20,296 (one time cost)
<p>4. Modify the 30s Line Supervisor Playbook – Based on one year of experience</p>	<ul style="list-style-type: none"> 1. Helps to assist supervisors in addressing schedule adherence, reliability, and other line management issues. 	\$3,377 (one time cost)
<p>5. Expand driver training – to occur after each pick. Training to include:</p> <ul style="list-style-type: none"> a. Intersecting bus routes b. Key destinations on route c. Frequently asked questions d. Tourist destinations 	<ul style="list-style-type: none"> 1. Enhances customer experience through more knowledgeable drivers. 2. Helps to improve trip times by streamlining passenger/driver interactions 	\$33,450 (annual cost)
Total Short Term Costs	Annual Costs One-Time Costs	\$433,450 \$123,673

Recommended for Implementation in the Mid-Term (3-4 years)

<p>1. Implement dedicated traffic control officers and parking enforcement staff. Recommend deploying five traffic control officers (two in NW, one downtown, and two in SE) and five parking enforcement staff (two in NW, one downtown, and two in SE).</p>	<p>1. Helps to address slow travel times and travel speeds. 2. Helps to address schedule adherence and reliability issues, including poor headway separation. 3. Enhances customer experience through faster and more reliable service.</p>	<p>\$688,500 (annual cost)</p>
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Recommended for Implementation in the Long –Term (5-6 years)

<p>1. Implement 30s Line Operations Center (continue to evaluate reliability and schedule adherence after other line management recommendations to determine if still required).</p>	<p>1. Helps to assist supervisors in addressing schedule adherence, reliability, and other line management issues.</p>	<p>\$160,000 (annual cost)</p>
<p>Total Costs – All Recommendations</p>	<p>Annual Costs One-Time Costs</p>	<p>\$1,281,950 \$ 123,673</p>

5.1.1 Recommendations Proposed for Implementation in the Short-Term (1-2 Years)

Re-instate Dedicated Field Supervisors

Data completed during the evaluation process shows that bus bunching has improved along the 30s Line since the implementation of the restructuring recommendations but that there is still bunching and schedule adherence issues in both the Wisconsin and Pennsylvania Avenue corridors. Schedule adherence and headway separation issues have a number of negative impacts, including an inefficient use of capacity and significant inconvenience for passengers because of longer waits for buses and uncertainty of when a bus will arrive. One of the primary approaches to maintaining headway separation and service reliability is proactive line management by dedicated supervisors. Dedicated supervisors were used on the 30s Line after the implementation of the restructuring recommendations but were removed in May 2009 because of funding constraints.

Based on the results of the evaluation process, it is proposed that the dedicated supervisors be re-instated on the 30s lines.

Proposed deployment of the dedicated supervisors is as follows:

- Supervisor coverage at Friendship Heights all day (2 full time equivalents – stationary at the station)
- Supervisor coverage at Southern Avenue/Naylor Road in the AM and PM peak (1 full time equivalent – stationary at the station)
- Supervisor coverage roving along Wisconsin Avenue and at the Virginia Avenue terminal in the AM and PM peak (1 full time equivalent)
- Supervisor coverage roving along Pennsylvania Avenue SE and at Federal Triangle in the AM and PM peak (1 full time equivalent)

Expedite Running Way Improvements

A number of running way improvements to improve operations and running times were recommended in the original 30s Line restructuring study. Analysis completed during the evaluation process shows that almost no progress has been made on implementation of these improvements, and that bus travel speeds on the 30s Line have not improved. Because the recommendations would involve changing traffic operations, the project team understands that more detailed design and definition of the changes, as well as studies evaluating the impacts of the changes, are required before actual implementation can occur. The recommendations here relate to the initiation of these studies.

Two design and impact studies for locations identified in the original restructuring study are recommended for implementation in the short term in the 30s Line corridor. The areas proposed to be evaluated in these studies are:

- Detailed design and impact analysis of running way improvements at Barney Circle and the Sousa Bridge. This work will have to be done in conjunction with the work on the 11th Street Bridge and the connection between 295 and the Southeast Freeway to determine if additional changes are required.
- Detailed design and impact analysis of running way improvements along Pennsylvania Avenue between Branch Avenue SE and the Sousa Bridge.

In addition, there were intersection improvement recommendations made in the original 30s Line restructuring study. More detailed design and impact analysis is proposed for the intersection at Pennsylvania and Branch Avenue SE.

This work will require close coordination between WMATA and DDOT. Once the studies are complete additional proactive coordination will be required to ensure the improvements move forward.

Implement a Major Marketing Campaign for the 37 and 39 Limited Stop Routes – Branding as Metro Express

The 37 and 39 limited stop routes were not originally branded as Metro Express routes and the project team received comments during the public outreach process that many people did not know that these premium limited stop services were running and were available. The 37 and 39 services have now been branded as Metro Express but a new marketing campaign that will proactively advertise the services to a wider potential market will be required. This campaign would be developed and implemented by WMATA Marketing staff and would also be part of a larger comprehensive effort marketing all of the Metro Express/Metro Extra services in the District of Columbia.

Modify the 30s Line Playbook Based on the Experience of the Last Year

Discussions with supervisors indicated that the 30s Line playbook developed as part of the original restructuring implementation is not used on a day-to-day basis but was useful for training new supervisors. It is recommended that the playbook be updated based on discussions with supervisors and drivers. This update would include strategies currently used but not included in the original playbook as well as the removal from the playbook of strategies that are not utilized. WMATA should also consider sharing the playbook with drivers.

Expand Driver Training

Discussion with drivers on the 30s Line indicated that current training is limited to learning the line routing after the route is picked. There is no training related to customer service items, as outlined in the original drivers training booklet. It is proposed that this customer service related training be re-instituted and occur after every pick.

5.1.2 Recommendations Proposed for Implementation in the Mid-Term (3-4 years)

Implement dedicated Traffic Control Officers and parking enforcement staff

Lack of enforcement of existing parking and traffic regulations was identified by drivers and supervisors as a major factor negatively impacting run times and schedule reliability. Based on this feedback, parking enforcement staff and Traffic Control Officers dedicated to the Pennsylvania Avenue and Wisconsin Avenue/Georgetown corridors during the morning and afternoon peak periods is recommended. Traffic Control Officers work for the District of Columbia Department of Transportation (DDOT) and would be managed by DDOT staff. Parking control staff work for the District of Columbia Department of Public Works (DDPW) and would be managed by DDPW staff.

These dedicated personnel are anticipated to be a cost-effective way to help address schedule and reliability issues in the two corridors served by the 30s Line. Analysis completed during the evaluation process show that there continue to be on-time performance issues, though there have been general improvements on the line. In addition, feedback from drivers and supervisors and riders indicate that on-time performance is still an issue and that lack of enforcement of existing traffic regulations is one of the primary reasons.

Proposed deployment would include Traffic Control Officers and parking enforcement staff deployed for three hours during each of the peak periods (total of six hours daily). Proposed deployment is as follows:

- One traffic control officer at Wisconsin and Massachusetts NW
- One traffic control officer at Wisconsin and M NW added to cover AM Peak (PM peak is already covered)
- One traffic control officer at 15th and H and I Streets
- One traffic control officer at Independence and Pennsylvania SE
- One traffic control officer at Pennsylvania and Minnesota Avenue SE to cover the PM peak (AM peak is already covered)
- One parking enforcement staff member on Wisconsin, covering the area between Massachusetts and Friendship Heights
- One parking enforcement staff member in Georgetown
- One parking enforcement staff member in downtown, focusing on H and I but also roving further east along 15th and Pennsylvania
- One parking enforcement staff member between Capitol Hill and Potomac Avenue Station
- One parking enforcement staff member east of the Anacostia River.

The ticketing powers of the parking control staff and Traffic Control Officers should be backed by quick towing capabilities that can rapidly move vehicles that are illegally parked in a bus stop or in a travel lane. The ability of a driver to communicate with parking control staff, either directly or through the operations control center should also be aggressively pursued.

5.1.3 Recommendations Proposed for Implementation in the Long Term (5-6 Years)

Implement 30s Line Operations Center

The 30s Line operates in a difficult and congested environment that continues to impact reliability and headway separation. To help address these challenges, the original 30s Line study recommended a dedicated operations control center which would track 30s Line vehicles and support dedicated 30s Line field supervisors in proactively managing the line. This recommendation was never implemented as part of the original restructuring implementation but the reasons for recommending it have not gone away. It is proposed, therefore, that a dedicated Line Operations Control Center be considered for implementation in the long-term. Implementation of this proposal would be based on an evaluation of the reliability and schedule adherence of the 30s Line after other short-term recommendations such as running way improvements, dedicated supervisors and traffic management recommendations are implemented. If reliability and schedule adherence issues persist, then the Operations Control Center should become a candidate for implementation.

As part of this recommendation, a review of the Transit Control Center for Metro Transit in Minnesota's Twin Cities was completed in order to understand the potential benefits of a dedicated 30s Line operations center. Metro Transit was selected as an example because their Control Center staff is very proactively involved in managing line operations. Each Control Center staff member monitors schedule adherence and bus spacing on their assigned routes on a continuing basis and have direct communications links to street supervisors, terminal supervisors and bus drivers to facilitate proactive management strategies. Metro Transit has identified this team-oriented proactive management approach incorporating Control Center staff and field staff as very effective in maintaining schedule adherence and correct and even bus separation. The ultimate success of the approach is based on the Control Center providing active oversight of the line and communicating instructions to field personnel who implement the instructions. This same sort of aggressive and proactive team approach to line management was envisioned for the 30s Line Operations Center.

5.2 70s Line Service, Line Management, and Running Way Recommendations

Outlined below in Table 5-3 is a summary of recommendations, including costs, for implementation on the 70s Line, further structured by proposed implementation time frame. Following the summary table is a more detailed description of each proposed recommendation.

Table 5-2: 70s Line Service and Line Management Recommendations Summary

Recommended for Implementation in the Short-Term (1-2 Years)

Recommendation	Anticipated Benefits	Cost
<p>1. Re-instate dedicated field supervisors</p> <p>a. 3 in AM and PM peak – 1 at Archives, 1 at Silver Spring, 1 roving. – 3 full time equivalents</p> <p>b. 1 in mid-day – roving – 1 full time equivalent</p> <p>c. Will provide line management for both the limited stop 79 route and the local 70 and 71 routes.</p>	<p>1. Helps to address poor headway separation that results in inefficient utilization of capacity.</p> <p>2. Helps to reduce overcrowding, which is partially the result of poor headway separation.</p> <p>3. Enhances the customer experience through more reliable and less crowded service.</p>	\$320,000 (annual cost)
<p>2. Add peak period (6:00 AM to 9:00 AM and 3:30 PM to 6:30 PM) capacity on the 79 Line. Proposed service structure:</p> <p>a. Trippers from Silver Spring to Archives in the morning peak and from Archives to Silver Spring in afternoon peak. Service would add two trips in the peak direction in each hour of the peak period. Headway would improve from approximately 7.5 minutes to 6 minutes.</p>	<p>1. Helps to address overcrowding on the 79 Line (overcrowding that is separate from headway separation issues).</p> <p>2. Enhances customer experience through less crowded trips.</p>	\$372,161 (annual cost)
<p>3. Expedite running way improvements recommended in original restructuring study.</p> <p>a. Most important focus - implement strategies to more effectively utilize transit signal priority system already in place.</p>	<p>1. Helps to address slow travel times and travel speeds.</p> <p>2. Helps to address schedule adherence and reliability issues, including poor headway separation.</p> <p>3. Enhances customer experience through faster and more reliable service.</p>	No cost – coordination by DDOT and WMATA Staff assumed as part of normal duties
<p>4. Implement physical treatments along 70s Line, as recommended in original restructuring study. Evaluate potential of restricting parking during peak period on 7th Street between Florida Avenue and Mount Vernon Square.</p>	<p>1. Helps to improve travel times through faster loading at major ridership stops.</p> <p>2. Enhances customer experience through more convenient loading at stops.</p> <p>3. Enhances customer experience through faster and more reliable trips.</p>	\$30,000 (one-time cost)

Recommendation	Anticipated Benefits	Cost
5. Develop 70s Line Supervisor Playbook	1. Helps to assist supervisors in addressing headway separation and other line management issues.	\$5,285 (one-time cost)
6. Expand driver training – to occur after each pick. Training to include: a. Intersecting bus routes b. Key destinations on route c. Frequently asked questions d. Tourist destinations	1. Enhances customer experience through more knowledgeable drivers. 2. Helps to improve trip times by streamlining passenger/driver interactions	\$22,725 (annual cost) \$5,285 (one-time cost to complete training booklet)
Total Short Term Costs	Annual Costs One-Time Costs	\$714,886 \$ 40,570

Recommended for Implementation in the Mid-Term (3-4 years)

1. Implement dedicated traffic control officers and parking enforcement staff	1. Helps to address slow travel times and travel speeds. 2. Helps to address schedule adherence and reliability issues, including poor headway separation. 3. Enhances customer experience through faster and more reliable service.	\$459,000
Total Costs – All Recommendations	Annual Costs One-Time Costs	\$1,173,886 \$ 40,570

5.2.1 Recommendations Proposed for Implementation in the Short Term (1-2 years)

Re-instate Dedicated Field Supervisors

Data from the evaluation process show that on-time performance has generally remained steady on the 70s Line but that there are still issues with headway separation. Irregular headway separation has a number of negative impacts, including an inefficient use of capacity and significant inconvenience for passengers because of long waits and uncertainty about bus arrival. One of the primary approaches to maintaining headway separation is proactive line management by dedicated supervisors. Dedicated supervisors were present on the 70s Line after the implementation of the 79 service but were removed in September 2008 because of funding constraints.

Drivers and supervisors both noted that the dedicated supervisors were extremely helpful in more effectively maintaining headway separation through proactive line management, including inserting a strategic bus, holding buses at the terminal, or running buses non-revenue for a portion of the line in order to fill a gap.

Based on schedule adherence and headway separation data from the evaluation process and the significant amount of feedback received from drivers and supervisors, it is proposed that the dedicated supervisors be re-instated along the 70s Line.

The proposed deployment of the dedicated supervisors is as follows:

- 3 supervisors deployed in the AM and PM peak periods (3 full time equivalents)
 - 1 supervisor at Archives
 - 1 supervisor at Silver Spring
 - 1 roving supervisor
- 1 supervisor roving in the mid-day (1 full time equivalent)

It should be emphasized that these supervisors will be deployed to actively manage all routes on the 70s Line, including both the local and limited stop routes.

Add Peak Period (6:00 AM to 9:00 AM and 3:30 PM to 6:30 PM) Capacity on the 79 Line

Data analysis from the evaluation process shows that there is crowding and inadequate capacity during the peak hours, in the peak direction, on the 79 service. The overall recommendation is to add capacity on the route during the peak period to address overcrowding and the capacity shortfall.

Different service options for providing this capacity were identified and evaluated as part of the development of this recommendation. The proposed option for adding capacity, which reflects boarding and load patterns on the line, is as follows:

- Run full length peak direction tripper service between Silver Spring and Archives in the morning peak and between Archives and Silver Spring in the afternoon peak. The tripper service would result in 10 trips per hour in the peak direction in each peak period (6 minute headways versus 8 today).

Expedite More Effective Use of Transit Signal Priority

A recommendation for Transit Signal Priority (TSP) to improve operations and running times was recommended in the original Georgia Avenue/7th Street new service plan. The EmTrac transit signal priority system has been installed at 28 intersections along the route and is operational for all of the branded route 79 fleet. However, an evaluation study of the TSP operations has been completed in which a number of problems were identified. This includes the operations of the EmTrac system. The system currently operates using a 10 second extension of the green phase of the signal cycle, which may not be appropriate at some locations. Further, the system only serves one TSP call every 10 minutes on a bi-directional basis, meaning the non-peak direction may be getting served at the exclusion of the peak direction.

A second issue with the current deployment of TSP is the location of bus stops, specifically that bus stops must be moved to the far side of the intersection to take advantage of the TSP system.

This recommendation involves the creation of a coordination framework between WMATA and DDOT staff to move forward with addressing the issues identified in the evaluation study in order to make the TSP system more effective. Staff time estimates assume there will be two staff members from each agency working on the coordination. Further, it is assumed 24 hours of coordination time per staff member per month for both DDOT and WMATA staff, occurring over four months. However, it is further assumed that this coordination will be completed as part of each person's normal duties and therefore no additional cost will be incurred.

Implement Physical Treatments along 70s Line and Evaluate Removal of Peak Period Parking on 7th Street between Florida Avenue and Mount Vernon Square

The original Georgia Avenue/7th Street new service plan identified a number of locations where bus bulbouts would enhance bus service, especially on the limited stop 79 service. Because implementation of the

recommendations would involve changing traffic operations, more detailed design and impact analysis than what was done in the original service plan is required before moving forward with implementation. This recommendation is to initiate the design and impact study for the proposed bulbouts. This study would be a required first step before implementation, given that no work has been completed on this initiative since the original service plan. This work will require close coordination between WMATA and DDOT.

Once the studies are completed additional proactive coordination will be required to ensure that the improvements move forward.

In addition to taking the preliminary steps necessary to implement the physical treatments identified in the original service plan, a review of the potential for removing parking along 7th Street between Florida Avenue and Mount Vernon Square is also recommended. Currently, the presence of all day parking in this stretch of 7th Street, including during both peak periods, means that there is only one lane available for vehicular traffic in each direction along this stretch of 7th Street. This creates a significant bottleneck that impacts 70s Line schedule adherence, reliability, and overall travel times. This recommendation is to complete an evaluation of the impacts associated with removing parking in the AM and PM peak periods along this stretch of 7th Street.

Develop a 70s Line Playbook

Discussions with supervisors indicated that the 30s Line playbook developed as part of the restructuring is not used on a day-to-day basis but was useful for training new supervisors. It is recommended that a comparable playbook be developed for the 70s Line. The playbook would include strategies currently used on the 70s Line for inclusion in the playbook as well as other strategies used on other routes that could be successful on the 70s Line. WMATA should also consider sharing the playbook with drivers.

Expand Driver Training

Discussion with drivers on the 30s Line indicated that current training is limited to learning the line routing after the route is picked. There is no training related to customer service items, as outlined in the 30s Line original drivers training booklet. It is proposed that this training be started on the 70s Line and occur after every pick. A training booklet comparable to what was done for the 30s Line should also be developed for 70s Line drivers, and used as the basis for customer service training after every pick.

5.2.2 Recommendation Proposed for Implementation in the Mid-Term (3-4 Years)

Implement Dedicated Traffic Control Officers and Parking Enforcement Staff

Lack of enforcement of existing parking and traffic regulations was identified by drivers and supervisors as a major factor negatively impacting run times and schedule reliability. Based on this feedback, parking enforcement staff and Traffic Control Officers dedicated to the Georgia Avenue/7th Street corridor during the morning and afternoon peak periods is recommended. Traffic Control Officers work for the District of Columbia Department of Transportation (DDOT) and would be managed by DDOT staff. Parking control staff work for the District of Columbia Department of Public Works (DDPW) and would be managed by DDPW staff.

These dedicated personnel are anticipated to be a cost-effective way to help address schedule and reliability issues in the corridor. Review of the bunching, on-time performance and data from field observations for the Georgia Avenue/7th Street corridor shows that there continues to be on-time performance and headway separation issues in the corridor. In addition, feedback from drivers and supervisors, and riders indicate that headway separation and on-time performance is still an issue in the corridor and that lack of enforcement of existing traffic regulations is one of the primary reasons.

Dedicated personnel can help maintain schedule performance and reliability in the corridors. In turn, using these resources to help address headway separation and schedule adherence can also help to address the issue of the even distribution of capacity.

Proposed deployment would include Traffic Control Officers and parking enforcement staff deployed for three hours during each of the peak periods (total of six hours daily). Proposed deployment is as follows:

- One traffic control officer in Chinatown at 9th and H in the AM peak and 7th and H in the PM peak
- One traffic control officer in the vicinity of the Convention Center at 9th and Massachusetts in AM peak and 7th and Massachusetts in PM peak
- One traffic control officer at 7th Street and Florida Avenue in both the AM and PM peak
- One parking enforcement staff member in downtown, covering the area between Archives and the Convention Center.
- One parking enforcement staff member along 7th Street and Georgia Avenue between the Convention Center and the general vicinity of Howard University.
- One parking enforcement staff member covering the area from Howard University north to the District Line.

The ticketing powers of the parking control staff and Traffic Control Officers should be backed by quick towing capabilities that can rapidly move vehicles that are illegally parked in a bus stop or in a travel lane. The ability of a driver to communicate with parking control staff, either directly, or through the operations control center, should also be aggressively pursued.