

May 14, 2001

Board of Directors  
Metropolitan Transit Authority  
130 Nestor Street  
Nashville, TN 37210

**Report of Internal Audit Section**

Dear Metropolitan Transit Authority Board Members:

We have recently completed a performance audit of the Metropolitan Transit Authority (MTA). According to the *Government Auditing Standards* issued by the Comptroller General of the United States, “a performance audit is an objective and systematic examination of evidence for the purpose of providing an independent assessment of the performance of a government organization, program, activity, or function in order to provide information to improve public accountability and facilitate decision-making by parties with responsibility to oversee or initiate corrective action.” A performance audit is different than financial statement audits, which are limited to auditing financial statements and controls, without reviewing operations and performance. In performing this audit, we retained John T. Doolittle & Associates, Inc. to perform an audit under our direction. Their report dated May 2001 is included with this report.

The Metropolitan Transit Authority (MTA) is a component unit of the Metropolitan Government and was created in 1953 to supervise, regulate and maintain jurisdiction over public transit in the City of Nashville. MTA is governed by a five member board appointed by the Mayor and approved by the Council. The Metropolitan Government partially funds MTA’s annual operating and capital budgets. MTA currently employs an active fleet of approximately 140 buses, vans and trolleys serving approximately seven

million riders annually. Other than the resident executive director, management and personnel operating the system are employees of the private non-profit corporation known as the Davidson Transit Organization. The current executive director is an employee of a private contractor, McDonald Transit Management.

Based on the most recent audited financial statements, MTA's summarized balance sheet and operating results for the 2000 and 1999 fiscal years were as follows.

	<u>June 30, 2000</u>	<u>June 30, 1999</u>
Total Current Assets	\$ 6,844,920	\$ 6,654,482
Property and Equipment	24,253,422	24,341,480
Other Assets	<u>401,715</u>	<u>495,357</u>
Total Assets	<u>\$31,500,057</u>	<u>\$31,491,319</u>
Total Liabilities	\$ 7,252,485	\$ 5,978,117
Fund Equity	<u>24,247,572</u>	<u>25,513,202</u>
Total Liabilities & Fund Equity	<u>\$31,500,057</u>	<u>\$31,491,319</u>
Operating Revenues	\$7,754,466	\$7,022,565
Local Operating Assistance	8,084,700	7,668,700
State Operating Assistance	2,987,328	2,237,328
Other Non-operating Revenues	<u>306,866</u>	<u>288,152</u>
Total Revenues	19,133,360	17,216,745
Total Expenses (including depreciation)	<u>28,078,826</u>	<u>25,065,707</u>
Total Net Loss	(8,945,466)	(7,848,962)
Add: Depreciation charged to Contributed Capital	<u>8,735,346</u>	<u>7,778,490</u>
Net Loss, Exclusive of Depreciation	<u>(\$ 210,120)</u>	<u>(\$ 70,472)</u>

Internal Audit typically addresses audit reports to and obtains responses from the department head and the board or commission overseeing the department audited or, for departments without a board or commission, the department head and the mayor. Since the current executive director of MTA is an employee of a private contractor, this report is being addressed solely to the Metropolitan Transit Authority Board of Directors.

## **Objectives, Scope, and Methodology**

This audit represents the first comprehensive performance audit of the Metropolitan Transit Authority. The overall objectives of this performance audit were as follows.

- Review performance outcomes and controls in key operational and financial areas.
- Conduct a peer group benchmarking analysis comparing and ranking MTA's efficiency, effectiveness and funding.
- Examine organizational efficiency and effectiveness.
- Develop findings and recommendations for any areas where performance could be improved.

The scope of the work included MTA's primary operations, and the benchmarking focused on fiscal year 1999 financial results, which was the most recent full year of data available for MTA and the selected peers when the work began. Certain other audit work and analyses required the consideration of financial results, performance and operations outside of that time period.

The methodology employed throughout this audit was one of objectively reviewing various forms of documentation, including written policies and procedures, financial information, Board minutes and various other forms of data, reports and information available from MTA and other sources, including federal transportation databases. Various aspects of MTA operations were directly observed, and Board members, employees and other stakeholders were interviewed.

We performed the audit procedures in accordance with generally accepted government auditing standards.

## **Findings and Recommendations**

We found that MTA's public funding and level of service per capita were generally in line with comparable peer systems. Overall costs in relation to the level of service provided were also in line with peers. However, MTA's level of service provided in relation to the service area is noticeably lower than the peers, attributable to MTA's much larger service area. At the same time, MTA's total miles of service provided compares favorably with the peers. With regard to MTA's operations, we found several key functions that needed improvement, including overall governance, financial management, marketing, customer service, planning and information technology.

Following is an overview of the more significant individual findings and recommendations that are addressed in more detail in Doolittle & Associates May 2001 report that is included with this report. The collective annual financial impact of the recommendations is net additional expenses related to administrative salaries totaling

approximately \$325,000. One-time costs of approximately \$250,000 related to information technology are also recommended.

1. Strategies for key Board, management and organizational arrangements

Doolittle & Associates' analysis identified several areas where improvements to the overall MTA operations would result from changes to certain institutional arrangements. These include:

- Revising the Metropolitan Charter provisions controlling MTA.

The current charter provisions are nearly 50 years old and do not provide a solid policy foundation for a modern public transit organization. MTA has evolved from a regulatory body to the primary transit organization for the county. MTA's current operation of the fixed route bus service, paratransit, car and van pools, magnet school and special event services, as well as involvement in regional planning activities are all responsibilities assumed under the implied powers of the charter phrase: "owning and operating a public transit system".

- Expanding the MTA Board from five members to seven.

In addition to adding two new voting members, consideration should be given to including Metro's Director of Finance and Planning Director as ex officio, non-voting members. This would increase the capacity of the Board and allow for the creation of functioning committees, while assisting the Board in dealing with longer-term planning, financial and other strategies. It would also enhance the coordination and linkages between MTA, Metro and other stakeholders.

- Hiring an executive director to work for the MTA Board.

This position would manage the affairs of MTA, provide leadership on regional transit and transportation issues, oversee the technical and professional staffs and manage all contract operators. Under the current arrangement, there is no MTA employee providing guidance to the Board. The Board must rely exclusively on the outside contractor, McDonald Transit, or managers from the captive non-profit corporation, Davidson Transit Organization. The cost to hire a staff executive director is estimated to be \$125,000 annually, including benefits.

- Staffing key management and professional positions.

Lack of management and professional staff is limiting MTA's capacity to effectively manage the current operation and expand its role in the region's public transit landscape. There is currently no marketing director, no finance director and only a small planning function. The contract executive director is involved in the details of several operational areas that would be more appropriate for other

positions. Administrative functions are normally more heavily staffed in transit organizations the size of MTA. The peer analysis showed that MTA's administrative costs were 11.7% of total costs, as compared to the peer average administrative costs of 19.5% of total costs. Additionally, MTA's administrative costs per mile were \$0.52, compared to the peer average administrative cost per mile of \$0.69. Several of the audit findings can be attributed to the lack of staffing, and specific staffing recommendations are addressed with those findings throughout this report. The new management level positions should be hired by and report to the staff executive director.

- Examining the provisions of the McDonald contract to ensure MTA is receiving the full benefit of the contract.

The August 1998 contract with McDonald Transit stipulates a flat fee of \$12,350 monthly for the first year, moving to \$14,200 per month in the fifth year of the contract. These fees cover the services of the contract executive director in addition to a range of optional technical and professional consulting services. Either McDonald or MTA can determine when such services should be provided. The types of services covered include insurance requirements and negotiations of coverage, internal financial and management audits, labor relations and collective bargaining, and public awareness and marketing campaigns. While McDonald provides some of these services as a matter of standard practice, labor negotiations for example, it is not evident that MTA has requested an appreciable level of other services from McDonald.

Additionally, the current McDonald contract covers the five-year period August 1998 through August 2003. This five-year contract is at odds with the MTA procurement policies, which limit all contracts for goods or services to three-years with a maximum of two, one-year extensions. The current five-year contract should be reviewed in light of possible compliance issues noted.

## 2. Peer review analysis of service levels and public funding

The primary objective of the peer review study was to compare MTA with a group of transit systems with similar general characteristics. This group of twelve systems is the "comparable peer" group. A second set of peers was selected representing much larger transit systems. This set, labeled "large systems" group, was selected to examine the differences between MTA and much larger systems where substantial commitments have been made to public transit. A third group of cities commonly used for various economic and civic characteristic comparisons was also analyzed. This group is labeled as the "policy group."

### Large Systems

The systems included in this group were Baltimore, Cleveland, Dallas, Denver, Houston, Milwaukee, Minneapolis-St.Paul, Oakland, Pittsburgh, Portland, Seattle and St. Louis.

<u>Key Service &amp; Funding Statistics</u>	<u>Average for Large Systems</u>	<u>MTA</u>
Revenue miles per square mile	46,473	11,259
Revenue miles per capita	15.7	9.5
Annual rides per capita	65.1	12.2
Total subsidies (fed, state, local- \$millions)	\$231	\$24
Total subsidies per capita	\$153	\$42

As shown in the statistics highlighted here, the large systems are significantly larger overall. Many of these systems have dramatically larger bus operations, combined with rail and other transit modes typical of major regional urban systems. On a per capita basis, annual ridership is five times higher than MTA.

### Policy Group

Included in the policy group were large systems like Austin, Orlando and Indianapolis, as well as small systems such as Chattanooga and Greenville. As a result, making valid comparisons between MTA and the average of these systems is problematic. Additionally, the larger systems in this group could easily fit in the “large systems” while some of the smaller systems were captured in the “comparable peers” below. What the data shows is per capita funding that is over 50% higher than MTA’s, with two-thirds more revenue miles per capita.

### Comparable Peers

The systems included in this group were Birmingham, Charlotte, Chattanooga, Daytona, Indianapolis, Knoxville, Lexington, Memphis, Mobile, Raleigh, Richmond, and West Palm Beach. Doolittle & Associates identified systems closest to MTA in characteristics such as population, service area, demographics and topography. Additionally, all major Tennessee systems were included. These comparable peers were analyzed in more detail than were the large systems or policy group systems.

<u>Key Service &amp; Funding Statistics</u>	<u>Average for Comparable Peers</u>	<u>MTA</u>
Revenue miles per square mile	18,952	11,259
Revenue miles per capita	10.0	9.5
Annual rides per capita	13.6	12.2
Total subsidies (fed, state, local- \$millions)	\$18	\$24
Total subsidies per capita	\$38	\$42
Local subsidies per capita	\$17	\$15

The data for the comparable peer group shows MTA near peer averages for revenue miles per capita and annual rides per capita. MTA's total subsidies from all sources were above the peer average but slightly below the average for per capita local funding. One of the key statistics from the review shows MTA with 59% of the service density of the peers. This is driven at least partially by the larger than average service area covered by MTA. MTA's service area of 484 square miles, the 3<sup>rd</sup> largest out of the 13 comparable peer systems, is 29% larger than the average for the peers. The two comparable peer systems with larger service areas also had low system density. MTA's total service miles of 5.4 million are approximately 13% greater than the average of 4.8 million miles for the peers.

The conclusions that can be drawn from the data suggest that MTA's funding and service per capita are comparable to the averages for the peers but that MTA's service levels for its service area are lower. This is because of the large size of MTA's service area as compared to the comparable peers' averages. Any meaningful increase in service would require additional public funding.

MTA should work with the administration and other stakeholders to develop a long-range strategic plan, including multi-year operating and capital budgets, taking into account projected economic development, population trends, and land use. Comprehensive planning is crucial for building consensus and support for policy decisions surrounding public transit and for building support for any additional public funding that would be needed for significant service expansions.

### 3. Peer review analysis of cost

In addition to analyzing service levels and funding, another objective of the peer analysis was to examine key cost metrics for the agency. Following are key cost

statistics for the average of the large systems, where applicable, for the average of the comparable peers and for MTA. Because of the impact of the additional cost to catch up on deferred maintenance during 1999, maintenance expenses were normalized in order to present MTA's expenses more in line with what average expenses should have been and are expected to be going forward.

	<u>Large Systems</u>	<u>Comparable Peers</u>	<u>MTA</u>
Operating expense per revenue mile	\$6.31	\$3.43	\$3.67
Operating expense per capita	\$92.00	\$34.45	\$34.89
Bus operating expense per passenger mile	N/A	\$.61	\$.63
Top driver wage	N/A	\$14.78	\$15.61

As expected, data from the review indicate that MTA's costs per capita and per revenue mile are significantly below the average of the large systems. When compared to the comparable peer averages, however, MTA's costs are approximately 7% higher on a per revenue mile basis than the peers. Driver wages account for much of this difference. Top driver wages, which serve as a proxy for measuring overall wage scales, are 5.5% higher for MTA than for the average for the peer group. The peer averages are lowered by the inclusion of the smaller market systems of Chattanooga, Knoxville, Lexington and Mobile. MTA wages are comparable, however, to the larger market systems in the comparable peer group. The other notable difference between MTA and the peer average is the overall system service area. The size of the service area impacts the level of "dead head" miles associated with moving buses to and from their assigned routes. MTA has a service area that is 29% larger than the average for the peers. This has translated into "dead head" miles that are approximately 2% higher than the peer average. Wage differentials and "dead head" miles account for approximately 5% of the difference in costs per revenue mile between MTA and the comparable peer average.

When looking at the bus system in isolation, costs per passenger mile are 3% higher for MTA than for the peers once 1999 maintenance costs are normalized. Again, driver wages and "dead head" miles would account for this difference.

In summary, MTA's cost of providing service is substantially in line with comparable peer averages on both a per mile and per capita basis. Since MTA's service area is 29% larger than the average of the comparable peers, it would require a meaningful increase in operating costs to achieve the service density, as measured by miles of service per square mile, of the comparable peers. Since costs per capita are already in



line with peer averages, an increase in funding would drive this metric above comparable peer averages.

4. Budgeting, accounting and cash management

Recommendations have been made in a number of areas related to cash management, operating and capital budgeting, and management and Board financial reporting practices. One factor impacting this area is the fact that there is not a finance director on staff, and the contract executive director has more responsibility for this area than is typical for that position. Following are some of the more significant issues noted.

- The practice of capitalizing unbudgeted maintenance expense should be examined. This practice distorts true operating results, thereby making budgeting problematic, and it also absorbs capital funds that could be used for other capital expenditures. Unbudgeted capitalized maintenance expenses for fiscal years 1997 through 2000 were \$947,599, \$990,512, \$2,204,935, and \$724,586, respectively. Additionally, from 1997 through 2000, over \$13,000,000 in budgeted and unbudgeted capital funding was used for maintenance, which reduced resources available to purchase buses. The use of capital funds for maintenance needs to be carefully coordinated with long range budgeting and fleet replacement plans.
- The budget process should be retooled in light of consistent budget shortfalls and material account level variances. Unfavorable budget to actual net income variances - before the capitalization of unbudgeted maintenance expenses - for fiscal years 1997 through 2000 were \$1,192,684, \$937,758, \$2,429,007 and \$735,160, respectively. For each of those years, actual revenues did not meet budget expectations, and actual expenses exceeded the budget. Further, the budget is revised throughout the year without reporting clear and consistent tracking back to the original budget so that the Board can maintain an awareness of why forecasts were changed and how the operation is being managed. The cumulative total of year-end budget to actual statements provided to the Board for 1997 through 2000 can be summarized as follows.

	Budget	Actual
Total revenues	\$69,620,754	\$68,904,290
Total expenses	<u>77,734,542</u>	<u>82,312,687</u>
Deficit before capitalization	(8,113,788)	(13,408,397)
Budgeted capitalization	<u>7,747,443</u>	<u>7,747,443</u>
Surplus/(deficit) after Budgeted capitalization	(366,345)	(5,660,954)

Add: unbudgeted maintenance		
Expense capitalized	_____ -	<u>4,867,632</u>
Final surplus/(deficit)	<u>\$ (366,345)</u>	<u>\$ (793,322)</u>

Additionally, the Board is provided the budget to actual summary based on unaudited balances. Although the audited financial statements are provided to the Board, the budget to actual summary is not updated after the audited financial statements are issued.

- Enhancements to the financial reporting package provided to the Board are needed. Each month's budget is stated simply as one-twelfth of the annual budget. Since revenues and expenses do not occur evenly throughout the year, this leads to an inaccurate portrayal of monthly financial position. Additionally, there is no comparison of year-to-date actual financial results to the cumulative year-to-date budget. Variances reported are not clearly identified as favorable or unfavorable, and financial reports often present bottom line deficits as a positive number instead of a negative number. All capital grant funds received should be shown as revenue items, even if used for capitalized maintenance, and not as credits to materials expense. Finally, the report to the Board does not always include an overall operating surplus or deficit.
- MTA's cash position has deteriorated significantly over the past several years to the point of insolvency. Weaknesses in the budgeting process discussed above, coupled with the absence of long-range operating and capital budget planning and a decision to utilize operating reserves, contributed to MTA's negative cash flow. The agency sought and secured a line of credit from a commercial lender to alleviate working capital shortfalls. After becoming aware of MTA's action, the Metro Legal department determined the agency lacked legal authority to obtain this financing. The Metro Finance Department has recently developed a mechanism for stabilizing MTA's cash requirements. However, MTA still needs to work with Metro Finance to develop a comprehensive capital budget and a procedure for securing local matching funds in advance of MTA making capital commitments requiring Metro funding.
- MTA should initiate a more aggressive grant draw down program, which could save MTA up to \$100,000 annually in interest expense.

These issues should be addressed in conjunction with hiring a director of finance and administration with an annual estimated salary of \$100,000, including benefits.

5. Analysis and reporting of service cost, cost recovery and fare setting practices

Fare policy is a difficult issue for most transit boards because it places two of the most important Board responsibilities, ridership generation and fiscal prudence, into potential conflict. It is not unusual to raise fares and lose ridership, but enhance the revenue profile of a transit agency. To help make the fare setting process more routine, many boards establish a policy that sets fares as a percentage of operating costs. As costs change, fares change automatically. MTA appears to have policies governing fare recovery of individual services, but there is not a clearly stated cost recovery policy for the system as a whole. MTA's fare structure, however, is similar to other systems', and MTA has a good mix of single fares, 20-ride tickets and monthly and other passes.

To the extent that MTA considers cost recovery in making route and fare decisions, the Board may not be considering all pertinent information. MTA's cost methodology excludes certain components when analyzing and reporting the cost of service. Cost models serve as the foundation for service offerings and as inputs to pricing decisions. This includes special events like the Titan's shuttle service, as well as regular bus routes. As an example, MTA cost and priced the Titans shuttle service at approximately \$32,000 per game. Doolittle & Associates identified costs surrounding the November 5, 2000 home game and determined that fully allocated costs were approximately \$50,000 after including an allocation of fixed "overhead" costs, adjustments for bus drivers earning overtime pay, and the inclusion of capitalized maintenance expenses. Assuming eight regular season home games per season could yield fully allocated costs of approximately \$140,000 above the cost identified by MTA.

Another example is the use of marginal cost analyses to evaluate the regular bus routes. MTA has established thresholds for cost recovery in their route analysis using a straight marginal cost per hour of approximately \$45. Doolittle & Associates have proposed a more accurate estimated cost per hour between \$55 and \$65. This range, again, is based on including capitalized maintenance expense, plus an additional charge for fixed "overhead" expenses. The recent Urbitran study used a cost of \$54.36 to reflect all variable costs, including capitalized maintenance expense, to appropriately present the incremental cost of service expansion recommendations.

MTA's cost model can be refined further by factoring additional variables such as miles traveled rather than simply hours of operation. Doolittle & Associates observed that by using more sophisticated cost models for evaluating current route service, four routes would fail the MTA established thresholds for service offering.

Pricing decisions are complex, involving a number of economic and public policy factors. Cost analysis is typically only one of the inputs in the development of a pricing model. In fact, when compared to peers, MTA's average fare is 33% higher than the peers' average fares, and MTA's revenue per passenger is 29% higher than the peers' average revenues per passenger. Additionally, MTA increased fares by 10% over five years through 2000, and the last fare increase resulted in only a modest revenue increase. All of this suggests that MTA's fares are currently near their upper

limit. However, special services, such as the Titans service, should be reevaluated to determine whether pricing covers related costs, unless there is a policy reason to do otherwise.

It is recommended that a more sophisticated set of tools be developed and used to evaluate and report on service offerings, especially in the context of cost recovery discussions. In addition to capturing capitalized maintenance expenses and fully allocated costs, most transit system cost models include several other measures, such as express service variable costs to reflect the different nature of that service, models for seasonal or one-time service to reflect the impact on vehicles required for such service, and models to plan for substantial increases in service that would require major fixed cost increases related to facilities or supervisory personnel.

Additionally, service pricing is an area where a marketing research program can provide crucial intelligence to aid management and the Board in setting fares. Overall fare policies also consider any number of economic development, public policy and other factors and are always subject to changing circumstances. By developing and reporting on a more sophisticated set of cost models, including fully allocated costs, and incorporating market research in the analysis of fares, more informed policy decisions can be made regarding service offerings and pricing.

#### 6. Overall marketing approach and customer service

MTA does not have a marketing department. The agency has chosen to delegate marketing activities to various MTA staff members and to contract for specific marketing services. This approach has primarily focused on promotion and advertising. More comprehensive marketing activity, including conducting research to identify service needs, understanding the local marketplace, providing input into pricing decisions, developing tools to measure results, as well as having a comprehensive approach to customer service, is needed.

Additionally, customer service at MTA is concentrated on the activities of the customer service centers and not on service delivery and market research. The current customer service activities are focused on the customer call handling function and include tracking comments and complaints, selling tickets, taking pictures for passes, providing general information, tracking the vanpool program, and conducting surveys. There are several specific recommendations regarding the operation of the customer service centers. These include the need to assess, and probably upgrade, the current call handling software, enhancing the processes by which customer complaints are investigated and tracked and by which customer survey results are measured, and better defining and meeting the needs of non-English speaking customers.

The audit also recommends the creation of an integrated marketing function that should be focused and organized under a new director of marketing. The concept of customer service should be expanded to include operational aspects of the business currently managed outside of the customer service department. For example, MTA's new Transit Guide defines safety, reliability, customer friendliness and efficiency as goals. These definitions should serve as the basis for developing appropriate customer service goals and measurement tools for each area. While some measurements are already reported, for example on-time performance and preventable accidents, these statistics are not presented in a manner that provides a complete picture of customer service. The marketing department should also coordinate the communication and information provided to customers about MTA's services, including publicizing new routes and maintaining consistency between current transportation services provided and route schedules and signage throughout the service area.

The cost of a marketing director position is estimated at \$75,000 annually, including benefits.

#### 7. MTA's planning capacity

Planning in the context of a transit agency has a number of different, yet related meanings. Longer-range regional transportation planning is conducted by a consortium of local and regional agencies that include MTA. The contract executive director of MTA serves as the primary liaison to these regional planning efforts. On a more local level, planning relates to the service and scheduling function for the transportation fleet. This includes scheduling the individual buses and drivers and creating logical, efficient routing. Planning should also consider an enterprise's various financial and operational plans, both strategic and tactical, that provide a blueprint for guiding management, governance bodies, policy makers and funding agencies. Typically embedded in comprehensive strategic and tactical plans are long- and short-range operating financial plans, comprehensive capital and fleet replacement plans, load leveling maintenance planning, human and technology resource plans, and sales and marketing plans.

This audit found the overall bus routing and scheduling function working well. MTA was right at the average peer's passengers per revenue mile and per revenue hour worked. With regard to regional transportation planning, however, the contract executive director was attempting to fill the lead role in regional planning efforts while also being responsible for the daily operation of the transit fleet. An MTA staff executive director reporting to the MTA Board, recommended in number 1 above, should play the lead role in regional transportation efforts, allowing the contractor to focus on operating the transit system.

Overall, the lack of staff planning capacity within MTA makes planning difficult to balance and limits MTA's ability to effectively participate in regional transportation

and land use planning and to ensure that MTA's short- and long-range transit plans are appropriately integrated into the overall regional plan. MTA should hire a planning director and one or two staff planners, which will allow MTA to fill its role in regional planning efforts while engaging in broader service planning and market development efforts, as well as developing an overall strategic plan that incorporates all aspects of MTA's operational and financial plans. The need for an overall strategic plan is also discussed in number 2 above. MTA's planning should be done in concert with external stakeholders such as the Regional Transit Authority, the State, the Metro Planning Commission and other Metro departments, and it should be integrated with capital projects management. The annual salary and benefits for a planning director and for one staff planner are estimated at \$75,000 and \$50,000, respectively.

#### 8. Bus maintenance program

The maintenance department is coming to the end of a major effort to catch up a substantial amount of deferred mechanical maintenance. From 1995 to 1999 annual maintenance expenses related to materials went from approximately \$860,000 to \$2,860,000, and annual wage expense went from \$1,760,000 to \$2,257,000, which included the addition of eleven mechanics. This effort has reduced the backlog list from 156 items in June 1997 to 11 items in January 2001. While the backlog of mechanical work has been reduced significantly, the body and paint work outstanding for the fleet remains substantial. Once this remaining work is completed, there should be a substantial reduction in maintenance expense in future years.

With regard to the fleet itself, MTA does not have a comprehensive fleet replacement plan in place. It was noted that the average age of MTA's fleet in 2000 was 8.8 years, compared to the industry standard of 6 years. Additionally, the number of different models in the fleet rose from 9 in 1995 to 14 in 2000. A large number of models, which can necessitate a large parts inventory, can have a negative impact on efficiency. One other observation about the fleet is that MTA's spares ratio of 20.5% is at the FTA guideline of 20%.

Going forward MTA will require a solid fleet management and maintenance plan that incorporates an adopted fleet replacement program, a supporting capital budget, and a utilization plan that levels the maintenance load. This planning process should also address the financial requirements required to support a normal maintenance program without resorting to unbudgeted capitalization of maintenance expenses and fluctuating year over year maintenance expense. Additionally, MTA should consider whether cost savings and other efficiencies would result by contracting tire maintenance and repair, which is a typical transit system practice. MTA may also want to consider whether additional efficiencies could be gained by revisiting the maintenance work shift schedule. Over half of the maintenance force is scheduled for the 8:00 a.m. to 4:00 p.m., Monday through Friday shift. Finally, MTA should

carefully evaluate maintenance staffing levels to ensure they are not excessive, now that deferred maintenance is essentially caught up, and consideration should be given to contracting the backlog of paint and body work to ensure those staffing levels are appropriate for a normal level of paint and body work once that backlog is caught up.

#### 9. Procurement practices

MTA needs to rationalize its procurement policies and practices. The current purchasing policies are confusing regarding the position and authority of the purchasing agent. It is unclear if the purchasing agent is supposed to be a Metro Finance Department employee or someone within the MTA staff. Additionally, some staff with inventory control and other incompatible duties have significant purchasing authority. MTA tends to issue purchase orders for most procurements, as opposed to establishing contracts for recurring purchases, and MTA does not have a procurement card program in place.

MTA should clarify purchasing policies and work with Metro Purchasing to use Metro contracts whenever possible. To reduce administrative time and cost surrounding procurement, MTA should also implement a procurement card program and minimize the number of purchase orders used by bidding and developing contracts for recurring purchases. The agency should ensure segregation of duties surrounding procurement, inventory management, and payment approval by designating specific purchasing positions without inventory management responsibilities. In implementing these improvements, MTA should adopt and utilize the Metro Finance Department's policies, practices and contracts in place to the fullest extent possible.

#### 10. Parts and supplies inventory management

MTA's overall inventory management system needs improvement. The inventory system does not interface with the accounting system. Some of the inventory on hand is not secured, and inventory levels are higher than average with approximately 9 months of stock on hand as compared to 6 months of stock, which is closer to what Doolittle & Associates consider to be the norm.

MTA needs to establish procedures with adequate controls over inventory and implement an automated system that would integrate the parts and supplies inventory system with the accounting and other systems to improve overall inventory management. MTA should also investigate the availability of contract vendors to maintain parts inventories to determine whether outsourcing stocking, controlling and

ordering parts inventories would be cost beneficial. Such arrangements are being used for local government fleets but have not yet become a common practice in the transit industry.

#### 11. Capacity of “paratransit” service for riders with special needs

MTA may have performance issues regarding on-time delivery of paratransit service. Although there is not a clearly established on-time performance standard, on-time performance of 91% is reflective of performance that the Federal Transportation Agency has accepted as adequate. MTA’s on-time performance was at 84% during the audit. Additionally, MTA needs to improve the eligibility screening process for this service. This is important because once these services are delivered, customers can legally require them to continue. A review of 104 applications revealed that 74 of those applications were missing information or signatures, and Doolittle & Associates observed that MTA’s determinations of eligibility tend to be more lenient than required under federal guidelines. MTA may also be providing paratransit service where existing fixed route service with the necessary equipment could provide the service required by law. Finally, it should be recognized that MTA could legally raise the current price of these services to help defray service expansion costs. Improved eligibility and service analysis could improve on-time performance and other aspects of paratransit service.

#### 12. Information technology

There were numerous situations noted pointing to the need for overall improvements in the area of information technology. Among the examples cited were the lack of support for an aging scheduling software application that is not Windows compatible, the lack of e-mail availability, the inadequacy of management information provided by the maintenance software, deficiencies in financial and other report writing systems and overall system connectivity issues. MTA should work with Metro’s Information Systems and Finance Departments to expedite the development and implementation of a sound, comprehensive information technology strategic plan. Given the critical nature of the scheduling system in particular and information technology in general, one-time expenses totaling \$250,000 are recommended to address scheduling software and the development of an information technology plan. Additional investments in technology are likely to result from such a plan.



### 13. Physical plant capacity

The MTA facility is located at 130 Nestor Street in Nashville. It was formerly an aircraft manufacturing facility that has been converted into a fleet transportation terminal by MTA. The maintenance operations, fuel depot, paint shop, and administrative offices are all housed at this facility. After the conversion from a manufacturing site to a fleet terminal, significant excess interior capacity remains under-utilized. Based strictly on observation, Doolittle & Associates estimated that as much as one third of the approximately 170,000 square feet available for fleet maintenance may be underutilized. To ensure this excess capacity is properly factored into Metro's short- and long-term facilities plans, MTA should work with the Metro Office of Facilities Planning and Construction Management. Ensuring excess facility capacity is considered in Metro's overall facilities planning will benefit MTA and other Metro departments.

\*\*\*\*\*

The MTA Board response to the audit recommendations follows this report.

We greatly appreciate the cooperation and help provided by the management and staff of the Metropolitan Transit Authority and by the MTA Board throughout the course of this audit.

This report is intended for the information of the management of the Metropolitan Government of Nashville and Davidson County. This restriction is not intended to limit the distribution of this report, which is a matter of public record.

Internal Audit Section

Kim McDoniel  
Internal Audit Manager

Copy: Mayor Bill Purcell  
Karl F. Dean, Director of Law  
David L. Manning, Director of Finance  
Eugene Nolan, Associate Director of Finance  
Metropolitan Council Audit Committee  
Richard V. Norment, Director of County Audit  
KPMG, Independent Public Accountant



May 15, 2001

Board of Directors

Clotilda D. Jackson  
Chair

Marian T. Ott  
Vice Chair

William L. Barnes  
Member

E. L. Collins  
Member

Lewis Lavine  
Member

Julian W. Blackshear, Jr.  
Secretary

Bill Purcell  
Mayor

Ms. Kim McDoniel  
Metro Department of Finance  
Internal Audit Division  
222 Third Avenue North, Suite 701

Dear Ms. McDoniel:

The Metropolitan Transit Authority is committed to the continuous improvement of its operations. We asked that the Metropolitan Transit Authority be among the first of the entities of Metropolitan Government to receive a performance audit. We are pleased to now receive the report developed by the Internal Audit Division with the assistance of Doolittle and Associates.

The Metropolitan Transit Authority acknowledges the receipt by each of its individual members of the draft audit report. We will consider the specific recommendations as soon as practical after the report is completed and made publicly available.

Accordingly, we have no opinion with respect to the specific findings and recommendations until such time as we have discussed the report in a public meeting. The Metropolitan Transit Authority shall address the issues raised in the report in detail at subsequent meetings.

Sincerely,

A handwritten signature in blue ink that reads "Clotilda D. Jackson".

Clotilda D. Jackson  
Chair

RTB/kbe



130 Nestor Street  
Nashville, TN 37210-2124  
(615) 862-5969

P.O. Box 100270  
Nashville, TN 37224-0270

FAX (615) 862-6208

**Exhibit 4-1  
Nashville MTA Performance Audit  
Comparison of Route Results  
MTAModel and Miles/Hours Model**

Route No.	Name	Revenue/Costs			Fail 60% Standard	
		MTA	Mi/Hrs	Delta	MTA	Mi/Hrs
1	VINE HILL	27.3%	19.3%	8.1%		
2	BELMONT	33.7%	22.7%	11.0%		
3	WEST END	33.3%	21.8%	11.5%		
4	SHELBY	50.0%	33.5%	16.5%		
5	OPRY MILLS - 100 OAKS CONNECTOR	9.9%	5.5%	4.5%	Fail	Fail
6	DONELSON	37.4%	21.8%	15.6%		
7	HILLSBORO	47.8%	34.9%	12.9%		
8	8TH. AVE. SOUTH	28.9%	20.1%	8.8%		
9	METROCENTER	54.8%	37.0%	17.8%		
10	CHARLOTTE	54.1%	36.5%	17.6%		
12	NOLENSVILLE ROAD	54.5%	36.5%	18.0%		
13	46TH - W. NASHVILLE - CROLEY	19.9%	11.9%	8.0%	Fail	Fail
14	WHITES CREEK	33.7%	20.2%	13.5%		
15	MURFREESBORO ROAD	49.8%	31.6%	18.2%		
16	OLD HICKORY CROSSTOWN	10.1%	5.7%	4.4%	Fail	Fail
17	12TH. AVE. SOUTH	39.4%	27.3%	12.2%		
18	ELM HILL PIKE/AIRPORT	25.3%	15.6%	9.8%	Fail	Fail
19	HERMAN	33.4%	24.0%	9.4%		
20	SCOTT	29.2%	19.8%	9.4%		
21	WHITE BRIDGE ROAD	33.9%	21.4%	12.5%		
22	BORDEAUX	52.6%	36.0%	16.6%		
23	DICKERSON ROAD	55.4%	34.2%	21.2%		
24	BELLEVUE	43.3%	21.9%	21.4%		
25	MIDTOWN CONNECTOR	54.2%	39.3%	14.9%		
26	GALLATIN ROAD	57.8%	36.3%	21.5%		
27	OPRYLAND HOTEL	14.3%	8.3%	6.0%	Fail	Fail
28	MERIDIAN	38.1%	28.6%	9.5%		
29	JEFFERSON	47.5%	34.7%	12.8%		
30	Mc FERRIN	33.6%	23.8%	9.8%		
32X	EDGE O LAKE EXPRESS	27.9%	15.7%	12.3%		Fail
33X	METROPLEX EXPRESS	27.0%	16.5%	10.5%		Fail
34X	OPRY MILLS - MUSIC VALLEY EXPRESS	43.5%	22.9%	20.6%		
35X	RIVERGATE EXPRESS	33.3%	16.4%	16.9%		Fail
36	MADISON SQUARE	39.8%	20.2%	19.6%		
37X	TUSCULUM EXPRESS	32.4%	18.7%	13.6%		
38X	UNA ANTIOCH EXPRESS	53.0%	32.7%	20.3%		
39	OLD HICKORY	24.6%	12.6%	11.9%	Fail	Fail
40	SENIOR TOWERS	5.5%	1.4%	4.1%	Fail	Fail
41	GOLDEN VALLEY	30.7%	16.5%	14.2%		Fail
42	ST CECILIA/CUMBERLAND	43.0%	31.4%	11.7%		
42	METRO SHUTTLE	2.1%	1.6%	0.5%	Fail	Fail
44	M.T.A. SHUTTLE	2.6%	2.0%	0.6%	Fail	Fail
45	BRENTWOOD	33.6%	18.2%	15.4%		
96	R.T.A. MURFREESBORO EXPRESS	110.7%	54.3%	56.3%		
	Subtotal MTA Bus Service	44.5%	29.1%	15.5%		
Magnet School Service						
46	CRIEVE HALL MAGNET #2	52.1%	31.1%	21.0%		
47	BELLEVUE MAGNET #1	53.8%	32.1%	21.8%		
48	ANTIOCH MAGNET #3	35.6%	24.2%	11.3%		
49	ANTIOCH MAGNET #4	71.8%	44.1%	27.6%		
90	CRIEVE HALL MAGNET #5	89.4%	51.7%	37.7%		
91	BORDEAUX MAGNET #6	27.5%	19.1%	8.4%		
92	ARTS MAGNET #7	24.9%	17.4%	7.5%	Fail	Fail
93	CAYCE - McFERRIN PARK	1.9%	1.3%	0.6%	Fail	Fail
	Subtotal Magnet School Service	46.8%	29.7%	17.0%		
	Total MTA	44.6%	29.1%	15.5%		
	60% Threshold	26.8%	17.4%	9.3%		

**Exhibit 6-1**  
**MTA Performance Audit**  
**MTA Capital Projects Included in Regional TIP for FY00 through FY02**

Project	Fed Funds	Federal Funds				Local & State funds				Total	Federal Share	State & Local
		2000	2001	2002	Total	2000	2001	2002	Total			
Accessride AVL systems	5307		72,000		72,000		18,000		18,000	90,000	80%	20%
Accessride Digital Communications	5307	72,000			72,000	18,000			18,000	90,000	80%	20%
Accessride Minibuses Replacement	5307		400,000	400,000	800,000		100,000	200,000	300,000	1,100,000	73%	27%
Associated Capital Maintenance	5307	1,440,000	1,440,000	1,440,000	4,320,000	360,000	360,000	360,000	1,080,000	5,400,000	80%	20%
Commuter Connection Vans	5307	336,000	160,000	160,000	656,000	84,000	40,000	40,000	164,000	820,000	80%	20%
Hermitage P&R Lot	R-CMAQ	300,000			300,000					-	100%	0%
	5307	280,000			280,000	70,000			70,000	350,000	80%	20%
Fleet Farebox System	5307			320,000	320,000			80,000	80,000	400,000	80%	20%
Full-size Bus Replacement	5307	1,600,000			1,600,000	400,000			400,000	2,000,000	80%	20%
Paratransit Capitalization	5307	320,000	320,000	320,000	960,000	80,000	80,000	80,000	240,000	1,200,000	80%	20%
Passenger Stop Improvements	5307	200,000	160,000	160,000	520,000	50,000	40,000	40,000	130,000	650,000	80%	20%
Preventive Maintenance	5307	1,440,000	1,440,000	1,440,000	4,320,000	360,000	360,000	360,000	1,080,000	5,400,000	80%	20%
Project Administration	5307	40,000	40,000	40,000	120,000	20,000	20,000	20,000	60,000	180,000	67%	33%
TOTAL	5307	5,728,000	4,032,000	4,280,000	#####	1,442,000	1,018,000	1,180,000	3,640,000	#####	79%	21%
	R-CMAQ	300,000	-	-	300,000	-	-	-	-	300,000	100%	0%
	total	6,028,000	4,032,000	4,280,000	#####	1,442,000	1,018,000	1,180,000	3,640,000	#####	80%	20%

**Exhibit 7-1  
MTA Performance Audit  
MTA Fare Structure**

**Regular Bus**

<b><u>Media</u></b>	<b><u>Price</u></b>	<b><u>Price/Ride</u></b>	<b>% Discount</b>		<b><u>Rides to Breakeven</u></b>			
			<b><u>No Transfer</u></b>	<b><u>Transfer</u></b>				
Cash	\$1.45	\$1.45						
Transfer	\$0.10							
Cash + Transfer	\$1.55	\$1.55						
Mobility Pass (20-Ride Ticket)	\$24.85	\$1.24	14.3%	13.4%				
Monthly Flash Pass	\$48.00				33.1	31.0	38.7	35.8
Weekly Pass	\$14.70				10.1	9.5	11.9	11.0

**Reduced Fares**

<b><u>Media</u></b>	<b><u>Cost</u></b>	<b><u>Cost/Ride</u></b>	<b>% Discount</b>		<b><u>Rides to Breakeven</u></b>			
			<b><u>No Transfer</u></b>	<b><u>Transfer</u></b>				
Cash	\$0.70	\$0.70						
Transfer	\$0.10							
Cash + Transfer	\$0.80	\$0.80						
Mobility Pass (20-Ride Ticket)	\$11.85	\$0.59	15.4%	13.4%				
Weekly Pass	\$7.35				10.5	9.2	12.5	10.7

**Express Bus**

<b><u>Media</u></b>	<b><u>Cost</u></b>	<b><u>Cost/Ride</u></b>	<b>% Discount</b>	
			<b><u>No Transfer</u></b>	<b><u>Transfer</u></b>
Cash	\$1.75	\$1.75		
Transfer	\$0.10			
Cash + Transfer	\$1.85	\$1.85		
Mobility Pass (20-Ride Ticket)	\$30.90	\$1.55	11.7%	11.1%

**Downtown Shuttle**

<b><u>Media</u></b>	<b><u>Cost</u></b>	<b><u>Cost/Ride</u></b>	<b><u>Rides to Breakeven</u></b>
Cash	\$0.25	\$0.25	
Monthly Flash Pass	\$5.00		20.0

**Magnet School**

<b><u>Media</u></b>	<b><u>Cost</u></b>	<b><u>Cost/Ride</u></b>
Cash	\$1.10	\$1.10
Mobility Pass (20-Ride Ticket)	\$22.00	\$1.10

**Exhibit 7-2**  
**MTA Performance Audit**  
**Peer Group Subsidies By Source**

	<b>Operating Subsidies</b>				<b>Capital Assistance</b>			
	<b>Federal</b>	<b>State</b>	<b>Local</b>	<b>Total</b>	<b>Local</b>	<b>State</b>	<b>Federal</b>	<b>Total</b>
Peers Minimum	240,731	0	1,954,341	2,738,020	0	0	1,603,813	1,918,262
Peers Maximum	6,529,792	6,154,552	18,374,110	26,250,780	1,819,619	1,741,145	13,674,347	17,235,111
Peers Average	2,453,368	2,293,529	7,348,986	12,095,882	541,985	397,450	4,666,115	5,605,550
Nashville	5,450,551	2,237,328	7,668,700	15,356,579	1,066,634	1,063,824	6,622,980	8,753,438
Nashville/Peers	122.20%	-2.50%	4.40%	27.00%	96.80%	167.70%	41.90%	56.20%
Rank(1 is high, 13 is low)	3	6	5	6	4	3	4	4
% Change	207.50%	41.20%	37.10%	71.50%	661.00%	673.40%	237.20%	290.50%
Average Annual	51.90%	10.30%	9.30%	17.90%	165.30%	168.30%	59.30%	72.60%
<b><u>MTA Trends</u></b>								
1995	1,772,647	1,584,587	5,595,375	8,952,609	140,153	137,552	1,963,998	2,241,703
1996	901,684	1,858,631	5,595,375	8,355,690	117,896	117,897	2,232,164	2,467,957
1997	880,523	2,068,535	6,395,375	9,344,433	281,835	281,835	7,062,871	7,626,541
1998	2,520,804	2,156,968	7,674,392	12,352,164	701,189	701,189	4,519,355	5,921,733
1999	5,450,551	2,237,328	7,668,700	15,356,579	1,066,634	1,063,824	6,622,980	8,753,438
% Change	207.50%	41.20%	37.10%	71.50%	661.00%	673.40%	237.20%	290.50%
Average Annual	51.90%	10.30%	9.30%	17.90%	165.30%	168.30%	59.30%	72.60%
Peers Per Capita Average	5.12	4.79	15.35	25.26	1.13	0.83	9.75	11.71

*Exhibit 8-3*  
**MTA Performance Audit**  
**Titan's Football Service**  
**Sunday, November 5, 2000**

**MTA Estimate of Service Costs with Contra Expenses,**  
**Overtime Impact, Plus Fixed costs**

Bus Service Costs	<u>Vehicles</u>	<u>Vehicle Hours</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>D</u>	
			<u>MTA Cost/ Hour</u>	<u>MTA Cost</u>	<u>MTAWith Contra Cost per Hour</u>	<u>New Cost</u>	<u>MTA/Contra &amp; Overtime Cost/Hour</u>	<u>New Cost</u>	<u>MTA with Contra,OT &amp; Fixed Cost per Hour</u>	<u>New Cost</u>
Regular Bus	79	7.50	\$42.94	\$25,441.95	\$51.96	\$30,786.30	\$59.23	\$35,093.78	\$70.48	\$41,759.40
Regular Bus	3	3.25	\$42.94	\$418.67	\$51.96	\$506.61	\$59.23	\$577.49	\$70.48	\$687.18
Regular Bus	3	2.25	\$42.94	\$289.85	\$51.96	\$350.73	\$59.23	\$399.80	\$70.48	\$475.74
Regular Bus	2	10.50	\$42.94	\$901.74	\$51.96	\$1,091.16	\$59.23	\$1,243.83	\$70.48	\$1,480.08
Regular Bus	2	10.00	\$42.94	\$858.80	\$51.96	\$1,039.20	\$59.23	\$1,184.60	\$70.48	\$1,409.60
Accessride	5	4.50	\$30.08	\$676.80	\$36.40	\$819.00	\$41.50	\$933.75	\$49.39	\$1,111.28
Trolley	5	7.50	\$34.97	<u>\$1,311.38</u>	\$42.31	<u>\$1,586.63</u>	\$48.23	<u>\$1,808.63</u>	\$57.39	<u>\$2,152.13</u>
<b>Total: Bus Service Costs</b>				<b>\$29,899.19</b>		<b>\$36,179.63</b>		<b>\$41,241.88</b>		<b>\$49,075.41</b>
<b>Add:</b>										
Security Guards				\$1,600.00		\$1,600.00		\$1,600.00		\$1,600.00
Miscellaneous				<u>\$1,200.00</u>		<u>\$1,200.00</u>		<u>\$1,200.00</u>		<u>\$1,200.00</u>
<b>Total: Other Costs</b>				<b>\$2,800.00</b>		<b>\$2,800.00</b>		<b>\$2,800.00</b>		<b>\$2,800.00</b>
<b>Total Costs</b>				<b>\$32,699.19</b>		<b>\$38,979.63</b>		<b>\$44,041.88</b>		<b>\$51,875.41</b>



**Exhibit 8-1**  
**MTA Performance Audit**  
**Titan's Football Service**  
**Sunday, November 5, 2000**  
**MTA Estimate of Service Costs**

**Bus Service Costs**

	<u>Vehicles</u>	<u>Vehicle Hours</u>	<u>MTA Cost Per Hour</u>	<u>Cost</u>	
Regular Bus	79	7.50	\$42.94	\$25,441.95	
Regular Bus	3	3.25	\$42.94	\$418.67	
Regular Bus	3	2.25	\$42.94	\$289.85	
Regular Bus	2	10.50	\$42.94	\$901.74	
Regular Bus	2	10.00	\$42.94	\$858.80	
Accessride	5	4.50	\$30.08	\$676.80	
Trolley	5	7.50	\$34.97	<u>\$1,311.38</u>	
<b>Total: Bus Service Costs</b>					\$29,899.19
<b>Add: Other Costs</b>					
Security Guards				\$1,600.00	
Miscellaneous				\$1,200.00	
<b>Total: Other Costs</b>					<u>\$2,800.00</u>
<b>Final Total Costs</b>					<b>\$32,699.19</b>

**Exhibit 8-2**  
**MTA Performance Audit**  
**Titan's Football Service**  
**Sunday, November 5, 2000**  
**MTA Estimate of Service Costs with Contra Expenses**

**Bus Service Costs**

	<u>Vehicles</u>	<u>Vehicle Hours</u>	<u>MTA Cost Per Hour</u>	<u>Cost</u>	<u>MTA With Contra Cost / Hour</u>	<u>Cost</u>
Regular Bus	79	7.50	\$42.94	\$25,441.95	\$51.96	\$30,786.30
Regular Bus	3	3.25	\$42.94	\$418.67	\$51.96	\$506.61
Regular Bus	3	2.25	\$42.94	\$289.85	\$51.96	\$350.73
Regular Bus	2	10.50	\$42.94	\$901.74	\$51.96	\$1,091.16
Regular Bus	2	10.00	\$42.94	\$858.80	\$51.96	\$1,039.20
Accessride	5	4.50	\$30.08	\$676.80	\$36.40	\$819.00
Trolley	5	7.50	\$34.97	<u>\$1,311.38</u>	\$42.31	<u>\$1,586.63</u>
<b>Total: Bus Service Costs</b>				\$29,899.19		\$36,179.63
<b>Add:</b>						
Security Guards				\$1,600.00		\$1,600.00
Miscellaneous				\$1,200.00		\$1,200.00
<b>Total: Other Costs</b>				<u>\$2,800.00</u>		<u>\$2,800.00</u>
<b>Total Costs</b>				<b>\$32,699.19</b>		<b>\$38,979.63</b>

Exhibit 10-3  
MTA Performance Audit

**Effect on Interest Costs of Monthly Invoice to Grants for Capitalized Maintenance and Parts Costs**

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]						
Month	Actual Letter of Credit Activity			Actual Capitalized Maint. & Parts			Potential Capitalized Maint. & Parts				Potential Letter of Credit Activity			Interest Savings	
	Beginning	Net Draws	Ending	Interest (est.)	Expensed	Reimbursed (est.)	Total O&M Expense @19.7%	Reimbursed	Net gain (loss)	Beginning	Net Draws	Ending	Interest (est.)	(cost)	
July	862,142	1,144,096	2,006,238	9,561	-	-	1,794,077	353,054	-	-	862,142	1,144,096	2,006,238	9,561	-
August	2,006,238	185,168	2,191,406	13,992	-	-	1,835,464	361,198	353,054	353,054	2,006,238	(167,886)	1,838,352	12,815	1,177
September	2,191,406	709,124	2,900,530	16,973	264,008	-	2,276,427	447,974	361,198	361,198	1,838,352	347,926	2,186,278	13,415	3,558
October	2,900,530	(2,262,855)	637,675	11,794	-	264,008	1,898,506	373,604	447,974	183,966	2,186,278	(2,446,821)	(260,543)	6,419	5,375
November	637,675	1,164,795	1,802,470	8,134	-	-	1,761,991	346,739	373,604	373,604	(260,543)	791,191	530,648	900	7,233
December	1,802,470	33,341	1,835,811	12,128	-	-	1,938,318	381,438	346,739	346,739	530,648	(313,398)	217,250	2,493	9,635
January	1,835,811	701,708	2,537,519	14,578	-	-	2,099,946	413,245	381,438	381,438	217,250	320,270	537,520	2,516	12,062
February	2,537,519	(50,763)	2,486,756	16,748	200,000	-	1,960,930	385,888	413,245	413,245	537,520	(464,008)	73,512	2,037	14,711
March	2,486,756	(1,085,864)	1,400,892	12,959	-	200,000	2,143,862	421,887	385,888	185,888	73,512	(1,271,752)	(1,198,241)	(3,749)	16,708
April	1,400,892	1,005,064	2,405,956	12,689	2,177,253	-	1,975,554	388,766	421,887	421,887	(1,198,241)	583,177	(615,064)	(6,044)	18,734
May	2,405,956	131,794	2,537,750	16,479	1,060,518	2,177,253	2,024,220	398,343	388,766	(1,788,487)	(615,064)	1,920,281	1,305,217	2,301	14,179
June	2,537,750	2,027	2,539,777	16,925	938,199	1,060,518	1,869,225	367,842	398,343	(662,175)	1,305,217	664,202	1,969,420	10,915	6,010
<b>totals</b>		<b>1,677,635</b>		<b>162,960</b>	<b>4,639,979</b>	<b>3,701,780</b>	<b>23,578,520</b>	<b>4,639,979</b>	<b>4,272,137</b>	<b>570,357</b>		<b>1,107,278</b>		<b>53,580</b>	<b>\$109,380</b>

**NOTES:**

- Actual letter of credit (LOC) activity derived from MTA bank statements. Total draws and ending balance reconcile to draft audited financial statements.
- Interest is calculated at 8% annual (0.67% monthly) on the average LOC balance [ (Beginning + Ending) ÷ 2]. The estimate for FY2000 is very close to the actual reported in the MTA audited statement (\$163,607).
- Actual capitalized maintenance costs are from monthly charges against active MTA grants.
- Capitalized maintenance costs were assumed to be reimbursed by the end of the following month.
- The potential timing for capitalized parts is based on the annual FY2000 ratio of capitalized parts to total operating expenses, the latter as reported in monthly financial reports to the Board. The ratio was 19.68%.
- The net revenue gain (loss) is the potential monthly reimbursement less the actual monthly reimbursement.
- The net revenue gain (loss) is subtracted from actual monthly net draws on the LOC, then the beginning and ending LOC balances are recalculated accordingly.
- Monthly interest is recalculated, using the same approach as for [2], with the revised monthly beginning and ending LOC balances.
- The monthly interest savings (cost) is the revised monthly interest less the monthly interest estimated in [2].

**Exhibit 10-2**  
**MTA Performance Audit**  
**MTA Balance Sheets and Financial Ratios, 1996-2000**

	annual results					annual change				change '96-'00
	1996	1997	1998	1999	2000	'96-'97	'97-'98	'98-'99	'99-'00	
<b>ASSETS</b>										
Current Assets:										
Cash & cash equivalents	297,505	688,281	149,858	23,235	89,811	390,776	(538,423)	(126,623)	66,576	(207,694)
Receivables from governments	883,607	1,734,620	1,424,322	4,153,674	4,107,965	851,013	(310,298)	2,729,352	(45,709)	3,224,358
Accounts receivable	170,899	232,403	167,929	339,506	302,082	61,504	(64,474)	171,577	(37,424)	131,183
Materials & supplies	1,338,142	1,495,452	1,698,729	2,032,107	2,256,562	157,310	203,277	333,378	224,455	918,420
Prepaid expenses & other	248,653	98,362	46,517	105,960	88,500	(150,291)	(51,845)	59,443	(17,460)	(160,153)
total, current assets	2,938,806	4,249,118	3,487,355	6,654,482	6,844,920	1,310,312	(761,763)	3,167,127	190,438	3,906,114
Property & Equipment	18,279,624	21,930,945	23,309,022	24,341,480	24,253,422	3,651,321	1,378,077	1,032,458	(88,058)	5,973,798
Other Assets	663,135	906,586	241,431	495,357	401,715	243,451	(665,155)	253,926	(93,642)	(261,420)
total assets	<u>21,881,565</u>	<u>27,086,649</u>	<u>27,037,808</u>	<u>31,491,319</u>	<u>31,500,057</u>	<u>5,205,084</u>	<u>(48,841)</u>	<u>4,453,511</u>	<u>8,738</u>	<u>9,618,492</u>
<b>LIABILITIES</b>										
Current Liabilities:										
Accounts payable	398,044	2,059,585	1,106,228	3,249,841	2,214,315	1,661,541	(953,357)	2,143,613	(1,035,526)	1,816,271
Notes payable	-	400,000	-	862,142	2,539,777	400,000	(400,000)	862,142	1,677,635	2,539,777
Accrued expenses	803,001	1,186,532	1,322,856	1,866,134	1,627,924	383,531	136,324	543,278	(238,210)	824,923
total, current liabilities	1,201,045	3,646,117	2,429,084	5,978,117	6,382,016	2,445,072	(1,217,033)	3,549,033	403,899	5,180,971
Capital lease obligation	-	-	-	-	870,469	-	-	-	870,469	870,469
total liabilities	1,201,045	3,646,117	2,429,084	5,978,117	7,252,485	2,445,072	(1,217,033)	3,549,033	1,274,368	6,051,440
<b>FUND EQUITY</b>										
Capital contributions	18,456,645	21,978,051	23,164,289	24,139,239	23,108,709	3,521,406	1,186,238	974,950	(1,030,530)	4,652,064
Retained earnings:										
Reserved, self insurance	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	-	-	-	-	-
Unreserved	1,223,875	462,481	444,435	373,963	138,863	(761,394)	(18,046)	(70,472)	(235,100)	(1,085,012)
total equity	20,680,520	23,440,532	24,608,724	25,513,202	24,247,572	2,760,012	1,168,192	904,478	(1,265,630)	3,567,052
total liabilities & fund equity	<u>21,881,565</u>	<u>27,086,649</u>	<u>27,037,808</u>	<u>31,491,319</u>	<u>31,500,057</u>	<u>5,205,084</u>	<u>(48,841)</u>	<u>4,453,511</u>	<u>8,738</u>	<u>9,618,492</u>
<b>INDICATORS</b>										
Current ratio	2.45	1.17	1.44	1.11	1.07	(1.28)	0.27	(0.32)	(0.04)	(1.37)
Quick ratio	1.13	0.73	0.72	0.76	0.71	(0.40)	(0.01)	0.04	(0.05)	(0.42)
Weeks of working capital	4.98	1.29	2.28	1.42	0.87	(3.69)	0.99	(0.87)	(0.54)	(4.11)
Operating expense (net depr)	15,739,050	16,945,455	17,144,859	17,287,217	19,476,145	1,206,405	199,404	142,358	2,188,928	3,737,095
Capital outlays	2,395,229	7,376,432	6,960,246	7,534,128	8,121,834	4,981,203	(416,186)	573,882	587,706	5,726,605
total expenditures	18,134,279	24,321,887	24,105,105	24,821,345	27,597,979	6,187,608	(216,782)	716,240	2,776,634	9,463,700
Working capital	1,737,761	603,001	1,058,271	676,365	462,904	(1,134,760)	455,270	(381,906)	(213,461)	(1,274,857)

source: audited financial statements, 1996-2000

notes:

Current ratio is current assets ÷ current liabilities

Quick ratio is (cash + receivables) ÷ current liabilities

Working capital is current assets minus current liabilities

Weeks of working capital is working capital ÷ (total expenditures ÷ 52)

Operating expense is the total operating expense reported in statements of revenues, expenses, and net earnings, less depreciation and loss on disposal of assets.

Capital outlays are calculated from statements of cash flows, and are the sum of: (1) acquisition of property and equipment; and (2) payment of accounts payable for construction in progress and

**Exhibit 10-1  
MTA Performance Audit  
Approximation of  
MTA Monthly Cash Flow, FY2000**

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
<b>Operating Cash Flow</b>													
<b>Operating Revenues</b>													
Internal Revenues	594,458	617,536	686,116	578,958	639,713	685,842	722,256	692,787	546,234	655,896	589,311	841,887	7,850,994
Metro	2,000,000	2,000,000	-	2,000,000	-	1,500,000	584,700	-	-	-	-	-	8,084,700
State	-	-	-	-	-	-	-	-	2,987,328	-	-	-	2,987,328
Planning & ridesharing	-	5,470	-	926	-	44,473	10,107	-	-	-	32,573	116,789	210,338
Expenses (excl. capitalized O&M)	(1,794,077)	(1,835,464)	(2,012,419)	(1,898,506)	(1,761,990)	(1,931,640)	(2,099,945)	(1,747,151)	(2,143,862)	201,699	(963,702)	(1,527,012)	(19,514,068)
net operating cash flow	800,381	787,542	(1,326,303)	681,378	(1,122,277)	298,675	(782,882)	(1,054,364)	1,389,700	857,595	(341,818)	(568,336)	(380,708)
cumulative	800,381	1,587,923	261,620	942,998	(179,279)	119,397	(663,485)	(1,717,849)	(328,149)	529,446	187,628	(380,708)	
<b>Capital Cash Flow</b>													
<b>Capital Expenses</b>													
Capitalized O&M Expenses	-	-	(264,008)	-	-	(6,681)	-	(213,779)	-	(2,177,253)	(1,060,518)	(1,009,782)	(4,732,022)
Other Capital Expenses	-	-	(782,372)	(40,500)	(47,874)	(42,586)	(225,423)	(15,872)	(9,255)	(50,659)	(444,883)	(1,282,147)	(2,941,573)
total capital expenses			(1,046,381)	(40,500)	(47,874)	(49,268)	(225,423)	(229,651)	(9,255)	(2,227,912)	(1,505,401)	(2,291,929)	(7,673,595)
Reimbursements	458,849	223,652	945,620	1,477,836	358,468	40,533	63,399	620,635	1,346,591	259,320	708,971	463,069	6,966,943
net capital cash flow	458,849	223,652	(100,761)	1,437,336	310,594	(8,735)	(162,024)	390,984	1,337,336	(1,968,592)	(796,430)	(1,828,860)	(706,652)
cumulative	458,849	682,501	581,740	2,019,076	2,329,670	2,320,935	2,158,911	2,549,895	3,887,231	1,918,638	1,122,208	(706,652)	
Net LOC draws	1,144,096	185,168	709,124	(2,262,855)	1,164,795	33,341	701,708	(50,763)	(1,085,864)	1,005,064	131,794	2,027	1,677,635
ending LOC principal balance	2,006,238	2,191,406	2,900,530	637,675	1,802,470	1,835,811	2,537,519	2,486,756	1,400,892	2,405,956	2,537,750	2,539,777	
<b>Cash Balance</b>													
Beginning	(785,108)	1,618,218	2,814,580	2,096,641	1,952,500	2,305,612	2,628,893	2,385,695	1,671,552	3,312,724	3,206,791	2,200,336	(785,108)
Net funds in (out)	2,403,326	1,196,362	(717,939)	(144,141)	353,112	323,282	(243,198)	(714,143)	1,641,172	(105,933)	(1,006,454)	(2,395,169)	590,275
Ending	1,618,218	2,814,580	2,096,641	1,952,500	2,305,612	2,628,893	2,385,695	1,671,552	3,312,724	3,206,791	2,200,336	(194,833)	(194,833)

note "LOC" is letter of credit

sources:  
Shelly MacDonald, MTA Dir. Accounting, monthly operating revenues, operating expenses (include. capitalization), capital reimbursements, beginning cash balance (worksheet dated 11/14/00, prepared from general ledger transactions)  
Shelly MacDonald, MTA Dir. Accounting, grant expenditures detail (monthly expenditures by grant, vendor - worksheets dated 11/16/00).  
Monthly checking statements, July 1999–June 2000, account 0001-1252-8310, re: line of credit (LOC) withdrawals and payments.

**Exhibit 15-1**  
**MTA Performance Audit**  
**Nashville MTA Call Center Performance**  
**January-October 2000**

Date	Calls Answered	Calls Lost/ Abandoned	Overflow Calls	Total Calls	% Calls Lost/ Abandoned	% Overflow Calls	Avg. Wait Time for Lost Calls (secs)	Avg. Wait Time for Lost Calls (mins)
Jan Week 1								
Jan Week 2								
Jan Week 3								
Jan Week 4	1,372	113	179	1,485	8%	12%	435	7.3
Feb Week 1	1,025	58	137	1,083	5%	13%	303	5.1
Feb Week 2	1,471	103	147	1,574	7%	9%	338	5.6
Feb Week 3	1,627	112	78	1,739	6%	4%	386	6.4
Feb Week 4	1,526	65	57	1,591	4%	4%	287	4.8
Mar Week 1	1,479	101	42	1,580	6%	3%	377	6.3
Mar Week 2	1,488	57	36	1,545	4%	2%	366	6.1
Mar Week 3	1,433	96	51	1,529	6%	3%	302	5.0
Mar Week 4	1,509	112	57	1,621	7%	4%	286	4.8
Apr Week 1	1,478	119	118	1,597	7%	7%	267	4.5
Apr Week 2	1,405	70	84	1,475	5%	6%	278	4.6
Apr Week 3	1,635	81	79	1,716	5%	5%	385	6.4
Apr Week 4	1,663	176	140	1,839	10%	8%	345	5.8
May Week 1	1,689	88	128	1,777	5%	7%	442	7.4
May Week 2	1,780	109	166	1,889	6%	9%	341	5.7
May Week 3	1,571	127	128	1,698	7%	8%	343	5.7
May Week 4	1,603	76	144	1,679	5%	9%	367	6.1
Jun Week 1	1,426	151	149	1,577	10%	9%	435	7.3
Jun Week 2	1,736	194	43	1,930	10%	2%	282	4.7
Jun Week 3	1,720	112	49	1,832	6%	3%	341	5.7
Jun Week 4	1,698	77	48	1,775	4%	3%	377	6.3
Jul Week 1	1,447	108	45	1,555	7%	3%	266	4.4
Jul Week 2	1,732	98	68	1,830	5%	4%	244	4.1
Jul Week 3	1,674	177	133	1,851	10%	7%	126	2.1
Jul Week 4	1,684	88	69	1,772	5%	4%	239	4.0
Aug Week 1	2,039	145	285	2,184	7%	13%	313	5.2
Aug Week 2	2,896	311	89	3,207	10%	3%	366	6.1
Aug Week 3	1,894	185	94	2,079	9%	5%	440	7.3
Aug Week 4	2,049	172	80	2,221	8%	4%	436	7.3
Sept Week 1	1,477	170	39	1,647	10%	2%	253	4.2
Sept Week 2	1,851	138	76	1,989	7%	4%	399	6.7
Sept Week 3	1,762	89	61	1,851	5%	3%	284	4.7
Sept Week 4	1,858	164	94	2,022	8%	5%	326	5.4
Oct Week 1	1,676	191	77	1,867	10%	4%	331	5.5
Oct Week 2	1,839	96	62	1,935	5%	3%	216	3.6
Oct Week 3	1,954	129	37	2,083	6%	2%	270	4.5
Oct Week 4	1,540	46	48	1,586	3%	3%	182	3.0
<b>Total</b>	<b>61,706</b>	<b>4,504</b>	<b>3,417</b>	<b>66,210</b>	<b>n/a</b>	<b>n/a</b>	<b>11,974</b>	<b>n/a</b>
<b>Weekly Avg</b>	<b>1,668</b>	<b>122</b>	<b>92</b>	<b>1,789</b>	<b>7%</b>	<b>5%</b>	<b>324</b>	<b>5.4</b>
<b>Weekly Min</b>	<b>1,025</b>	<b>46</b>	<b>36</b>	<b>1,083</b>	<b>3%</b>	<b>2%</b>	<b>126</b>	<b>2.1</b>
<b>Weekly Max</b>	<b>2,896</b>	<b>311</b>	<b>285</b>	<b>3,207</b>	<b>10%</b>	<b>13%</b>	<b>442</b>	<b>7.4</b>
<b>Avg/Day</b>	<b>278</b>	<b>20</b>	<b>15</b>	<b>298</b>	<b>n/a</b>	<b>n/a</b>	<b>54</b>	<b>n/a</b>

**Exhibit 18-1  
MTA Performance Audit  
Trend in Road Call Rates  
September - December 2000**

Fleet Series	Vehicle Type									Quarter Total	Monthly MDBF
	87 & 88 Chance Trolley	1979 RTS 900's	1991 40 ft Flx's 700's	1997 Neoplans 300's	87-88 40 ft Flx's 500's	99/2000 Bluebirds 9900's	ACCESS RIDE	2000 Neoplans Artic's	99/00 RTS 920's		
<b>Road Calls</b>											
September	10	14	20	14	25	14	25	1	6	129	
October	8	10	18	8	34	5	19	10	3	115	
November	11	10	19	9	31	11	23	7	8	129	
December	<u>8</u>	<u>15</u>	<u>22</u>	<u>17</u>	<u>27</u>	<u>10</u>	<u>12</u>	<u>6</u>	<u>5</u>	<u>122</u>	
Total	37	49	79	48	117	40	79	24	22	495	
<b>Miles</b>											
September	13,340	40,619	49,911	38,646	102,885	33,973	84,651	15,504	70,047	449,576	
October	16,467	31,702	59,745	48,111	120,668	43,099	94,919	28,113	89,966	532,790	
November	16,877	25,875	56,925	40,499	107,242	39,269	81,656	30,947	77,635	476,925	
December	<u>14,452</u>	<u>25,529</u>	<u>56,271</u>	<u>46,295</u>	<u>107,846</u>	<u>35,691</u>	<u>73,969</u>	<u>35,742</u>	<u>77,635</u>	<u>473,430</u>	
Total	61,136	123,725	222,852	173,551	438,641	152,032	335,195	110,306	315,283	1,932,721	
<b>MDBF</b>											
September	1,334	2,901	2,496	2,760	4,115	2,427	3,386	15,504	11,675	3,485	3,485
October	2,058	3,170	3,319	6,014	3,549	8,620	4,996	2,811	29,989	4,633	4,633
November	1,534	2,588	2,996	4,500	3,459	3,570	3,550	4,421	9,704	3,697	3,697
December	<u>1,807</u>	<u>1,702</u>	<u>2,558</u>	<u>2,723</u>	<u>3,994</u>	<u>3,569</u>	<u>6,164</u>	<u>5,957</u>	<u>15,527</u>	<u>3,881</u>	3,881
<b>Quarterly MDBF By Subfleet</b>	1,652	2,525	2,821	3,616	3,749	3,801	4,243	4,596	14,331	3,904	

MDBF: Mean distance between failure

**Exhibit 19-2  
MTA Performance Audit  
Demand Responsive Fleet Profiles  
1995 vs 2000**

<u>Year</u>	<u>Maker</u>	<u>Fleet Size</u>			<u>Period Miles</u>	<u>Average Period Miles</u>	<u>Life Time Miles</u>	<u>Average Lifetime Miles</u>	<u>Service Years</u>	<u>Average Age</u>
		<u>Fleet</u>	<u>Active</u>	<u>Accessible</u>						
<b>1995 Fleet</b>										
1985	Ford	1	1	0	39,000	39,000	222,000	222,000	10	10.0
1986	Ford	6	5	0	192,000	32,000	1,362,000	227,000	54	9.0
1986	Ford	1	1	1	15,000	15,000	191,000	191,000	9	9.0
1987	Ford	2	2	0	64,000	32,000	394,000	197,000	16	8.0
1988	Ford	9	8	0	339,000	37,667	1,728,000	192,000	63	7.0
1988	Ford	1	1	1	32,000	32,000	200,000	200,000	7	7.0
1990	Ford	10	10	10	190,000	19,000	2,120,000	212,000	50	5.0
1990	Ford	2	2	0	42,000	21,000	64,000	32,000	10	5.0
1991	Ford	4	4	4	15,000	3,750	564,000	141,000	16	4.0
1993	Ford	4	4	4	50,000	12,500	392,000	98,000	8	2.0
1994	Ford	1	1	1	18,000	18,000	39,000	39,000	1	1.0
1995 Totals		41	39	21	996,000	24,293	7,276,000	177,463	244	6.0
<b>2000 Fleet</b>										
1991	Ford	4	4	4	69,000	17,250	1,116,000	279,000	40	10.0
1992	Ford	8	8	8	130,000	16,250	2,184,000	273,000	72	9.0
1993	Ford	5	5	5	112,000	22,400	1,300,000	260,000	40	8.0
1995	Ford	6	6	6	199,000	33,167	1,140,000	190,000	36	6.0
1995	Ford	1	1	1	34,000	34,000	148,000	148,000	6	6.0
1996	Ford	1	1	0	29,000	29,000	70,000	70,000	5	5.0
1998	Ford	11	11	11	513,000	46,636	1,606,000	146,000	33	3.0
2000 Totals		36	36	35	1,086,000	30,167	7,564,000	210,111	232	6.4



## **MTA Governance and Organization**

The Metropolitan Transit Authority of Nashville and Davidson County has evolved into its present form over a period of about half a century, during which its mission, structure, and the context in which it operates have all changed dramatically. The MTA has evolved from its original mission as a regulator of public transit and street railways in the City of Nashville to its current role as the principal public transit operator in the Metropolitan area.

The MTA board and staff are currently reviewing the existing vision and mission statements to update them to reflect current and future requirements. The prevailing “Strategic Vision” and the mission statement of the MTA are shown in the following boxes.

### **MTA’s “Strategic Vision”**

1. The goal of the MTA is to balance customer needs with taxpayer resources in a manner fair to all.
2. While improving the public transportation product for our customers, we will aid in designing;
  - Future services which slow the rate of congestion growth or reduce congestion in the travel corridors
  - Future services for neighborhoods in which car travel is becoming less practical; and,
  - Future neighborhoods in which travel without a car is more practical

### **MTA’s Mission Statement**

“To provide safe, reliable, efficient, customer friendly public transit and alternatives to driving alone.”

The current MTA organization and programs are built on a continuous set of incremental changes designed to meet the series of challenges that have faced it over the years, very few of which were likely to have been anticipated by the original framers of the Charter amendment that created the MTA.

The MTA operates under the general powers given to it in the Metropolitan Charter, including the delegated power to “. . . own in the name of the metropolitan government and to operate a public transit

system” (Section 6.a.3 of the Appendix). This one sentence is deep in the overall Appendix of 50 pages, which deal with issues that are no longer relevant to the MTA.

The implicit mission of the MTA has changed as the private transit companies disappeared and the need for a regulatory agency disappeared. MTA has thus evolved from a regulatory body to the primary transit organization for the County operating fixed route transit, paratransit, car and van pools, and related means of increasing vehicle occupancy.

Unlike most transit systems of similar sizes, there is little in the enabling amendment that provides a policy foundation for defining a mission that is applicable to the contemporary requirements of a transit system in a metropolitan area like Davidson County.

The legislation that created the Regional Transportation Authority (RTA), for example, provides a much more specific set of responsibilities relating to transit development. The legislation charges the RTA with developing a mass transit plan for the region that is to include:

- Establishment, location, and relocation of transit routes
- Areas to be served
- Frequency and method of service
- Coordination of existing services
- Setting contributions by governments in the service area toward the costs of transit services
- Contracting to provide transit services
- Determining sources and methods of funding
- Providing services for handicapped riders
- Providing services for special events
- Any other provisions necessary to establish a coordinated, reliable, scheduled, regional service

This is an example of the sort of enabling policy foundation that is needed for the MTA. Currently, MTA has assumed varied responsibilities under the heading of implied powers essential to “owning and operating a public transit system”. These include magnet school, paratransit, special event services, regional planning activities, and more. In many locales these responsibilities would normally be handled by a regional transit system.

The MTA is one of the few urban transit systems of its size that is organized to operate within the boundaries of a single county, rather than a metropolitan area. Others include Milwaukee County, Miami-Dade County, Jacksonville, Florida and many of the counties in California. MTA’s form of governance of transit is more typically found in smaller urban areas. As a result of the structure, Metro has more authority over the MTA than most counties since the Board is appointed by the Mayor and the local funding is provided by one county alone rather than by a regional agency of all of the local

governments in the region. The MTA Board operates as befits an independent agency in its operating and administrative decision-making, while working under the available funding from the Metropolitan Government and from the state.

By contrast, most transit systems in metropolitan areas the size of Nashville and Davidson County operate on a regional basis, and are governed by a regional board and funded through some regional funding mechanism. Funding for these regional operations is sometimes “dedicated” to transit after a regional referendum and controlled by the agency alone, or appropriated by the participating governments and subject to the annual appropriation processes of those governments.

The MTA is now faced with a set of challenges that will define its future for the coming decade or more. MTA needs to exert a new level of professional, technical, and policy leadership in transit development and transit related activities, to operate an efficient and cost-effective transit system, and to provide transit service and facilities at a higher level of quality and convenience.

### **The Near Term Challenges**

The MTA is about to receive the results of two major transit planning studies, provided by outside contractors, which will consist of a short range and a long range transit operating and capital plan. These plans will help provide a blue print for the future of transit in the region. The scopes and schedules for these planning efforts are provided in other sections of this report. These studies are likely to recommend major changes in the bus and paratransit services, facilities, and financial requirements of the system. The MTA may also be faced the possibility of carrying out a proposed commuter rail program. The organization will confront these challenges while also responding to the recommendations of this audit.

The MTA has traditionally run a system with an active objective of cost effectiveness and expense controls. To some extent, this cost consciousness has led to some decisions which may have seemed sensible in the short-term but which created longer term issues. Examples of this include capitalizing maintenance operating expenses, arranging to borrow money to pay current operating expenses, buying new personnel management information applications without the training modules, or buying buses without the financial capacity to pay the local share to operate them. These examples are discussed further in other sections of this report.

Developing a clear and comprehensive service, operating, capital, and management plan, with the participation of the region’s transit stakeholders, will be an important step in moving the MTA to the next level in service quality. A comprehensive planning exercise of this type will help frame a policy and funding discussion with the Metropolitan Government and other regional transit stakeholders. MTA will also need to make cost effective changes in its policies, programs, and management structure that will

increase the confidence of the policy makers that the agency is operating efficiently and effectively. This should provide the foundation for greater support for implementation of the commuter rail services, the recommendations from the two transit studies about to be completed, and this audit.

### **Board Operations**

The manner in which the five-member board operates internally presents a number of procedural and communications problems to its members, and to the management staff of the MTA.

- First, the Board operates through the committee system, but each committee has only one member. Committee meetings are not normally held, and when they do only one or two Board members are present. This limits the ability of the Board and staff to work on issues together prior to consideration by the Board as a whole at its monthly meeting. The role of the committees is very limited, and management often takes matters to the board with little or no prior review by the committee member.
- Second, the lack of substantive committee consideration of staff recommendations forces the staff to take the leadership in presenting and recommending actions to the Board. In an effective committee structure, the committee chair often carries the recommendations of the staff to the board and acts as the floor manager for the recommendations, after the committee members have done their due diligence at the committee meetings
- Third, the lack of functioning committees limits the more informal interaction among Board members, and between the Board and the staff, than can be achieved during Board meetings.
- Fourth, the absence of an effective committee process often means that Board members hear of and speak on issues at the Board meetings for the first time, or that the staff has had to meet with Board members individually at a great cost of time and effort. Members and staff do not use committee meetings as the venue for the more probing questioning of staff, and for more creative interaction with one another in a manner that helps to consider and shape recommendation for action by the Board as a whole.
- Lastly, there is no established means for the Board to regularly communicate with legislative and executive branches of the Metro government, or other transit stakeholders, to ensure policies and programs are consistent with current and future priorities.

**Management Structure** - MTA has chosen over the years to operate its bus services through private transit management firms. McDonald Transit Management has been the incumbent management company for 10 years. The current executive director has been in that position for the entire ten-year period. The average tenure for a transit executive director is two to three years.

McDonald manages a total of 18 urban transit systems, largely in the south and southeast. Its current five-year contract covers the period from August 20, 1998, through August 19, 2003. This five year term is unusual, in that Federal procurement guidelines and the MTA procurement procedures limit contracts to three year terms, with a maximum of five years by adding two one year extensions as an option. The term of the McDonald contract is a straight five years with no options.

The compensation for the services provided range from \$12,350 per month for the first year to \$14,200 a month for the fifth year. These fees cover the services of the Executive Director and a range of optional technical and professional consulting services. Either the MTA or McDonald Transit can determine when such services should be required or provided.

The kinds of services that McDonald is obliged to provide within their management contract include:

- Insurance requirements and negotiations of coverage
- Public awareness and marketing programs
- Internal financial and management audits
- Development of capital and operating budgets
- Labor relations and collective bargaining

While McDonald provides some of these kinds of services as a matter of course, labor relations for example, the MTA has rarely made a request for any additional work under the existing contract.

Other than the executive director, the management and personnel who operate the system are employees of a "captive" private non-profit corporation known as the Davidson Transit Organization (DTO). This includes the senior management team and all other employees of the system. The employees of DTO are private sector employees, and the National Labor Relations Board (NLRB) governs their collective bargaining and employee relations. The use of a management company to manage the transit system is a common practice employed by over 50 U.S. systems. The use of a captive private corporation to employ the operating personnel is less common, and is used in perhaps 6 to 10 systems nationwide.

These captive corporations are used to provide an entity to administer an inherited collective bargaining agreement from a prior private operator, and as a means to preserve the administration of labor relations under the NLRB – usually to preserve options in dispute resolution that are often prohibited by state

public employee laws. Other transit systems that have a similar arrangement are Jacksonville, Florida, and Austin, Texas. By and large, this arrangement is invisible to the casual observer.

The current overall organization structure of the MTA is represented on Exhibit 1-1. As this exhibit shows, the Executive Director, who is also the management company's resident manager, reports to the five-person Board. The resident manager has nine people reporting directly to him. His primary subordinates are the managers of Operations, Equipment Services, and Support Services.

Among the unusual aspects of the MTA and its operating staff organization compared to other urban transit systems in the United States are:

- The lack of a permanent central staff to oversee the contract manager
- The relatively small size of its planning and ridership development staffs
- The reliance on the management firm to take the leadership in areas other than the direct operations of the bus system
- The fact that the MTA has jurisdiction in only one of the several counties in the urban area
- The arrangement under which operating personnel work under the jurisdiction of the National Labor Relation Board, rather than under state public employee rules and regulations.

The internal organization structure also has a number of notable features that are unusual, including:

- Multiple "purchasing" officials (discussed in the procurement review section)
- The large number of managers with different levels of responsibility who report directly to the Executive Director
- The location of planning activities within operations
- The absence of a planning manager with responsibility for longer term service, facility, fleet, financial, and personnel planning
- The absence of a focused marketing staff
- The location of safety and training within operations, rather than in the Executive Director's office
- The assignment to the Capital Programs Manager of the responsibility for the EEO program.
- The Charter provision for a Board Secretary who is not a member of the Board, who is also the attorney to the board and is not a Metro Attorney.
- Notwithstanding the prescribed role of the Secretary described above, the charter also requires Metro Legal to support the MTA should this be requested.

### **Roles and Responsibilities of Board and Staff**

The division of responsibilities between the Board and Staff is largely based on the by-laws, the management company contract, the Metropolitan Charter creating the MTA, ad hoc assignments from the Board to the management, and past practices.

There is a basic clarity to the current assignment of the powers and duties of the Board and Staff. It is questionable, however, how well that division of labor is carried out under the current mode of operations. The Board meets once a month, with very little communication among the board members and between the Board members and staff between meetings. Committee meetings lack substantive debate among board members and between the Board and staff on issues that are before the committee.

Further, virtually all of the communications between the Board and staff take place with the Executive Director. This is good for discipline of communications, but it is poor for the development of mutual trust and respect between the board and staff, and the communication of Board priorities. This situation is also compounded by the committee structure previously discussed.

Among the weaknesses of the current arrangement are:

- A lack of clear common agreement on the programs and priorities of the MTA as a whole
- A similar lack of mutual understanding between the MTA and Metro as to the priorities for the MTA
- Too many issues come before the board unexpectedly and with little advance work
- The lack of a number of management tools that help Board and staff set priorities, monitor performance, and undertake remedies - such as a program budget which spells out the proposed activities of the staff and the resultant performance expected
- Monthly performance reports that are poorly organized, with too much detail, and with insufficient narrative to highlight issues and proposed recommendations.

### **Recommendations**

The MTA, working in partnership with Metro and other stakeholders in the region's transit system, should adopt a vigorous strategy designed to continue advancing the level and quality of the MTA's transit system services, to increase the responsiveness to the policies of the Metropolitan Government, and to advance the various plans and programs now under development to better serve the citizens of Davidson county. This strategy should include changes to the institutional arrangement, Board operations, management structure, external relations of the MTA, and in its internal organizational structure as discussed below:

1.) The Metropolitan Government should substantially revise the Charter Appendix that created the MTA, and to provide a more relevant and modern prescription of the powers and duties of the MTA and relationship to the Metropolitan Government.

The new Appendix should explicitly specify the powers and duties of the MTA as the owner and operator of the transit services and facilities in the County, and should detail its responsibilities in the planning and development of new transit services and facilities in a manner that is similar to the RTA charter.

2.) The revised Appendix should increase the membership of the Board of the MTA from five members to seven, by adding two new voting members. Consideration should also be given to defining the Metropolitan Government's Director of Finance and Planning Director (or their designees) as ex-officio non-voting members.

These changes are designed to achieve several results, including:

- Increase the MTA Board's awareness of the policies of the Metropolitan Government
- Allow the creation of three-person committees of the Board and increase the capacity of the Board to deal with longer term capital, financial, and other strategies of the MTA at the committee level
- Help provide support for the MTA's programs and funding needs.
- Provide for increased participation by the Board in seeking input and support for MTA programs and to gain public understanding for the MTA and its programs

3.) The MTA needs to broaden its central focus from the day-to-day operation of its existing services to include greater participation and leadership in longer-range regional transportation and land use planning issues.

To meet the needs of the Metropolitan Government's citizens MTA must:

- Provide a "first class transit system" for the citizens of Davidson County
- Become a more visible and vocal leader in the development of transit options for the region
- Be an active participant in the region's overall metropolitan land use and transportation planning program
- Improve the services and facilities of transit, and to increase the use of public transit in the region
- Provide transit support in the economic development of the metropolitan area
- Take the lead role in the development and operation of new public transit services and facilities, including the commuter rail program
- Do all of this and more in a cost effective manner.



4.) The MTA should appoint a full time Executive Director to manage the affairs of the MTA, to provide leadership for the MTA staff, to work with the MTA Board and the Metropolitan Government on regional transit and transportation issues, and to oversee the technical and professional staffs and contractor operators of the MTA.

Most transit agencies draw candidates for Executive Director positions from either the ranks of local public agencies familiar with the policies and priorities of the region, or from the ranks of transit professionals of other transit agencies across the United States. Reporting to the board, this position would manage the affairs of the MTA, provide leadership on regional transit and transportation issues, oversee the technical and professional staffs and manage all contract operators.

5.) The new Executive Director should reorganize the internal staff in a manner that makes the best use of the current personnel, strengthens the technical and professional skills by providing new leadership in Finance, Planning, and Marketing, adds a team to direct the commuter rail program (if required), and reduces the number of people who report directly to the Director.

The coming generation of activities will require the continued attention to the efficient operation of the existing system of the maintenance and transportation management team. It will also require a new set of managers to increase marketing and planning activities, deal with recommendations of the two ongoing transit planning studies, and potentially take on the management of the commuter rail program.

A preliminary design of the recommended organization structure is illustrated on Exhibit I-2.

The bus transportation and maintenance activities of the bus operation structure should be left intact, with the exception of the changes noted later in this report. The Director of Planning and Marketing should consolidate the current marketing and planning resources of the MTA, and create a unified program that focuses on a full range of activities designed to increase ridership, improve the standing of transit in the community as a whole, and provide analysis and reporting to facilitate sound management and board decision making. Planning and Marketing functions can be consolidated, or maintained as two units with close working relationships.

These units should include:

- A marketing manager (director) and staff under the leadership of a transit marketing expert, and supported by the current sales executive, rideshare staff, and the customer service staff.
- A planning staff under the leadership of a transit planning expert and supported by the current planning and scheduling staff and the Capital Program Manager. This planning section unit

should be responsible for short and long range planning, should actively participate in the technical committees of the Metropolitan Planning Organization (and Planning Commission), and should lead planning outreach and community relations programs for the MTA.

The finance and administrative activities of the MTA should be restructured under a Director of Finance and Administration, with responsibility for this diverse set of functions that are now dispersed across the organization. The MTA needs to develop more aggressive analytical and managerial programs that include financial analysis, cost analysis, program budgeting, budget analysis, and evaluation of cost trends and trends in operating and financial performance.

6.) Should the commuter rail program move forward, the MTA should recruit a commuter rail director and a team of contractors to develop and manage the implementation and eventual operation of the rail program.

The nature and extent of the contract team should change as the implementation moves through planning, engineering, construction, operations planning and preparation, and eventual operations. Currently the MTA Director needs a manager assigned to handle planning, organization and construction details for the proposed system. Once operational, the system can be managed in a method analogous to the current bus system management team, with a private contractor providing the management and operating personnel.

The team should consist of a manager (director) of commuter rail, and contractors qualified to provide the skills necessary to the implementation of the commuter rail plan. The commuter rail system can be managed in much the same way that the bus system is, with contract operating management, and with technical specialists managing each function starting with engineering and design, through operations and maintenance.

7.) Management tools and reporting should be developed to help the staff and Board set priorities and monitor performance.

As discussed elsewhere in detail within this report, management and board reporting needs to be enhanced. Reporting should concisely describe priorities, activities and performance expectations for staff while also providing regular reporting feedback of actual performance against these expectations. Monthly board reporting should also summarize performance against key strategic metrics. Improvements to the financial presentations are described in detail in the *Budgeting, Accounting, Internal Controls* section.

### **Cost Estimate**

The recommended changes in the staff of the MTA will increase expenses of the agency. There are four, and possibly five, new senior positions to be filled. Many of these positions will be more clearly detailed in subsequent sections of this report. The estimated costs of these additions could range from \$400,000 to \$500,000 a year for wages and fringes in the first year. Details of these positions are as follows:

Executive Director-	Approximate Salary \$100,000 plus \$25,000 benefits(1) = \$125,000 total comp
Marketing Director-	Approximate Salary (2) \$60,000 plus \$15,000 benefits = \$75,000 total comp
Planning Director-	Approximate Salary \$60,000 plus \$15,000 benefits = \$75,000 total comp
Finance Director-	Approximate Salary \$75,000 plus \$18,750 benefits = \$93,750 total comp

Additionally, should a commuter rail program be implemented a separate rail management position would be created with the following approximate cost:

Rail Manager (Dir.)-	Approximate Salary (3) \$65,000 plus \$16,250 benefits = \$81,250 total comp
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Notes:

- (1) all benefits calculated at 25% of base salary
- (2) The Marketing position may also include a component of incentive compensation depending on the job scope.
- (3) There is little data available for rail managers (directors)

## **Peer Group Assessment**

The use of peer group assessments helps to gauge the relative performance of a transit system in comparison with the tendencies a set of “peer” systems whose operating and financial results might be expected to approximate those of the subject system.

Every transit system is made up of a variety of modes, service area density, fleet characteristics, labor agreements and work rules, management and organization structures, markets, transit histories, funding, working environments, management styles, and financial policies. No system has a directly comparable “peer”.

The primary subject of the assessment consists of a review of a peer group of twelve systems whose general characteristics are “similar” to those of Nashville’s MTA. This assessment includes a system-wide comparison of these agencies to the MTA, as well as a comparative assessment of the performance of the fixed route bus elements of the systems. These systems are identified on Table 2-1 as the “Detailed Peers”.

The selection of a valid peer group that can be used as a guide for decisions is more art than science. A study of national transit data by a team of MIT analysts has postulated that it is statistically valid to use any selection of systems, as long as the group consists of at least 12 systems. This may be correct, but it ignores the likelihood that such a randomly selected set of systems is not likely to be understood or accepted by local decision makers as a valid basis for discussion.

Our approach in selecting a peer group is to start with the 12 systems that are closest to the population of the service area of the subject system. We then tailor the group by eliminating systems that are not intuitively similar to the subject system, and then add systems that have an affinity to the subject system – such as being in the same state – even though they may be in a smaller or larger population range. Systems that fall within the original population group might be excluded for such reasons as operating different modes, or operating in a region with economic, demographic, or topographical differences that are too great to be acceptable. Systems might be added for a number of reasons, even though they may not be close to the population of the subject system. This was the case in adding Knoxville and Chattanooga to the detailed peer group.

The other two peer groups illustrate the order of magnitude differences between Nashville's transit system and the transit systems operating in two larger sets of regions. The first of these is a set of systems operating in substantially larger regions. This group is included in this assessment to illustrate the level of investments in transit that are made in regions which are sometimes cited as examples of major commitments to transit system development. During the course of this audit, several interviewees asked questions about systems in this group, and they are included here in part as a way of answering those questions. The systems in this group are identified as "Large Systems" on Table 2-1.

**Table 2-1**  
**MTA Performance Audit**  
**Urban Areas in the Three Sets of Peer Groups**

<b>Region</b>	<b>"Large Systems"</b>	<b>"Policy"</b>	<b>"Detailed"</b>
Austin		x	
Baltimore	x		
Birmingham			x
Charlotte		x	x
Chattanooga		x	x
Cleveland	x		
Columbus		x	
Dallas	x		
Daytona			x
Denver	x		
Greenville		x	
Houston	x		
Indianapolis		x	x
Jacksonville		x	
Knoxville		x	x
Lexington			x
Louisville		x	
Memphis			x
Milwaukee	x		
Minneapolis – St. Paul	x		
Mobile			x
Oakland	x		
Orlando		x	
Pittsburgh	x		
Portland	x		
Raleigh		x	x
Richmond			x
Seattle	x		
St. Louis	x		
West Palm Beach			x

The second of these other two peer groups compares the MTA with the transit systems urban areas that are often used by Nashville business and civic leaders to compare Nashville's economic and other characteristics to those of other urban areas. The lists of the cities that are used in these assessments are identified on Table 2-1 as the "policy group".

All of the data used in these comparisons are from the National Transit Database, a set of data compiled by the Federal Transit Administration from reports filed by the individual transit systems. The large peer

group data are from FY1998. The rest of the data are from the FY1999 reports. The accuracy of these data submissions are certified by the agencies' external auditors and the General Manager or Chief Financial Officer, and then are checked by an FTA contractor after submission. While this is not a perfect data set, it is the best and most consistent data available on this scale on the national level.

**Key Performance Measure Results:  
Comparison of MTA to the Three Groups**

The data on Table 2-2 illustrate comparisons between all three peer groups and the MTA using a selection of operating and financial performance indicators commonly used in transit system assessments. This table shows the results of the average for each of the three groups, the results for the MTA, and the percentage difference between the MTA and the averages of the groups. Collectively, the results for these measures represent a selection of "vital signs" of the fiscal and operating health of the systems.

The first two columns show the relative levels of service provided by the systems on the groups, as measured by revenue miles per square mile, and revenue miles of service per capita per year. In these two measures, the tendency is for the levels of service to decline with the size of the region's population. MTA has a relatively large service area and small service density as measured by revenue miles per square mile.

**Table 2-2  
MTA Performance Audit  
Comparison of Selected Financial and Operating Results**

<b>Groups</b>	<b>Revenue Miles/SqMile</b>	<b>Revenue Miles/Capita</b>	<b>Rides/Mile</b>	<b>OpExp/Rev Mile</b>	<b>OpExp/Capita</b>	<b>Annual Rides Capita</b>	<b>Local Sub/Capita</b>	<b>Total Sub/Capita</b>	<b>Total Subsidies (Millions)</b>
Large Systems	46,473	15.7	3.0	\$6.31	\$92.00	65.1	NA	\$153.00	\$231.40
Policy Systems	23,761	13.7	1.4	4.41	79.02	20.9	\$21.61	64.09	62.50
Peer Systems	18,952	10.0	1.5	3.43	34.45	13.6	16.90	37.80	17.70
MTA	11,259	9.5	1.5	3.67	34.89	12.2	15.24	42.06	24.00
MTA/Large Group	24.2%	60.5%	50.0%	58.2%	37.9%	18.7%	na	27.5%	10.4%
MTA/Policy Group	47.4%	69.3%	107.1%	83.2%	44.1%	58.4%	70.5%	65.6%	38.4%
MTA/Peers	59.4%	95.0%	100.0%	107.0%	101.3%	89.7%	90.2%	111.3%	135.6%

(1) The operating expenses of the MTA include "normalized" maintenance expenses rather than the actual. During 1999 MTA was attempting to "catch up" on several years of deferred maintenance. We attempted to adjust for this by using an approximate 5 year average maintenance charge as part of total operating expenses. Also see Bus Maintenance below and the separate report section on *Maintenance*.

On the other hand, while the MTA results for riders per mile was 50% of the average of the large group, they carry 7% more riders per mile than the policy group and are right at the average of the detailed peer

group. This suggests that the MTA routes and schedules are well designed. The residents of the MTA service area use the system an average of 12 times a year, compared to 65 times for the large peer group systems, 21 for the policy peer group, and 14 for the peer system.

The operating costs results for the systems are summarized in the columns headed "OperExp/RevMile" and "OperExp/Capita". As the data in these columns suggest, the level of costs per mile and per capita get smaller with the size of the cities in the group. The MTA's results for cost per mile are well below the average of the two groups with the larger cities, right at the average of the detailed peer systems for cost per capita and 7% higher than the peer systems average for cost per revenue mile.

The miles of service per capita was 95% of the detailed peer group while the operating expense per capita was virtually the same as the detailed peer average and the number of rides per year per resident of the region was 10% below that average.

To be complete, some of the cost comparisons must also factor wage scales and service area. Service area can impact costs by increasing or decreasing the "dead head" costs associated with getting buses to and from their assigned routes. For most systems, larger service areas mean increased "dead head" time. MTA has a total service area that is 28% larger than the average of the detail peers. Over this area, MTA operates 5.5 million total revenue miles versus an average of 4.8 million miles for the detail peer group. "Dead head" time is approximately 2% higher for the MTA than the average of the peers. Wages for the MTA are also slightly higher than the average of the detail peers. Top driver wages are approximately 5.5% higher for the MTA than the average of the peers. The peer average is lowered somewhat by the inclusion of smaller market systems of Chattanooga, Knoxville, Lexington and Mobile. When MTA is compared to the larger markets of the detail peers wages are comparable. Combining "dead head" time plus wage differentials probably adds close to \$1 million of incremental cost to the MTA service in comparison to the detail peer group. This would, in turn, explain approximately 5% of the 7% difference in operating costs per revenue mile for MTA versus the peer average.

The levels of subsidy for capital and operating expenses for the groups are shown on the two right hand columns of Table 2-2. The level of subsidy per year for the three groups ranges from an average of \$231 million a year for the large systems to \$17.7 million a year for the average of the peer group, with the MTA at \$24 million in 1999. On a per capita basis, the MTA is lower than the average of the two larger groups, but is 11% higher than the peer group. The funding from local sources for the MTA was 70% of the policy group average and 90% of the detailed peer group.

A different perspective on the public funding for the three groups is shown on Table 2-3. These data show the percentage of the public subsidies by source: Federal funding, appropriated state and local

funding, and “dedicated” funding from the state and local sources. “Dedicated” funding is funding that is generally approved by referenda, and is not subject to the budget or appropriation process of a state or local government. Often, these come from local option sales taxes that are “dedicated” to specified transit purposes. Once the referenda are passed, the funds often are collected by the agency that collects other sales taxes, and are then passed directly to the transit agency for their use.

The nature and extent of state and local funding is a function of state laws relating to transit funding. In cases where there is a “dedicated” source, it usually flows from enabling legislation that allows localities to enact the tax, often from a list of “local option” sales taxes.

**Table 2-3**  
**MTA Performance Audit**  
**Peer Systems Funding By Source**  
**FY1999**

	<b>Total Public Funds (Mil)</b>	<b>Percent Federal</b>	<b>Percent State and Local</b>	<b>Percent (1) “Dedicated”</b>	<b>Total Public Funds/Capita Per Year</b>
<b><u>Large Systems Group</u></b>					
Maximum	\$415.40	49.0%	78.0%	85.0%	\$366.11
Minimum	\$79.10	11.0%	0.0%	0.0%	\$38.90
Average	\$231.40	24.4%	38.1%	37.4%	\$153.30
Nashville	\$24.11	50.1%	49.9%	0.0%	\$42.06
Nashville /Average	10.42%	205.33%	130.97%	0.00%	27.44%
<b><u>Policy Systems Group</u></b>					
Maximum	\$422.70	64.00%	69.00%	73.80%	\$195.91
Minimum	\$1.40	10.00%	7.30%	0.00%	\$5.58
Average	\$62.50	39.10%	48.00%	12.90%	\$64.09
Nashville	\$24.11	50.10%	49.90%	0.00%	\$42.06
Nashville/Average	38.56%	128.13%	103.96%	0.00%	65.60%
<b><u>Detailed Peer Systems</u></b>					
Maximum	\$38.50	52.39%	69.00%	40.00%	\$55.85
Minimum	\$4.86	31.00%	0.00%	0.00%	\$5.20
Average	\$17.70	41.15%	49.00%	3.40%	\$37.80
Nashville	\$24.11	50.10%	49.90%	0.00%	\$42.06
Nashville/Average	135.6%	121.69%	101.84%	0.00%	111.3%

(1) Dedicated funds are not additive, and are included in the state and local figures.

As these figures show, the range of public funds available to these systems ranges from a low of \$1.4 million a year to over \$400 million, with Nashville well below the average of the two larger groups but nearly 36% larger in total than the detailed peer systems. Nashville has been more successful than the average of each group in getting Federal funding (not even counting the commuter rail funding), and has gained slightly higher than average in state funding, while lower than all group averages in local funding (see table 2-2 for local funding comparisons).



Measured in total public funding per capita per year, the MTA received about 27.5% of the large systems peers, 66% of the policy peer systems, and about 11% more subsidy per capita than the detailed peers.

### **The Detailed Peer Group**

The central focus of the peer group assessment was the comparison of the MTA to those systems that are listed on the right hand column of Table 2-1, headed "detail" systems. In forming peer groups for more detailed assessments, we start with systems that have service areas which are in scale with that of the subject organization, and that have some natural and intuitive similarity to each other. We usually start with population as the primary basis for selection of peer group members, to demonstrate the kind of transit systems that cities of a given size tend to provide.

We also try to select systems that operate in environments that are reasonably comparable, considering such factors as climate, topography, cost of living, labor costs, and other external factors that may influence the performance but that are beyond the control of the management and policy-makers. We eliminated several systems that may have seemed like obvious candidates because we were aware of unique operating characteristics within their systems.

No peer group ever perfectly reflects the character of the subject system. In carrying out the peer comparison, we are looking for tendencies that might suggest areas in need of further examination, or that may identify areas of strength and good performance relative to the peers. It is a diagnostic process that is intended to identify symptoms, not solutions.

In undertaking a peer assessment, the expectation is that the subject property will produce results that approximate the average of the peers, and its performance will rank in the middle of the group. Any result that is within 5% of the average and ranks from 5<sup>th</sup> to 9<sup>th</sup> is considered at expected values for the systems.

We have divided the discussion of the detailed peer group into two major sections:

- An evaluation of the performance of the systems as a whole
- An evaluation of the directly operated bus services of the systems

For each performance measure, we present:

- The average value for the twelve peer systems for FY1999, the last year for which NTD data are available
- The value for Nashville in FY 1999
- The percentage of the peer average compared to the MTA results

- The ranking of Nashville among the 13 systems (including Nashville)
- The trends of the MTA over the years 1995-1999.

### **System Wide Comparisons**

A summary of the result of the comparison of the MTA and the peer systems in system wide measures is shown on Table 2-4. The numbers behind this assessment include all operating costs, services, and operating revenues for all modes operated by the systems. The effort here is to show the overall effectiveness and efficiency of the system as a whole, including all modes of operation.

**Table 2-4  
MTA Performance Audit  
Comparison of Results**

<b>System Wide Performance Measure</b>	<b>MTA 1999</b>	<b>Peer Average</b>	<b>MTA/Peer Average</b>	<b>MTA Rank</b>	<b>MTA 1995-99</b>
Average fare	\$0.89	\$0.67	132.8%	2	9.7%
Total revenue per passenger	\$1.02	\$0.79	128.7%	3	10.9%
Fares as % of costs *	32.0%	24.3%	131.7%	3	-5.0%
Passengers per revenue hour	21	20.6	101.9%	7	-8.0%
Revenue hour/work hour	0.53	0.60	89.0%	8	9.7%
Riders per work hour	11.25	11.96	94.1%	7	0.9%
Annual rides per capita	12.2	13.6	89.7%	8	4.3%
Miles of service / square mile	11,259	18,952	59.4%	11	7.0%
Passengers per mile	1.5	1.5	101.0%	6	-1.4%
Expense/per passenger mile Bus Only *	.63	.61	103.0%	5	34.0%

\* Maintenance costs have been normalized in these statistics. Cost data includes costs for all services and functions. These costs vary from system to system depending on the mix of services offered.

As these data show, the MTA's average fare at \$0.89 was the second highest among the peers, and was 33% higher than the peer systems average. It increased by 9.7% from 1995 through 1999. The average total operating revenue per passenger was similarly higher than the peer results. It ranked 3<sup>rd</sup> highest among the peer systems, and was 29% above average. Over the five-year period, it increased by 11%. It should be noted that passenger fare revenues for FY2000 recently concluded were up only fractionally despite a fare increase in August 1999. This suggests the possibility that MTA may be pushing the upper limit on average fares for the local transit market.

In two other critical performance measures, fares produced 32% more revenue as a percentage of costs than the peers average, and ranked fifth among the 13 systems. Over the five years, however, this ratio had declined slightly. This is due to the increased maintenance expenses that have not been normalized in this statistic. In the second measure, the number of passengers carried per revenue hour of service was 2% better than average, and ranked 7<sup>th</sup> among the 13 systems. In other words, it was right at par for

this measure. The decline of 8% over the five-year period is better than might be expected given the fare increases during this period.

Results for other measures and their trends are discussed below:

- Revenue hours per work hour was 89% of average, but improved by 9.7% over the period – in spite of the increase in maintenance work hours. The MTA ranked 8<sup>th</sup> among the peers in 1999.
- Rides per work hour was at 94% of the peers average, and ranked 7<sup>th</sup> among the 13 systems. The result for this measure was virtually the same in 1995 as it was in 1999.
- The residents of the service area rode the MTA an average of 12.2 times a year, compared to 13.6 times for the peer group. The MTA result was 10% below average, and ranked 8<sup>th</sup> among the peers.
- The levels of service provided by the MTA, measured in miles of service per square mile, was 59% of the average of the peer systems, and ranked 11<sup>th</sup> among the 13 systems. The results for this measure increased by approximately 7% over the five years.
- Expenses for the bus service on a per passenger mile basis are in line with the peers, but have increased substantially over the 5 year period.

### **Bus Maintenance**

The MTA maintains a fleet of transit vehicles that is relatively varied for a system of this size. Among the varieties are electric powered “trolleys”, regular trolleys, 60-foot articulated buses, traditional 40-foot transit coaches, and 35-foot coaches. This departs from the traditional transit fleet of all 35 foot or 40-foot buses with the same basic components and drive trains. This fleet mix adds to the complexity of the maintenance activities, the parts requirements, and training.

The MTA has been engaged in the past two years in a major effort to catch up on a significant amount of deferred maintenance on the bus fleet. To achieve this recovery program, they have hired additional maintenance staff and have expended large volumes of materials and supplies. To illustrate the magnitude of this program, the cost of materials and supplies for vehicle maintenance was \$859,925 in 1995, but had tripled in 1999 to \$2,859,819.

The maintenance department has achieved a high level of productivity during this effort, and has the third lowest number of work hours per bus among the peer systems, and is about 20% more efficient than the peers average. The MTA has improved about 2% in this category over the five-year period.

**Table 2-6  
MTA Performance Audit  
Bus Maintenance Measures**

<b>Bus Maintenance Performance Measure</b>	<b>MTA 1999</b>	<b>Peer Average</b>	<b>MTA/Peer Average</b>	<b>MTA Rank</b>	<b>MTA 1995-99</b>
Work hours per bus	655	827	79.2%	3	2.1%
Work hours per 1,000 miles	20.57	23.28	88.4%	3	7.0%
Annual miles per bus	31,848	37,209	85.6%	9	-2.5%
Average fleet age	10.4	8.6	120.9%	7	20.0%
Maintenance cost per bus	45,108	25,720	175.4%	1	NM
With normal maintenance-Approx	27,000				
Materials cost per bus	19,760	7,818	252.8%	1	NM
With normal maintenance-Approx	8,000				
Maintenance cost per mile	1.42	0.71	200.0%	1	NM
With normal maintenance-Approx	.85				
Maintenance cost as a % of total	31.7%	20.1%	157.7%	1	NM
With normal maintenance-Approx	19%				

NM = not meaningful

The number of work hours required to support 1,000 miles of operation is about 12% below the average of the peers systems, and the MTA ranked 3<sup>rd</sup> in the group in this measure.

The individual vehicles in the bus fleet operated about 15% fewer miles per year than the average of the peers, and ranked 9<sup>th</sup> among the 13 systems. The figure declined by about 2.5% over the period. At the same time, the average age of the fleet increased by 20%, and ranked seventh in the peer systems.

The cost of bus maintenance at the MTA in 1999 was the highest of the peers in all measures, reflecting the on-going catch-up program. The total cost per bus and per mile, and the cost of materials per bus and per mile, were all significantly higher than the average of the peers, than the 1995 results for the MTA. Much of the increase in costs, and in the difference between the MTA and the peer average, was in the cost of materials and supplies connected with the major maintenance recovery effort.

**General Management and Administration**

The MTA's overall managerial, administrative, and clerical expenses are consistently and significantly below the average of the peer systems, and rank in the top levels among the peers. While the costs of compensation have increased with the overall increases in costs of the system, the percentage of total costs represented by administration and the administrative costs per mile have both decreased significantly over the five years.

**Table 4-7  
MTA Performance Audit  
Administrative Expenses**

<b><u>Administrative Performance Measure</u></b>	<b><u>MTA 1999</u></b>	<b><u>Peer Average</u></b>	<b><u>MTA/Peer Average</u></b>	<b><u>MTA Rank</u></b>	<b><u>MTA 1995-99</u></b>
Compensation costs/work hour	18.71	20.03	93.4%	5	29.1%
Admin costs as % total costs	11.7%	19.5%	60.0%	2	(58.0%)
Admin costs per mile	\$0.52	\$0.69	.4%	3	(.9%)

These results suggest a general level of costs for general and administrative expenses that is markedly lower than the peer systems average, and among the lowest of the systems. This reflects in part the fact that MTA's administrative resources are minimal and well less than might be expected at a system of this size. As the functional reviews reflect, the MTA operates with a smaller administrative staff, less than adequate information systems software and technology, and minimal planning and marketing programs.

**Conclusions**

A number of conclusions and observations may be drawn from the peer review statistics:

Funding- From a local funding perspective only, MTA is funded at approximately \$15 per capita versus nearly \$17 per capita for the detail peers. When all sources of funds are examined, MTA's receives \$42 per capita versus \$38 per capita for peers. When compared to the larger peer groups, however, the per capita funding is dramatically lower, \$42 per capita versus \$64 per capita for policy group versus \$153 per capita for the large system group.

Fares- Average fares at MTA are higher than the detail peer average and represent a higher percentage of overall operating costs than the average for the peers. They also, for now, appear to be about as high as the market will tolerate. Therefore, increased pricing for the average fare does not represent any significant revenue opportunity.

Operating Costs- With maintenance costs normalized (as discussed above), Operating Cost per Capita for MTA is right at the detail peer average of approximately \$35. Expenses per revenue mile are \$3.67 versus \$3.43 per rev mile for detail peers versus \$4.41 for the policy group. This slightly higher cost per mile is caused by 5% higher labor rates than the peer average and 2% higher "Dead Head" miles due to larger service area. The peer average labor rate is lowered somewhat by inclusion of several smaller market systems. MTA's wages are on target with the larger market peers in the detail peer group.

Ridership- MTA is close to the detail peer average in terms of riders per work hour and annual rides per capita and exactly matches the average in passengers per mile.

Other- In most other key metrics of performance and efficiency examined as part of this review, MTA did not deviate significantly from the detail peer systems. One exception to this was the low administrative cost. This subject is further discussed in the *Governance* section of this report.

**Recommendations/Cost Estimates**

Making recommendations as a result of a peer analysis is difficult since many operating results are outcomes directly attributable to public policy decisions. Overall, MTA operates in a manner that is consistent with average performance of the detailed peer group used for comparison. While some of the recommendations of this audit may result in modest improvements within the context of this detail peer group, it should be clear that moving the yardstick significantly in terms of expanded service area, increased ridership, etc. will mean an increased financial commitment to the public transit.

## **The Effectiveness of Planning Structures**

Transportation and transit planning in the region are carried out by a consortium of local and regional agencies, principal among which are the Metro Planning Commission, the Regional Transportation Authority (RTA), the Tennessee Department of Transportation (TDOT), the Metropolitan Planning Organization, and the MTA. These agencies, along with local governments in the region, all participate in the regional transportation and land use process created under the guidelines of the Federal government. The roles of these agencies with respect to the current plans reflect the constituency to which each agency is responsible.

- The MTA is responsible for a short-range transit plan that focuses on the details of transit operations in Davidson county
- The RTA has lead technical responsibility for a multi-county commuter rail plan
- The Metro Planning Commission, which also serves as the staff to the metropolitan planning organization (MPO) that allocates Federal transportation funds, is the lead agency for the transit development plan. The Planning Commission offers a tie to land use planning for the county and the metropolitan area, while the RTA and MTA deal with transportation issues only.
- The Tennessee Department of Transportation has historically focused almost exclusively on surface road planning and construction.

Our assessment of the effectiveness of this planning structure considered several factors:

- Staff capabilities to support a continuous planning process;
- The integration of planning activities among the responsible entities, particularly the ability of the planning structure to define a consistent and meaningful context for transit investment
- Representation of MTA interests in a broader discussion of transportation programs.

### **MTA Staff Capabilities To Support A Continuous Planning Process**

It is important to maintain a continuous planning process because transit and transportation programs typically take several years to bring to fruition, and the policy and financial landscape in which they operate is constantly changing. Monitoring of these changing conditions, and subsequent refinements to a plan, are as important as the original plan itself. Whether the plan is prepared in-house or by contract, the process of monitoring and refinement requires a staff that is qualified to perform the work and has sufficient depth to make the effort worthwhile.

Our analysis of transit planning staff capabilities focused on the MTA. For all practical purposes, the MTA has very little in-house planning capability, and no one dedicated uniquely to transit and transportation planning. While the MTA does have a position titled “Director of Scheduling and Service Planning”, this

job is focused on day-to-day bus service issues; adjusting schedules, preparing for service changes, special event planning (e.g., Titan service), and preparing monthly Board reports on service. Until very recently this position was also responsible for maintaining personal computers at MTA. Not surprisingly, this Director's participation in regional transit planning has been limited. With little or no internal staff devoted to broader planning issues, MTA's representation in regional planning issues has been largely limited to the participation by the Executive Director.

The Metro Planning Commission does county planning and is the staff of the Metropolitan Planning Organization. The Commission appears to be well staffed with qualified planners that serve as staff to both the county planning activities as well as the Metropolitan Planning Organization. Membership of the MPO is comprised of Davidson, Rutherford, Sumner, Williamson, and Wilson counties. The MPO approves the regional transportation improvement plan and allocates regional Federal transportation funds.

The RTA has a transportation planning mandate for a nine county area that includes Davidson County. The staff of the RTA consists of one person. Considering the broad geographic reach of this agency, this limits the agency's focus to special projects that fall outside the bounds of the Metro Planning Commission or the MPO. These RTA projects have included the commuter rail plan, vanpools, and sponsorship of long-distance commuter express bus services.

#### **Integration of Planning Activities**

Transit, transportation, land use and financial planning activities are most effective when they are integrated — that is, when planning for related issues is done in concert by the agencies that are responsible for implementation of those plans. Because plans usually are predecessors to the investment of public funds, integrated planning activities help to ensure that public services are planned to assure efficient use of resources and the achievement of common objectives by projects that have an impact on one another.

Although planning activities can be integrated in a variety of ways depending on prevailing circumstances, the most common approach when two or more agencies are involved is to separate the activities longitudinally. In this manner, one agency taking the long-term view, and one or more agencies that may be functionally distinct (e.g., transit and highways) focusing on short-term or implementation planning. This nested approach to planning provides a broad context for public investment in which the contribution of each element to achieving long-term regional land use and transportation goals can be better understood.

As recently as a year ago, this type of context did not exist for transit planning in Davidson County. Transit plans, historically, were developed infrequently, were usually project-specific (e.g., light rail,



commuter rail), and appeared to focus on solutions in absence of a clear definition of the problem. The 1991 Transit Development Plan did initiate a number of studies and projects but was complicated by other municipal initiatives and funding issues. The current organization of planning activities in Davidson County is rather new, but holds promise for a more integrated approach to transit planning and development.

The Transit Development Plan (TDP) being managed by the Metro Planning Commission should result in a long-term view of transit investment priorities that are tied to the County's development plans. Ideally, this longer-term view should provide direction for both transit service plans and funding that reflect the Metro government's and the region's development objectives. This should allow the Metro government and the MTA to have a mutually understood view of the financial requirements and expected contributions of transit. The TDP will also link to the metropolitan transportation plan, which is adopted by the Metropolitan Planning Organization as a precondition for the receipt of Federal transportation funds.

The short-range transit plan (SRTP, discussed in detail in the next section) is appropriately assigned to the MTA. A SRTP usually focuses on incremental adjustments that conform the transit system to the prevailing metropolitan transportation plan. The current SRTP has a slightly broader focus, including the definition and evaluation of alternative route structures and services, which is appropriate since the TDP effort is just now getting underway. Future SRTP updates should be "nested" within the policy and funding espoused in the TDP.

Within Davidson County, then, the current allocation of long-term planning to the Metropolitan Planning Commission, and short-term planning to the MTA, is a logical means of integrating and coordinating the interests of Metro and the MTA – assuming an adequate complement of planners and clear and consistent policy direction.

The integration of planning activities between the MTA and RTA occur on an as-needed basis, for specific projects. These include the commuter rail plan, extension of MTA express bus routes, and the vanpool program. This less formal, ad hoc integration of activities is not problematic, provided it does not conflict with policies, funding, and performance expectations that are established between MTA and the Metro government.

### **Representation of MTA Interests**

The most important planning contacts for the MTA are the Metro Council, Mayor, the Metro Planning Commission, the Regional Transportation Authority, the Metropolitan Planning Organization (MPO), and Tennessee DOT. Collectively, these entities provide the vast majority of external funds on which the MTA depends.

Currently, MTA is represented by the Executive Director at the staff level on the MPO and in planning work being performed by the Metro Planning Commission. The MTA Executive Director participates in the oversight of the Transit Development Plan, and, along with the MTA Director of Capital Projects, sits on the Technical Coordinating Committee of the MPO. In our opinion, the effectiveness of the Executive Director's participation would be enhanced if MTA had technically qualified planners to carry more of the workload, and leave the Executive Director to participation in the higher level planning and policy issues.

There is no direct linkage between the MTA Board and either the Planning Commission or the MPO. Thus, MTA's input on regional planning issues is limited to that provided by the Executive Director. A representative of the Mayor's office represents the Metropolitan Government on the MPO Board.

### **Conclusions**

- Transportation and land-use planning at the Metropolitan level is structured in a traditional pattern in which the region's local governments and transportation agencies participated in a joint program designed to conduct transit and transportation planning in the context of larger regional issues.
- The MTA does not have an adequate planning staff to participate effectively in regional transit, transportation, and land use planning.
- The current short-term and long-term transit plans are not integrated with other planning activities in a way that will assure compatible and practical proposals, but an overall regional planning and policy structure is in place to allow this integration.
- The integration of long term plans, prepared by the Planning Commission, and short-term plans, prepared by the MTA, should result in a more fully informed understanding on the part of the Metro government of MTA's funding needs and service priorities.
- The MTA has actively participated in regional planning efforts, but its effectiveness is limited by the absence of a planning and analysis staff within the agency, and by the other demands on the time of the Executive Director.
- Representation of MTA interests could be improved by changes to its Board structure that link membership to one or more of the policy bodies that allocate funds to the MTA, as well as an expanded internal planning staff.
- The fact that the MPO staff and the MTA are both "county" agencies provides a locus for the coordination of transit, transportation, and land use planning for the county, as well as providing an additional link between the MTA and longer range regional issues.

### **Recommendations**

- Responsibility for long-range regional transportation and transit planning should be concentrated in the Metropolitan Planning Commission (long-range planning of 5+ years), with involvement by the RTA in projects that occur outside of the County.
- Analysis of current services and the development of short-term transit plans should be the responsibility of the MTA and coordinated with the Planning Commission.
- The planning resources of the MTA should be expanded to support an internal management planning program, increased short range service planning and analysis, and maintenance of a proper transit planning activity.
- The MTA's short term service and capital plan should be part of an overall business plan that includes staffing and personnel plans, financial capacity analysis and planning and labor planning.
- Long-range transit plans should develop transit investment proposals in the context of economic and community development and multimodal transportation objectives of the metropolitan area.
- Short-range transit plans should focus on implementation of long-range transit strategies, and provide a basis for the capital improvement plan and the annual budget.
- Recommendations regarding the structure of the MTA Board discussed in the *Governance* section of this report will provide needed structural linkages between the MTA and other policy bodies.

### **Cost Implications**

The major cost implication of this set of recommendations is the enlargement of the planning staff. The cost of a new planning director has been included in the cost implications of the reorganization included in the *Governance* chapter. We estimate that the cost of providing one or two additional planners as follow:

Salary \$40,000 plus benefits at \$10,000 (25%) = \$50,000 per planner annually.

### **Service Planning, Scheduling, and Cost Analysis**

The Scheduling and Service Planning (SSP) Department is headed by the Director of Scheduling and Service Planning who reports to the Director of Operations. The Director of SSP also acts as the Director of Operations when the Director is absent. The SSP Department has two full-time employees — the SSP Director and the Assistant Service Planner. In addition, there are three data collection checkers who are part-time employees and work under the supervision of the Assistant Service Planner. This staff is the right size for a scheduling function, but not for the workload represented by the planned service changes, representing the MTA in regional planning projects and system development planning (discussed below).

Service planning within SSP is oriented toward short-range decisions largely related to existing routes within the current MTA service area. This focus appears to be driven both by limited funds for new services and the small size of the planning staff. According to the SSP staff, when an immediate service need arises, SSP is asked to reallocate miles and hours from existing services rather than propose changes that produce a need for additional funding.

The staff has participated in planning for a number of service changes over the past several years in response to requirements such as planning for the Landports, Opry Mills service, and similar projects. There is a sound process for evaluating existing route performance on a routine basis, but there is relatively little regular activity dedicated to longer-term service opportunities prior to the current short and long range planning projects.

These longer-range, systems planning activities at the MTA have typically been addressed in five-year transit development programs prepared by outside consultants with input from MTA staff. Two current consultant studies are underway and about to be completed. These deal with short and long term service development programs

The SSP Director is MTA's principal planner and scheduler. Our interviews with him and our review of the SSP work suggest that he is a skilled and competent service planning analyst and schedule maker. Until the beginning of 2000, the SSP Director also acted as the system administrator for MTA's computer system. These additional responsibilities meant that the Director had to focus his attention on current and immediate scheduling and service problems rather future, longer-range service improvements and expansions. The remaining SSP staff provides good support to the Director, particularly in data collection. However, the staff does not participate significantly in the service planning analysis and scheduling preparation activities.

**Use of Performance Indicators** - SSP uses performance indicators in its work scheduling and planning transit service. Three performance indicators for each MTA route each month. Results for the three measures are reported for different service types — i.e., bus type, trolley shuttle.

The three indicators are:

- passenger revenue per revenue bus hour
- percent of *marginal* costs covered by passenger revenue
- passengers per revenue hour.

If each of the three indicators for a given route falls below 60 percent of the system (i.e., group) average, the service is reviewed and corrective strategies recommended to the MTA Board. As part of the review, any trip with less than five passengers is to be considered for termination. The 60% has been adopted as a policy standard by MTA and as such is well within industry norms.

The general structure of the performance indicators provides good service planning guidance to SSP. The three key route performance indicators reported to the MTA Board every month are consistent with the similar practices in the transit industry. There are some concerns, however, with MTA's current reporting of these performance indicators and service groupings. The first issue is the service type groupings. The second is the method used for estimating costs used in the measures. These issues are more fully explored below.

### **Service Type Groupings**

The MTA now uses different service groupings than are stated in its service policy. The policy lists four service grouping; local bus, express bus, trolley and shuttle. In practice MTA uses local and express bus as one category. Additionally, the trolley and shuttle services are combined into a single category

Magnet school routes were implemented after the service standards were adopted and are considered a separate route category from conventional bus routes. However, discussions with MTA staff suggest that the routes are considered internally as conventional bus routes. This is reflected in the front page of the monthly report — System Service Comparison —where results for conventional and magnet school routes are reported in a combined result.

### **Methodology for Estimating Cost Values for the Performance Measures**

The second issue related to performance reporting is the use of marginal costs and the method of cost calculation as reflected in the indicator *percent of marginal costs covered by passenger revenue*. Before a further discussion of this subject is possible a brief description of cost terminology is required:

*Marginal Costs* - Marginal costs are the out of pocket costs which change directly with changes in service levels. Examples are fuel and driver compensation.

*Fully Allocated Costs*- These costs include a share of all costs of the operation. Fully allocated costs would include a pro-rata share of overhead costs which are fixed in nature and do not vary with changes in volume. Examples of these fixed costs include executive salaries and building maintenance.

We examined the MTA's operating expenses as reported to the National Transit Database for fiscal year 1999 and estimate that fixed costs represent about 16 percent of MTA's operating expenses which corresponds to a ratio of fixed to variable expenses of 19 percent. This means that for every \$1 of marginal cost expense incurred by a break-even route, another \$0.19 is not included in the performance measure as reported at the MTA.

The use of marginal costs, rather than fully allocated costs, in the service metric *percent of marginal costs covered by passenger revenue* provides policy makers and the public only part of the picture when examining the percentage of operating costs covered by passenger fares. The use of only marginal costs exaggerates the percentage of costs covered by passenger fares, suggesting a route "breaks even" if its fare revenues cover its marginal costs.

Although the fixed costs do not change with minor levels of service changes, they are part of the operating costs and must be paid for by some funding source. The use of marginal costs in the fare revenue/operating cost indicator implicitly supports a policy that passengers should not be required to cover any portion of fixed costs. This contrasts with the practices of most transit systems that have a policy that passengers should support a stipulated portion of all operating costs — fixed and marginal.

The last point regarding the use of marginal cost versus fully allocated cost relates to the time allocation of fixed resources. While it is true that fixed costs do not change as readily as variable costs, it also is true that use of these resources would change when routes are added or eliminated. For example, the salaries for employees taking passenger surveys are a fixed expense. When routes are eliminated, the time spent surveying these routes can be reallocated so that more surveys can be conducted on the

remaining routes. Therefore, it is reasonable to “charge” routes for the time use of these fixed resources since they could be used elsewhere.

In addition to the use of marginal costs in the determination of route performance, the calculation of the true “marginal costs” used by the MTA is subject to question. The MTA estimates the marginal cost in a process that is shown in Table 4-1. These costs are based on two months actual data for the period July-August 2000. The steps are as follows:

- Sum the variable expenses (\$2,763,731)
- Subtract the estimated portion of the maintenance expenses (\$480,000) that are to be funded through the FTA capital program (the contra expense)— to yield the net total expenses (\$2,283,731).
- Divide the net variable expenses by the estimated number of vehicle hours (50,855) to produce an estimated cost per vehicle hour (\$44.92).

**Table 4-1**  
**MTA Performance Audit**  
**Comparison of Marginal Costs With And**  
**Without Contra for Capitalized Maintenance**

<u>Expense Category</u>	
Total Variable Costs	\$2,763,730.76
Hours operated during period	50,855
Divided by Hours Operated	\$54.35
Subtract contra for capitalized maintenance	-\$480,000.00
Net marginal costs net of contra	\$2,283,730.76
Divided by hours operated	\$44.92

We agree with the general method of estimation of the marginal costs, with the important exception of the step in which the contra expenses are deducted. These expenses apparently are deducted by the MTA because they are funded using FTA capital funding. Using this approach suggests that these expenses should not be considered in a cost analysis.

Good practice would instead consider these expenses as part of the analysis of marginal costs for two reasons:

- The contra expenses are in fact operating expenses, no matter how they are funded. Excluding these expenses understates operating costs, and overstates the portion of operating expenses paid by passenger revenues.
- The contra expenses represent FTA capital which are used to cover operating expenses. This reduces the funding available for the MTA capital program. It is, therefore, proper that this transfer be assigned a cost value.

If the contra expenses were not deducted, a truer marginal cost per vehicle hour of \$54.35 would result. We confirmed this estimate using data reported to the National Transit Data Base for fiscal year 1999. We extended this analysis to estimate the *fully allocated cost* per vehicle hour at \$64.96. This is the unit cost value that most transit systems would use in their monthly performance reports.

To summarize, the range of cost for service changes represented by these various cost allocation approaches is thus:

- MTA estimated hourly marginal cost rate, with the contra deducted: \$44.92
- Hourly marginal costs rate, with contra included: \$54.35
- Rate with fully allocated costs and contra included: \$64.96

### **Building Cost Models**

Most transit agencies use a variety of cost models designed for specific planning and analysis purposes. One agency that we have worked with maintains a set of 19 cost models. In the current short range planning project, the contractor (Urbitrans) used at least four different models in estimating service change costs for different types of services.

The basic package of used and useful transit cost models at a transit system often includes:

- A fully allocated cost model that includes all operating expenses – the essential starting point in developing a package of cost models
- A model for express service that reflects the different nature of variable costs related to express service
- A model for seasonal or one-time services that increase the peak vehicles required for service
- A marginal cost model for estimating the costs of service reductions or additions, that excludes most fixed costs
- A “step-wise” model for use in planning substantial service changes that require major changes in fixed costs such as facilities and supervisory personnel
- Mode specific cost models for fixed route, paratransit, trolley service, or other mode of operation.

Most basic cost models most often include coefficients for three variables:

- Hours of operation, to reflect the sensitivity of operations costs to the hourly costs of drivers wages and benefits
- Miles of operation, to reflect that sensitivity of maintenance costs to miles of operation
- Peak period buses, as a surrogate for the fixed costs related to facility maintenance and general and administrative costs.

Models that are used for determining the cost impact of small changes in service usually ignore the fixed costs, which do not vary with small changes in service.



The process of building a model consists simply of assigning percentages of the costs from all of the various lines in a chart of accounts to one or more of these three variables. The sensitivity of a given model can be changed to reflect the nature of the service to be evaluated, particularly to reflect changes in speed and the number of peak buses required for the service. The level of detail in the costs used in the model can also vary significantly

### **Applying a Two Factor Model to the MTA Services**

The MTA uses a one factor model for most purposes: hours of operation. A common refinement on a one-variable model is to use a two variable model that estimates costs based on numbers of vehicle hours and vehicle miles operated. This approach recognizes that some costs such as driver's wages are primarily driven (or incurred) by the number of hours operated, while other costs such as vehicle maintenance are primarily driven by the number of miles operated.

This two-factor model using *hours and miles* is appropriate when there is significant variation in the operating speeds among bus routes. This is exactly the situation that exists at the MTA. We examined the scheduled operating speeds for the 52 bus routes operated in September 2000 and found that the average speed was 15.0 miles per hour. However, the operating speeds ranged from a low 9.9 miles per hour (44 MTA Shuttle) to a high of 25.7 miles per hour (97 RTA Murfreesboro Express).

Using MTA estimates and data reported to the National Transit DataBase for fiscal year 1999 we estimated that the *fully allocated* hours and miles cost (including contra expenses) as follows:

$$\text{Full Cost} = \$32.49/\text{vehicle hour} + \$1.93/\text{vehicle mile}$$

These are the unit cost values that most transit systems would use in calculating their operating expenses in their monthly performance reports.

We examined the affect using our hours and miles, full cost approach versus the current MTA approach that uses a marginal cost of \$44.92 per vehicle hour. Under both approaches, we grouped the MTA and Magnet school routes together and considered them one route class, rather than two separate groups as currently done.

The results of this analysis shows that more express routes fail the indicator *percent of operating costs covered by passenger revenue* when the hours/miles approach is used (Exhibit 4-1). When the marginal hourly approach is used, 11 routes fall below the 60 percent threshold. This 60% threshold represents 60% of the system average. Note that on the bottom of the Exhibit 4-1 the 60% system average under

the MTA approach is 26.8% versus 17.4% for our estimate using fully allocated hours and miles costs. When the full cost, hours and miles approach is used, the same 11 routes fail plus an additional four routes — three express routes and one local route.

The four additional “failing” routes operate at speeds greater than the system average. This means that they operate more miles per vehicle hour than the average bus route. It suggests that the RTA contract route (route #96 in Exhibit 4-1) pays only 54.3% of operating expenses, rather than 110.6% indicated with the use of the MTA model.

Since the hours and miles method is sensitive to these speed differences, it assigns more operating cost to these high-speed routes to reflect the additional expenses that result from the increased number of miles operated per hour.

### **Scheduling and Service Planning Decisions**

As discussed, the SSP staff considers the three performance indicators when it makes service planning and scheduling decisions, usually in the form of route and schedule adjustments to current services. These indicators help identify routes that may require major service adjustments. SSP has been involved in service restructuring and developing new service proposals, much of which has not been funded. The focus of the group, however, has been short-range work on existing service

Longer-range planning activities are typically addressed in the five-year transit development program that is prepared by an outside consultant with some involvement from the SSP staff. SSP staff also is responsible for responding to changing street conditions due to construction, repair, and temporary closings. SSP tries to coordinate with the METRO Department of Public Works. While the working relationship has been good, SSP indicated that it is sometimes not aware of sudden changes because Public Works notifies SSP by letter mail which typically arrive after a street detour is in place.

### **Data Collection**

SSP staff also manages a data collection program that is designed to support regular reporting, planning and scheduling activities. The planning activities focus on identifying and addressing low performing routes. The scheduling efforts focus on improving schedule adherence and minimizing crowding during peak periods. The data also support the monthly route status reporting. SSP primarily relies on data collected by the MTA drivers, largely via their farebox readings, and by its own SSP staff checkers.

As part of their fare collection duties, the MTA drivers assure that fare boxes properly register passenger boardings. The registering farebox keeps a running count of passenger boardings and the cash revenue received. SSP in turn monitors these passenger boardings and at the end of each month,

reconciles the farebox counts with the total passenger revenue and pass sales recorded by the finance department. SSP has developed a comprehensive spreadsheet process for allocating passenger revenues and passenger boardings based on the actual farebox readings for each route.

The spreadsheet process is logical, comprehensive and well documented. SSP annually compares the spreadsheet ridership estimates with those estimated using the sampling process for the annual National Transit Database statistics. SSP found that the two ridership estimates were within one percent of each other for last year. While the SSP processing and use of the fare box data is consistent with good industry practice, only the SSP Director has a thorough understanding of the spreadsheet logic used to process farebox data.

The second group of data collectors are the three part time SSP checkers who spend most of their time on ride counts. These counts require a checker to ride each bus trip at least once a year and record the number of passengers boarding and alighting at each stop. The checker also records the arrival times at each time point. The counts provide a wealth of information including key planning and scheduling data such as passenger usage and bus loadings by route segment and running time data. These boarding counts are updated annually so that SSP has current data on every scheduled trip. This is consistent with good industry practice.

**On-Time Monitoring & Data Collection** –SSP collects, summarizes, and reports monthly data on system on-time performance. The MTA uses the common industry standard (0 minutes early to 5 minutes late) for on time of service metrics. While MTA’s goal is to operate all service on-time, it recognizes that factors such as weather and traffic congestion can delay service. Therefore, the on-time standard is 95 percent. Again, this is standard in the industry.

According to SSP, a maximum of 20 hours per week is spent to collect this system-level information. In addition to the annual ride checks of on time performance, the SSP checkers also collect data on system on-time performance at randomly selected time points each week. The objective of these checks is to measure on-time performance of the system as a whole over a period of time. Data are not systematically collected and reported by specific routes. MTA is meeting their system-wide standard for on-time performance.

**Other Data Collection-** SSP recently introduced a program to solicit input from the street supervisors. SSP designed a form for street supervisors to report information on the arrival of buses at the downtown transfer centers. This information includes schedule times, routes, and reasons for any late arrivals. This is an excellent method for collecting data on a large number of routes at a minimal cost. While the data may not provide statistical data on on-time performance, it is an excellent tool for pinpointing problems. SSP also distributes survey questionnaires to drivers and street supervisors before each

semiannual schedule change. The questionnaire asks for specific comments on current service problems, low ridership trips, and suggestions for service improvements.

SSP also considers suggestions from employees, and in particular from drivers. The SSP Director is actively involved with the MTA operators and visits with them daily in the drivers' room that is just down the hall from his office. This approach generates useful ideas and contributes to favorable employee morale.

### **Scheduling**

SSP also has responsibility for preparing driver work schedules, a major determinant of the efficiency of the driver work force. Two such schedules are prepared each year, one starting the first week in March in the other starting the first week in September. Since transit is labor intensive, efficient schedule preparation has a significant impact on operating costs.

The efficiency of the scheduling function is evaluated by most transit systems by tracking the ratio of total scheduled pay hours to the number of hours actually used in driving a bus, or "platform hours". This indicator measures the performance of the schedule makers in efficiently scheduling operator labor to provide the scheduled transit services. Ideally, the value for this measure should be low and as close to 1.0 as possible. The achievement of the low values for this measure is limited by the service schedule, labor agreement provisions and work rules, plus the skill of the scheduling staff.

MTA 's system ratio of scheduled pay hours to platform hours consistently was 1.07 to 1.08 for the four-year period 1995 to 1999, as shown on Table 4-2. However, this ratio increased last year to 1.1. Some of this increase was due strictly to a computational change in the method of compiling the data. Another part of the change was a result in the increase in daily "report time" from 8 minutes to 15 minutes for each assignment each day negotiated in the last labor contract. This was a conscious decision to improve the quality of pre-trip inspections. The financial impact of this change is minimal. From the chart below, using the September year-over-year differences, there are approximately 350 "extra" hours per month in FY2000 than in previous years. Assuming half this difference is real and not a statistical fluke, this would equate to approximately 2100 extra hours annually ( $350/2 * 12$ ). Multiplying this number by a wage rate of \$15/hr would yield \$31,500 extra cost per year. This ratio of 1.1 is still well within a range that is considered acceptable.

**Table 4-2**

**MTA Performance Audit  
Scheduled Pay-Platform Ratios  
Using March and September Hours**

<u>Year</u>	<u>Pay/Plat Ratio</u>		<u>March</u>		<u>September</u>		<u>Difference</u>
	<u>March</u>	<u>September</u>	<u>Pay</u>	<u>Platform</u>	<u>Pay</u>	<u>Platform</u>	
1995		1.088			5,723.9	5,260.4	463.51
1996	1.087	1.082	5,778.8	5,314.4	5,772.9	5,335.1	437.76
1197	1.084	1.085	5,902.5	5,443.5	5,994.1	5,524.8	469.32
1198	1.078	1.072	6,098.7	5,659.7	5,992.0	5,590.8	401.22
1999	1.072	1.075	6,385.2	5,957.3	6,554.8	6,095.5	459.28
2000	1.094	1.138	6,655.5	6,084.1	6,839.0	6,012.0	826.99

The SSP Director reviews the ratio of pay hours to platform hours that is produced by the SAGE computer program. This is an early 1990's scheduling package that was written for a DOS operating system. The SSP Director is the only MTA employee who knows how to use this software. More recent scheduling software is written for the Windows environment. The software is more user-friendly and interactive, which makes it easier for new schedulers to learn to use the system. Much better technical support also is available.

SSP also is responsible for determining driver requirements for regular and extraboard bus operators. The extraboard is simply a scheduling device used to ensure there are "extra" drivers available to fill in for drivers who are out with illness or to man unplanned trips. SSP uses a spreadsheet approach to determine the number of five-day work assignments that are needed to cover the seven-day service provided by the MTA. The approach is straightforward and clearly designed.

SSP also uses a spreadsheet approach to determine the staffing of the extraboard — the pool of drivers who fill-in for regular operators who are absent because of sickness, vacation, or other reasons. Extraboard drivers also operate some Magnet school service. When school is not in session, SSP schedules more operator vacations to use the five operators who ordinarily would operate the Magnet service. The overall extraboard management approach is clearly designed and is sensitive to the varying driver absence rates by day of week.

As with service planning, the SSP Director considers suggestions from employees, and in particular drivers, in schedule development. Since resources have been limited, the Director has tried to address passenger crowding through the deployment of large or small buses. When these changes are being considered, the Director discusses them with the affected drivers.

## **Conclusions**

- The MTA has limited resources for service planning and market development. The SSP staff has focused on service scheduling, monitoring and evaluating the current services. Longer term service and capital planning activity common in many transit SSP departments is limited at MTA.
- The SSP Director is a skilled and competent planner and scheduler.
- The MTA uses different service groupings than are stated in its service policy.
- Contra expenses, capitalized maintenance expense, should not be excluded from MTA's marginal costing approach.
- MTA needs to develop more sophisticated cost models for use in measuring and evaluating service. An example, the two variable costing method using both hours and miles, is more appropriate for measuring marginal costs when there is significant variation in the operating speeds among bus routes — the situation that exists at the MTA. If MTA used this method, some planning attention would shift to some express bus routes with borderline performance.
- A model that includes the contra expenses and a factor for fixed costs should be used whenever representations of costs and costs recovery are made.
- There are communication problems between MTA and the METRO Department of Public Works regarding changing street conditions due to construction, repair, and temporary road closings that have an adverse impact on planning for and dealing with detours that are required as a result of public works activities.
- The ongoing data collection activities — ride checks, farebox readings, street supervisor reports, operator/supervisor questionnaires — are well designed to meet MTA's planning and scheduling needs for existing services.
- The reconciliation spreadsheets for the farebox readings are well documented. However, only the SSP Director truly understands the spreadsheet logic.
- SSP uses the SAGE computer program — an early 1990's scheduling package — that should be replaced. It is not user-friendly and is written for a DOS operating system that is approaching obsolescence. There is inadequate support available for this obsolete application.

- SSP has reasonable approaches for determining the number of regular operators needed to operate the scheduled service and the number of extraboard operators needed to cover “normal” operator absences.

### **Recommendations**

- MTA should provide training to the Assistant Planner and others, as appropriate, on the service planning and scheduling functions performed by the SSP Director. This will provide the necessary backup protection for the SSP Director.
- The MTA should formally adopt expanded service design standards such as minimum service frequencies, hours of service, and days of service. Good starting points for this work are the informal standards now used by SSP and the possible standards being used in the current update of the transit development program. (One of the current planning projects is expected to recommend such service standards.)
- The MTA should update its service policy regarding the different service groupings.
- The METRO Department of Public Works should use email to communicate with SSP regarding changing street conditions due to construction, repair, and temporary closings.
- The MTA should replace its SAGE scheduling program with a new program that can be supported on new Windows operating systems. Care should be taken to ensure that the new program vendor provides good technical support that would enable more staff members to use the system.
- Contra expenses, capitalized maintenance expense, should not be excluded from MTA’s marginal costing approach.
- MTA needs to develop more sophisticated cost models for use in measuring and evaluating service. An example, the two variable costing method using both hours and miles is more appropriate for measuring marginal costs when there is significant variation in the operating speeds among bus routes — the situation that exists at the MTA. If MTA used this method, some planning attention would shift to some express buses routes with borderline performance.
- A model that includes the contra expenses and a factor for fixed costs should be used whenever representations of costs and costs recovery are made.

### **Cost Implications**

- It is possible that the change in the cost model will produce some rethinking of the current services if the decision is to enforce the service standards on the services that fall below the acceptable performance standards.
- Costs associated with a new planning director and two additional planners are discussed in sections *Planning Structures and Governance*.
- Costs for a new planning and scheduling software program are estimated between \$75,000-\$150,000.



## **Short-Range and Long-Range Planning Efforts and Other Studies Underway.**

Four major planning efforts are underway that directly affect the MTA. In order of their stage of development, these are:

- a commuter rail plan, developed over the past several years
- a short-range transit plan, now being completed
- a transit development plan, now in process
- a regional transit funding analysis

The MTA is the managing contractor for the first two studies, and directly manages the short-range planning work effort. The Regional Transportation Authority (RTA) is the lead technical agency for the commuter rail study. The Metro Planning Commission, which also serves as staff for the Metropolitan Planning Organization (MPO), is the lead agency for the longer-range transit development plan. The MPO is managing the regional transit funding analysis. This funding analysis was not included in the scope of this review.

We evaluated these planning efforts from several perspectives. First, we assessed how MTA was managing or otherwise participating in the studies. Second, we evaluated how the scope of work would prepare the MTA to meet future transit needs within its service area. Finally, we looked for logical connections, particularly with respect to the operating and financial impacts of the strategies being considered. In the course of our analysis, we interviewed planning staff at the MTA, Metro, and the RTA, and reviewed the scopes of work for each study.

### **Commuter Rail Planning**

Commuter rail planning has been underway since 1996, when the RTA and MTA jointly participated in a study to evaluate the potential for commuter rail in the Nashville region. The 1996 study report identified six corridors for further evaluation. A 1998 study refined this list to three corridors, from which the East corridor was selected as the first priority for implementation. This is a 31-mile alignment, with five stations, between downtown Nashville and the City of Lebanon in Wilson County.

While much has been accomplished on the rail project, there are still a number of hurdles to overcome before plans can be finalized. This audit has focused on the ramifications to the MTA of ongoing involvement in short and longer term rail plans. Obviously the agency must maintain a posture of flexibility regarding rail projects given the current level of uncertainty.

Preliminary engineering was completed on the 31-mile East Corridor plan in early 2000, and the project is now in final engineering. According to a report submitted by MTA to the Federal Transit Administration (FTA) for the most recent "New Starts" report to Congress, capital costs for the project are estimated to be \$30 million in year-of-expenditure dollars, and operating costs are estimated to be \$2 million annually.

The project is planned to operate on an existing rail line owned by the Nashville and Eastern Railroad Authority (N&E), a governmental entity comprised of the Tennessee Department of Transportation, Wilson County, the cities of Lebanon and Mt. Juliet, and the Metro Government of Nashville and Davidson County.

To date, the project has been jointly managed by the RTA and the MTA. Because the proposed system spans multiple political jurisdictions the RTA has taken on the coordination role between the various local officials. The RTA and MTA have jointly directed the consultants who were hired to perform the original study and the subsequent preliminary engineering and environmental studies. This has included preparation of the request for proposals, evaluation of bidders, and management of work-in-progress. Consultant selection was made by a committee comprised of representatives from the MTA, RTA, and from Metro, Wilson County, and the City of Lebanon. The RTA is the grant recipient project manager for funds applied to the project. The Executive Director and the Capital Planning Manager represent MTA in these efforts.

### **Short Range Transit Plan**

The preparation of the new short-range transit plan (SRTP) commenced in July 2000. Preliminary reports are currently being reviewed by the MTA. The plan's focus is service evaluation of the MTA system. It is being performed by outside contractors. Other than special planning efforts (e.g., commuter rail and light rail), this is the region's first transit development plan since 1991.

The SRTP will cover the next five-year period. It is being prepared primarily by a consultant team (Urbitran), working with the MTA staff. According to the consultant's scope of work, the plan will include a service design plan, an implementation plan, a financial plan, and a capital plan.

The tasks in the scope of work include:

- Project initiation/goals & objectives
- Evaluation of fixed route service
- Service standards
- Fixed-route bus system analysis and route diagnostics
- Bus system alternatives and evaluation
- Final system redesign plan.

The planning effort is being managed by the MTA Executive Director. MTA staff involvement has been limited to providing data to the consultant on the front end, then reviewing and critiquing on the back end of the study. Although the MTA has a scheduling and service planning department, the two-person staff is small for a system of its size and necessarily occupied by detailed scheduling activity and service monitoring. (See discussion in *Planning Structures* section.)

The SRTP has several scope limitations that should be corrected in future generations of the plan:

- First, there is little consideration of ACCESSRIDE and vanpool programs, though these are growing parts of MTA service and need to be considered in a full set of service plans.
- Second, there is no mention of the commuter rail plan in the scope of work, including the bus feeder system requirements, or other financial and operational implications.
- Third, there is no analysis of management systems or actions that may be necessary to manage the service and cost implications of the plan's recommendations.
- Finally, there is little to no participation in the planning process by MTA's funding partners.

A broader view of the SRTP - for instance its use as a business planning document as well as a bus route planning document - would help the MTA realize and prepare for the implications over a longer-term horizon.

### **Transit Development Plan**

The Transit Development Plan (TDP) is being prepared by the Metropolitan Planning Commission, with the assistance of an outside contractor. The TDP has a longer time horizon and a different focus from the SRTP and will present prioritized transit improvements for four, five-year increments beginning in 2005 and extending through 2020. The TDP is designed to develop transit improvements in the context of regional development patterns and highway projects. Development of the plan started in October 2000 with completion scheduled by late 2001. The MTA has been involved in the TDP from its inception, commenting on the draft scope, consultant selection, and with membership on the steering committee by the MTA Executive Director.

By examining the contribution of different transit strategies to the achievement of regional development priorities, the rationale for transit investment in the Nashville region can be stated in the context of transit's role in supporting the region's land use, transportation, economic, and social policy goals.

### **Conclusions: Current Planning Projects**

With respect to the current planning projects and their impact on regional transit and the MTA specifically, we noted the following:

- The transit development plan being developed by the Metropolitan Planning Commission should provide a useful context for setting priorities for future modifications and investments in transit.
- The MTA technical planning capacity is too small to play a proper role in transit and transportation and land use planning for the future.
- Due to the small size of the MTA planning staff, too much of the planning function is vested with the Executive Director. Based on our experience with other transit systems, the MTA planning function is not large enough to provide the necessary checks and balances on operational and financial commitments required for solid system planning.
- The short-range transit plan and the commuter rail plan were developed independent of one another, and do not address the combined effect of the plans on MTA operating requirements and financial capacity
- The SRTP places too little emphasis on ACCESSRIDE and the potential use of the ACCESSRIDE system as a substitute service for low performing fixed route services.
- The SRTP will help the Board, staff, and Metro to focus on the types of service improvements needed for the short term, and how to make decisions relating to service evaluation and implementation.
- There is no multi-year business plan to guide MTA management efforts with regard to non-fixed route services, performance, internal resource allocation, financial planning, labor and personnel planning, human resources, systems, or asset replacement.

### **Recommendations**

- The MTA should establish a planning function that meets the needs of the organization.
- With an expanded function the Executive Director will be able to delegate more responsibility for plan development and representation of MTA on technical committees.
- All MTA planning efforts should include a financially-constrained plan that serves as the baseline for evaluating new services and funding strategies, as well as an unconstrained plan that is built on “what-if” financial assumptions and real-world needs assessments that illustrates a larger strategy.
- MTA should expand the focus of the short-range plan to improve its use as a management tool for evaluating current and prospective performance assessments. This would incorporate ACCESSRIDE and vanpool assets in the service mix.
- Note: Recommendations to help resolve issues surrounding the financial condition of the MTA are addressed in the *Cash Management* and other sections of this report.

### **Cost Implications**

The cost of the additional staff is included in *Planning Structures* and *Governance* sections.

The costs of implementing new services that may be adopted from the ongoing planning projects could be significant, depending on the extent of their recommendations and the determination by the region's policy makers to undertake the recommended service changes. These costs would be included in the recommendations of any such studies.

### Capital Funding And Relationships With The MPO

The funding of MTA capital projects has a fairly simple structure. All capital projects are 100% grant funded. Capital project costs are paid first by the MTA. Then, the MTA's grantors reimburse the MTA. The Federal government, acting through the Federal Transit Administration (FTA), funds 80% of capital project cost. Currently, and in the recent past, one Federal transit grant program — section 5307 urbanized-area formula grants — has been the predominant source of capital funds used by the MTA. The State of Tennessee, acting through the Tennessee Department of Transportation, funds 10% of capital project costs. The Metro government funds the remaining 10%.

Grant expenditures for FY2000, and their allocation to the FTA, the State, and Metro, are presented in Table 6-1. Also noted in the table is the balance remaining on each grant at the close of FY2000.

**Table 6-1**  
**MTA Performance Audit**  
**MTA Capital Project Funding, FY2000**

Grant	GRANT EXPENDITURES FOR FY2000				Avail. For use bal. @ 6/30/00
	Federal	State	Metro	total	
TN-03-0049	307,499	38,437	38,437	384,373	3,841
TN-90-X112	8,523	-	-	8,523	45,688
TN-90-X117	-	-	-	-	-
TN-90-X126	36,047	4,506	4,506	45,059	3,445
TN-90-X135	-	-	-	-	-
TN-90-X145	-	-	-	-	789
TN-90-X155	448,356	56,043	56,043	560,442	1,161,199
TN-90-X163	1,771,903	221,487	221,487	2,214,877	5,918,310
TN-90-X173	3,568,256	446,034	446,031	4,460,321	1,637,048
Total	6,140,584	766,507	766,504	7,673,595	8,770,320
% of Total	80.0%	10.0%	10.0%	100.0%	

sources:

MTA Accounting Dept., Grant Expenditure Detail for FY2000 (worksheet dated 11/16/00)

Memo, Shelly MacDonald (MTA) to Kraft CPAs, Unexpended Grant Monies @6/30/00 (10/2/00)

The capital funding process is closely associated with the metropolitan transportation planning process, conducted under the auspices of the Nashville Area Metropolitan Planning Organization (MPO). The MPO is a policy board comprising Davidson, Rutherford, Sumner, Williamson, and Wilson counties. The MPO is staffed by the Metro Planning Commission personnel.

The MPO reviews and adopts a 20-year metropolitan transportation plan and regional transportation improvement program (TIP). The TIP, adopted triennially, lists individual projects to receive Federal transportation funds. The projects listed in the TIP must be consistent with the twenty-year metropolitan transportation plan. Both the twenty-year plan and the TIP must be financially constrained — that is, the funding for the projects must have been committed or be reasonably obtainable. This is a condition of Federal law and must be met for the region to receive Federal transportation funds.

The MTA's capital projects are included in the TIP, which satisfies the basic requirement for Federal funding. The TIP is also the basis for authorizing the State share of capital projects, and serves as the basis for the capital improvement plan (CIP) funding request to Metro by the MTA. The MTA projects currently included in the TIP are listed in Exhibit 6-1.

The process for acquiring the Federal funds is governed by the individual grant programs. The Federal Section 5307 transit grant funds are allocated to the MTA by formula. The FTA informs transit systems annually of the funding likely to be available, and then updates this amount when Congressional appropriations are made. MTA enters into a grant agreement for these funds, which remains in effect until the funds are depleted.

MTA submits payment requests directly to the FTA through an on-line system. The MTA will also be using Congestion Management & Air Quality (CMAQ) program funds for one of its capital projects. These are technically Federal Aid Highway funds, but once approved locally (by the MPO) for use in a transit program, the funds are managed by the FTA in the same manner as for the Section 5307 urbanized area formula grant funds.

One prominent Federal transit program that MTA has used inconsistently due to issues related to local match funding, is the Section 5309 Bus program. This is a discretionary grant program used for bus system capital acquisition and replacement projects. MTA is part of a statewide 5309 funding request that is being led by the State DOT. The 5309 Bus program funds are appropriated by Congressional earmark. Thus, support from the State's Congressional delegation is an important element in acquiring the funds. This program could provide significant funding for MTA bus replacement and facility rehabilitation, and should be energetically pursued by the MTA. We noted that the Metro Planning Organization (MPO) and the MTA Executive Director are well aware of this funding program.

MTA separately requests approval from Metro for funding a 10% share of the MTA capital projects. The submission to Metro does not present a capital plan in a comprehensive, easily understood format. This budget request should clearly summarize capital requirements in the context of the triennial TIP plus any other interim requests, as well as a comprehensive fleet replacement plan presentation. It should also include estimated funding requirement dates.

According to the MTA Executive Director, there is no agreed-upon process for obtaining funds from Metro once the CIP is approved. When MTA projects are to be funded from a bond issue for a group of Metro projects, funds may not be transferred to the MTA for some time after MTA incurs the capital expenditure.

At the time the fieldwork for this management audit was conducted, Metro owed MTA approximately \$2.3 million, dating back to project expenditures in FY1998. According to a worksheet provided by the MTA Director of Accounting, the receivables were as follows:

➤ 1999 Capital projects	\$495,470
➤ 1999 Capital projects	1,179,601
➤ 2000 Capital Projects	567,300
➤ 1999 Electric Trolley Demonstration	37,219

### **Conclusions**

- A regional process exists for considering MTA grant-funded projects in the context of other transportation projects.
- Federal funds appropriated for MTA grants are part of a larger appropriation, from which MTA receives its share via formula.
- Although capital projects are 100% grant funded, capital project funding is still a cash flow concern for the MTA since it must first fund the capital projects, then seek reimbursement.
- Delay in providing the local match for Federal grant funds exacerbates the MTA's liquidity problems. See section on *Cash Management*
- There is apparently no agreed-upon procedure for MTA to obtain cash from Metro for its share of capital project costs in a timely fashion.
- The process regarding the capital budget request to Metro for the local match needs improvement.
- Capital and Operating subsidies are discussed in detail in the section *Fares and other Revenues* subheading Other Revenues. See also Exhibit 7-2 which accompanies this discussion.

### **Recommendations**

- MTA should work with Metro to develop a mutually agreeable procedure for payment of the local share of MTA capital projects, with the objective that the local share is paid within an identified timeframe. This procedure should include a means to resolve problems if MTA project expenditures deviate from the amounts agreed to when the Metro CIP is approved by the Council. As part of this enhanced procedure MTA needs to improve the capital budget presentation to Metro. It should clearly summarize capital requirements in the context of the triennial TIP and any subsequent amendments. This submission should also include a



comprehensive fleet replacement plan presentation. Metro policy makers and administrators should be able to clearly understand the capital budgeting methodology. It is crucial that the annual presentation of capital requirements be understood in terms of the multi-year planning impact.

- MTA should work actively with Metro to ensure that available Section 5309 federal Bus funds are used to the greatest degree possible. These funds should not be forfeited due to issues related to local matching funds unless unavoidable. To be successful, this effort will require MTA to clearly describe its capital needs (see comment above).

**Cost Estimate**

None.

## **Fares and Other Revenues**

Transit systems typically generate most of their operating revenues through passenger fares and advertising revenues. Transit systems must consider multiple objectives when they develop their revenue policies. Fare increases almost universally cause ridership losses. While one major objective is usually to maximize revenues, transit systems often must consider other public objectives such as maintaining or increasing ridership or rejecting controversial advertising. We reviewed MTA's revenue policies regarding passenger fares and advertising revenues. We also assessed MTA's performance in these two revenue-generating activities.

Passenger fares can be assessed from several perspectives including peer comparisons, policy direction, and fare structure design.

### **Peer System Revenue Profiles**

One way to assess MTA's passenger fares is to compare its performance with the transit systems in its peer group. For the comparisons, we used the most current national data for fiscal year 1999 from the National Transit Database. Transit systems are only required to report data at the system level. Therefore, we made comparisons at the system level and not by mode (e.g., bus, demand response).

The MTA has high average fares in comparison with the transit systems in its peer group, as shown on Table 7-1. MTA's average fare per passenger (\$0.89) is about one-third higher than the average fare per passenger for the average transit system in the peer group (\$0.67). This places MTA average fares 12<sup>th</sup> highest out of the 13 transit systems in the peer study.

**Table 7-1**  
**MTA Performance Audit**  
**MTA Fares Compared to Peers**  
**Fiscal 1999**

<u>Measure</u>	<u>MTA</u>	<u>Peer Group Average</u>	<u>MTA as % of Average</u>	<u>Rank of 13</u>
Average Fare	\$0.89	\$0.67	132.8%	2
Fares as % Costs*	28.8%	24.3%	118.6%	4

\*Costs are total costs reported in NTD data for 1999. With normalized maintenance Fares as % of costs moves to 32%.

Similarly, MTA's customers pay for a larger percentage of operating costs, as shown on Table 7-1. In fiscal year 1999, passenger fares covered 28% of MTA operating costs. This is 18% higher than the percent of the operating costs supported by passenger fares at the average peer system (24.3%), and was 4<sup>th</sup> highest among the 13 systems.

## **Fare Policy Direction**

Fare policy is a difficult issue for most transit boards. Making fare decisions place two of the most important roles of a board, ridership generation and fiscal responsibility, potentially into conflict. It is generally conceded that increasing fares will frequently result in decreasing ridership. Most boards, however, feel that riders should pay a fair share of transit costs. That share is usually spelled out in a fare policy that generates fare-changing decisions in a more routine manner. However, since raising fares is unpopular, many boards postpone action while costs continue to rise. As a result, fare revenues cover a decreasing portion of costs until the boards raise fares, often in response to a funding crisis.

Some transit systems try to avoid raising fares in a crisis mode by adopting a fare policy that stipulates that fares should pay a certain percentage of expenses. Having clear-cut fare policy simplifies the process of making fare decisions.

**MTA Fare Policy** - We examined the policy of the MTA Board regarding fare revenues. While the Board has a policy regarding fare recovery of individual routes, the Board does not have a policy for the transit system as whole.

We then examined the fare recovery performance of the MTA bus service over the five-year period 1995 to 1999. We focused on the bus system because of the federal limitations on fares that can be charged on the demand response service. These federal restrictions require that paratransit fares be limited to no more than twice the fare charged for bus service. Since the federal regulations also do not allow service to be restricted because of financial capacity, transit systems do not have the flexibility to raise fares and change service on demand response services like they do on conventional bus services.

The operating ratio of the bus system as a unit has declined over the period ('95 to '99) from 42.2% to 30.3%. The overall operating ratio for all operating revenues and all operating expenses declined from 37.7% and 28.8% respectively over the same period. See Table 7-2 below.

**Table 7-2**  
**MTA Performance Audit**  
**Fares as a % of Operating Cost**  
**Fiscal Years 1995-1999**

<u>Year</u>	<u>Fare Increase Implemented</u>	<u>Bus/Bus %</u>	<u>all/all %</u>
1995		42.2	37.7
1996	August, 1996	38.5	37.4
1997	August, 1997	37.6	36.3
1998		35.9	33.0
1999	August, 1999	30.3	28.8

While the MTA management and the Board were making ongoing efforts to maintain fare revenues after three fare increases in four years, the operating ratio has declined significantly since 1996. According to MTA management, part of this decline was associated with uncertainty related to the new Titan football service. MTA management revised the service and pricing in 2000 and expects performance to rebound.

**Impact Of the 1999 Fare Increase.** As a result of fare increases during 1999 overall passenger fare revenue was up only fractionally for the fiscal year. This indicates there is little revenue opportunity available through increasing fares further.

**Fare Structure Design.**

Transit systems offer a variety of pricing or ticketing plans to customers as a means of encouraging use of the system by additional riders, or of recovering a higher return for premium services. The MTA offers several basic plans, including:

- **Cash Fares-** The customer pays cash for the full fare every time a ride is taken. This fare was the standard fare at most systems until the mid-1970's when market-specific or service-specific discount or premium fares became a common practice. Cash fares are usually the highest price per ride at most transit systems.
  
- **Tickets-** The customer purchases tickets for a specific number of rides in advance - in the case of the MTA, 20 rides. The tickets offer the user the convenience of not having to carry the correct fare for each ride. Many transit systems offer a discount over the cash fare for three reasons: 1) the financial advantage of receiving money in advance of providing the transit service and 2) improved boarding speeds at stops, a new way to market the services.

- **Flash Passes**- The customer purchases an unlimited-ride ticket for use at any time during a specified amount of time, for either one week or one month. The pass offers the user the convenience of not having to carry the correct fare for each ride. Many transit systems offer a discounted pass over the cash fare for two reasons: 1) the financial advantage of receiving money in advance of providing the transit service and, 2) improved boarding speeds at stops. Flash passes have the potential for increasing the discount per trip for a user who rides the system frequently.

Coincidentally, tickets and passes offer a pre-paid media that can be used for a variety of promotional purposes by third parties such as employers, merchants, special event managers.

Like many other transit systems, the MTA also has fares that are designed for three general types of riders — regular adult, express adult, and discount riders (children, senior citizen, and disabled). MTA also has special fares for users of the downtown shuttle and magnet school routes.

The MTA follows the practices of many other transit systems and provides lower fares for discount riders, as indicated on Exhibit 7-1. The base cash fare of \$0.70 is slightly less than half of the adult cash fare of \$1.45. This pricing structure also meets the federal requirements for discounted fares for the elderly in off-peak periods.

**MTA's 20 Ride Tickets** - The MTA sells 20-ride passes for regular bus and express bus adult fares and for discount fares. The discounts when compared to the full fares for the tickets range between 12% and 14% for each ride. If a transfer is made, the ticket user must pay the full \$0.10 for the transfer and the discounts are reduced to a range between 11% and 13%. The 20 ride pass encourages riders who use transit for work commuting to purchase the 20-ride tickets, since it provides them the security that they will not lose their discount if they miss work a few days.

**MTA's Monthly Flash Pass** The MTA offers monthly flash pass only to adult users of local services. The pass is priced at 33 times the cash fare, or 31 times cash fare with transfer. This pricing is common among transit systems and provides a reasonable discount for a commuter traveling to work 22 days a month, making an assumed 44 rides a month on average. The monthly pass encourages people to use the transit system seven days a week for all travel purposes. The greater the use, the greater the actual discount. This pricing plan supports a public policy objective of offering the lowest fares to the people who use the system most. It also produces cash up-front.

**MTA's Weekly Flash Pass** - The MTA offers weekly unlimited use flash passes to adult users of local services, and to discount riders. The pricing of these passes is focused on people who use the transit

system more than for work commuting. It is also more accessible to people with limited means that do not want to spend the price of the larger monthly volume passes.

Flash passes are not offered for adult express bus users. This appears appropriate since the majority of these users usually limit their transit riding to work commuting. Often, these riders are not as price sensitive as frequent, seven-day riders. Nevertheless, the MTA offers them some pricing discounts through the 20-ride mobility pass (ticket).

It is not clear if the MTA uses the difference in the pricing of local and express fares fully to reflect the differences in the cost of services.

**Special Fares** - The MTA charges special fares for the downtown shuttle and magnet school services. The cash fare for the downtown shuttle is \$0.25. The monthly pass is priced at \$5.00 or 20 times the cash fare. The multiplier of 20 is inconsistent with the multiplier of 33 that is used for the monthly flash pass for local services.

The cash fare for the magnet shuttle is \$1.10. A 20-ticket pass also is offered at \$22, with no discount compared to the cash fare. Offering no discount to student users of the shuttle is appropriate and consistent with the practices of other transit systems.

**Advertising Revenues**

One way to assess MTA’s advertising revenues is to compare its non-fare revenue performance with the transit systems in its peer group. For the comparisons, we used the fiscal year 1999 data from the National Transit Database in the reporting category auxiliary transportation funds, which includes advertising revenues.

**Table 7-3  
MTA Performance Audit  
Auxiliary Revenue  
Compared to Peer Systems**

	<b>MTA</b>	<b>Peer Group Average</b>	<b>MTA as % of Peer Average</b>	<b>Rank Among 13 Systems</b>
<b>Auxiliary Revenue as % Of total revenue</b>	2.4%	1.22%	197.5%	2

The MTA earned significantly higher revenues in comparison with the transit systems in its peer group as shown on Table 7-3. In fiscal year 1999, it earned 2.4% of its operating revenues from auxiliary

revenues, primarily advertising revenues. This is almost double the percent of operating revenues funded by auxiliary revenues at the average peer system.

The MTA has a higher percentage of operating costs supported by auxiliary funds than 11 of the 13 transit systems in the peer group.

**Table 7-4  
Advertising Revenues  
Fiscal Years 1995-1999**

<b>Year</b>	<b>Cash Revenues</b>	<b>Trade Revenues</b>	<b>Total Revenues</b>
1996	\$385,268	\$146,314	\$531,582
1997	493,030	192,947	685,977
1998	393,935	272,651	666,556
1999	538,113	174,741	712,854
2000	744,826	150,768	895,596
% Increase	93.3%	3.0%	68.5%
Average Annual Increase	17.9%	0.8%	13.9%

Advertising revenues have grown significantly in the past five years, as shown on Table 7-4. Actual cash advertising revenues nearly doubled from \$385,000 to \$744,000 between fiscal years 1996 to 2000. Trade revenues — comparable value trade of advertising (e.g., radio station) — remained constant at about \$150,000 during this period. Taken together, total revenues increased almost 70% from \$532,000 in 1996 to \$896,000 in 2000 or grew at average annual rate of 13.9%.

**Bench Advertising** - The backbone of MTA's advertising sales revenues are the bus benches. The MTA now has over 570 bus benches under contract for advertising. The rates for these benches range from \$86 to \$105 per month and yield over \$660,000 per year.

The MTA recently added 150 bus benches to meet advertisers needs. The MTA located the benches based on their appeal to advertisers and to address complaints or requests made by MTA riders.

**Shelter Advertising** - The MTA also sells advertising on bus shelters. The advertising rates for shelters range from \$233 to \$299 per month. The MTA has sold advertising on less than 20 of the 77 available spots on its shelters. According to MTA staff, these limited sales reflect the difference in advertising rates between shelters and benches when they have similar visibility to the public.

**Bus Advertising** - Finally, the MTA sells advertising on buses. This includes exterior signs and complete fully illustrated (wrapped) buses. MTA had five wrapped bus sales as of December 2000.

## **Other Revenues**

The principal sources of revenues for the MTA , and for most transit systems, are public subsidies. While the MTA collects a higher than average level of funds from operating revenues, it still must rely heavily on operating and capital assistance from the Metropolitan Government, the state, and from the Federal government.

A comparison of the MTA's subsidy for capital and operating expenses compared to the peer systems is illustrated on Exhibit 7-2. Local, state, and federal subsidies for capital is better than average, with the MTA ranked 3<sup>rd</sup> or 4<sup>th</sup> out of 13 peers in 1999, as shown on the exhibit. Note, however, this data represents absolute dollars only and does not represent statistics on a per capita or a relative system size basis. For a more complete discussion of subsidies see the *Peer Review* section of this report.

As these data show, the MTA has garnered over double the level of operating subsidies from the Federal government, compared to the peer average for 1999, and ranked third in that category. Its local and state operating assistance levels were just about average for the peer systems, and ranked near the middle of the group.

Capital subsidies from all sources increased substantially year-over-year ('99 over '98).

## **Conclusions**

- The MTA has high priced fares in comparison with the transit systems in its peer group. The MTA has higher average fares than 12 of the 13 transit systems in the peer group.
- MTA's customers pay for a larger percentage of operating costs in comparison with the transit systems in its peer group. Passenger fares covered 28% of MTA operating costs —15% more than fares of the average peer system.
- The MTA Board does not have a fare policy for the transit system as whole but does have a policy regarding fare recovery of individual routes and special services.
- The MTA made continual efforts in the last five years to increase fare revenues as a percent of operating expenses. This performance reflects management and Board concern with fare revenues, and their efforts to maintain fare revenues at about 40% of operating costs.
- The MTA fare structure is designed similar to fare structures found at other transit systems. It has a good pricing balance among cash fares, 20-ride tickets, and passes.



- The difference in the MTA 's pricing of local and express fares generally reflects the differences in the cost of local and express services, although their methods for identifying the actual differences in local and express services are inadequate to the extent of the differences in these costs. (See a related discussion in the Chapter entitled "Pricing".)
- The MTA earned significantly higher auxiliary revenues, principally advertising, in comparison with the transit systems in its peer group. In fiscal year 1999, it earned 2.4% of its operating funding from auxiliary revenues — almost double the percent at the average peer system and higher than 11 of the 13 transit systems in the peer group. Advertising revenues have grown significantly in the past five years from approximately \$532,000 in 1996 to \$896,000 in 2000 — a compounded annual rate of 13.9%.
- The backbone of MTA's advertising sales is for the bus benches. This program has been financially successful.
- The MTA may also be mispricing shelter advertising (and possibly "wrapped buses") given the lack of market response to these venues.

### **Recommendations**

- The MTA Board should adopt a formal fare policy for the transit system as whole that relates passenger revenues to operating expenses. The fare side of the ratio should reflect the best balance possible of the impact on ridership and revenues, considering the amount of subsidy available. In establishing this balance the Board should understand there is no "magic bullet" in setting fares. Local market price elasticity, local custom, and many other factors play a role in the fare setting equation. Building a more sophisticated Marketing department should provide an aid to understanding the local market and establishing the optimum fare rate balance. (See sections on *Marketing* and *Governance*.)
- The MTA should adopt a pricing policy for each type of bus service that reflects the different costs of those services.
- In setting policy operating ratios and in pricing all services, the MTA should use fully allocated costs in defining the operating expenses. See sections on *Pricing* and *Service Scheduling* for a discussion of *fully allocated costs*.

- MTA should re-examine the current approach to selling advertising for the shelters and bus-wraps. The marketing approaches to these ad products may need to be re-positioned and possibly re-priced.

**Cost Estimate**

None.

## **MTA's Pricing Methodology – special services**

Pricing transit services has evolved over the past several decades. Early on fares were set at a level to provide a net operating income and return on capital, or at least a positive cash flow for the owners of the private systems. These systems are the predecessors to today's public transit systems. Today's modern, public transit management's attempt to set fares at a level that will maintain the highest level of ridership, while living within the anticipated levels of operating subsidies from local, state, and federal funding agencies. These systems do not operate to make economic profits, or even break even on an operating basis overall.

Fare decisions are often made in an atmosphere of financial or political uncertainty, and frequently in haste. Few transit systems have a fare policy that will endure under all circumstances. The recurring effort in most systems is to find, and then try to maintain equilibrium among fares, ridership, and service coverage.

The setting of fares consists of three fundamental policy and management activities:

- Setting well-considered operating ratio objectives for each service segment, in an atmosphere of systematic and objective analysis so that they are well understood by the policy and political leaders and can be followed at fare setting time with mutual confidence
- Determining accurate costs for use in costing services to achieve a given system and market operating ratio.
- Understanding and building on the elasticity of the market place in a manner that will yield the needed revenue while minimizing ridership loss.

Different prices are increasingly being set at transit systems by such market segments as express and local service levels, frequent riders, school children, handicapped and elderly riders, special event service riders, weekend and late night riders. These different pricing scenarios may in some cases reflect public policy decisions regarding cost recovery, i.e., riders should bear some or all the costs of a particular service. In other cases, such as handicapped riders, fares are regulated. While others are market driven in an attempt to balance the factors described above.

The MTA, like most transit systems, provides tailored transit services for a number of special activities in addition to the basic daily service that it operates. Special service for major public events is provided by many transit systems throughout the country. Such service often is provided to handle large crowds that otherwise would strain the supporting highway system and overload event parking. Pricing this type of service then may represent an attempt to balance a number of public policy issues.

This year, the MTA operated special services for public events such as the Billy Graham Crusade, the Titans football games, a Vanderbilt game, and a number of public concerts such as NSYNC. In addition, the MTA provides incidental charter service for private events such as weddings and company outings. Often, the MTA is contracted because it can provide special equipment like the replica trolley buses that are unavailable from private providers in the area.

The downtown parking shuttle and magnet school services are a third type of service that might be considered ancillary to the basic daily service that MTA operates. They are different from the special event services because they operate regularly throughout the year. However, they have certain characteristics — special state funding for the parking shuttles, special fares and reporting for the magnet services — that make them very similar to the public and private event services.

We reviewed MTA's methods for establishing rates for all three of these service types. (Note that much of the discussion related to cost estimation and cost models is also discussed in the *Scheduling and Service Planning* section.)

#### **Setting Prices for Special Event Services**

The policy of the MTA Board is that the rates for special activity service should at least cover the costs of providing the service. For the Titans service, the 2000 goal is to recover 20 percent more than incurred costs estimated by MTA management. The Board's cost-based approach for setting rates places heavy emphasis on the accuracy and type of cost model used.

The MTA uses a hybrid approach for estimating the costs for special activity services. Marginal costs (sometimes called avoidable or variable costs) cover the operating costs that are incurred to provide the special service. Examples include drivers' wages and fuel. The MTA estimates the marginal costs of providing basic bus service using a flat rate per vehicle hour — currently \$42.94 for bus service. (We tested and confirmed this number using two months actual costs and were within 10% - \$44.94 - of this estimate.) MTA estimates the marginal unit costs for the Trolley service (marginal cost = \$34.97 per vehicle hour) and ACCESSRIDE services (marginal costs = \$30.08) using the same approach. The MTA's unit cost estimate, using the hours and vehicles by type of vehicle for the November 5, 2000 Titans game, is illustrated on Exhibit 8-1.

The other direct expenses that are incurred in providing special services beyond the basic bus service are estimated separately by the MTA. For example, the costs for crowd management at Titans games - erecting fences, managing boarding and alighting passengers - are estimated separately and then added to the estimated marginal costs of operating the bus service as shown in the exhibit. We reviewed how MTA's approach was applied to the service provided to the Titan's game on November 5, 2000.

We noted several areas related to the cost presentation of the basic bus service, which represents over 90% of the cost, which we believe should be factored into future pricing discussions regarding this service. These included:

- Deduction of the capitalized maintenance expenses
- Use of average costs for labor working at overtime
- The lack of charges for fixed costs
- Capital replacement policy considerations

#### **Capitalization of Maintenance Expenses**

The FTA has in recent years allowed the use of Federal assistance for the capitalization of maintenance expenses (“contra expenses”), which the MTA has done for the past two years. One step in the MTA’s estimation of the marginal unit cost of bus service is the deduction of expenses for capitalized maintenance. The MTA deducts these expenses apparently on the grounds that they are funded using Federal transit capital funding and therefore need not be included in the charges for the Titan services (or other services).

Deducting these expenses suggests that they should not be included in the expenses to be covered by the revenues of the service. There are two reasons why these expenses should be included in the costing of special activity services:

- These are operating expenses, no matter how they are funded. Excluding these expenses serves to understate the cost of providing the special activity services, and, thereby, “under-price” them.
- FTA capital funding used to cover operating expenses reduces the funding available for the MTA capital program. It is proper that this transfer be assigned a cost value.

If the contra expenses are not deducted, the resulting marginal cost per vehicle hour for this service is \$51.96, or 25% higher than the MTA’s marginal rate of \$42.94. We have added a similar factor to the costs of the trolley and ACCESSRIDE services for purposes of our analysis. Under these assumptions the estimated cost of the service provided to the Titan’s game on November 5, 2000 would increase from \$32,700 to almost \$39,000, as illustrated on Exhibit 8-2.

**Labor Cost Considerations** - The MTA uses a one-variable formula that estimates costs based on the number of vehicle hours operated. The same unit cost per hour is used for all service no matter the time of day (e.g., morning rush period, midday, evening rush period) or day of week (e.g., weekdays, Saturdays, Sundays).

The MTA costing approach is most accurate when the drivers operating the special event services receive the same pay provisions as the average driver in the system. It is less accurate when there are significant differences in pay provisions, such as more or less overtime pay.

The drivers of the Titan service work on their days off and receive overtime pay (time-and-one-half) for all hours worked on game days. We reviewed the service provided to the Titan's game on November 5, 2000. According to MTA estimates, 710 vehicle hours of service were operated. If the service were operated as part of regular daily operations, a total of 730.67 hours of pay would have been paid. However, since the drivers all receive overtime, we estimate that the equivalent a total of 1,096 (1.5 \* 730.67) pay hours were paid.

The ratio of scheduled pay hours to platform (vehicle) hours for MTA's 2000 fall schedule is 1.10. The ratio of scheduled pay hours to platform (vehicle) hours for the Titan's game on November 5, 2000 is 1.54. Therefore, the Titan's drivers were paid 40% (1.54/1.10) more than the average driver in the MTA system.

The consideration of overtime costs has a large impact on the estimated costs of the Titan special event service. We assumed that the MTA marginal cost rates *with contra expenses included* for regular bus, trolley and ACCESSRIDE services would increase by 14%. Under these assumptions, the estimated cost of the service provided to the Titan's game on November 5, 2000 would increase from almost \$39,000 to over \$44,000 with contra expenses included (Exhibit 8-3 column C). A marginal cost rate of \$59.23 for the regular buses.

**Variable and Fixed Cost Policy Considerations** – In pricing discussions where cost recovery is the subject, it is common among transit systems to use an allocation of fixed (overhead) expenses in the cost model. Marginal costs (sometimes called avoidable costs) cover the operating costs that would be incurred only if a special service were provided. Fully allocated costs include both variable costs and fixed (overhead) costs — the costs that would not be saved or avoided if a special event service were eliminated. Management wages and benefits are examples of fixed costs.

Using fully allocated – or some reasonable factor of overhead charges - provides policy makers and the public with a better understanding of the true operating costs covered by revenues from special event services. It allows for a more accurate "break even" analysis in the pricing discussion. After all, operating costs in total must be funded from all the various sources available.

The use of marginal costs in the fare revenue/operating cost indicator implicitly supports a policy that special event passengers should not be required to cover any portion of fixed costs. This contrasts with the practices of many transit systems that do not distinguish between fixed and marginal costs in such

costing exercises. They simply have a policy that all passengers should pay a reasonable portion of all operating costs — fixed and marginal.

Time allocation of fixed resources is another reason for using fully allocated costs. While it is true that fixed cost do not change, it also is true that use of these resources would change when special event services are added or eliminated. For example, the salaries for marketing employees are a fixed expense. When special event services are added, these employees must spend less time on existing services to free time to spend on the new services. Therefore, it is reasonable to “charge” special event services for the use of these fixed resources since they could be used elsewhere.

The consideration of fixed costs has another large incremental impact on the costs of the Titan special event service. We assumed that the MTA marginal cost rates, modified to include the contra and overtime expenses, for regular bus, trolley and ACCESSRIDE services would increase by an additional 19% — the ratio of fixed to variable expenses reported by MTA to the 1999 National Transit Database. Under these assumptions, the estimated cost of the service provided to the Titan’s game on November 5, 2000 would increase from the MTA rates of \$42.94 to \$70.48 and hour. The combined impact of including the contra and overtime expenses and the fixed costs would increase the cost of the November 5, 2000 Titan service from \$32,700 to almost \$51,900, as shown on Exhibit 8-3 Column D.

**Capital Replacement Policy Considerations** - The costs of providing transit service include not only the operating costs such as labor, fuel, and other consumables but also the capital replacement costs of operating assets such as buses and garages. The MTA costing approach focuses on operating and does not address the issue of capital replacement costs. It is important to recognize that the MTA approach does address the costs for the *repair* and *maintenance* of capital assets, but does not address the costs of their *replacement*.

In the private sector, depreciation is used to cost or recapture capital replacement costs. Costs are not normally separated into operating and capital costs.

Transit systems typically do not use depreciation as a way to cost or recapture capital replacement costs. Depreciation often is not shown in operating budgets. If it is shown at all, it is “below the line” as a reconciling item as is done in the National Transit Database reports. Therefore, it is not surprising, or unusual, that the MTA does not include depreciation or capital replacement costs in its costing approach.

It is, however, a policy issue that the MTA Board has not explicitly addressed.

Our estimate, based on NTD data, of full bus replacement cost per vehicle hour would be \$13.05. This is consistent with a rough rule-of-thumb in the industry that transit bus costs are often 20 to 30 percent of

operating costs. If a cost model is built with a factor for capital costs it could be argued that only the local component of costs should be captured. Since the local funding share of capital costs is 10%, the net increase in costs in the model would be approximately \$1.30. This is a subject that should be settled by Board policy.

### **Downtown Parking Shuttle and Magnet School Services**

The downtown parking shuttle and magnet school services are other types of special event services that might be considered ancillary to the basic daily service that MTA operates. They are different than the other special event services because they operate regularly throughout the year. They do, however, have certain characteristics such as special state funding for the parking shuttles, increased security, special fares and additional reporting, that make them very similar to the public and private event services. It was not clear during our review that there was consensus regarding the evaluation of these services. In addition to the cost estimation methods discussed above, discussions with MTA staff suggested that the routes are considered internally as conventional bus routes with no special targets for revenue return. In our view these services should be subject to the same sort of analysis and policy discussion as the Titan Service.

### **Conclusions**

- The discussion above is not meant as a recommendation regarding proper pricing for the Titan's Service. As mentioned earlier, there may be many, perhaps conflicting, public policy considerations factored into pricing decisions. Nor should this presentation be construed to represent the perfect cost model for the service. We have identified labor as an unusual factor that should be modeled in the cost presentation. There may be others. Similarly, it may be appropriate to apply some factor to fixed charges in order to arrive at a more accurate overhead allocation. (We do feel, however, that capitalized maintenance should be included in any cost model presentation.) Our point is that since cost models are going to be used in policy discussions and as a basis for pricing decisions then more sophisticated approaches need to be developed.
- Our estimate (with assumptions outlined above) of the cost of the Titan's service is approximately \$52,000 versus the MTA estimate of approximately \$33,000.
- The MTA estimates the marginal costs of providing basic bus service using a flat rate per vehicle hour. This estimate (excluding the contra expenses discussed above) was accurate.
- The MTA costing approach for special services does not incorporate significant unusual factors such as driver overtime pay.



- The MTA Board has not set a clear policy regarding recovering capital replacement costs.
  
- The downtown parking shuttle and magnet school services are different from the other special event services because they operate regularly throughout the year. However, they have certain characteristics — special state funding for the parking shuttles, special fares and reporting for the magnet services — that make them very similar to the public and private event services. There is no clear consensus regarding the evaluation of these services.

### **Recommendations**

- More sophisticated cost models need to be developed to aid in pricing decisions and assist public policy decisions regarding cost recovery.
  
- The MTA should revise its costing approach to include contra expenses in all costing models.
  
- Allocation of fixed charges should also be included in costing and pricing decisions when the context is cost recovery.
  
- Unusual cost factors, e.g., driver overtime, should also be incorporated into models when applicable.
  
- The board should establish a policy regarding capital cost replacement.
  
- The Board and management should establish clear consensus regarding the approach to all special service activity.

### **Cost Estimate**

A detailed market study would be required to determine impact of re-pricing any of the special services. Pricing analysis is normally a function incorporated with an integrated Marketing program which is described in other sections of this report.

## **Budgeting, Accounting, And Internal Control Processes**

### **Budgeting and Internal Controls**

Our analysis focused on use of the annual operating budget as a management tool to control the financial performance of the agency. We analyzed the development of the budget, trends in budget variances, and management and Board reaction to budget variances. We did not examine internal controls in an auditing sense, as these are addressed in the annual external audit. We did review audit letters and found no unresolved control issues.

We noted from interviews that, from a budget and financial management standpoint, control is materially vested in the Executive Director to manage the operations of the agency within the adopted budget. The adopted budget is interpreted by the Executive Director as the variance between total revenues available to operations, less operating expenses.

We found that the use of the MTA operating budget as a management and oversight tool can be enhanced significantly. Material account-level variances are the norm, and deficits are mitigated by unbudgeted capitalization of maintenance expenses. Although this practice does not violate Federal transit grant rules, it does draw money that might be used for approved capital projects. It also confuses true operating results and makes year over year trend analysis and budgeting problematic.

The capital budgeting process consists of three elements. The Transportation Improvement Program is approved by the Board. The Board then approves the program of projects and grant application for the annual capital grant. Frequent amendments to grants, however, tends to limit the usefulness of these documents as an expenditure control. Although capital expenses are controlled to authorized purposes, the capital budget does not receive a great deal of management attention. We did not observe a comprehensive capital plan, which incorporated a fleet replacement plan plus other capital assets. Our review of the Capital budgeting process was limited.

Our analysis of the operating budget is presented below. It addresses the budget development process, budget variances 1997–2000, monthly budget variances for FY2000, and variance analysis, and budget control and reporting practices.

### **Budget Development Process**

The budget development process at the MTA is highly centralized. An account-level budget is developed by the Executive Director, after he considers requests from the departments. Following Board discussion

and approval (February through May, generally), the annual budget for each account is allocated to each month by the Director of Accounting. MTA has used various means to estimate the monthly budgets. In FY2000, the monthly budget was simply stated as one-twelfth of the annual total.

**Trend in Variances, 1997–2000** – Exhibit 9-1 shows the actual and budgeted values, and variances, for each of the MTA fiscal years 1997–2000. The source for these values is the pre-audited “Statement of Operations Compared to Budget” as of year-end June 30, for each of the four years examined. These are the primary financial reports provided to the MTA Board. The presentation of information in our exhibit (9.1) has been reorganized from the actual report to Board in a number of ways listed below. None of the financial information, however, has been altered from the original reports.

- Variances are labelled as favorable or unfavorable, based on the condition of the item being reported (e.g., if actual revenues were less than budget, the variance is unfavorable);
- Capitalized maintenance costs are shown distinctly rather than presented as an offset to expenses
- Budgeted and unbudgeted use of capitalized maintenance is presented distinctly to highlight the use of unbudgeted allocations of capital funds to cover operating deficits.

The trend in budget variances indicates that the budgets adopted by the MTA Board are not an effective control on operating costs, considering these factors:

- Expense budgets adopted in 1997, 1998, and 1999 were not balanced to budgeted revenues, thereby building a cumulative deficit through FY2000.
- Revenue variances have been unfavorable every year.
- Expense variances were unfavorable every year.
- Operating deficits, prior to capitalization of maintenance expenses, ranged from \$0.7 million to over \$2 million. All vehicle maintenance expenses are an eligible use of Federal capital funds under TEA-21, the Federal funding program.
- Budgeted capitalization of maintenance expenses totaled \$7.7 million for the period. This total corresponds to the capital funds requested for maintenance that are included in the regional Transportation Improvement Program adopted by the Metropolitan Planning Organization.
- Unbudgeted capitalization of maintenance expenses totaled approximately \$5 million cumulatively. These are funds that have been reallocated away from capital funds.

Clearly, some of the budget variances are affected by events that render the original forecast inaccurate. Budgets are, after all, estimates. A good example is increased fringe benefit costs that explains a portion of the labor and fringe cost variance noted above. Taken as a whole, however, the consistency of the budget variances and the use of unbudgeted capitalized maintenance suggests the budget process needs enhancement.

Capitalization of maintenance expenses is a double-edged sword. It does help to reduce the local and state funding requirements. But it tends to lead to an understatement of the true ongoing financial needs of the operation, and it reduces the capital available for capital costs such as fleet replacement. In the case of the MTA, its use for bus repairs was viewed as a solution to overcome a major maintenance backlog. At the same time, the fleet age of the MTA increased and the number of over age buses increased.

The MTA makes the case that the lack of a committed local share of capital for fleet replacement made the use of the Federal monies for new buses a moot point, and made the use of the funds for operating purposes more advantageous. This is another reason why the MTA needs to develop a financial strategy for capital and operating costs.

### **Management Reporting, Variance Analysis and Budget Control**

Regular financial reporting to management and the board showing actual performance versus expected "budgeted" results is a fundamental tool for the management and oversight of any enterprise. We examined the financial reporting to the Board and found the following weaknesses in the current presentation: (see Exhibit 9-2 for the actual February 28, 2000 report to the Board.)

- There is no indication of year to date line item variances (favorable or unfavorable) to the budget. Only the annual budget is shown. A board member would have to perform a somewhat complicated calculation to determine where the agency actually stands relative to the budget.
- Since the monthly budget is simply 1/12 of the annual budget, the calculation described above will only produce rough guidance.
- Monthly variances are not labeled favorable or unfavorable.
- Mid-year forecasts or "budget reestimates" are not captured on the monthly report to the board. Only the original budget is referenced. This means the Board has no way to track performance against the new, presumably more accurate, estimate of future activity.
- Other observations regarding the Board reporting are highlighted in the Recommendation section that follows the end of this section.

Variance analysis refers to a systematic review of budget variances to determine if budget modifications are necessary as the year progresses. This is a fundamental tool for managing budgeted costs to actual program activity. It also has policy implications - Board members should be apprised of activities that are consuming materially more or less resources than planned, so that surplus resources can be reallocated or other programs trimmed consistent with their policies.

Based on interviews with the MTA Executive Director, the Director of Accounting and other staff members, attendance at Board meetings and review of Board minutes, we did not observe a rigorous variance analysis process.

### **Revenue Collection Security**

MTA fare media are generally of two types: cash and pre-paid fares. Cash fares are collected on MTA vehicles. These represent about 70% of fare revenue. On buses, cash fares are deposited in registering fareboxes. On paratransit vehicles, cash is deposited in secure, but non-registering, grey boxes.

The remaining 30% of revenues, for prepaid fare media, are collected at the Landport and Deaderick Street ticket booths, and at the MTA accounting offices at headquarters. Ticket booths sell directly to individual customers, while accounting handles sales to companies and organizations. Overall, about 95% of fare revenue is collected from bus passengers, and about 5% from paratransit passengers.

### **Cash Collected on Buses**

Our review of revenue collection security focused on cash collected on buses. This security system has three components — collection of cash on board a bus and its transfer to a larger, secure vault; rotation of the large vaults between the bus servicing aisle and the money room, where it is counted; and transfer of the cash via secure transport to the bank where it is deposited. A cash count by electronic fareboxes aboard the buses is the basis for reconciling cash collections to the bank deposits.

The electronic registering fareboxes count cash (coins and bills) and store the totals in on-board memory. The cash drops into a secure vault within the farebox, separated into coin and bill bins. During the nightly servicing procedure for each bus, the farebox vault is removed from the bus and dumped into a large secure vault at the servicing aisle.

The farebox vault and the larger vault are designed such that the cash is not accessible during the transfer procedure. When the farebox vault is pulled and the contents dumped into the larger vault, the servicer extracts the contents of the on-board memory with an infrared probe. The data is transferred to a computer that maintains a database of revenue collected from each bus.

The fareboxes are pulled nightly, Monday through Friday. On the following morning, the large cash vault on the servicing aisle is towed into the money room, and an empty vault is brought to the servicing aisle. Each outgoing vault is locked and sealed, using a serialized seal that is crimped and recorded by staff from the accounting office. When an incoming vault is opened by a money room clerk, the money room supervisor verifies the serial number.

Cash is counted and bagged daily. The bags are sealed and recorded, then transported by armored truck to the bank. Bank deposits are reconciled against the registering farebox counts. Complications to the reconciliation process are introduced by two factors — lags between the farebox count and the day of the deposit, and bypassing of the electronic farebox system due to mechanical or electronic failure.

Lags in the counting-depositing process are due to the Monday-Friday operation of the money room. Cash collected on Saturday, Sunday, and Monday is counted on Tuesdays (Friday cash is counted on Monday, the normal lag of one business day). When the cash volume is very large, some of the Tuesday count may not be counted and deposited until the following day. This affects the monthly totals, since several days of cash collected in a prior month may be credited to the current month. Based on an analysis we performed it would not be cost beneficial to employ counters over the weekend to shorten the cash counting and deposit lags

Bypassing of the farebox system can also skew the reconciliation process. A radio supervisor must authorize a by-pass. These occur one to two times a day, system wide. When this occurs, the cash is not counted by the on-board system. If the farebox is unable to securely accept cash (e.g., if jammed), a supervisor takes a secure, serialized gray box to the bus. The money is counted at the end of a day by a supervisor, and logged. Only a small amount of cash is collected in gray boxes, usually less than \$10 but occasionally as much as \$20.

Monthly cash reconciliation is nonetheless fairly close to bank deposits. We reviewed the reconciliation reports for several months and noted no meaningful exceptions.

#### **Cash Collected for Prepaid Fare Media**

The cash collected for prepaid fare media (i.e., tickets and passes) is somewhat less complicated to control since the points of sale are fewer.

All prepaid fare media are initially stored in the money room. The customer service outlets are restocked quarterly from the money room inventory. Any media that have expired are returned to the money room. The returns and daily sales are reconciled against the stock issued to each location. Customer service provides accounting with a daily inventory that is reconciled to cash deposits daily.

In summary, MTA has reasonable procedures in place to secure its cash revenues. Initial counting, deposits, and reconciliation are handled by separate staff. The procedures appear to be followed regularly.

### **Safeguarding of Physical Assets**

Physical assets are safeguarded by a tag system and biennial physical inventory. Items are added to the inventory from capital expenditures. A paper trail is maintained by Accounting for each capitalized item. When a capital item is recorded as paid, the Director of Accounting assigns an inventory number, identifies a depreciation schedule, and assigns a property tag.

Capitalized assets entered into the fixed assets inventory semiannually, usually in December and June. Capitalized items greater than \$1,000 value (for grant purchases) and replaceable assets under \$1,000 value are placed in the fixed assets system. The fixed assets system maintains the inventory of fixed assets, and calculates annual depreciation. The annual depreciation amount is transferred manually to the general ledger system at the end of the fiscal year.

The physical inventory procedure compares existing tagged assets to the current fixed assets listing. The most recent physical inventory was March 1998. An inventory was scheduled for March 2000 but was deferred due to a staffing shortage in Accounting. A new inventory must be conducted prior to the FTA triennial audit, scheduled for calendar 2001.

There have been no recent financial audit issues associated with the fixed assets system. According to the Director of Accounting, the inventory procedure has been reviewed and accepted by the external auditor and the FTA.

### **Conclusions**

- Reasonable controls exist for revenue collection and reconciliation.
- Reasonable controls exist to safeguard assets, but physical inventory is behind schedule.
- MTA has exceeded its budgeted operating expenses for each of the last four years.
- MTA uses maintenance capitalization in a manner we consider inappropriate.
- Capital expenditures and budgets receive inadequate attention, and are modified without consideration of long-term capital replacement needs.
- The budget development process needs refinement in light of the year over year budget shortfalls.
- Budget variance analysis process needs to be enhanced.
- Monthly financial reports to the Board need to be revised.

### **Recommendations**

- The MTA should develop a comprehensive asset replacement plan, including fleet replacement, to guide its board approved capital budget.

- The unbudgeted capitalization of maintenance expenses should be seriously examined in light of the MTA's other capital needs and the distortion created to true operating results.
- The operating budget should be refined and developed under a more conservative set of assumptions, with perhaps greater input from MTA department managers. It may also be helpful to develop the budget on a program basis specifying the activities that are to be funded by the budget. This would include miles and hours of operation by mode, passengers carried, routine and special maintenance activities, planning, and other activities that are to be carried out under the budget.
- The MTA should develop and implement a combined operating and capital budget that specifies the proposed operating and capital expenses for the upcoming budget year, and a capital budget for the subsequent five years. This should also include a proforma for the entire six-year period that illustrates the long-term financial picture of the MTA assuming the implementation of planned projects.

There are several features of the current Board report that warrant improvement:

- The monthly budget should better reflect monthly activity. In 2000, monthly budgets were simply one-twelfth of the annual budget. This leads to inaccurate portrayal of monthly financial position. Financial assistance from Metro and from the state, for example, is drawn down by February of each year. There is no expected draw in June, yet the June report shows a budgeted draw. Correspondingly, draws for earlier months would be understated.
- The report should clearly identify favorable and unfavorable variances. Currently, revenues that exceed budget are shown in brackets, conveying what would normally be considered an unfavorable variance, while revenue shortfalls are not bracketed.
- Year-to-date expenses should be compared to a year-to-date budget. The current report compares YTD expenses to the annual budget. The only time this comparison is meaningful is at year-end. In intervening months a somewhat complicated manual calculation is required to understand year to date performance to year to date budget.
- If the budget is re-cast to provide a more accurate forecast of future activity, this view should also be captured in monthly reporting. A standard financial report format would typically show Year-to-date actuals with a better(worse) comparison to year-to-date budget next to a better(worse) comparison to the new forecast.
- Capital grant funds used for maintenance should be displayed as a revenue item, under Federal/State/Local income, instead of being applied as a credit to parts, materials, & supplies expense. Presenting the capitalized expense as a credit to materials is factually incorrect, since maintenance capitalization includes labor costs as well. When unbudgeted transfers of capital grants are made, an addendum or note to the report should identify the projects from which the funds were drawn, and the implications of the transfer for that project.



- The bottom line of the report should indicate whether the agency has an operating surplus or deficit.
- Given the MTA's cash flow problems, the report should also present MTA's current cash on hand, and draws against working capital reserves or lines of credit.

The above changes would aid the Board and MTA management in focusing on budget variances before they become a year-end problem.

**Cost Estimate**

Costs associated with adding a new finance director position are described in the *Governance* section.

## Cash Management

### Cash Flow Management

A cash flow for any period of time is the difference between cash income and cash outlays. Cash flow management consists of predicting and managing variations in cash income and cash outlays so that the net cash position (i.e., the sum of a beginning cash position and cash flow) is consistently positive, allowing a safety margin for the inevitable forecast error. When the net cash position is negative, outside financing must be used, either in the form of explicit credit agreements (such as a line of credit with a bank), or through increases in accounts payable.

Use of external financing should not unduly place an organization at risk — that is, the assets used to secure external financing should be available in the amount and at the time to meet the maturing obligations. This concept is known as liquidity — the ratio of cash and other cash-convertible assets to near-term financial obligations (or current liabilities). The management of liquidity is closely related to cash flow management. Whereas cash flow management is evaluated from actual cash transactions over some period, liquidity is evaluated over a longer period of time, using a more methodical rendering of assets and liabilities as reported in annual financial statements.

We reviewed MTA's cash flow management from two perspectives — trends in liquidity, using year-end financial statements for 1996 through 2000; and monthly, for fiscal year 2000 (i.e., July, 1999 through June, 2000), using cash transaction data made available to us by the MTA.

At the close of FY96, MTA was in reasonably sound financial condition. Since then, however, all indicators of liquidity have deteriorated dramatically. MTA does not have enough cash to meet maturing obligations — cash plus receivables are less than current liabilities. In the last two years cash flow has been managed actively using an external line of credit (LOC), accounts payable, and accrued expenses.

The latter two tactics allowed MTA to avoid a \$785,000 cash shortfall at the close of FY99 (see Exhibit 10-1 July Cash Balance – Beginning). In FY2000, excluding the funds made available by the LOC, this shortfall would have increased to about \$1.9 million. Net draws (i.e., draws less payments) on the LOC, totaling \$1.68 million in FY2000, lowered the overall cash shortfall to about \$195,000 (Exhibit 10-1) June Cash Balance - Ending). Expenses and revenues accrued at year-end allowed a more positive cash position (+\$89,811) to be reported in the financial statements. Nonetheless, liquidity and cash flow continue to be problematic.

Sufficient liquidity can be restored through several actions; creating an operating reserve, creating capital reserve for FTA and State funds, and either current-funding the Metro capital match or allowing MTA to issue bond anticipation notes for Metro bonds that will cover the local share. The reserves must be rigorously managed so that they will be maintained, rather than depleted, at year-end.

The details of our findings on liquidity trends, monthly cash flow, and a proposal to improve MTA's liquidity are presented below.

### **Liquidity Trends**

We analyzed MTA's trend in liquidity from its balance sheets for 1996–2000, presented in summary form on Exhibit 10-2. Three indicators of liquidity — the current ratio (i.e., current assets divided by current liabilities), the quick ratio (i.e., cash plus receivables, divided by current liabilities), and weeks of working capital (i.e., current assets less current liabilities, divided by average weekly expenditures) were calculated from the balance sheet data. All three have deteriorated since 1996:

- The current ratio declined to 1.07 in 2000 from 2.45 in 1996. This indicates that all assets held by MTA that could conceivably be converted to cash would, at par value, barely cover current liabilities (i.e., those coming due within the next year).
- The quick ratio was relatively safe in 1996, at 1.13, but fell below 1.0 in 1997 and has stayed about the same since then. This indicates that MTA has insufficient cash and receivables to cover near-term liabilities, technically an indication of insolvency. This is a more conservative indicator of liquidity since it excludes materials and supplies inventories, which are usually valued well above their potential liquidated value.
- Working capital declined to less than one week of expenditures in 2000, from about five weeks in 1996. This means that MTA could fund less than one week of operating and capital expenditures after meeting its current liabilities, assuming that all current assets could be converted to par value in cash.

Several important changes to MTA's financial structure have contributed to this trend. First, annual unfunded operating deficits have drawn down MTA cash.

Second, annual expenditures have increased by 50%, to about \$27.6 million in 2000 versus \$18.1 million in 1996. Most of this increase is in capital outlays which, although 100% grant funded, increase MTA's working capital needs because these expenses are reimbursed in arrears.

Third, MTA's use of external financing (i.e., accounts and notes payable) has increased dramatically. This is reflected in the almost seven-fold growth in current liabilities. Finally, MTA now carries a much larger accounts receivable balance of about \$4.4 million in 2000, versus about \$1.1 million in 1996. See Table 10-1 for details on receivable balances.

Collectively, these changes have added to MTA's cash requirements and have increased its financial exposure.

Another factor that may contribute to MTA's deteriorating financial condition is the lack of multi-year financial planning. MTA has not developed a systematic means to anticipate its financial requirements beyond the current budget cycle, and even that process is wanting. Given the lack of financial planning, in combination with the budget variances (further discussed in the Budgeting, Accounting and Internal Control section), it is not surprising that the agency has suffered from significant financial uncertainty.

More attention to financial planning would allow the MTA to more carefully determine an affordable level of service, including some margin of safety for unanticipated events.

### **FY2000 Cash Flow**

An estimated FY2000 monthly cash flow for MTA is presented in Exhibit 10-1. This is an "estimated" cash flow because the financial transactions from which the monthly cash flow data were generated do not reflect time lags that occur between check issuance and payment, and between grant invoices and payment. Thus, it is difficult to confirm each month's actual revenues and expenditures.

Accordingly, we focus on general trends rather than month-to-month specifics. The annual totals, however, conform reasonably to the audited financial. The monthly cash flow total for operating expenses, net of depreciation and capitalized expenditures, differed by less than 1% from the financials. Capital expenses, however, were about 10% different. We attribute these differences to year-end accruals that affect the month to which a transaction is credited.

The precariousness of MTA's cash flow can be seen in the beginning cash balance, a deficit of \$785,108 (see "cash balance" toward the bottom of Exhibit 10-1. This deficit contrasts with the FY99 year-end cash balance of \$23,235 presented in the audited financial statements. The difference is attributed to expense accruals at the close of FY99. In the subsequent year 2000, MTA again began and ended the year in a difficult financial condition. (see "Ending Cash Balance" of a deficit \$194,833 in Exhibit 10-1).

We simplified the presentation of MTA's cash flow for the remainder of the year by separating it into an operating cash flow, a capital cash flow, and net draws (i.e., draws less payments) from its letter of credit. In reality, MTA co-mingles these funds.

The operating cash flow consists of internally generated operating revenues, and operating assistance from Metro, the State, and from the FTA (planning and ridesharing grants). Internally generated revenues, accounting for about 41% of operating revenues, vary within a small range throughout the

year. Operating assistance, accounting for the remaining 59% of operating revenues, varies substantially month to month.

MTA draws on the Metro operating assistance first, since the annual amount is available as of July 1. Financial assistance from the State becomes available in January, although in FY2000 the first payment of State funds occurred in March. Planning and ridesharing funds, like all FTA funds, are paid within a week of the funding request for active grants. The overall operating cash flow was negative (-\$380,708). The financial statements showed a slightly lower loss on operations of just over \$200,000, due to lower operating expenses that may reflect treatment of accrued expenses. The revenue totals are virtually the same.

The capital cash flow consists of capitalized maintenance expenditures, other capital expenditures (e.g., acquisition of plant and equipment), and reimbursement of capital expenses. The capital cash flow differs from the operating cash flow in that it is 100% grant funded, and funds are received in arrears of expenses. Practically all MTA capital projects are funded 80% Federal, 10% State, and 10% Metro.

**Table 10-1**  
**MTA Performance Audit**  
**MTA Year-End Receivables from Other Governments**  
**1996-2000**

	1996	1997	1998	1999	2000	'96-'00
Federal Transit Administration	\$642,793	\$1,200,466	\$1,055,415	\$2,663,251	\$1,917,653	\$1,274,860
Tennessee DOT	116,468	189,331	178,772	666,944	625,967	509,499
Metro	124,346	344,823	143,239	817,787	1,558,653	1,434,307
Other	<u>0</u>	<u>0</u>	<u>46,896</u>	<u>5,692</u>	<u>5,692</u>	<u>5,692</u>
Total	883,607	1,734,620	1,424,322	4,153,674	4,107,965	3,224,358

Source: audited financial statements 1996–2000

The FTA funds derive from formula grants. Funds for the Federal fiscal year (October–September) are made available by reasonably predictable Congressional appropriations. The FTA makes payment usually within two days of request. These funds are routed through Metro, and are usually received by MTA within a week. State funds are usually received within two to five weeks following a payment request. Capital funds from Metro have been paid very slowly. As noted in Table10-1, the Metro receivable totaled \$1.43 million at June 2000 and accounted for 44% of receivables from other governments, despite a 10% share of capital costs.

The total capital cash flow for the year showed a deficit of \$706,652. This is slightly less than the unbudgeted capitalized maintenance costs for FY2000 (approximately \$728,000). The capital cash flow

ran a cumulative surplus until May, when additional maintenance costs were capitalized. See Exhibit 10-1 “cumulative” cash flow in May.

Net draws on the line of credit (LOC) were fairly steady throughout the year, totaling \$1.68 million. This raised the LOC principal balance to \$2.54 million at fiscal year end. The draws exceed the combined operating and capital deficits of \$1.09 million. Presumably, the difference (\$590,000) was needed for working capital in MTA’s sub-accounts.

The ending cash balance from the estimated monthly cash flow was a deficit \$194,833. The audited financial statements show a positive cash balance of \$89,811. The difference between the two is partially explained by additional capital funds credited to FY2000 that were apparently not reflected in the cash receipts for June. MTA closed the year in slightly better financial condition than from which it started, but it still verged on being illiquid.

### **Improve MTA’s Liquidity**

MTA has two financial issues to solve in order to improve its liquidity: closing out its line of credit, and developing cash management policies that will return the agency to a safer level of liquidity.

Our recommendation addresses the latter of these two issues. It has three components:

- Working capital for operations
- Working capital for capital expenditures
- Funding of Metro local share of capital projects.

**Operating Funds** – The MTA must work with the Metropolitan government to address the operating cash flow requirements of the enterprise. One possible solution is the establishment of an operating reserve fund. The reserve should be sized to six weeks’ operating expenses. These funds could be drawn during the year to meet cash flow needs, but should be fully restored at year-end. This level of reserve is a common requirement of bond covenants for transit systems, and is a liquidity threshold used by the FTA in assessing the financial condition of transit systems applying for New Starts construction funds.

An operating reserve based on FY2000 expenses would have been \$2.25 million. This is slightly above the maximum \$1.72 million operating cash flow shortfall occurring in FY2000.

**Capital Funds** - A capital reserve should be established to fund capital grants receivables. The reserve should be set at the outside expectation of the payment lag, say two weeks for FTA funds and five weeks for State funds. Based on FTA grant-eligible expenditures in FY2000 of about \$6.14 million, the reserve for FTA funds would be 2:52 of this amount, or about \$236,000. The State share of grant-eligible

expenditures was about \$767,000 in FY2000. The reserve would be 5:52 of this amount, or about \$74,000. Thus, a capital reserve for grant-eligible expenditures would be about \$310,000.

Lags in payment of the Metro share for capital projects have been attributed to the time delay between adoption of a capital improvement program, and the issuance of bonds to finance that program. MTA has interpreted adoption of the CIP to connote authority to expend capital funds. The bulk of its capital projects (e.g., maintenance capitalization, vehicle replacement) cannot be deferred to accommodate a Metro bond issue that is governed by different considerations entirely.

For approved projects, Metro should either make the local share funds available to MTA on an as-needed basis, or should allow MTA to obtain external financing for the local share. MTA should investigate lower-cost forms of external capital financing, such as tax-exempt commercial paper or tax-exempt bond anticipation notes. Either of these sources is available at a much lower interest rate than paid by MTA for its line of credit.

In addition to these actions, we believe MTA should separate its accounts for operations and for capital projects. This will make it easier to associate the reserves with the intended uses of funds, and will allow the Board and Metro to exercise better financial control.

The MTA should accelerate its draws on Federal grant funds for capitalization of maintenance expenditures. In FY2000, about 90% of the eligible expenses were capitalized in the final quarter. The present value of these grant funds would be greater if MTA capitalized its maintenance expenditures monthly. There are no restrictions that would prevent MTA from doing so. The potential interest savings from a more aggressive draw program are outlined in Exhibit 10-3.

### **Use of Grant Funds**

MTA receives grant funds from two sources: the Federal government, acting through the Federal Transit Administration (FTA); and the State of Tennessee, acting through its Department of Transportation (TennDOT). Grant funds are based on a contract between the grantor and the MTA. The grant contract specifies the scope of the grant, the amount of the grant, among other information.

The MTA also receives operating assistance and local matching funds for capital grants from the Metro government, but these funds are made available by action of the Council to MTA as a political subdivision, and thus are not technically grant funds.

Grant funds are used almost exclusively for capital projects. The cost of capital projects is shared among the Federal government (80%), the State (10%), and Metro (10%).

- Several controls are in place to ensure that grant funds are expended only for their intended purposes. First, before grant funds are applied for, the projects must be included in the regional transportation improvement plan (TIP) that is approved by the Metropolitan Planning Organization (MPO). The MPO is an intergovernmental policy body that approves projects for Federal transportation funds.
- Second, a grant contract between MTA and the FTA, or MTA and TennDOT, specifies the terms and conditions of use of the grant funds.
- Finally, when MTA makes a request for reimbursement for eligible capital expenditures, the expenditures must clearly relate to the scope of the grant, and the reimbursement requested must be within the remaining grant balance.

Authorization to apply capital expenditures to grants is made by the MTA Manager of Capital Planning. The procedure is as follows:

1. A "request for purchase" form must be completed for any grant-related capital purchase
2. The form is submitted to purchasing, then brought to the capital planning manager for approval
3. Purchasing assigns a purchase order and either purchases or authorizes the purchase of the item
4. When the item is received, the purchase order and invoice go to accounting
5. Accounting requests approval from capital planning manager to pay
6. The purchase is entered in the accounting system as a charge against a particular grant.

The procedures described above appear to be an adequate safeguard for the proper allocation of capital funds.

#### **Use Of and Authorization of Lines of Credit**

In March 1999, the MTA entered into a revolving loan note, also referred to as a line of credit (LOC), with the Bank of America, with whom the MTA has its checking accounts. The LOC is for a maximum of \$2.9 million. Draws from the LOC are triggered when a negative balance is reached in the MTA revenue account.

Repayments of the LOC draws are authorized by MTA as funds are available. MTA pays 1% below the bank's prime rate. At the time of our fieldwork, MTA was paying 9% annual interest. The outstanding principal on the LOC was \$2.54 million at the close of FY2000. According to the current note, the outstanding principal balance and any accrued and unpaid interest is due on March 5, 2001. In fiscal year 2000 the MTA paid approximately \$164,000 in interest versus approximately \$56,000 in 1999.



In October 2000, the Metro Department of Law concluded that the MTA did not have the authority to open a line of credit without Metro Council approval. The legal memorandum stated that the MTA is authorized two kinds of debt — secured financing of real and personal property, and long-term or short-term debt through bonds or notes issued by Metro.

The memo also noted that although MTA may enter into secured financing agreements for the purchase of real or personal property, there is no express authority for MTA to enter into revolving lines of credit.

### **Timeliness in Paying Bills**

MTA has been timely in paying its bills. We reviewed an accounts payable aging summary from the MTA Accounting Department during our fieldwork. As of September 30, 2000 the accounts payable totaled \$672,455. About 54% of payables were less than 30 days, and 46% were 30 to 60 days. This aging is consistent with aging that could be inferred from the FY2000 year-end financials. At that time, accounts payable totaled \$2.2 million. About 7% of annual outlays, or slightly less than four weeks' average expenditures.

### **Conclusions:**

- MTA is technically insolvent — cash and current accounts receivable are exceeded by current liabilities.
- MTA has been increasingly reliant on external financing to meet growth in its expenditures. Total expenditures have increased by \$9.5 million (52%) since 1996, and current liabilities have increased by \$5.2 million (430%).
- MTA's cash position in FY2000 improved slightly compared to FY99, but only due to increased draws on its line of credit. Excluding the LOC draws, MTA had a combined operating and capital cash flow deficit of approximately \$1.87 million.
- MTA's negative capital cash flow in FY2000 (\$707,000) was only about half of its accounts receivable from Metro (\$1.4 million).
- MTA has no financial planning tools that would allow it to accurately anticipate its financial needs.
- Procedures are in place to ensure that grant funds are used only for allowable capital projects.
- MTA paid approximately \$164,000 in interest in fiscal year 2000. This was an increase of over \$100,000 from the prior year.
- MTA has been timely in paying its bills.

### **Recommendations**

- MTA should work with the assistance of the Metro finance department to find a better long-term solution for the agency's operating cash requirements. Establishment of a six-week operating reserve that may be drawn on during the year is one possible solution.

- MTA should establish, with the assistance of Metro, capital reserves that are tied to the outside expectation of the length of time to receive grant funds, following MTA's invoicing of its grantors.
- MTA should be authorized to secure external financing to fund the local share of approved capital projects, pending receipt of bond proceeds from Metro, unless the local share is provided on an as-needs basis within approved funding levels.
- Operating and capital funds should be managed in separate accounts.
- MTA should invoice FTA for capitalized maintenance expenditures as they occur, rather than bunching these requests late in the year.
- MTA should develop a multi-year financial plan that explicitly establishes its cash requirements, including the funds needed to replace plant and equipment, for periodic discussion with the Metro Mayor and Council. MTA should manage its service levels within the envelope of affordability that is established in this multi-year financial plan.

### **Cost Implications**

While there may be implied costs associated with the establishment of operating reserves, there should be a net reduction in borrowing costs associated lower cost funding sources (Metro versus bank financing). Assuming MTA could reduce interest charges by 2%-3% on approximately \$1.5M would save between \$35,000-\$40,000 annually. Additionally, a more aggressive grant draw program would also save approximately \$100,000 annually in interest costs (see Exhibit 10-3).

## **Services for People with Special Needs**

The MTA provides an extensive service for riders with special needs in general accordance with the provisions of the Americans with Disabilities Act as well as some services beyond the ADA required operations. These services are generally provided through the paratransit services called ACCESSRIDE, as well as through complying with the ADA requirements for certain elements of the fixed route services such as wheel chair equipped buses.

### **ADA Paratransit Service Delivery**

MTA's ACCESSRIDE service is an organizational unit that parallels the MTA's fixed route service. There are 43 drivers who report to the Operations Supervisor. Three reservationists and three dispatchers report to the lead dispatcher. Both the Operations Supervisor and the Lead Dispatcher report to the Director of Operations.

ACCESSRIDE has a four-week driver-training program, and conducts regular ride checks on driver performance. Drivers are provided with a handbook that details policies and operating procedures. Monthly drivers meetings are held and drivers have been organized into teams to encourage compliance with rules, promote safety and control absenteeism.

The MTA implemented the Midas-PT software system in January 2000. Prior to this time the MTA used a simple software database to track system performance. Since the implementation of this system, the MTA has been able to increase average monthly passenger per hour from 1.7 to 2.3 passengers per hour while on-time operation has also improved. Excessively late trips, those over 60 minutes late, have decreased from around 13% of trips to only 2% of monthly trips.

A review of the performance of the ACCESSRIDE service has to be viewed in terms of efficiency and service quality as defined by the Americans with Disabilities Act of 1990 (ADA). This is essential for the following reasons:

- The Americans with Disabilities Act of 1990 (ADA)
- Complementary i.e., the service must complement (parallel) the fixed route service. Also, Paratransit eligibility once granted becomes a right as long as the infirmity that entitled them to use it originally still exists.
- ADA requires that accessible service must be provided within  $\frac{3}{4}$  of a mile of most fixed route services, except for services that are designated express and commuter.
- Trips requested by eligible individuals may not be denied.

The Americans with Disabilities Act of 1990 (ADA) mandated that transit systems providing fixed route service must also provide paratransit service that is “complementary” and “comparable” to fixed route service for riders who are functionally unable to use the fixed routes. Persons who have difficulty boarding, riding or disembarking the fixed route system must be certified as eligible to use complementary paratransit for some or all of their trips.

The complementary paratransit service requirements can be provided by a variety of modes including:

- Demand responsive vans
- Flexible route service options such as point deviation or route deviation service
- Service contracted to a private entity
- User-side subsidies
- Any combination of these and other approaches.

The MTA has chosen to provide service with a combination of programs to maximize existing resources and maintain full compliance. A fleet of 36 vehicles is used to provide complementary paratransit service. In addition, the MTA contracts with Special Transportation Services, Inc. to provide what is defined as Demand Management Services. This service manages a Cab Discount program better known as Mobility Checks which books complementary paratransit overflow trips on taxis for the MTA. It also performs ADA certifications. Demand Management Services is intended to divert or direct non-ADA eligible individuals to other less costly transportation options.

Complementary paratransit service delivery is controlled by the provisions in the law that specify how service is to be delivered. Service standards have to be maintained which assures that paratransit is comparable to fixed route. Such criteria include:

- Offering service within a service area that is 3/4 of a mile on either side of a fixed route.
- Operating the same days and hours of service as the fixed route.
- Charging fares no more than double the adult fixed route.
- Placing no restrictions on trip purpose.
- Assuring that riders who call and request service the day before will be able to ride the next day.

The Americans with Disabilities Act states that "The entity shall not limit the availability of complementary paratransit service to ADA eligible individuals" by any of the following:

- Creation of waiting lists for access to the service
- Any operational pattern or practice that significantly limits the availability of service to ADA paratransit eligible persons. Such patterns or practices include, but are not limited to, the following:

- Substantial numbers of significantly untimely pickups for initial or return trips
- Substantial numbers of trip denials or missed trips
- Substantial numbers of trips with excessive trip lengths

The intended effect of this provision is to create a paratransit system that provides ADA paratransit eligible persons the same level of reliability as fixed route service.

#### **The Six Service Criteria of Comparability**

There are six criteria used for evaluating for service:

- service area
- response time
- fares
- trip purpose
- hours and days of service
- capacity constraints

**Service Area** - The basic bus system service area is a corridor with a width of 3/4 mile on each side of each fixed route. At the end of a route, there is a semicircular “cap” on the corridor, consisting of a three-quarter mile radius from the end point of the route to the parallel sides of the corridor. In addition the core service area must be defined to include those areas not within the core but which common sense dictates should be included.

In its Passenger Handbook, the MTA described that ACCESSRIDE service is available within an area that is 3/4 miles from a regular bus route. The original 1992 ADA Plan was not available for review and therefore some observations about this provision could not be made. The original service area should have been approved as part of the plan and the core service area contained in the 1992 Plan that was not available for review.

The MTA operates commuter express routes in the outlying areas. These express routes may be exempt from the complementary paratransit provision and could have been excluded in the original paratransit service plan area. Commuter and express services are not required to be ‘complemented’ with paratransit service. Once the practice of offering eligibility to people who live in these areas has begun, however, it is hard to retract.

The ACCESSRIDE passenger rules state that only trips that are within 3/4 mile are eligible trips. According to a reservationist, trips are booked for passengers who travel beyond the required 3/4 mile

complementary service area. The Midas-PT scheduling system that is used to schedule trips can be programmed to flag trips outside the 3/4 mile corridor, but to date it has not been used to do so.

MTA exceeds the service criteria in this category.

**Response Time** – The operating agency must make its paratransit reservation service available during the same hours its administrative offices are open. If those offices are open 9 to 5, those are the hours during which the reservations service must be open, even if the regular transit service operated 6 a.m. to midnight.

On days prior to a service day on which the administrative offices are not open at all (e.g., a Sunday prior to a Monday service day), the reservation service must be open 9 to 5. The reservation service does not have to be provided directly by a “real person”. An answering machine or other technology can suffice.

The MTA does offer service on the weekend, but its offices are not open on Saturday or Sunday. ACCESSRIDE utilizes an answering machine to record requests for services and cancellations when the business office is closed. So far, this has proven sufficient.

MTA is compliant in this area.

**Fares** – Paratransit fares can be set no higher than twice the fare for a comparable fixed route ride. ACCESSRIDE charges \$1.75 for each trip, 10 ticket books are available for \$16.80. Regular bus fares are \$1.45 with a \$.10 transfer charge. Express service is \$1.75. ACCESSRIDE could charge up to \$3.10 for a one-way, one-seat ride. Charging twice the fare is a common practice

MTA is compliant and in fact, exceeds requirements for this criteria.

**Trip Purposes** - There can be no restrictions or priorities on a comparable complementary paratransit system that are based on trip purpose. When a user reserves a trip, the agency needs to know the origin, destination, time of travel, and how many are traveling. The entity does not need to know why the person is traveling, and should not even ask.

ACCESSRIDE is in compliance with this requirement of the ADA.

**Hours and Days of Service** - This criterion says simply that if a person can travel to a given destination using a given fixed route at a given time of the day, an ADA paratransit eligible person must be able to travel to that same destination on paratransit at that time of day.

This criterion recognizes that the transit service varies by time of day and day of the week. . Late at night, for example, it is common for certain routes not to be run. Those routes are not required to be served by paratransit when the fixed route system is not running on them.

ACCESSRIDE service is available during the same days and hours as the fixed route system. Service is available service area-wide between 05:20 – 23:30.

MTA is compliant.

**Capacity Constraints** - This provision specifically prohibits two common mechanisms that are used to limit use of a paratransit system so as to constrain demand on its capacity. The first is a waiting list, and the second is a limit on the number of trips a person can take in a given period of time.

Typically, a waiting list involves a determination by a provider that it can provide service only to a given number of eligible persons. Otherwise eligible persons are not able to receive service until one of the people being served moves away or otherwise no longer uses the service. Then the persons on the waiting list can move up.

The second mechanism specifically mentioned is a limit on the number of trips a passenger can take in a given period of time. It is a kind of rationing in which, for example, if one has taken his quota of say 30 trips this month, he cannot take further trips for the rest of the month.

In addition, this prohibits any operational pattern or practice that significantly limits the availability of service of ADA paratransit eligible persons. Such a “pattern or practice” involves regular, or repeated actions, not isolated, accidental, or singular incidents. A missed trip, late arrival, or trip denial now and then does not trigger this provision. Operational problems outside the control of the entity do not count as part of a pattern or practice under this provision.

A directive is in effect at ACCESSRIDE expressly prohibiting the denial of service on complementary paratransit. The practice of negotiating trip times, permissible under the ADA, does take place.

Prior to July 2000 passengers wanting subscription service were placed upon waiting lists. Subscription service is allowed by the ADA and can be considered to be premium service, and a waiting list is permitted. Customers on subscription waiting lists must be able to schedule demand trips up to the day before service. Subscription trips must not exceed 50% of ADA service if trips are denied. Subscription trips are trips that are arranged in bulk for one or more users for a period of time – maybe a month or

several months, or until changes are made by the rider. This reduces the transactions required to prepare the service plan for each day, helps to predict the capacity needs for longer periods than a day, and make scheduling significantly more productive. They are typically made for work trips or for people undergoing treatment on a regular basis for an extended period of time. They may also be used by employers or providers of health service for groups of their employees or clients.

In September 2000, subscription trips represented 65% of trips. When the MTA removed the subscription waiting list in July trip denial went down to 5. However, since July trip denials have been increasing, in September there were 53 trip denials and in October trip denials doubled to 109.

Being able to provide on-time operations can also create a capacity constraint, if there is not enough equipment of personnel to provide on-time performance for all scheduled trips. Recent FTA performance reviews have considered systems with on-time performance of at least 91% within a 30 minute window as acceptable as long as those trips which are late are not extremely late and ride times are not excessive.

The MTA's ACCESSRIDE has averaged 84% on-time (within the first 15 minutes) for the first nine months of 2000. However, an average of 3% of trips are over an hour late.

Although trip denials are less than 1%, MTA may have compliance issues related to these criteria.

#### **ADA Paratransit Eligibility-Standards**

The ADA law recognizes that "a person may be eligible for some trips but not others" since "eligibility does not inhere to the individual or his or her disability, as such, but in meeting the functional criteria of inability to use the fixed route system established by the ADA". The regulations specify three conditions

**Category 1** - Eligibility determinations made under Category 1 are based upon the ability of the individual to "navigate the system". This category is typically populated by persons with "mental or visual impairments...who cannot board, ride, or disembark from an accessible vehicles 'without the assistance

**Category 2** - A determination under Category 2 "applies to persons who could use accessible fixed route transportation, but accessible transportation is not being used at the time". It is expected that the ranks of the eligible under Category 2 will diminish over time "as transit systems become more accessible". In this context, accessibility exists "when all buses scheduled on the route are accessible".



It is important to remember that eligibility for complementary paratransit service under Category 2 is “route based, not system based” and that in those instances where “the lift on a vehicle cannot be deployed at a particular stop, an individual is eligible for paratransit under this category with respect to the service to the inaccessible stop”.

**Category 3** - Eligibility for complementary paratransit under Category 3 “concerns individuals who have a specific impairment-related condition which prevents them from getting to or from a stop or station”. Of critical importance when making determinations is “the interaction between an impairment-related

While the Department of Transportation acknowledged that “some judgment is required to distinguish between situations in which travel is prevented and situations in which it is merely made more difficult”, it determined that “if an impairment-related condition only makes the job of accessing transit more difficult than it might otherwise be, but does not prevent the travel, then the person is not eligible”.

### **MTA’s ADA Paratransit Eligibility-Process**

ADA requires that every operator of complementary paratransit establish a process for determining eligibility. The goal of such a process is to ensure “that only people who meet the regulatory criteria, strictly applied, are regarded as ADA paratransit eligible”.

The eligibility determination process “may not impose unreasonable administrative burdens on applicants”. The regulations permit the use of evaluations by physicians and functional assessments as part of the eligibility determination process, but in the final analysis concluded that “what is needed is a determination of whether, as a practical matter, the individual can use fixed route transit in his or her own circumstances”. Such a determination would be “a transportation decision primarily, not a medical

Ultimately, the details of the eligibility determination process should be “devised through the planning and public participation process for paratransit services.

In 1998, the Transit Cooperative Research Program (TCRP) published a study of certification practices used by transit authorities throughout the United States. TCRP Synthesis 30, ADA Paratransit Eligibility Certification Practices identified four models for making eligibility determinations (self-certification plus professional verification, interview, full functional assessment, and hybrid interview/functional assessment) and attempted to establish the criteria for evaluating their respective results.

Although the goal of an effective eligibility certification is clear - namely, to provide accurate certification – it is hampered by our inability to measure the effectiveness of any generally accepted standards. However, a number of different measures that cumulatively provide some ability to evaluate various models are suggested in this study. The evaluation factors that are suggested in this study include dispersion of eligibility determinations throughout the three categories: measurable levels of denials, the number of appeals, and the proportion of appeals that are upheld. That is, they use several factors in some combination of weighting that reflect the values of the agency.

### **The Eligibility Certification Process at ACCESSRIDE**

The MTA uses a standard eligibility application with a professional verification. Eligibility determinations are made by the contractor STS. STS assists with the distribution of applications, accepts applications, performs the assessment, and forwards eligible applicants to the MTA.

A review of 104 customer applications received between October 1 and mid-November 2000 showed that 74 of the applications were incomplete. Information was missing, including signatures of potential customers. A review of the applications indicated that eligibility did not appear to be granted based upon the applicant's functional ability as defined in the ADA legislation. Additionally, personal care attendants were authorized without the necessary information on the application.

ACCESSRIDE has produced determinations that are far more “lenient” than any of the models cited in TCRP 30. Statistical information about category eligibility, denials and appeals are not tracked as a way to measure the effectiveness of STS determinations.

### **Conclusions and Recommendations**

The FTA is beginning to look closely at citizen complaints especially as they relate to “Capacity Constraints” such as on time performance. The MTA has made progress in improving the quality of service over the last year, even in the face of increasing demand. However the operation lags behind generally accepted standards of performance for on-time service delivery. It will require a major effort to improve the on time service delivery from the current 84% and may require reallocation of resources to accomplish.

Absent locally defined standards, ACCESSRIDE should adopt an internal minimum on-time performance standard of 91% to reflect the current FTA standard for adequate service quality. At a minimum the MTA should devise a plan and begin to make incremental improvement toward the 91% goal. This will demonstrate good faith and may avoid intervention by the FTA if a complaint is lodged.

The MTA offers a number of paratransit services, not all of which are for ADA eligible customers. It is important that those who receive ADA service be eligible, and that non-ADA customers understand their eligibility status since the MTA is not required to provide unlimited service to this group.

In order to devote resources to improving on time performance the MTA must do a better job of controlling demand for ADA service. Controlling demand for ADA begins with controlling the eligibility screening process. Complementary paratransit eligibility once granted becomes a right. It is therefore important that the eligibility screening mechanism be scrupulous and follow the ADA eligibility guidelines. The STS application and screening process at the MTA is not as rigorous as it needs to be to control eligibility and therefore the overall cost to deliver service. It may be necessary to change the process to screen out incorrectly granted eligibility.

The MTA should compare paratransit service with the fixed route service area so that ADA service can be curtailed in areas and at times that are not required by law as a means of saving operating expenses and redistribute resources to the un-served eligible users living in the service area. For example, fixed route service considered express or commuter is exempt from the provisions of the ADA.

MTA has some pricing flexibility to raise rates for paratransit services. This may also help offset cost increases to improve on capacity constraints.

### **Cost Implications**

It is difficult to estimate the financial impact of the recommendations noted above. It is entirely possible that improved on-time service performance can be accomplished through better eligibility screening, eliminating or reducing coverage based on express or commuter classifications, and increased prices for existing service.



## **Information and Information Management**

Information management and technology at the MTA is managed by the Information Systems Manager. This is a new position that has been in place for less than a year. Prior to that time, the Director of Planning and Scheduling undertook this responsibility. The current collection of software and hardware at the MTA has grown incrementally on an as-needed basis.

There are approximately forty-six desktop computers and over twenty applications currently in use at MTA. The software in use consists of a wide variety of general business and transit specific applications.

Among these specialized programs:

- Midas, used in the scheduling and dispatching of the ACCESSRIDE service
- DOS based GFI, used to manage data from the GFI fare boxes
- A DOS based bus driver and service scheduling system
- The "Turley" maintenance data management system
- The TSI training program, used in the safety and training department.

The business applications consist of a variety of word processing, accounting, and spreadsheet applications. In addition, the Manager of Information Systems has created and maintains an MTA web site.

There are many technological accessories available to transit systems, futuristic in nature, where the economic case for deployment is currently unclear. To the credit of the agency, we observed none of this type equipment in use at MTA.

The MTA has recently purchased and installed a personnel records management system (ABRA). Although currently in use, no training was purchased with the installation, and the staff has been learning the program on the job.

The Manager of Information Systems has a long list of improvements to the current system that he is working on, including:

- Upgrading the server from Novell 4.1 to internet-ready Novell 5.1
- Expanding email (currently limited to a few workstations)
- Acquiring a windows-based transit scheduling system that incorporates bus and paratransit services
- Moving to a universal office processing software in place of the current collection of applications
- Upgrading the GFI software to a windows-based system

- Continual upgrades of office hardware
- Improving the links among the accounting, purchasing, maintenance, and grants accounting applications
- Acquiring new software and hardware to support customer service sales, ACCESSRIDE tickets sales, mobility checks, and other non-cash media
- Adding applicant tracking to the Abra software
- Improving customer service and complaint tracking
- Increasing internet access speed
- Acquiring maintenance software for vanpool maintenance
- Acquiring swipe card payroll software
- GPS for actual time tracking of buses
- Windows based software for the customer service telephone system.

### **Conclusions**

Information management and technology in the transit industry, like most other industries, has expanded and become increasingly sophisticated over the past several years. The MTA has opted for a series of incremental improvements to meet the short-term needs of the organization. This has led to creation of a somewhat limited system that is not well integrated and has little connectivity.

The list of tasks being undertaken by the information systems director is substantial and will address many of the shortcomings of the current situation.

### **Recommendations**

The Director should develop an overall MIS and IT strategy that brings the MTA up to acceptable standards of operational efficiency. This may require the use of an outside expert to evaluate the current systems environment and make recommendations for upgrading.

The Director should assure that all users are proficient in the systems that are critical to the performance of their jobs, and develop a training program to overcome any deficiencies. This would include training with the Abra personnel records system which we noted was purchased without the associated training program.

### **Cost Implications**

It may be possible to develop a complete MIS plan using the Director and staff from McDonald headquarters under the current contract. If the skills to do this are not available through McDonald, then a consulting contract needs to be carried out. Such a study could run as high as \$50,000.

## **Compliance With Statutes and Regulations**

The MTA works within a framework that provides safeguards that actions of the Board and Management team are in compliance with the laws and regulations. The following is a list of important structural elements of this framework. It was not within the scope of this review to evaluate the effectiveness and degree of compliance associated with each of these elements. We did, however, see some of these in operation and have made comments as appropriate.

- The structure of the board whereby an independent Secretary/Attorney reports to the Board and sits with the Board at its meetings. The Secretary is called upon by the Board or management to render formal and informal opinions.
- Professional knowledge and judgement of the management team. The management team consists of individuals with years of experience in the transit industry.
- The oversight of the management and administration by McDonald corporate officers
- Metro's purchasing department relationship with MTA. Director of MTA purchasing is a Metro purchasing professional.
- The independent personal judgement and experience of the Board members.
- The ability of the Board to call upon Metro legal staff for advice as embodied on the Metro Charter.
- The intermittent oversight by FTA staff members of MTA actions arising from grant contracts.
- Operational and financial framework of internal controls.
- The annual financial audit conducted by the MTA's external auditors (Kraft CPAs). This audit includes tests of compliance with certain provisions of laws, regulations specifically related to presentation of financial results. Additionally, the Auditors issue a separate report related to compliance with OMB Circular A-133. This is essentially compliance requirements for federal programs.
- Triennial Review conducted by a third party contractor as mandated by FTA regulations. These reviews are sponsored by the FTA and consist of evaluating the compliance by grantees with a series of specific FTA requirements.

### **Conclusions**

The existing protections against violations of law or regulations at the MTA are more or less standard for an organization of this size and scope. The institutional relationships, however, among the Metropolitan Government, the MTA Board, McDonald Transit Management, and Davidson Transit Organization does present a relatively complex operating environment which may represent a challenge to the experience of many MTA Board members. Having the DTO, for example, as the employer of the operating personnel

may provide unique complexity related to issues such as employee law, labor relations, health and welfare funds, etc.

The MTA Board expects that the management staff will be aware of and act according to any relevant laws and regulations relating to the activities of the MTA. We found no reason to question this expectation during the course of our review.

We did see evidence of financial and operating controls in place, e.g., money room counts, bank reconciliations, etc. Any issues noted related to these controls were noted in the appropriate sections of this report.

The board uses its attorney as an additional check on actions when seeking guidance for board action. The Metropolitan Government's attorney ruled recently that the MTA acted incorrectly in arranging for a line of credit. A careful reading of Code sections governing the MTA should have raised questions regarding the legal authority of the agency to secure this type of funding. This was a case where the safeguards did not work as intended.

There is no specific requirement that staff recommendations be reviewed and approved by the attorney in advance of Board action.

The FTA triennial audits provide the Board with a good, if infrequent, evaluation of the MTA's compliance with the regulations connected with FTA grants.

Management reporting to the Board is weak in our judgement. It is not well organized, consistent or presented at a level which will allow the board to fulfil its governance role. See sections on *Budget and Accounting* and *Governance*.

### **Recommendations**

The Board should consider hiring an Executive Director. Among other things, this position would assist the Board in sorting important issues in the complex operating environment of the MTA. (See section on Governance.)

The Board reporting package should be revamped in order to provide the Board a broader, more coherent view of the operations of the organization. This will allow the Board to properly fulfil its Governance responsibilities.

The Board should require a review of each FTA audit as they are submitted, and require a monthly report from the staff until each criticism is remedied to the satisfaction of the Board



The Board should insist that Metro Legal be consulted any time there is a question raised regarding the legal foundation for an action based on the Metropolitan Code.

The Board should require the endorsement in advance of its attorney for all staff recommendations.

**Cost Implications**

The cost associated with the Executive Director's position is covered in the *Governance* section of this report.

## **Marketing At the MTA**

The marketing functions at the MTA are handled by various MTA staff in several different departments. Most marketing work is currently done by the Rideshare Director, Rideshare Committee, the Executive Director, and the Customer Service Department. With the exception of sales of space for advertising on benches, shelters, and signs on buses to outside firms, MTA does not have any staff dedicated solely to marketing related functions. It has been approximately 10 years since MTA had a full-time Marketing Director who handled marketing activities. During the October Board meeting a job description for a marketing position was presented for consideration by the Board. This position has not yet been budgeted and filled.

The Rideshare Associate reports directly to the Executive Director and is responsible for coordination of ride matching and car/vanpooling activities, outreach to local businesses and agencies to determine the needs of area employers, the development of new programs to meet needs, administration of the Mobility Check program, and other special services and promotions of those services. It falls to the Rideshare Associate to coordinate marketing and promotion of new services. In this capacity, the Rideshare Associate is a member of the Rideshare Committee, a committee that works on the development, marketing, and promotion of all new services and on the redevelopment of existing services that no longer meet the needs of the community.

### **Marketing Plan**

Each Fall, the MTA staff works directly with its marketing consultant to develop an annual marketing plan. The MTA staff that are involved in the development of the annual marketing plan are the Executive Director, the Director of Customer Service, and the Rideshare Coordinator.

With the marketing agency, this group makes decisions related to design, layout, expenditures, target audiences, media releases, and anticipated marketing results and the evaluation of those results. The annual marketing plan includes marketing objectives, key strategies for advertising and promotions, public relations, research and tracking, and target audiences for various campaigns.

Advertising and promotional campaigns vary based on the service being promoted. Most consist of bus ad signs, bench ad signs, print ads, 30-second radio spots, and media releases. The MTA Advertising Sales Office negotiates with newspapers and radio stations for the purpose of acquiring print ad space and air advertising time. Space is reserved for print ads and is placed directly by the contracted advertising agency. Radio spots are approved by the Rideshare Committee and are placed directly by the advertising agency. On occasion, direct purchases are made for specific campaigns and promotions.

The MTA produces an extensive variety of advertising and promotional media, and handouts that provide information relating to the MTA and its transit services.

### **Marketing Goals and Objectives**

The goal for the 1999-2000 marketing plan was to continue to enhance MTA's image through an integrated marketing communications program that made the best use of available resources, including media trade, MTA's own media vehicles, targeted promotions, and public relations. Objectives included:

- Generate increased usage for bus, trolley, vanpools, and Access Ride
- Attract new users through improved communications and continued introduction of new programs that meet specific needs
- Continue to position public transportation and the MTA as the key to Nashville's successful growth as a major urban player
- Increase trip frequency among existing riders through special activities and promotions
- Expand the MTA customer database to allow for more targeted advertising and promotional programs
- Reduce air pollution to relieve traffic congestion by enticing people to use public transportation
- Find ways of reaching new riders through increased visibility at special events and targeted programs that encourage trial use of the system.

### **Targeted Programs**

During 1999-2000 a number of targeted marketing programs were undertaken. A selection of some of the larger undertakings includes:

- MTA Website - came on line March 2000 for MTA customers with internet access
- Transit Guide 2000 - available March 2000 for MTA customers without internet access
- Improved system map - more comprehensive and understandable
- Direct mail campaigns - to targeted businesses and individuals who may use the service being marketed. Use mailing lists from promotions and other lists. Identify who they are trying to reach and where they are located (with contractor's assistance).
- Door-to-door Opry Mills service campaign - literature distribution to those businesses and households within the area of Opry Mills services
- Midtown Connector Community Outreach - information booths were set up at three grocery stores in three sectors of the city served by the Midtown Connector to provide information about this new service.
- Quarterly publication of the Commuter Connection - information guide to commuting in middle Tennessee that has a circulation of approximately 15,000.

- Special event service and promotions such as Tennessee Titans games, relocation of remote parking lots, advance ticket sales, promotions and press releases
- Try Transit - community outreach campaign to eight targeted groups: city-wide bus riders, student riders, college students, tourists, downtown commuters, special event riders, disabled riders, and senior riders.
- Clean Air Month - a \$40,000 campaign to promote the use of public transit with the objective being to encourage the public to take part and contribute to a healthier environment. Clean Air Month is a collaborative effort between RTA, American Lung Association, Tennessee Department of Environment and Conservation, and the Metro Health Department.
- RIDE Team - a partnership between MTA, RTA, the TMA Group, and Tennessee Vans. RIDE Team's collective efforts enhance the effectiveness of regional ridesharing and increase the overall efficiency of the Rideshare program. The RTA maintains the ride-matching database. The MTA requests matches based on call-in requests from the MTA's rideshare telephone line.
- Mobility Check program - vouchers from employers to employees for transportation, having a tax benefit for employers. The program is initially promoted via direct mail to business. Follow-up meetings are scheduled to fully explain the program to interested employers. The program recently took a large jump in size when the USDOT signed on (\$200,000 contract value).
- Vanpool services - MTA offers leases to employers and individuals operating vanpools.

Marketing activities and promotions for ACCESS RIDE services are handled separately by another private contractor, working directly with the ACCESS RIDE staff.

### **General Programs**

Along with its marketing agency, the Rideshare Committee selects what MTA programs and services are marketed. Some long-established programs that include marketing efforts to the general public, such as Clean Air Month, occur each year. Other programs are marketed to the general public for shorter, more focused periods of time.

For example, each year the Rideshare Committee reviews existing services to determine whether they are still meeting the needs of the public. Market specific campaigns are then developed to improve the performance of under-performing routes and services.

Examples of marketing efforts to the general public include:

- **Clean Air Month** - the objective of this collaborative program is to make information available about products and services, including transit (both bus and commuter rail), that contribute to a healthier environment. Events included a "Clean Air Party in the Plaza", with exhibits on how the

public can make a difference, an RTA clean air website, \$0.25 bus fares on Wednesdays in May, free commuter rail rides, presentations, community outreach, demonstration trolley rides, and “Share-a-Ride Day”. A brochure detailing Clean Air Month efforts and outcomes was created and distributed to the public.

- **Try Transit** - conducted along with Clean Air Month, this community outreach campaign target eight groups, including city-wide bus riders. This outreach campaign provided in-depth information to the public about MTA’s various services through site visits and direct mail. The program also offered free coupons to “Try Transit” and solicited information from the public about their transportation needs and wants.
  
- **Reintroduction of the “Zone” service** - MTA talked to users of the service to determine how to make it better meet their needs. As a result, the service was reintroduced to the public via radio and other media releases, with an easier to read color-coded map. The fare was lowered to \$0.25 from \$0.30 and bus and bench signage for the “Zone” was changed because patrons thought it looked like a restaurant ad. The impact of this change is being measured through ridership data collected through fare boxes and analyzed by the Director of Operations.
  
- **“It’s Time for Transit” campaign** - newspaper advertisements promoting the progress being made by MTA, quoting statistics on ridership and recent service improvements, and including plans and a strategic vision for the future.
  
- Annual updates of the MTA system map
  
- Bi-annual schedule updates that match routine service changes.

As with targeted marketing efforts, advertising to the general public is often placed in newspapers and on the radio through the use of trade value, coordinated through MTA’s advertising Sales Executive. MTA bus, bench, and other facility signs are also utilized to the fullest extent possible.

#### **Staff Qualifications and Experience**

Presently, there is no marketing department at MTA. Aside from the Rideshare Director, who handles some marketing related activity, and a Sales Executive, who handles sales of advertising space to outside vendors, there are no employees fully dedicated to marketing functions. Of the MTA staff that is involved in marketing activities, excluding advertising sales, none have an educational background in marketing, or significant work experience (outside of present MTA duties) in marketing.

Most of the work done on marketing in the MTA is done by staff members who have other primary responsibilities. Rather than having in-house expertise, MTA has chosen to contract for marketing expertise.

### **Outside Resources**

MTA contracts for the majority of its marketing needs, including advertising, printing, graphics layout, press and media releases, and direct mail. Although it is now maintained and updated in-house, MTA also contracted for the initial development of its website.

MTA's primary marketing contract recently ended after a long-time relationship with one firm. A new firm was awarded the contract. A part of the reason a new firm was selected was that the MTA wanted to tie ridership trends and other statistics to marketing efforts. The new marketing firm committed to developing an annual marketing plan that includes measurable goals, goals that will allow MTA to assess the success of individual programs.

The new marketing plan was presented at the November 2000 MTA Board meeting. However, the full plan has not yet been approved due to concerns about not having fully identified and researched targeted markets and questions about measurement tools.

### **Conclusions**

MTA does not have a Marketing Department or a true marketing staff. Instead, MTA has chosen to delegate marketing related duties to various MTA staff members, and to contract for specific marketing expertise. Staff from various MTA departments coordinate with the marketing consultant to develop marketing and advertising campaigns. The majority of marketing and advertising campaigns are targeted campaigns that are developed to complement new, specialized, and reintroduced services.

The marketing materials that the MTA has developed are similar to those that other transit systems use, well prepared and presented, and are well suited to the MTA's services and programs.

The marketing approach so far has been focused on promotion and advertisement. These plans have not provided MTA with the tools it needs to gauge the results of these activities. More comprehensive Marketing activity, such as research to identify service needs, understanding the local marketplace, input into pricing decisions and the tools to measure results have been largely absent. The little work that has been done appears to have been based largely upon general perceptions and conventional wisdom relating to public transportation needs, desires, and target markets.

Marketing and advertising results from past plans have been documented in quarterly summaries. These summaries list the activities of each quarter, but generally do not attempt to quantify activity outcomes or compare outcomes to the achievement of goals. Results are not reported in a way that they can be tied to ridership trends or other statistics. Nor do the reports provide statistics that can be used to gauge the success of programs. Therefore determining the extent to which past marketing and advertising campaigns were successful is difficult.

Some of the documented key strategies of the 1999-2000 marketing plan focused on research, tracking, and developing marketing tools that reach people. It is unknown whether any of the proposed surveys were completed or what actions were taken as a direct result of the survey outcomes. The 2000-2001 marketing plan has not been approved by the MTA Board due to concerns about not having fully identified and researched target markets and due to questions about measurement tools.

### **Recommendations**

Responsibility for marketing functions should be focused and organized under a qualified director of marketing. Contracting for outside marketing and advertising expertise has its place but is no substitute for the development and management of an integrated marketing program.

The successful candidate should be a seasoned marketing professional who is not tasked with non-marketing related job responsibilities. Current participants and contributors to the marketing program should continue to provide marketing support under the direction of the new director. The new approach would hopefully move MTA beyond ad hoc promotion and advertising campaigns of the past to a more balanced integrated marketing approach.

The MTA should also review the role of the marketing consultant that works with ACCESSRIDE and integrate the work of that program with overall marketing program – particularly as the recommendations of the SRTP are finalized and the possible use of the ACCESSRIDE system as the provider of substitute services develops.

### **Cost implications**

The cost of the recommended Marketing Director is included in the recommendations from the Governance section of this audit (approximately \$60,000 salary plus \$15,000 in benefits – Note also Marketing positions may also include a component of incentive compensation depending on job scope). The follow-on costs associated with upgrading and building a more sophisticated Marketing function may well be funded through reallocation of existing activities in the near term. Longer term there are likely to be expanded investments in this function. If the Marketing group is effective, however, these costs can

be thought of as self-funding. That is, specific goals related increased ridership, revenue, etc. should be directly tied to Marketing funding and performance evaluations.



## **Customer Service At the MTA**

When discussing customer service with MTA staff, the focus is on activities which take place in the Customer Service Centers rather than a broad view of customer service. This activity is centered on customer call handling at the two Customer Service Information Centers. The Ticket Booth located at Shelter A, Deaderick at 5th Avenue and the Clement Landport located at 1011 Demonbreun.

The customer service offices at the Clement Landport are open Monday through Friday from 6:30 am until 5:30 PM. Call Center hours are Monday through Friday from 6:30 am until 6:00 PM and Saturday from 8:00 am until 12:00 PM (9:00 am until 6:00 PM during Trolley season (April to December). The facility and telephone information Call Center is closed on Sundays and all major holidays. Those customers who call for information after business hours, or on a Sunday or holiday, are instructed by a recording to call back during normal business hours.

The center at the Clement Landport has 9 employees:

- A Director of Customer Service
- A Lead Customer Service Representative
- 6 Customer Service Representatives
- A Schedule Rack Stock Clerk

MTA sometimes adds temporary staff at peak seasons to handle increased call volumes.

Activities at the Clement Landport are focused on five activities:

- Customer Service
- Information
- Ticket Sales
- Picture ID's
- Bus Transit Center

### **Call Center Telephone System**

The MTA Call Center's telephone system is managed by ACD Call software. The computer system that the software is loaded on is an independent system and is not networked to any of the other computer systems that are located at the facility. The ACD Call system has a 20-minute power backup. After 20 minutes without power, data will be lost. As may be expected, data loss due to extended power outages

does occur on occasion. With continued power, ACD Call will store two months of data. After two months, the system purges itself. At present, the data is not archived before being purged.

The ACD Call system was purchased at the time the Clement Landport was built and the Customer Service Department was moved there (approximately 3 years ago). The software package purchased was a basic system. Upgrades (for example, Caller ID) do exist, but none have been purchased and installed to date.

The ACD Call system distributes and counts all calls that are made to the Call Center. Incoming calls are automatically routed to the first open line, and the Customer Service Representative manning that line takes the call. There are a total of six telephone lines. Customer Service Representatives are trained to answer the call on the first ring. If all lines are busy, the caller will hear a recording and will be put on hold until a line becomes available. All overflow calls are routed to one specific line located in the Landport ticket booth. During direct observation of operations in the ticket booth, this overflow line received 10 calls over the course of 30 minutes, and were handled readily by the booth attendant in the midst of her other duties.

The existing telephone system for the call-in system has eight telephones that use six telephone lines. Each line is assigned to a particular type of call (for example, information or a complaint). Each different telephone number is provided to the public. There is also a general information line if a customer is unsure which telephone number to select.

As a Customer Service Representative answers a call, the telephone display shows a code, telling the representative what line the person called in on. For example, "MTA" is displayed for information, and "Complaint" is displayed for a call that came in on the complaint line.

ACD call tracks the total number of answered, lost, abandoned, and overflow calls. A lost or abandoned call is one that was hung-up after hearing the initial recording. This could mean that the customer waited on hold too long and hung-up or that the call was a wrong number. An overflow call is a call that is not answered within a pre-set amount of time. These calls are re-cycled back into the system. In addition to counting calls, the computer system tracks the number of seconds that a lost/abandoned call waited on hold after hearing the recording before the call was lost or abandoned.

The ACD call system has the capacity to print out a daily report listing the number of answered, lost, abandoned, and overflow calls. The output from this daily report is used to create monthly Customer Service Activity Reports that are presented to the Board. A sample of this monthly report is presented on Table 15-1.

**Table 15-1  
Customer Calls Report  
October 2000**

<b>Phone Calls</b>				<b>Average Wait</b>
<b>Week</b>	<b>Answered</b>	<b>Lost</b>	<b>Overflow</b>	<b>Time (Seconds)</b>
1	1,676	191	77	331
2	1,839	96	61	216
3	1,954	129	37	270
4	1,540	46	48	182
Total	7,009	462	224	999

The present ACD call system does not separate abandoned calls by line. Therefore, the Call Center staff must manually dis-aggregate calls to individual lines so that they may tie this performance measure to individuals. The system also does not have call recording capabilities, which staff members feel could be useful for training.

**Call Taking**

Each day, four to five Customer Service Representatives work one of several shifts to cover the entire workday. Shifts overlap during the busier parts of the day. Due to low unemployment and competition for persons seeking employment in the Nashville area, it has been difficult for MTA to keep the Customer Service Department fully staffed, resulting in a consistently under staffed situation. Due to a Customer Service Representative vacancy, a light duty operator is currently providing part-time telephone support. This vacancy is the post for a Spanish-English bilingual operator, and has been hard to fill.

To ensure the accuracy of the information that is provided to callers, each Customer Service Representative candidate must complete a three-week training program during which they learn MTA scheduling, service, and operational details. They are also provided the opportunity to ride the buses to learn how the system operates. The three-week training is part of a six-month probationary period.

Call answering procedures are currently governed by a short training guide and the MTA Customer Service Center Employee Telephone Training Handbook. This handbook outlines how to answer calls, place a caller on hold, return to a caller on hold, mail schedules, and telephone manners. It also summarizes what customers expect when they call, who benefits from excellent customer relations, and how to improve your attitude towards your customers.

As service changes are made, the MTA Scheduler provides materials or training (sometimes both) to the Customer Service Department and its representatives detailing the upcoming changes. In addition to formal training, each week the Director of Customer Service or the Lead Customer Service Supervisor monitors approximately two calls answered by each Customer Service Representative. A form is filled

out detailing the quality of the representative's demeanor, attitude, initiative, and information provided. The calls that are monitored serve as the basis for identifying needed training and bi-annual performance reviews.

On average, approximately 300 calls are made each day to the Customer Service Call Center. The busiest days for calls are in August, when school starts, and in the winter on snow days. According to the Customer Service Department staff, very few calls (1% or less) are for service requests, and around 4% of calls are complaints. A review of the monthly of call data presented at the November Board meeting shows that the number of complaints were less than 1% of calls (446 of 61,706 calls answered between January and October 2000).

The bulk of calls made to the Call Center are bus service information requests. Information is maintained on the local area, bus stop locations, how to ride the buses, schedules, fares, accessible routes, magnet school routes, ID cards, passes, construction detours, kiosk information, parking fees at facilities with parking, and field trips.

Customer Service Representatives manually look up the requested information for each caller. All information is kept in hard copy in a binder that is maintained by each Customer Service Representative. The MTA has no automated or computer system that maintains the vast array of information that the Customer Service Representatives must have at hand. Brochures and schedules are mailed to customers upon request.

According to Customer Service Department staff, the number of calls to the Call Center has been on the rise due to city growth, school transportation services, awareness of services, and more aggressive marketing. Historical data prior to mid-January 2000 was not available (the first three weeks of call data for January were lost). Table 15-2 presents call volume since February 2000.

**Table 15-2**  
**Average Monthly**  
**Call Volume: Feb – Oct 2000**

<u>Month</u>	<u>Calls Received</u>
Feb	5,987
Mar	6,275
Apr	6,627
May	7,043
Jun	7,114
Jul	7,008
Aug	9,691
Sept	7,509
Oct	7,471
Average	7,192

The flurry of calls in August is attributed to annual opening of the school year

**Tracking of Comments and Complaints Tracking**

Currently all service requests, comments and complaints are tracked manually on paper. However, a networked computer software program for this process is currently under development and is expected to be operational before the end of the year. This new, networked system will allow anyone at MTA to review the status and outcome of any request, comment, or complaint.

According to the Customer Service Department staff, when a complaint call is received, the Customer Service Representative fills out an MTA Complaint Record form. A copy of this form is forwarded to Operations, Maintenance, or other appropriate functional area depending upon the nature of the issue. The issue is then investigated.

Responses and return calls are made by the department assigned to investigate the problem. The complaints that are received through the Call Center are usually about service timeliness, buses not stopping to pick-up patrons, operators not accepting transfers (transfers expire after 30 minutes or the time of the next connecting bus), driver discourtesy, or bus cleanliness. In these instances, complaints are forwarded to Operations or to Maintenance.

The Customer Service Department staff described the normal process as follows:

- When a service change or service comment is received, the Customer Service Representative fills out a Service Change Request form.
- A copy of the form is forwarded to Operations or Scheduling depending upon the nature of the request. Responses and return calls are made by the person assigned to investigation.

If appropriate, small system adjustments are made quickly. If a change would result in additional expense, it is sent to the Board for consideration.

Comments and complaints are also taken through MTA's new website. These comments and complaints are initially received by the Director of Customer Service. The Director fills out the necessary forms and distributes copies as appropriate for follow-up.

#### **Other Customer Service Center Activities**

In addition to taking telephone calls for information and receiving service complaints and comments, the Customer Service Department at the Clement Landport is responsible for several other activities.

- **Ticket and Pass Sales** - The Customer Service Department staff sells bus tickets and passes, and also is responsible for issuing tickets to the downtown ticket booth. The Department maintains records of all sales for accounting purposes and is responsible for the deposit of all sales receipts. In addition to selling MTA passes and tickets, the Customer Service Department also sells Regional Transit Authority (RTA) passes. Sales activity reports are prepared monthly for both the downtown ticket center and the Clement landport.
- **Picture ID's** - The Customer Service Department staff is responsible for processing and fulfilling all requests for student and ACCESSRIDE ID's. Two separate software driven ID-making units are used to produce the ID's.
- **Field Trips** - MTA offers \$0.25 fares for school field trips. The Call Center takes these calls and fills out the paperwork.
- **Ride Matching** - For half of each day, the MTA Call Center receives calls for Rideshare information. The other half of the day, these calls are answered by the Rideshare Office staff. Forms are filled out by the Customer Service Representative and are passed on to Rideshare Associate. This frees time for the ride share staff to work on other issues.
- **Vanpool Program** - Once a vanpool has been set up and is operational, the Customer Service Department is responsible for tracking mileage, maintenance, and accidents.
- **Provide And Compile Information For MTA Publications** – The staff members are often called upon to provide and compile data for printed material such as the trolley brochure, student guide, flashes/notices, service changes, surveys, and the Transit Guide (essentially, materials for existing services). They also provide data for website updates and data for updates to signage

displaying schedule information and distribute printed materials such as the Transit Guide, brochures, and public schedules.

- **Monthly Customer Service Surveys** - The Customer Service Department is responsible for carrying out and collecting data for a monthly customer service survey that becomes part of the board report.
- **Facility and Parking Administration** - the Customer Service Department staff handles all activities related to facility maintenance and parking administration at the Clement Landport, including the update of electronic sign information.
- **Lost and Found** - Items that are lost by MTA customers are brought to the Clement Landport after being logged in by dispatch. They are kept at the Landport for several weeks before being donated or discarded if no one claims them.
- **Travel Training** - In the past, Customer Service staff has been asked to provide bus service information and support at malls, festivals, fairs, and job fairs. Because of staff shortages and other duties, this has not been done recently.

#### **Customer Service Goals**

Fast response is expected on complaints and service requests/comments. The goal is for complaints to be handled within one day, although many require two to three days. Very serious complaints are responded to immediately by an appropriate department official. The goal for response to service requests is two to three days. Each person is responsible for tracking his or her own response time. No formal reports are currently produced documenting response times or outcomes.

The Customer Service staff does track the number of complaints received against its official goal of no more than 50 complaints per month (not including ACCESSRIDE complaints, which are tracked separately by ACCESSRIDE. How this goal was arrived at is unclear. However, from January through October of this year 446 complaints were received. This is 11% below the number of "allowable" complaints for the 10-month period.

MTA has recently begun to tie Call Center performance to each Customer Service Representative. During a representative's performance review, goals for calls answered are set (around 95 percent). A bonus program for those representatives exceeding their goal has also been established. Weekly reports including the number of calls taken and the length of those calls are kept for each Customer Service Representative. If goals cannot be achieved, the Customer Service Department will consider additional training or adding staff.

Monthly reports for the Call Center as a whole are also maintained. The information contained in the monthly reports is the data that has historically been requested by the Executive Director. The monthly data do not appear to be tracked against any goals, and it is unclear whether there are any formal departmental goals other than that described above for individual Customer Service Representatives and for the maximum number of complaints per month.

Performing further analysis with the monthly data that has been presented to the Board (exhibit 15-1), it can be demonstrated that, on average:

- The call center achieved 93% calls answered for the period January – October 2000.
- Call center volume is increasing.
- The trend is for an increase in the number of calls lost/abandoned.
- That the trend is toward a decrease in overflow calls.
- That the trend is toward a decrease in average wait time for lost/abandoned calls.

This could mean that callers are waiting a shorter amount of time on hold or that callers are hanging up earlier. Data to make that determination is not currently available.

#### **Other Customer Service Related Goals**

The Customer Service Department maintains data regarding the number of calls received, calls answered, calls lost and abandoned, calls put into overflow, and the number of complaints received each month. Although not maintained by Customer Service or directly generated out of customer service activities, other customer service metrics and goals have been established.

These goals are viewed as operational statistics, not directly related to customer service as it is perceived by MTA (essentially, the Customer Service Department activities at the Clement Landport). However, these goals are customer service related in that they reflect the level of service and the quality of service received by patrons. These goals and the data reflecting achievement of these goals are reported to the Board each month:

- waiting list for Access Ride
- on-time performance
- miles between road calls
- preventable accidents.

#### **Conclusions**

For the MTA, the term “customer service” applies principally to the activities of the Customer Service Department, most especially the activities of the Call Center. For many transit agencies, the customer



service function is an integral part of total transit operations. Providing quality information is viewed as a subset of providing quality service.

The Call Center works at an acceptable level, but its improvement depends on making some changes in its method of operations:

- The MTA is losing potentially valuable data by not archiving the ACD call data that is now purged after 90 days.
- The MTA loses some level of efficiency by not upgrading its ACD system to include such features as caller ID, aggregation of calls by line, etc.
- Maintaining the staff at authorized levels, particularly the bilingual operator opening.
- Updating the old procedures manual for use as a training and SOP for operators.
- The MTA has no automated data for route and schedule information.

The call center data are not tracked in a manner that would enable their use for service planning and evaluation.

The rate of calls to the call center has increased over 20% in 2000.

The complaint handling process has a number of shortcomings that reduce its effectiveness as a management tool.

- Complaints are investigated by the department which is responsible for the problem
- Contact between the complainant and the MTA is through the cognizant department
- There is no process for reporting to customer service the disposition of a complaint or a request

Call statistics suggest that the number of calls is increasing and the effectiveness of the call center staff is improving.

### **Recommendations**

The MTA should adopt a broader view of the Customer Service function to include many of the operational aspects of the business currently managed outside of the Customer Service Department. This would include both the provision of information and the provision of actual transit services. MTA's new Transit Guide defines safety, reliability, customer friendliness, and efficiency. These definitions should serve as the basis for the development of appropriate goals and measurement tools for each area. Some of these measurements are already reported (for example, on-time performance, miles between road calls, and preventable accidents). However, these statistics are presently not joined together into a comprehensive picture of MTA customer service.

MTA's mission is "To provide safe, reliable, efficient, customer friendly public transit and alternatives to driving alone." Customer service metrics should be re-defined to measure the degree to which this mission and related goals are being met.

MTA should also ensure that its Call Center is adequately staffed. Additionally, MTA should evaluate the current hardware and software employed in the Service centers to determine if it is adequate for the current and future requirements. Certain enhancements would provide operational efficiency inside the call centers e.g., call aggregation to identify abandoned calls by line automatically (rather than manually), and may well by quick payback investments. As part of our review of the Information Systems function we recommended consultant study of the IT infrastructure. The customer service center hardware and software requirements should be incorporated into this study.

Customer service data collection and measurement should be delegated to appropriate staff members throughout the organization. Achievements versus targets can be presented and publicized on such periodic intervals as MTA determines is appropriate (for example, monthly or quarterly). Standards for service (e.g., call handling statistics – abandoned calls, wait times, etc.) should be established objectively, monitored and regularly reported.

For all services (existing and new, service oriented or information oriented) and for any service changes MTA should clearly define the goals and objectives of the service or change, such as the new service standards being developed by the short range transit consultant. They should identify appropriate measurement tools to gauge the success of the service or change. Baseline data should be gathered, and follow-up data should be gathered at defined intervals after implementation. Analyzing the data and comparing it to the defined goals will allow MTA to determine the success of a service or change and to determine if adjustments are necessary.

**Costs Estimate**

None.

## **Customer Service Related Activities**

Three customer service related activities were special subjects for review during this audit:

- How the MTA obtains regular customer input
- How the MTA deals with non-english speaking customers
- How the MTA deals with special customer surveys.

### **1.) Obtaining Regular Customer Input**

In addition to the small, targeted market research efforts described in the previous section, MTA receives customer input through various means, such as public hearings, user committees, the MTA website, and at regular monthly Board meetings.

#### Public Hearings

MTA conducts service changes twice each year, as well as less formal hearings as a part of Board meetings for less significant service changes. Federal requirements state that transit agencies must hold public hearings for major service changes. MTA receives public comments on the proposed changes at these public hearings. Formal public hearings are held at several locations in the Nashville area on varied days and at varied times. The meetings are publicized through flyers on buses, newspaper advertisements, radio announcements, and on the website.

#### User and Community Committees

Interviews with MTA staff identified two user committees: Tying Nashville Together, and the Access Rider User Group.

Tying Nashville Together (TNT) meets with MTA staff monthly and with the Mayor of Nashville quarterly. This group brought customer service issues and complaints to the MTA Board. Today the group works directly with MTA to improve service, with the Executive Director having the most contact with the group. TNT's transit program is a part of its much larger set of community service issues.

Recent areas of discussion between TNT and MTA have included issues related to bus stop sign changes and the limited number of bus benches and shelters. In the past, the TNT group has been responsible for suggesting things such tools as the Transit Guide and has worked with MTA to develop and/or speed the development of other services to meet the needs of the community.

The Access Ride Policy Advisory Committee works directly with Access Ride staff to address issues and improve services for the handicapped community.

#### Outreach Programs

Marketing campaigns such as Clean Air Month and Try Transit detailed earlier in this document frequently include targeted or general outreach programs. In addition, through on-site visits, direct mail, and door-to-door campaigns the Rideshare Associate continually works with local employers and employees to inform them of transportation options such as vanpooling, the Mobility Check program, and local and commuter bus services that may meet their transportation needs. Somewhat less frequently, the Rideshare Associate and Customer Service staff members are asked to conduct outreach for the general public to inform customers of new or improved transit services.

MTA has recently added a Community Outreach Coordinator position to assist with the growing outreach opportunities. This new position is fully funded through a grant. The Coordinator will call on local businesses and agencies such as the Dell Corporation and the Corps of Engineers, public schools, and neighborhood and other local groups. The Coordinator will attend fairs and other local events to assess community needs and identify ways to meet those needs now and in the future.

#### Other Public Input Options

Other options for regular public input include MTA's new website and monthly Board meetings.

The MTA website has been operational for 6 months. It provides a forum for customers with Internet access to submit their comments and questions electronically.

An opportunity is provided at each Board meeting to receive public comment on issues on the agenda or about other general issues and concerns.

#### Conclusions

For a transit agency of its size (approximately 150 vehicles, serving a population of over half a million) MTA provides a good variety of avenues for regular customer input. Opportunities for customers to comment are offered periodically at transit events and through public hearings and customer surveys. Continual opportunity to provide input is provided through MTA's website and through the Customer Service Center Call Center.

As discussed later in this section regarding *Recent Surveys*, documentation of survey results is limited and it is difficult to determine specifically what and how data and public commentary is used.

## **Recommendations**

As MTA grows and increases its role in transit advocacy, it will need additional methods to solicit information from customers. This may be accomplished through:

- Appointed customer committees, advisory committees, or panels with periodically rotating membership and regular meetings with the transit agency
- Public planning meetings where MTA jointly develops services and programs with its customers
- Neighborhood or area meetings where the MTA discusses plans for service in specific neighborhoods or service areas
- Regularly scheduled targeted outreach efforts to provide information and receive input from groups such as seniors, persons with disabilities, students, non-English speakers, etc.
- Surveys such as the boarding and alighting and origin and destination surveys described earlier in this document

The new Community Outreach Coordinator should lead these efforts as a part of an enlarged planning and marketing program for the MTA.

## **2.) Addressing The Needs Of Non-English Speaking Customers**

As the diversity of the Nashville area grows, addressing the needs on non-English speaking customers will become increasingly important.

MTA has not conducted any extensive studies to identify or quantify the non-English speaking populations of Nashville. Rather, these populations have been informally identified through discussions with the Customer Service Department and the contracted marketing agency. At present, Spanish-speakers are considered the largest non-English speaking population in the region, although many other non-English speakers are also present in the Metro region.

The efforts undertaken by MTA to address the needs of non-English speaking populations include:

- The MTA is trying to fill the open Customer Service Representative position with another Spanish-speaker (to replace the one Spanish speaker who left). MTA will also provide Spanish versions of its schedules to customers upon request. MTA has worked with Tying Nashville Together (TNT), operators, passengers, supervisors and others, to identify and understand the needs of the growing Hispanic population of users.
- A TDY machine for hearing-impaired customers is located at the Customer Service Call Center

- MTA has chosen to use an on-demand internet translation program to allow customers with internet access the option of viewing their Website in multiple languages (Spanish, Portuguese, French, German, and Italian)
  
- Visually Impaired - Available to all MTA customers, the downtown talking post that provides schedule information is especially useful to those with visual impairments. MTA will also provide Braille versions of its schedules on request.

### **Conclusions**

MTA has conducted little formal research to identify the nature and extent of its non-English speaking market populations. However, according to the 1990 US census, English is spoken at home by 89 percent of the Nashville urbanized area's population. Although numerous languages were reported, Spanish is the second most spoken language spoken at home in the urbanized area's population. MTA's recent anecdotal evidence seems to support the notion that the Spanish-speaking population is a growing major population that may, along with other non-English language speakers, require specialized communication tools.

### **Recommendations**

MTA should continue its efforts to provide services (for example, a Spanish-speaking Customer Service Representative, translation of informational materials, schedules, guides, and system maps) for the non-English speaking population. MTA should also conduct a review of updated data about the languages spoken in its service area (including tourist traffic) as soon as new data is made available (for example, 2000 Census data). Much of this data probably already exists among various groups in the region including sections of the Metropolitan Government. Additionally, the new outreach coordinator should develop a relationship with the agencies, non-profit, and faith-based organizations in the area that work with new immigrant populations to identify other non-English speaking constituencies as they emerge.

### **3.) Recent Surveys and Their Outcomes**

Recent surveys have included the Titans Shuttle Survey, the Try Transit Survey, the Midtown Connector Survey, and the Zone Survey. In most of the surveys discussed below we were unable to view a comprehensive set of survey results.

#### **Titans Shuttle Survey**

Titans shuttle riders were asked a series of questions pertaining to their commuting habits, transit service use, what media sources they generally see (radio, newspaper, and television), and what else the MTA should be doing more of (choices included late night bus service, light rail service, commuter rail service,

better express services, and other). MTA representatives state that improvements made after the survey included fare changes, changes in pick-up/drop-off points, and changes in elderly transportation.

#### Try Transit Survey

As a part of the Try Transit program, eight targeted groups were asked to answer the questions about types of services they would like to see more of in the future. Choices included late night bus service, light rail service, commuter rail service, better express services, or other services. In lieu of a detailed report, a brochure presenting an overview of Try Transit survey results and services that were in development by MTA (Night Owl late night services, enhanced express bus services, a Transit Guide, new system map, and commuter rail status) was created and distributed to the public.

#### Midtown Connector Survey

In conjunction with the Midtown Connector Community Outreach program, MTA received 88 completed surveys from persons within the South sector of the Midtown Connector service area. It is not known how specific questions were selected. However, four questions were asked and survey results were analyzed.

#### Zone Survey

Following the reintroduction the Zone service, Zone users were asked to complete a survey, asking about commuting habits, how often and why they use "Zone" service, what media sources they generally see (radio, newspaper, and television), ways that MTA can make Zone service better, and what more MTA should be doing.

#### Monthly Customer Service Survey

Each month a Customer Service Representative or a light duty operator is asked to conduct a survey of bus patrons. The goal for each month is 50 completed surveys. The routes and locations where the survey will be conducted are selected each month by the Director of Customer Service based on recent route changes, complaints, or at the request of the Scheduler.

The predecessor to the current Director of Operations, who was heavily involved in marketing functions, developed this monthly survey. The utility of the information gathered through this survey is the reason it continues today. Open-ended comments from the form are forwarded to appropriate departments to be addressed, and survey results are compiled into a monthly report. Examples of the types of commentary from these surveys includes:

1. Line up should be 5 minutes apart
2. Every once in a while there is a "cruel" driver, but for the most part the service is satisfactory
3. Your drivers are super. They get an A+
4. Service is very reliable

5. No improvements are needed
6. Need more frequent service
7. We need more outbound trips on 10<sup>th</sup> Avenue south
8. Increase bus service in all areas and add more late night service.

### **Conclusions**

MTA generally conducts a number of small, targeted surveys each year. These “spot check” surveys do not generate statistically valid data. However, the data and public comments that are gathered are referred to and considered by MTA as new services are developed and as existing services are updated.

Quantified documentation of survey results is extremely limited, and it is difficult to determine specifically what data and public commentary has been used. Rather, it seems that MTA staff’s perception of the data is used to shape the direction of future operational decisions. In addition, anecdotal information says that survey results have been used to speed up programs that are already in the works or being considered.

With the exception of the monthly customer service survey, MTA’s surveys tend to focus on evaluation of services after they are first implemented. Efforts to research demographics, travel patterns, market demand and pricing elasticity are extremely limited. These topics are also discussed in the *Marketing* section of this report.

### **Recommendations**

MTA should develop and periodically update a comprehensive set of statistically valid planning data, working with the MPO and the RTA. This data would serve as a marketing and planning tool that can provide a broader understanding of the service area’s demographic make up, travel patterns, and transportation needs.

Development of the data sets can be accomplished through the completion of demographic analyses, boarding and alighting surveys, origin and destination surveys, and other types of customer surveys. Most transit agencies complete boarding and alighting and origin and destination surveys only once every few years (generally every five years). This data should be consistent from year to year so trends over time can be monitored. Studies can be completed in-house or under contract to an experienced outside agency or firm. Data can also be collected at varying levels - by route, day of week, time of day, block, etc.

The MTA should tabulate and report on the ad hoc surveys that have been completed in recent months to assure that the results of these surveys are available for planners and other decision makers in the future.



The implementation of such surveys should be part of the work assigned to the expanded marketing and planning staffs.

**Overall Cost Implications**

None.

## **Communications and Safety**

As with most transit operators, the MTA is aggressive in its management of operating safety. The overall responsibility for administering the safety program is assigned to the Director of Safety and Training, who reports to the Director of Operations. The Director of Safety and Training is supported by a variety of other personnel at the MTA, including part time contract “watchers”, trainers, and supervisors who assist in training drivers, retraining programs, and monitoring the performance of the driving work force.

The watchers observe the in-service practices of drivers, and their observance of correct operating procedures. Part of the road supervisors' job is to observe the drivers for various performance issues, including safety and operating rules. Training of new drivers includes a safety module. Any driver who exhibits unsound practices is provided with specialized retraining aimed at remedying such problems. Training facilities at the MTA are modest but adequate to the task, and include videotapes on a range of training and safety issues.

### **Bus Communications**

The MTA has a fairly standard, but somewhat dated, two-way communications system in which the dispatchers who are housed in MTA's headquarters are able to communicate with the drivers and supervisors on the road. This can be used when, for example, there is a need to inform drivers of street detours that may arise out of notifications from Public Works. They are able to communicate with emergency service and public service agencies in case of an emergency.

### **Public and Passenger Safety**

The passengers and drivers of MTA services are protected on buses through a combination of traditional transit security methods common in the industry. Among these are:

- Pre-employment background checks of motor vehicle, arrest, and prior employment records for new drivers
- Training for drivers in dealing with difficult people
- Radio communications between drives and dispatchers
- “Call the Police” destination signs that can be deployed by the driver
- An “Open mike” button that drivers can activate is being installed on all buses so dispatchers can hear what is going on in buses and take actions accordingly

The MTA has also tried on-board video cameras, and is in the process of installing a new type of video camera on a number of buses. The new articulated buses are equipped with a new video system with

two cameras that play into a 24-hour circular tape. The MTA is considering installing this system on all buses.

The MTA also has a program that rewards witnesses who come forward and provide information that relates to incidents on the system. This program is advertised on cards on the buses.

The MTA also has security guards posted at the landports from 6 PM to the early morning at the end of service hours. There are also security cameras in the rest rooms at the landports, and security people can gain access to the rest rooms from the outside. Security guards also ride the magnet school runs to monitor activity and deter incidents. They have no powers of arrest.

### **Conclusions**

The Communication system between the dispatchers and the operating personnel is functional and adequate for the foreseeable future.

There is a reasonable arrangement for handling emergency situations that occur on buses from time to time.

Magnet buses are the only services on which there are on-board monitors to maintain order and deal with special problems.

Organizationally the Director of Safety should report to the Executive Director in order to comply with Federal guidelines. Federal inspectors will commonly check to see where the Safety Director is placed organizationally. A direct reporting relationship to the Executive Director provides some degree of independence from the operational management of most transit systems.

While there are no guarantees of personal safety, the MTA's current protections are typical of most transit systems of its type and size.

### **Recommendations**

Reassign the Director of Safety and Training to report directly to the Executive Director, in accordance with Federal guidelines for the administration of safety programs.

The Director should develop a system safety plan that lays out the overall strategy for public, employee, and passenger safety with the appropriate tactics to achieve a high level of safety, and with specific tactics and a budget to support the program.

**Cost Estimate**

None.

## **Management of In-Service Breakdowns**

The minimization of service disruptions due either to bus breakdowns or other causes is a major focus of effort for the MTA, as it is in most transit systems. Efforts to prevent service disruptions consist largely of efforts to assure that both the driver and the bus are ready for service. Efforts to reduce the impacts of any disruption for any cause generally focus on a series of preventive and remedial actions, including:

- Assuring that all drivers are fit for duty
- Assuring that all vehicles are properly inspected and maintained
- Holding vehicles that are due for inspections out of service
- Assuring that all vehicles assigned for service are ready for service
- Assigning vehicles to tripper service that are in need of midday running repair
- Assuring that all drivers complete their “walk around” inspection of vehicles before they leave the yard for revenue service as a safeguard against having a defective in service
- Maintaining radio communications with drivers in service
- Trouble shooting in-service problems with the driver and solving minor in-service problems, by radio
- Leaving buses with non-critical problems in service, at least until a relief bus can reach the scene of the problem, or until the mid-day or evening pull-in periods
- Having replacement vehicles available for service if required both for breakdowns as well as for delays, heavy loads, or other unexpected needs

Other safeguards against undue disruptions include leaving buses with minor defects in service and having maintenance personnel meet the vehicles at layover points and make repairs. Any bus, however, with a safety-related defect or with malfunctioning air conditioning is pulled out of service immediately and replaced with a substitute vehicle. All of the current fleet is air-conditioned.

A summary of recent road call rates for the last three months of 2000 for various components of the fleet is summarized on Exhibit 18-1. As these figures indicate, the average miles between failure for the quarter was approximately 4,000 for the fleet, with individual subfleets rates ranging from a low of 1,652 for the Trolleys to a high of 14,331 for the newer RTS buses. This average is well within an acceptable range. It should be noted, however, that industry reporting practices for this number are highly variable. Some systems report almost any defect as a “failure” where others take a more conservative approach.

The systems that are in place to minimize service disruptions are well thought through and well executed.

There was no reporting for failures by fleet by components. This type of reporting permits a more systematic and active approach to failure management. It can provide insight into recurring problems within a subfleet and expedite a mass correction. This level of sophistication will improve failure rate averages for the entire system.

We did not see any evidence of specific campaigns to remedy failure by cause by subfleet.

**Conclusion**

Failure rates at MTA do not appear to be unusual and are well within an acceptable range based on industry standards.

**Recommendation**

The MTA needs to develop and maintain a report that indicates failure by fleet by component. This will help MTA develop campaigns to remedy failure by cause by systemic subfleet issues.

**Cost Estimate**

None.

## **Fleet and Facility Maintenance**

The maintenance of vehicles and facilities at the MTA is under the direction of the Director of Equipment Services. The vehicles include the 150 fixed route buses, 36 handicapped service vans, vanpool vehicles, and a number of non-revenue and service vehicles. The facilities include the operating base at Nestor Street, the landports, the shelters, bus stop signs, and benches spread throughout the service area.

A comparison of the MTA's bus fleet statistics for 1995 and 2000 is shown on Table 19-1. We have attempted to identify industry norms or standard practice based on our experience where these exist. Where these standards or norms do not exist the table is noted NA for not applicable.

**Table 19-1**  
**MTA Performance Audit**  
**Fleet Characteristic, Fixed Route Vehicles**  
**As Reported to NTD for FY 1995 and FY2000 (1)**

<u>Item</u>	<u>1995</u>	<u>2000</u>	<u>Standard (goals)</u>
Active Fleet	124	150	NA
Wheel Chair Equipped	24	61	100% of active
% Wheel Chair Equipped	17.9%	40.7%	100%
Annual miles of operation	4,227,000	4,702,000	NA
Average miles per bus per year	31,545	31,347	30-40,000
Average life miles per bus	303,754	335,907	under 500,000
Fleet life miles	40,703,000	50,386,000	NA
Years in services	1,158	1,322	6 x fleet size
Average age	8.6	8.8	6
Coaches Over 12 Years	36	43	0
% Coaches Over 12 Years	26.9%	28.7%	0%
Number of different models	9	14	NA

(1) These data are for the year end for FY1995 and FY2000. The 1995 data are from the NTD reports, and the 2000 data are from the maintenance department's submission for use in the 2000 NTD report.

The basic statistics at the end of fiscal years 1995 and 2000 transit coach fleets are listed by type of bus on Exhibit 19-1. As these data show, there are 14 different subfleets in the transit coach fleet of 150 buses. The average age of the fleet is 8.8 years, and the average lifetime miles accumulated by the fleet is 335,907. The total number of miles on the fleet is over 50 million, and the total years of service by the fleet is 1,322. All three of these measures are higher than the 1995 numbers – in other words the fleet

is older, operates more miles each year, and accumulated more miles per bus in 2000 than it did in 1995.

The average bus at the MTA traveled 31,545 miles in 1995, and 31,347 in 2000. These figures are within the range of industry norms of 30,000 to 40,000 miles a year. Some systems with long periods of service during the day and frequent headways approach 60,000 miles a year.

The common standard used in planning transit fleets is an average age of 6 years old, a maximum lifetime mileage of 500,000, and a maximum age of 12 years. Both the 1995 fleet and the 2000 fleet exceed the FTA's age standards of 6 years on average and 12 years maximum age, but are well below the lifetime miles standard of 500,000. This variation from standards is a common pattern on many transit systems. Even with average maintenance practices, transit coaches tend to last beyond the 12-year life, and most transit systems do not approach the 500,000-mile standard for 15 to 20 years of operation. It is not uncommon to see average fleet ages approaching ten years without the fleet approaching 500,000 miles of use.

The peak period fleet requirement is 105 buses, plus trolleys, for the fixed route service. The active fleet size is 150 at the end of 2000. Although the MTA has 60 buses that will pass through the industry's 12 year life standard, only one fleet – the 17 General Motors buses – will exceed the 500,000 mile standard.

**Spares Ratio** - The size of any bus fleet is subject to constant change as new buses are delivered and old buses are retired, and as buses are out of service for extended periods due to body damage or lack of parts. A key measure of the correct fleet size is the ratio of active buses to the number of buses required for the maximum service period. The FTA standard for total fleet size is 120% of peak service requirements. This 20% allows for regular maintenance and repair during the peak periods. The spares ratio of the MTA transit fleet at month end February, 2001, was right at 20%, as shown on Table 19 –2.

**Table 19-2**  
**MTA Performance Audit**  
**Peak Vehicle Requirement and Fleet Size, February 2001**

<b>Fleet</b>	<b>Active</b>	<b>Peak Needs</b>	<b>Spares Ratio</b>
<b>Motor Bus</b>	<b>128</b>	<b>104</b>	<b>23%</b>
<b>Trolleys</b>	<b>13</b>	<b>13</b>	<b>0%</b>
<b>Combined</b>	<b>141</b>	<b>117</b>	<b>20.5%</b>

The introduction of more complicated specifications, the increased number of fleet types and component variations, the introduction of electronics, wheel chair lifts, and the need to operate several different kinds of services, have all contributed to the doubling of the FTA standard for acceptable spares ratio from 10% to the current guideline of 20%.



The actual spares ratio of a transit fleet changes periodically as new buses are purchased, old buses are retired, and buses are placed on the reserve list. At the same time, the peak bus requirements change seasonally, with each change in the public timetable.

**Demand Responsive Fleet**

A comparison of the paratransit fleet profile is shown on Exhibit 19-2. The demand responsive fleet is a much simpler maintenance problem than the fixed route fleet in a number of ways. The vehicles are all virtually the same, they are less complex mechanically, and they get much less arduous use from their riders.

The 1995 fleet and the 2000 fleet are similar in most respects, except that the annual miles per van was higher in 2000 than it was in 1995, at 30,167 miles versus 24,293 miles, respectively. This suggests a better fleet utilization in 2000 than in 1995. A summary of these data is provided on Table 19-3.

**Table 19-3  
MTA Performance Audit  
Demand responsive Paratransit Fleet Comparison  
1995:2000**

<b>Item</b>	<b>1995</b>	<b>2000</b>
Fleet size	41	36
Active Fleet	39	36
Wheel Chair Equipped	21	35
% Wheel Chair Equipped	51.2%	97.2%
Annual miles of operation	996,000	1,086,000
Average miles per bus per year	24,293	30,167
Average life miles per bus	177,463	210,111
Fleet life miles	7,276,000	7,564,000
Years in services	244	232
Average age	6.0	6.4
Coaches Over 8 years old	10	17
% Coaches Over 8 years old	24.4%	47.2%
Number of different models	1	1

(While all of the vans were Fords in both fleets, there were small differences in the models from year to year.)

As these data show, the 2000 demand responsive fleet was generally older than the 1995 fleet, had accumulated more lifetime mileage, and operated more miles per year than did the 1995 fleet. In addition, all but one of the vans were lift equipped in the 2000 fleet, while only 21 of the 41 1995 fleet were lift equipped.

Of the 2000 fleet, 17 had accumulated more than 250,000 miles, and were older than 6 years. In 1995 none of the vehicles had even accumulated more than 230,000 miles, much less 250,000 miles.

**Maintenance Expense**

The trends in the major elements of maintenance expense over the past five years are illustrated on Table 19-4. As these data show, there was a major increase in 1998 and 1999 in the expense for wages, materials and supplies.

**Table 19-4  
MTA Performance Audit  
Maintenance Expense Trends 1995-1999**

	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>'99/'95 %</b>
Wages	\$1,756,612	\$1,785,246	\$1,968,835	\$1,795,942	\$2,256,572	28.5%
Services*	127,273	127,429	102,101	116,679	100,005	-21.4%
Materials	<u>859,925</u>	<u>763,234</u>	<u>712,679</u>	<u>2,073,924</u>	<u>2,859,819</u>	232.6%
	2,743,810	2,675,909	2,783,615	3,986,545	5,216,396	239.6%

\*Services represents work performed by contractors

The maintenance department is coming to the end of a major effort to catch-up on a substantial amount of deferred maintenance and to improve the appearance and condition of the fleet. A review of a selection of maintenance “swing sheets” for June 1997 and January 2001 illustrates the dividend from these expenses on the mechanical condition of the fleet. These “swings sheets” show the status of the maintenance backlog on each vehicle in the fleet, including any deferred maintenance.

The costs of maintenance should decline markedly as the MTA recovers from the elimination of the deferred maintenance program.

A summary of the change in the deferred maintenance backlog for June 1997 and January 2001 is illustrated in Table 19-5. By January 2001, the backlog of deferred mechanical work had virtually disappeared.

**Table 19-5  
MTA Performance Audit  
Comparison of Backlogs: 1997 to 2001**

<b>Defect Type</b>	<b>June 1997</b>	<b>January, 2001</b>
Coach engine	17	2
Van engine	4	1
HVAC defects	20	2
Brakes	28	5
Oil leaks	27	1
Exhaust	5	0
Low power	8	0
Motor mounts	7	0
Transmission oil leak	4	0
Wheel seals	3	0
Electrical malfunctions	5	0
Air leaks	18	0
Speedometer	10	0

For a further discussion of Maintenance see the Bus Maintenance item in the *Peer Group Assessment*.

### **Appearance of the Fleet**

While the reliability and air conditioning of the fleet has improved substantially due to the initiative of the department management team over the past two years, the body and paint problems of the fleet have been given a lower priority. The elimination of the backlog of mechanical problems has enabled the maintenance department to begin to shift its attention to working on the appearance of the fleet, while keeping after the mechanical work to prevent another build up of deferred maintenance.

The large number of buses with body damage, window and windshield damage, roof leaks, and seats in disrepair was greater in 2000 than in 1997. The April 1997 swing sheet reported 42 vehicles with body damage. The November, 2000 report showed an increase to 52 vehicles with paint and body damage. In 1997, 34 buses had damage to seats, and in 2000 the number was virtually the same.

**Cleaning Standards** - The MTA strives to do a thorough external cleaning of every bus every day, when buses are serviced and refueled – usually at the end of each day of service. The general cleanliness of the fleet is typical of the industry, and is adequate on most days, except when there is rain for a few days.

The MTA has committed to a complete interior ‘scrub down” every 45 days to every bus. They are currently achieving about a 35-day cycle. The interiors are generally clean and free from physical damage, except for some damaged seats and some cracked window glass.

These standards for cleaning are typical of transit systems of this size that operate in a climate like Nashville.

### **Maintenance Operations**

At least one crew of the vehicle maintenance department staff at the MTA is at work virtually every hour of the day, seven days a week. Like most transit systems, the bulk of the scheduled maintenance and running repair work is performed on the day shift on weekdays. A profile of the work shifts is illustrated on Table 19-6. This maintenance work shift pattern is typical for the industry.

Most of the vehicle fueling, cleaning, and servicing takes place at night from before the evening pull-ins start until the early morning hours. Some minor cleaning is done at midday at the shops or at a landport. Overnight maintenance personnel make sure that the fleet is ready for the morning service.

**Table 19-6  
MTA Performance Audit  
Vehicle Maintenance Work Shifts**

<b>Shift</b>	<b>Sun</b>	<b>Mon</b>	<b>Tue</b>	<b>Wed</b>	<b>Thu</b>	<b>Fri</b>	<b>Sat</b>
8AM –4PM	6	36	45	45	44	41	3
4PM-12Mid	4	6	9	8	8	5	4
6PM- 2AM	1	9	9	9	9	9	5
7PM-3AM	2	7	9	9	9	7	2
11PM-7AM	1	1	1	1	1	1	0
12Mid – 8 AM	3	4	7	7	7	5	4
Total	17	63	80	79	78	68	18

The maintenance work force is a relatively junior staff. Of the maintenance staff members who were on the seniority roster at the time of the site visits, 49 were hired since 1990, 15 were hired in the 1980's, and 16 were hired before 1980. The staff includes 11 sweepers and general helpers, three janitors, three storeroom clerks, six body and paint staff, and one fare box mechanic. Thirty (30) members of the staff are certified air conditioning technicians.

The maintenance staff selects their work and their shifts by seniority from a roster of available shifts and work assignments that is prepared by management. Work shifts are posted by type of work and by shift, and personnel who are qualified for each type of work chose their work by seniority. Generally, a mechanic is restricted by work rules to doing work assigned to the shop that he has chosen for a given work schedule period.

For example, a mechanic who has picked a shift in the air conditioning shop will not be able to be assigned to work in another shop. Most transit system are eliminating these shops and allowing the qualified work force to work as assigned during their shifts. This flexibility in the work rules allows

management to allocate people on a tactical basis to meet short term needs like AC fixes in hot days in the summer, or open work for a given shift.

The daytime mechanical work is divided into a typical arrangement of scheduled and unscheduled activities. Some of the maintenance activities are scheduled at predictable thresholds. For example, inspections are based on miles operated, and cleaning and servicing is performed daily for all pullouts. The personnel requirements for this work can be predicted ahead of time – even annually at the time of budget preparation.

Most of the rest of maintenance work is based on less predictable requirements. This includes

- Daily running repair work that arises out of in-service problems
- Road calls
- Accident repair work

The volume of this work on any given day can only be anticipated in general levels of effort, and depend on the problems that arise during the operation of service.

Most of this less predictable work is assigned by the foreman at the beginning of each shift, based on the personnel available and the list of maintenance jobs to be done that arise out of defects reported by drivers, scheduled maintenance, and inspections. This unscheduled work is selected on a triage basis, with one objective being to keep as many buses available for service as possible.

### **Preventive Maintenance (PM)**

The MTA has three levels of scheduled inspections beginning at 6,000 miles, with more extensive inspections due at intervals of 12,000, 36,000, and 48,000 miles. These inspections must be conducted within 600 miles or 30 days of their scheduled time. A review of the PM report dated November 2, 2000, showed bus inspection intervals that were almost random, and many showed no relationship to the reported odometer reading and the anticipated inspection intervals of 6,000, 12,000, 36,000 or 48,000 miles.

The MIS maintains a complete summary of the inspection status of each vehicle, including the date and miles of the last inspection for each interval. The report also notes the mileage at which the next inspection is to be conducted, and shows the miles or days remaining until the next inspection. On the day of one site visit, eight buses were overdue for inspections – a fairly normal degree of variance.

The inspection work force works on the 6PM to 2AM shift. This is after the evening peak period. The staff includes both inspectors and follow-up mechanics who perform repairs on items found to be deficient by the inspectors.

### **The Operating and Maintenance Facility**

The MTA fleet maintenance is performed in a large former aircraft manufacturing plant that has been retrofitted for its current purpose. About 50% of the total square footage is dedicated to fleet maintenance and repair, and the rest is used for storage, a full sized basketball court, and a work out gym for employees. A significant amount of space away from the primary maintenance areas is underutilized and could possibly be used for other activity.

There are several buildings in the facility, each with a specific use: administration, transit bus maintenance, bus cleaning and servicing, small bus maintenance, small bus parking, and storage for benches, signs, and shelters.

The administrative offices are adjacent to and connected to the major maintenance building. The layout of the first floor of this area allows the maintenance and transportation staffs to be located with easy access to the drivers' and the mechanics' areas. The remaining administrative offices and the boardroom are on the second floor. The layout of these spaces is adequate. Each employee has either an enclosed office or a cubicle for workspace. Public access to the second floor of the administrative offices is necessary because the boardroom and the personnel assistant are on that floor. There is handicapped access to the offices, including an elevator to the second floor.

The interior layout of the shops that are dedicated to bus maintenance and repair was arranged and installed by the MTA staff, and is adequate to the tasks assigned to it. The maintenance work areas are well lighted and have adequate space for normal work activities. There are no inspection pits in the shop, and many of the lifts are portable lifts. The buses pull in and back out of the berths, with no movement conflicts. The tools and bench areas are easily accessible, and both the passive and active ventilation appears to be good. Hoses for consumable and power connections are handy to the work areas.

The major problem with the internal layout of the bus maintenance area has to do with parts storage and disbursing. To begin, the storage area is at a distance from the maintenance bays that are used for repair work. Second, there is a substantial amount of major parts stored in unsecured and open areas. The location and manner of this storage gives this part of the facility an unkempt and disorganized appearance. Due to the nature and size of the parts in question, however, there is little risk of loss.

The body and paint shop are somewhat remote and separate from the area dedicated to general repair, as is appropriate to this kind of work. There is an enclosed paint shop equipped for painting buses that has been built onto the large open area in the building.

The remaining space is a large, "L" shaped area that is used for a number of functions. This space is largely underutilized. Among the activities that take place in this space are van maintenance and storage, trolley storage, and storage for signs, shelters, and benches.

The buildings compound separates two parking areas for employee vehicles. The area for driver parking is almost always full to overflowing. These areas are fenced in, and are covered by outside cameras.

There is little or no space on the site for expansion beyond the limits of the present structure without taking some of the current parking spaces, of which there are already too few. As noted above, there is a significant amount of space available in the enclosed areas for other activities that might be undertaken.

### **Maintenance MIS**

The current MIS system includes a vehicle history that contains all job order entries. The data for all work orders is recorded in each vehicle history. The vehicle histories are thorough records of all work done on the vehicle. The entries include the date of the work, the work order number, the odometer reading, the description of the work, the costs of parts and labor for the job, the hours worked, and the mechanic's identification number.

The maintenance system (Turley) is not being used to generate a number of reports which would normally be used to manage the maintenance function effectively, e.g., a list of buses overdue for inspections. It is unclear whether this is a deficiency of the system or lack of report writing expertise. The maintenance director maintains a number of special reports on Excel on his desktop computer. Much of this data are hand entered rather than being transferred electronically from the Maintenance MIS.

### **Conclusions**

The rapid and substantial increase in maintenance expenses over the past three years has enabled the department to eliminate a major backlog of deferred maintenance.

The department has gone through a period of transition under the new Director over the past two years. The achievements over this period include a substantial rapprochement with the maintenance employees, and the virtual elimination of the backlog of mechanical problems with the fleet. This performance is to be commended.

While the mechanical condition of the fleet has improved over this period, the extent of body and paint damage has worsened. The number of buses on the "swing sheet" with such problems has increased by 25% since 1997.

Scheduled preventive maintenance is being performed according to periodic mileage or hours intervals. Eight buses were overdue for inspection on the date of our fieldwork review.

As currently used, the Turley maintenance software is not providing adequate management information.

The ability of the department to sustain the current mechanical condition of the fleet, to continue to improve reliability, and to carry out the needed campaign on the body and paint damage will require a new financial strategy to take the place of the capitalization of maintenance expenses.

There is no documented long term strategy for fleet management and maintenance that incorporates an adopted fleet replacement program, a supporting capital budget, and a fleet utilization plan that levels fleet use in a manner that increases the predictability of more maintenance work.

### **Recommendations**

The Maintenance Director should develop a maintenance management plan that brings the fleet age and condition up to standards, and prevents the accumulation of the type of backlog that he inherited when he came to the MTA. Additionally, maintenance schedules should be established which correspond to periodic mileage intervals. This schedule should be adhered to rigorously.

The plan should incorporate a fleet operations strategy that lays out the use and maintenance strategy for each subfleet.

The plan should develop mileage thresholds for major component rebuild and replacement thresholds, and estimate of the work hours and materials necessary to support that level of maintenance, and personnel strategies that provide the staff necessary to carry out the plan.

The Maintenance Director should do a complete evaluation of the body damage repairs and paint work necessary and prepare a program budget that restores the fleet damage as a part of the maintenance budget for the coming fiscal year.

The budget for the coming year should specify the maintenance campaigns to be undertaken, the costs of each maintenance element, and the expected changes in fleet performance as a result of that investment.

If the work hours and facility capacity that are necessary to complete the body and paintwork in a year are not available at the MTA, the maintenance Director should seek proposals from the private sector to accomplish the work.



The report writing capacity of the Turley maintenance software should be examined.

MTA should strive to change the provision of the labor agreement that limits management's flexibility to contract work, and increases management flexibility in assigning work, within the overall collective bargaining strategy of the MTA.

**Cost Implications**

Once the body and paint backlogs are worked down through fiscal year 2001, maintenance expense should return to more normal ("average") levels. This could result in year over year reductions of \$1 million or more from savings in materials and supplies.

## **Contracting for Vehicle Maintenance Work**

Transit systems in the United States often use private providers of vehicle maintenance for a variety of activities. Among the most common are:

- Tire and tube repairs (probably the most common, with most transit systems providing on-site facilities for tire service providers)
- Towing service
- Engine and transmission overhaul
- Component part overhaul
- Engine oil testing and fluids analysis
- Complete vehicle rebuilding
- Warranty work
- Non-revenue vehicle maintenance
- Specialized bodywork
- Total bus overhauls.

See the section on *Procurement and Related Activities* for a discussion on parts inventories.

In some cases, these services are provided on a continuing basis, and in others they are provided on an as-needed basis. As-needed arrangements are either for periodic maintenance overloads or for special projects. In some cases, transit systems conduct projects in which a maintenance campaign is provided half by the transit system labor staff, and half by a private provider. Engine overhauls would be a typical example.

Warranty work on new buses is now being performed by vendors in the MTA shops. The maintenance of vanpool vehicles is done by vendors.

Several factors go into the decision as to whether to contract out maintenance. These include:

- The provisions relating to contracting in the labor agreement. There are three general cases:
  - The contract is silent on the issue, reserving the right of management to contract
  - The contract specifically allows contracting
  - The contract specifically prohibits contracting
- The Impact of contracting on labor relations, regardless of the contract provisions
- The condition of the fleet, and the need for outside help on a temporary or continuing basis
- The lack of specific technical skills on the transit system staff
- The availability in the local private sector of competent providers

- The existence of some special maintenance program grant or third party program
- The ability of the transit system management to release buses for outside work and still have enough buses for regular scheduled services

**MTA Labor Agreement** - The MTA's labor agreement has a clause that prohibits contracting for work that is covered by the jurisdiction of the labor union. This provides a serious obstacle, but not necessarily an absolute barrier, to contracting for work now performed by the union.

**MTA Labor Relations** - The maintenance management has spent a good deal of effort in the past two years or so to rebuild a constructive relationship with the maintenance employees and their union. As a part of the major campaign to catch up on the substantial amount of deferred maintenance, the staff was expanded and a major amount of work was accomplished.

Nevertheless, a well-planned and sustained effort is needed to increase management's flexibility in contracting work when there is an economic case and MTA does not have the capacity to do the work in house.

**Condition of the Fleet** – After the maintenance campaign just concluded, and the retirement of several older buses, the fleet is in relatively good mechanical condition, but still has a significant backlog in body and paint repair work.

**Special Skills** – In some cases, transit systems have contracted for work which requires special skills that are not available on the system's staff. This includes such different skills as electronics maintenance and blacksmithing. In some cases, these skills are acquired as a part of the purchase of new equipment that comes with life cycle or warranty period maintenance agreements.

**Local Contractor Availability**– The Nashville area is a major trucking center – in fact, the MTA facility is close to a major complex of private companies that operate, service, and provide parts for major truck fleets. Much of the drive train and major component systems on a bus are the same as those for over the road trucks.

**Special Grant Programs** – Some states have sponsored statewide fleet maintenance campaigns for participating transit systems in their state. In these cases, managements negotiate with the unions to allow having a third party provide maintenance for a finite period of time. In other cases, specific maintenance activities and inspections by a third party are a condition of state capital grants to purchase the buses.

**Bus Availability** - The MTA has more than an adequate number of buses to operate the current service schedule.

### **Conclusions**

The elimination of the mechanical backlog has reduced the argument that an emergency exists that threatens the safety of the system that might allow for outside maintenance participation.

The MTA labor agreement represents an obstacle to contracting for work. Even in the presence of a prohibition in the agreement, courts have held that it may be allowed if the contracting is done in good faith, can be supported by good business decisions, will improve the efficiency of the operation, and is not aimed at breaking or weakening the union.

The backlog of paint and body repair represents one opportunity for contracting.

Tire maintenance represents another. It is the usual practice for transit systems to contract for tire maintenance and repair as a part of their program to provide tires for the system.

Contacting for parts and inventory management is an additional opportunity, considering the currently unskilled parts staff, the condition of the parts storage area, the critical flaws in the inventory management system, and the condition of the inventory. (See this fully discussed in the *Review of Procurement* section.)

### **Recommendations**

The MTA should consider the following actions related to contracting for maintenance services:

- Develop a collective bargaining strategy that emphasizes the elimination or softening of the current contract maintenance clause.
- Identifying and evaluating the qualifications of potential contractors for select services through requesting interested parties to submit letters of interest and qualifications.
- Conducting limited comparative tests of the costs and effectiveness of MTA staff and contractors on specific maintenance activities such as tire maintenance and component rebuilding.
- Developing a plan to complete the remaining backlog of paint and bodywork using both staff workers and contract providers that will allow the elimination of the backlog by the end of 2001, if the work cannot be completed by the staff by the end of 2001.

### **Cost Estimate**

None.



## **Review of Procurement and Related Activities**

There are several elements of the scope of services for this audit which related directly or indirectly to procurement, receiving, inventory management, asset management, and parts controls and disbursing. This section of the report looks at these collective activities of the MTA for both capital and operating expense purchases.

### **Procurement Expenses**

Procurement at the MTA, as with most transit systems, deals primarily with materials and supplies for bus operations and maintenance, and for capital purchases. The major operating expenses are for fuel, bus parts, and tires and tubes. The major elements of capital purchases are rolling stock and facilities. The trends in the expenses, i.e., purchases consumed, for these activities for the five years 1995-1999 are shown on Table 3-6.

**Table 3-6**  
**MTA Management Audit**  
**Costs of Purchases**  
**Costs of purchased items and service**  
**Consumed: 1995-1999**

<u><b>Year</b></u>	<u><b>Capital</b></u>	<u><b>Services</b></u>	<u><b>Fuel</b></u>	<u><b>Tires &amp; Tubes</b></u>	<u><b>Materials &amp; Supplies</b></u>	<u><b>TOTAL</b></u>
1995	\$2,241,703	932,050	962,679	166,258	1,026,143	5,328,833
1996	2,467,957	728,430	943,347	172,950	918,038	5,230,722
1997	7,626,541	806,445	1,040,062	153,309	825,967	10,452,324
1998	5,921,733	736,780	998,551	152,522	2,435,112	10,244,698
1999	8,753,438	933,269	743,090	185,409	3,489,200	14,104,406
% Change	290.5%	-0%	-23%	12%	240%	165%

As these data show, the expenses for materials and supplies over this period increased by approximately 240%, due in large part to the increased levels of maintenance on the bus fleet that occurred in 1998 and 1999. At the 1999 level of expense, the cost of these purchases has increased to about 24% of overall operating expense.

The MTA has also undertaken a capital program during the same period that totaled \$26.4 million, of which \$18 million was for vehicles and \$8.4 million was for facilities. Taken together, the capital and operating

purchases over this period consumed a total of \$43.4 million – or the equivalent of about two years of operating expense.

### **Purchasing Responsibilities**

Five different staff members have specific and significant duties related to procurement:

- The Director of Purchasing, who reports to the Executive Director, is available to the MTA on a part time basis. The Metropolitan Government provides this procurement professional from the Metro Finance Purchasing Division to assist and advise MTA in purchasing actions. This individual is a Metro employee.
- The Purchasing Agent, is an individual in the Equipment Services Department. The Purchasing Agent is responsible for processing purchase requisitions and issuing purchase orders for all MTA procurements. He is supervised by the Facilities and Purchasing Manager. (Below)
- The Facilities and Purchasing Manager reports to the Director of Equipment Services and supervises the Purchasing Agent and the parts clerks, as well as other functions. He is supervised by the Director of Equipment Services. (Below)
- The Director of Equipment Services is the customer for much of the procurement and supervises the internal procurement and warehousing staffs. He is also designated as the Purchasing Agent in one section of the policies and procedures.
- The Capital Programs Manager, whose duties include procurements for capital programs, which generally refer to projects funded by the FTA.

### **MTA Purchasing Policies and Procedures**

The guidelines for procurement at the MTA are contained in “Metropolitan Transit Authority Purchasing Policies and Procedures”. The procedures were adopted in February 1991 and have been amended periodically to reflect changes in regulations or purchasing practices. The most recent amendment was in March 1997. The MTA Purchasing Policies and Procedures govern procurement of all goods and services procured directly by the MTA. No representative of the MTA may obligate the MTA to a financial commitment except as provided in the MTA Purchasing Policies and Procedures.

All procurement is either by purchase order or by contract. There are no standards in the manual that define when it is appropriate to use a purchase order or a contract.

The assignment of authority for procurement is specified in two contradictory sections of the MTA Purchasing Policies and Procedures. The Director of Purchasing (Metro employee-see above) is designated as the Purchasing Agent in Section 1.9. In Section 1.2, the Purchasing Agent is identified as either the Director of Purchasing or the MTA Director of Maintenance and Service Parts. (The Maintenance and Service Parts Department is now known as the Equipment Services Department.)

### **Exceptions to the Normal Policies and Procedures**

The MTA Purchasing Policies and Procedures include some special exceptions to the Policies and Procedures that are designed to facilitate procurements in unusual circumstances as described below:

**Emergency Procurements** - The requirements of the MTA Purchasing Policies and Procedures may be waived if it is determined that an emergency exists directly and immediately affecting customer service, or if public health, safety, or welfare requires immediate delivery of supplies, materials, equipment, or services, provided the circumstances creating an emergency can be “properly authenticated.”

The purchasing requirements may also be waived if it is determined that the property or service to be purchased is a unique article that cannot be obtained from another source, provided the reasons are “properly authenticated.”

The section on emergency procurements does not assign authority for making the finding of an emergency, or define procedures to authenticate an emergency or sole source procurement.

**Contract Term and Options** - No contract shall be executed for provision of goods or services to the MTA for a period in excess of three years. Options for additional years should be exercised on an annual basis if provided in the original competitive procurement. No more than two extensions by option for term shall be utilized in any procurement.

**Price Volatile Procurements** - For procurements that may be price-volatile, all reasonable efforts shall be made to obtain a vote on the subject from the MTA Board of Directors prior to award. The vote may be obtained by either by facsimile, or conference call, or by telephone, after which said vote shall be confirmed for the record at the next regular meeting of the Board of Directors.

**Federal Requirements** - The Purchasing Agent is responsible for ensuring the procurement policies of the Federal Transit Administration (FTA) are followed in all MTA procurements that are funded in part by federal funds. The FTA policies are included in the FTA Third Party Contracting Guidelines (Circular 4220.1C). A summary of FTA Circular 4220.1C is included in the MTA Purchasing Policies and Procedures.

The MTA may use its own procurement procedures which reflect applicable state and local laws and regulations for procurements that are funded in part by federal funds unless state and local laws conflict with the standards spelled out in FTA Circular 4220.1C.



**State Requirements** There are no Tennessee procurement requirements cited in the MTA Purchasing Policies and Procedures.

**Metro Government Requirements**

The MTA Purchasing Policies and Procedures reference Appendix Four of the Metropolitan Code of Nashville and Davidson County (Metro) which identifies the authority of the MTA with regard to procurement activity. All agreements, contracts, transfers and conveyances made and executed by the authority are acquired, held, owned, transferred and conveyed in the name of the metropolitan government.

All such contracts, agreements, transfers and conveyances need no further approval than that of the authority. The metropolitan government is not responsible for performance of any agreement by the MTA or for the payment of any amounts agreed to be paid by the MTA. Local ordinances that address the rules and regulations of the metropolitan government are codified in the Regulations to the 1992 Procurement Code of the Metropolitan Government. They were adopted by the Procurement Standards Board through June 1996 and revised February 1998. The Procurement Code is provided by Metro to all departments, boards, commissions, and agencies.

**Cost-based Variations in Procedures and Approvals**

The MTA policies and procedures for procurements provide variations in the approval and award process for procurements of different values. The basic thresholds are \$20,000, \$9,999, \$1,000, with other minor variations at other different levels.

**Procurements above \$20,000** – Procurements for goods and services above this level are subject to the approval of the Board of Directors before award. Proposals must be submitted in sealed documents using standard procedures for submission, evaluation, award, and appeal.

**Procurements Above \$9,999** – The basic difference between these procurements and those above \$20,000 is that there is no requirement for prior approval of the award by the Board. All purchases valued above \$9,999 are made by sealed bids or sealed proposals. Section 2.1 of the MTA Purchasing Policies and Procedures states that any procurement in this category requires approval by the MTA Board of Directors, except in the case of a documented public exigency. The term public exigency is not defined in the procedures. The MTA needs to define this term to assist distinguishing between a casual problem that creates an inconvenience versus an exigency which threatens public safety, etc.

Sealed bids are used if purchase requirements or specifications can be defined precisely, there are at least two suppliers willing and able to compete for the bid, the award can be made fairly and reasonably on the

basis of price alone, and there is time to carry out the necessary procedures. The contract awarded is to be a firm fixed-price or a fixed-price with escalation.

Sealed proposals are used if the purchase requirements are for services or items that cannot be precisely defined, for research and development, or if artistic or aesthetic value must be considered. To the maximum extent practical, procurement of real estate is to be conducted with competitive proposals.

Responsibility for the solicitation of competitive bids or proposals exceeding \$9,999 is not specifically delegated with the following exceptions. Proposals for services of external audit and related services by a certified public accounting firm, transit management, and special counsel are to be evaluated directly by the MTA Board of Directors. All other proposals are to be evaluated by staff subject to approval by the MTA Board of Directors if the amount of the award is above a \$20,000 limit.

**Procurements Between \$1,000 and \$9,999** - Procurement of items between \$1,000 and \$9,999 are executed in the same manner as those above \$9,999, with two "exemptions." Formal notice, advertisement, and sealed submission are not required, and facsimile transmissions are acceptable.

Approval by the MTA for these procurements is delegated from the Board of Directors to the Purchasing Agent. The Purchasing Agent is to determine the lowest responsive bid or best proposal and so note on the procurement file or purchase order.

**Procurements Below \$1,000** - Procurement of items below \$1,000 are made by the Purchasing Agent in a manner that ensures competition and confidentiality among competitors. Petty cash may be used for purchases smaller than \$75.

All procurements, unless specifically exempted, require the department that will utilize the product or service to initiate the procurement by requisition to the Purchasing Agent. The Purchasing Agent is responsible for all parts of the procurement from receipt of requisition to receipt of goods or services.

There are no procurement cards in use at MTA.

### **Appeals and Remedies**

The MTA Purchasing Policies and Procedures include a bid protest policy that is consistent with the FTA bid protest appeal procedures in Circular 4220.1C. The procedures specifically delegate responsibility for handling protests to the Purchasing Agent and the Executive Director.

The Purchasing Agent is responsible for dealing with all written claims by a contractor against MTA relating to a contract. The MTA Purchasing Policies and Procedures provide procedures for the Purchasing Agent to follow in the case of a claim.

The MTA Purchasing Policies and Procedures also provide procedures in the event the Purchasing Agent, after consultation with the Secretary for the MTA Board of Directors, determines that a solicitation or award of contract is in violation of federal, state, or municipal law. The same procedures apply if the Purchasing Agent finds the MTA Purchasing Policies and Procedures are not followed.

**Code of Ethics**

The MTA Purchasing Policies and Procedures Manual include a code of ethics as required by FTA Circular 4220.1D.

**Disadvantaged Business Enterprises**

A policy to encourage participation of disadvantaged and women-owned enterprises in MTA procurements is included in the MTA Purchasing Policies and Procedures. Goals for participation of disadvantaged and women-owned businesses (DBE/WBE) are established annually. The MTA agrees to ensure that disadvantaged business enterprises, as defined in 49 CFR, Part 23, have the maximum opportunity to participate in contracts and subcontracts financed in whole or in part with federal funds.

The MTA DBE/WBE Liaison Officer has the primary responsibility to assure that the program is effectively and equitably carried forward by MTA. The Executive Director is designated as the DBE/WBE Liaison Officer.

**MTA Staff Procurement Resources**

Many members of the MTA staff have a strong procurement background. Both the Director of Equipment Services and the Director of Operations worked as the purchasing agent in another transit property. The Manager of Capital Programs has experience in purchasing and grants management for a federally funded program. The Facilities and Purchasing Manager has experience in purchasing for a large private bus company. The MTA also has access to the Purchasing Department of Metro government to provide advice and assistance.

**Purchasing Agent** - Although the Purchasing Agent position title corresponds to the same title in the MTA Purchasing Policies and Procedures, the responsibilities are not comparable. In actual practice, the Purchasing Agent is responsible for purchase orders and also serves as the storeroom manager. Two parts clerks report to the Purchasing Agent. The clerks are not knowledgeable about parts and require assistance. A mechanic is assigned to help the parts clerks develop technical skills.

Although MTA recognizes both purchase orders and contracts as legal instruments for the purchase of goods and services, almost all purchases are made by purchase order. A purchase order is often issued for an approved contract. The Purchasing Agent receives all purchase requisitions, secures price quotes, and issues purchase orders.

The Purchasing Agent is also responsible for receiving all goods purchased by the MTA. Parts are delivered to the storeroom to enter into inventory. Other goods are delivered to or picked up by the requesting department. The Purchasing Agent pulls delivery tickets and packing slips to document receipt of goods.

The Purchasing Agent receives the invoices for payment from vendors. If invoices are sent in the mail to the Accounting Department, the invoices are forwarded to the Purchasing Agent. The Purchasing Agent matches the invoice to packing slips and forms to verify delivery. The invoice and confirming documentation are referred to the Accounting Department for payment.

**Facilities and Purchasing Manager** - The Facilities and Purchasing Manager supervises the Purchasing Agent. The Facilities and Purchasing Manager is responsible for purchasing, parts supply and inventory, and non-procurement related activities such as facilities maintenance, cleaning buses and facilities, fuel, repairs of transit shelters, placing advertising on buses and bus benches, assisting with special events, and supervising mechanics if needed.

The Facilities and Purchasing Manager assists the Purchasing Agent in preparing procurement specifications and solicit price quotes. In particular, he assists the Purchasing Agent in the procurement of some parts and equipment needed for Equipment Services. For capital procurements involving federal grants (purchase of buses), the Facilities and Purchasing Manager prepares the specifications and then coordinates with the Manager of Capital Programs for the procurement.

**Director of Equipment Services** - The Director of Equipment Services supervises the Facilities and Purchasing Manager. He assists in preparing the specifications for purchases of anything “technical,”

especially the purchase of buses and fuel.

**Capital Programs Manager** - The Capital Programs Manager is responsible for federal grants management and procurement of assets under the Federal grant program. She also serves as the MTA Civil Rights officer, EEO officer and DBE/WBE program administrator. The Capital Programs Manager spends about 90 percent of her time on capital programs and 10 percent on civil rights, EEO, and DBE/WBE issues.

The Capital Programs Manager prepares annual grant applications for operating assistance to the state and FTA. She has also prepared a grant application to the Tennessee Department of Transportation for planning and a grant to FTA for the purchase of trolley buses. She prepares the annual capital budget for the MTA.

She is involved in the purchase of most goods for more than \$4,999. Items of this value are usually designated as capital and the MTA attempts to identify grant funds for those purchases. In addition to capital procurements, she has also assisted in requests for proposals for professional services.

When asked to identify the procurement activities she has managed during the past year, the Capital Programs Manager specifically referenced the following: requests for bids for purchase of buses, commuter vans, service trucks, bus power plants; requests for proposals for architecture/engineer consultant for commuter rail, external audit services, payroll services, armored car services for fare revenues, performance evaluation of bus services, and consultant for transportation demand management services.

**Director of Purchasing/Metro "Buyer"** - The Metro government designates a Buyer from the Purchasing Division to provide assistance to the MTA. The position is actually listed on the MTA organization chart as the Director of Purchasing. The Metro Buyer serves as a consultant to the MTA Board of Directors and staff as requested, under the terms of a memorandum of agreement between Metro government and the MTA.

The Metro Buyer goes to the meetings of the MTA Board of Directors and offers his services when requested. The Manager of Capital Programs is the MTA staff person who most often requests his help. During the last several years, the Metro Buyer has been called upon to help with procurements for MTA management services (1998), external audit services (1998), and engineering design services for commuter rail (1999). His counsel is needed less and less as the MTA staff develops more purchasing experience.

Metro Government contracts for goods and services are open to use by the MTA. For example, the MTA could use the Metro contracts for purchase of fuel or office supplies. The MTA has not taken advantage of the opportunity to use Metro contracts.

### **Inventory Management And Control**

Inventory management and control at the MTA suffers from a number of problems that need attention. As with many of the systems at the MTA, the current inventory management systems are out of date and in need of improvement.

The Equipment Services Department is responsible for most MTA assets, including buses, general service vehicles, parts inventory, and facilities. The Facility and Purchasing Manager is responsible for parts supply inventory and for maintenance of all MTA facilities. The Purchasing Agent supervises the storeroom supervisor and two parts clerks. The Facility and Purchasing Manager is working to improve parts inventory management. The MTA just completed a sale of obsolete or damaged inventories of equipment, tools, and supplies.

Among the issues that are currently being addressed by the MTA staff are the lack of an interface with the accounting applications, the lack of bar-coding, and the consequent lack of an automatic inventory control system that monitors inventory levels and identifies replacement orders using an automated minimum/maximum inventory management program. Since there are not sufficient management information systems to monitor expenditures for parts and to analyze trends, an extraordinary effort is required to manage inventory.

Adding to this is the potential impact on the inventory of the high levels of use that are a result of the major effort to overcome large amounts of deferred maintenance over the past two years. As shown on Table 1, the 1999 expense for materials and supplies was over three times greater than in 1995, and 50% more than in 1998. These anomalies will make the determination of "normal use" and the creation of the appropriate levels of inventory more difficult. It should be noted that usage in 2000 has been reduced over 1999 levels.

The Director of Equipment Services is implementing a vehicle management information system (VMIS) known as the "Ron Turley " system. The Ron Turley VMIS software was originally designed for a truck maintenance function. The software does include a module for inventory management. The Director of Equipment Services has been working to implement the inventory management module. The Equipment Services Department is also installing bar codes to help manage inventory.

The physical inventory is located in various secured and unsecured locations in and adjacent to the maintenance department. Most of the smaller parts and components are in bins and storage areas within

the secured area in the parts department. There is an open stock of consumable parts, such as nuts and bolts, available to mechanics just outside of the parts storeroom.

However, there is a large inventory of larger components, such as engines and transmissions and body parts, that is stored in open areas in the large spaces that are open and unsecured.

According to the staff, the current parts inventory is about \$2.15 million. This is almost nine months of expensed parts, using the 1999 figures for expensed parts. This is a very low "turn rate" of about 1.3 to one. Most managers strive for a rate that is closer to 2 to 1 or 3 to 1 – in other words, a level of inventory of four to six months' usage. In most industries, these levels of inventory would still be too high. Many industries – but not transit systems - are now using "just in time" inventory management that significantly reduces on-hand inventory values. The transit industry has been slow to adopt these more aggressive inventory management techniques. The cause of this slow adoption are many and varied; tradition, the desire to be able to handle any emergency, the lack of a compelling reason to do so, inventory not viewed as a cost until parts are consumed and expensed. Inventories are also often enlarged by purchasing large value spare parts as a part of fleet purchases with 80% federal funds.

The MTA conducts three inventories annually to check inventory counts. Typical variances are \$60,000 to \$80,000. The review team was provided documentation of the activities to prepare for one of the three annual parts inventories. Memoranda show "the purpose of the overtime will be to get the storeroom straightened up somewhat and to start the ...inventory." Storeroom personnel were asked to work overtime each of four weeks in June 1998 to prepare for and conduct the final inventory for fiscal 1998.

The MTA does not use an automated minimum-maximum (min-max) system to generate purchase requirements for parts. Parts are ordered when supply is visibly low. The Facility and Purchasing Manager said he is installing bar codes to assist in implementing a min-max system in the future.

The MTA does not have an annual bus parts supply contract. The Facilities and Purchasing Manager told the review team that 95 percent of all parts are acquired by purchase order according to the MTA Purchasing Policies and Procedures. The remaining 5 percent are emergency requirements. Parts clerks or mechanics go to vendors to pick-up the required parts in cases of emergencies. Many systems make greater use of blanket purchasing agreements, akin to Metro's contracts, under which vendors propose on multi-year, multi-commodity contracts. Agencies then order from one of several qualified vendors through faxed (or on-line) orders with the vendor selection based on the bid prices and timely delivery.

The review team identified several public agencies, but no transit fleets, that contract the management of parts supply and inventory management to a private business. Some of these agencies include the Virginia Department of Transportation; the City of Richmond, Virginia; the City of Cary, North Carolina; the City of

Savannah, Georgia; and Mecklenburg County, North Carolina

Mecklenburg County's Fleet Management Department contracts parts supply and inventory management to the NAPA General Services Division. As part of the contract, NAPA opened a retail outlet in the Fleet Management Department that operates like a regular NAPA store. NAPA owns the parts, provides NAPA employees to operate the outlet and treats the Fleet Management Department mechanics as customers. Mecklenburg County has identified many benefits to privatizing parts supply and inventory management.

The county no longer deals with 78 individual vendors; NAPA is the single vendor. The number of purchase orders for parts was 400 a month. Now NAPA stocks 90 percent of the parts the county needs and provides parts not in stock within 24 hours. As a result, repairs are never held up due to lack of parts. Since NAPA is responsible for supplying the stock, the Fleet Management Department employees no longer need to take the time to drive to vendors to pick up parts, eliminating non-productive time for mechanics.

Other services by the private company can include disposal of tires, batteries, motor oil and other fluids and materials and tracking parts warranty. The Director of Fleet Management for Mecklenburg County said the parts supply and inventory management contract has saved the county \$160,000 in lower administrative cost. This does not include the capital costs associated with on-hand inventory balances.

The cost of parts is another benefit to privatization. A markup of 30 percent above wholesale is typical when parts are purchased in competitive bid bulk purchase. A 100-percent markup more than retail is typical when parts are purchased retail over the counter using an emergency purchase order. A sample NAPA contract provided to the review team calls for 10 percent above wholesale cost plus the cost of overhead to provide a parts clerk.

**Storeroom Staff** – The MTA is working at a disadvantage since an experienced and valued employee who was the storeroom supervisor was killed in an auto accident last year. The loss of that employee's expertise in the storeroom has been difficult. The current parts clerks bid into their positions from jobs as bus cleaners. The department managers told the review team that the storeroom staff lacks sufficient technical expertise and sufficient knowledge of vehicle maintenance to do their job effectively.

Mechanics are required to leave their vehicle maintenance jobs to help in the storeroom. The Director of Equipment Services told the review team he is attempting to define a position of Parts Specialist to serve as a liaison between the Purchasing Agent and the mechanics in vehicle maintenance.

**Warranty Management** - The Capital Program Manager is responsible for the warranty recovery program, according to the Facilities and Purchasing Manager. The Facilities and Purchasing Manager tracks warranty by recording a work order as a warranty repair. He then collects a hard copy of the repair and



sends it to the Capital Programs Manager to file the claim. He did not have a trend analysis of warranty work, and did not use the vehicle maintenance information system to keep automated records on warranty. The Director of Accounting is responsible for confirming paid warranty claims.

The Capital Programs Manager receives documentation of warranty work from the Facility and Purchasing Manager. She files the claims but does not have any information to confirm the claims are paid or if the MTA receives a credit for the warranty work. The risk is that warranty work performed by MTA may not be collected from the warrantor.

### **Disposition of Obsolete Items**

The combination of high inventory values, periodic retirement of buses, and the lack of an automated inventory management system have a tendency to contribute to excess and obsolete inventories.

The manager of the department that uses an item is responsible for the declaration of obsolescence. The MTA Purchasing Policies and Procedures do not specify criteria to determine obsolescence. There are no specific procedures to identify and manage excess, obsolete, or damaged inventories.

Once an item is determined to be obsolete, permission to dispose of assets is required from the Board of Directors if the sum of items is \$20,000 or more. Permission to dispose of assets is required from the Executive Director if the sum of items is less than \$20,000.

According to the MTA Purchasing Policies and Procedures, the Purchasing Department is responsible for disposing of obsolete items through sealed bids or sale at auction. In practice, the Equipment Services Department is responsible for disposition of obsolete items. The MTA recently held an auction for sale of many accumulated parts and supplies that are no longer needed.

### **Conclusions**

- The organization of purchasing within MTA needs to be examined and re-aligned. Responsibilities need to be clarified. See Recommendations below.
- Purchase orders are not being properly used.
- Standard contract provisions are not being used. Additionally, the current process does not ensure adequate competitive procurement.

- The MTA is not making full use of the existing Metro purchasing contracts.
- There is not adequate segregation of duties in the procurement/payment process.
- Outsourcing of parts management has not been examined.
- Warranty trend analysis is not maintained.
- Excess, obsolete and damaged inventory procedures need to be updated.
- Procurement cards are not in use at MTA. (This process has been adopted by Metro.)

### **Recommendations**

The MTA should initiate a series of adjustments to clarify the assignment of duties for procurement and inventory controls. Below are a series of possible solutions which would resolve the current issues:

- Create a position for Director of Purchasing and Grants Management, designated as the Purchasing Agent in accordance with the MTA Purchasing Policies and Procedures, with responsibility for all operating and capital purchases for the MTA, including goods, professional services, and construction.
- Assign the responsibility for preparing grant applications and managing all grants on behalf of the MTA to the current Capital Programs Manager, under the proposed Manager of Purchasing and Grants Management.
- Reassign the Purchasing Agent to the Purchasing and Grants Management Department and rename the position as Buyer, with such authority as the Director shall delegate from time to time. Locate the Buyer in the Equipment Services Department to ensure a quality service for maintenance.
- Change the title of the Facility and Purchasing Manager to the Facility and Storeroom Manager. Reassign the duties of the management of the storeroom to the Facility and Storeroom Manager. If the storeroom operation remains in-house and is not outsourced, then it should be staffed based on qualifications and not an open bid process.
- Designate the Director of Purchasing and Grants Management as the MTA DBE/WBE Officer with the primary responsibility to assure that the program is effectively and equitably carried forward by MTA.

- The ambiguity in the manual relating to who is the responsible Purchasing Agent should be resolved by appointing the Director of Purchasing as the Purchasing Agent.
- Purchase orders should be used for non-routine purchases, and contracts should be used for recurring purchases.
- A set of standard contract provisions should be developed for use in contracts that meet all local and federal requirements.
- The Director of Purchasing should review and revise the procurement process to insure increased competition.
- The MTA should generally follow the Metro purchasing guidelines and should use city contracts where they are advantageous.
- The procedures for verifying invoices for payment should be changed to ensure adequate segregation of duties and thereby improve overall control checks and balances. All invoices should be submitted directly to the Accounting Department. Each invoice should be matched to a purchase order or contract. A copy of the invoice should then be forwarded to the receiving department to verify receipt of the goods or services. Accounting should then pay the invoice after confirmation of receipt and satisfaction by the receiving department. The current practice of having the same person receive the requisition, process the purchase order, receive the goods, receive the invoice, and approve the invoice for payment is not an acceptable segregation of duties.
- The MTA should contact the Virginia Department of Transportation; the City of Richmond, Virginia; the City of Cary, North Carolina; the City of Savannah, Georgia; or Mecklenburg County, North Carolina to learn about their retail parts contracts and to determine the feasibility of outsourcing the parts management function at MTA.
- Procedures to manage excess, obsolete and damaged inventory should be updated. Additionally, MTA should investigate the need for a more sophisticated automated inventory control system.
- MTA should begin tracking warranty work in a manner to allow trend analysis and management.
- MTA should contact Metro and investigate the use of procurement cards.

### **Cost Estimates**

It is difficult to estimate the costs or savings resulting from implementing the suggested recommendations. There are likely to be some savings associated with the more active use of the combined Metro purchasing arrangements.