

DOWNTOWN – AIRPORT TRANSIT CORRIDOR ALTERNATIVES ANALYSIS AND ENVIRONMENTAL SCREENING REPORT

EXECUTIVE SUMMARY

DRAFT
MAY 2006

PREPARED FOR
MEMPHIS AREA TRANSIT AUTHORITY
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This is a draft document that has not been reviewed by the Federal Transit Administration (FTA). If the FTA has comments, changes will be made to address those comments.

Additional analysis is underway on ridership forecasts. Changes to the document can be expected based on new ridership forecasts. Affected sections of this document will be Sections S.4.1 Transit Impacts; S.4.2 Roadway System Impacts, S.4.3 Regional System Impacts, and S.6.2, Evaluation Results. Changes will also be made, as appropriate, to incorporate more current information that becomes available.

On May 22, 2006, the MATA Board of Commissioners voted to eliminate Alternative 1 and Alternative 1/Fairgrounds. References to these alternatives remain because the document was prepared prior to the Board action

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S.0 EXECUTIVE SUMMARY

The Memphis Area Transit Authority (MATA), in cooperation with the Federal Transit Administration (FTA), is undertaking an Alternatives Analysis and Environmental Screening to evaluate potential future transit improvements in the Downtown-Airport Transit Corridor in Memphis, Tennessee. This Alternatives Analysis and Environmental Screening Report (hereafter AA/ES Report) is specifically intended to document the recent and ongoing efforts to identify and evaluate alternative transit technologies and alignments through the Corridor. The AA/ES technical analysis and public review activities have been designed to support and encourage the process whereby a locally preferred alternative (LPA) can be adopted and then undergo the full environmental review that is required for all federally funded projects by the National Environmental Policy Act (NEPA) of 1969.

MATA is examining potential improvements to transit service in the corridor that extending between downtown Memphis, the heavily residential Midtown area, and the Memphis International Airport (Airport, hereafter). The improved transit service would connect the region's largest employment and activity centers: the CBD, the Medical District, and the Airport area, which includes a major FedEx package sorting facility.

This summary highlights the contents and findings of the AA/ESR. It is organized into the following sections:

- Project Background;
- Purpose and Description of the Project;
- Alternatives Considered;
- Transportation Impacts;
- Environmental Impacts;
- Comparative Benefits and Costs; and
- Consultation and Coordination.

S.1 Project Background

Memphis has a strong tradition of providing transit service. The use of streetcar rail service, the precursor to modern light rail transit, was used in Memphis between 1866 and 1947, and was instrumental in shaping the development of many of the city's urban neighborhoods. Streetcar transportation was renewed in 1993 when MATA opened the Main Street Trolley in downtown Memphis. Subsequent extensions include the 2.5-mile Riverfront Loop Rail Extension, the North End transfer terminal, renovations to the historic Central Station, and most recently, the Madison Avenue Line. These combined services connect the downtown Main Street Mall, the Central Business District (CBD), the Pyramid and other tourist destinations, and the Medical District.

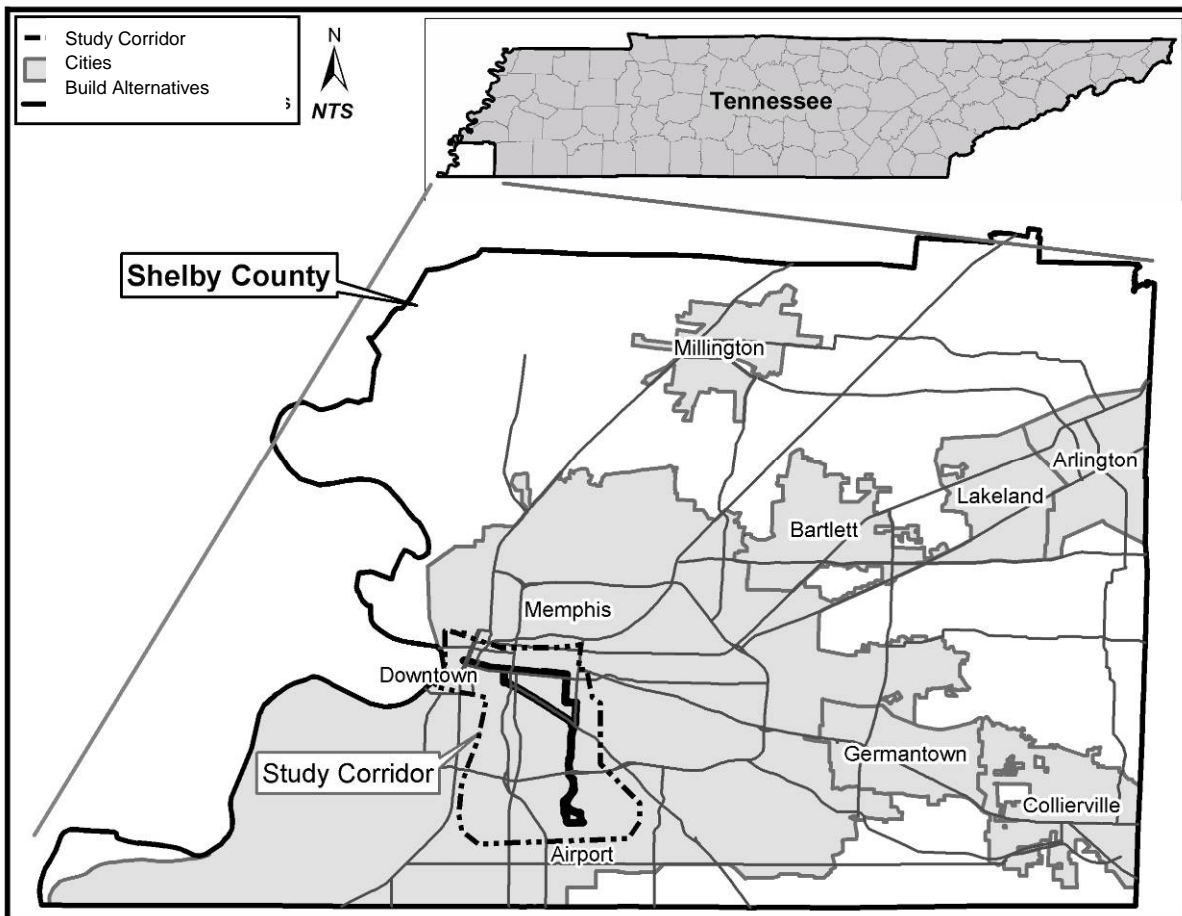
MATA developed a twenty-year Regional Transit Plan (RTP) in 1997 to map the future of high capacity, fixed guideway rail service in Memphis. The plan included the development of high capacity, fixed guideway systems in three general corridors extending outward from the downtown area by the year 2020, as well as bus facilities

and bus service components. The Memphis Area Metropolitan Planning Organization (MPO) adopted the RTP as the Transit Element of the Long Range Transportation Plan (LRTP) in 1998; the RTP recommendations have been included in all subsequent LRTPs and their associated updates, including the 2026 LRTP adopted in 2004. A Regional Rail Steering Committee (RRSC) was established in late 1999 for the purpose of advising MATA in the development and implementation of a high capacity transit system for the Memphis region. The RRSC consists of approximately 30 individuals representing a broad range of community interests, including elected officials, private businesses, and public agencies.

The three corridors identified for additional study were the North Corridor (between Downtown and Millington), the Southeast Corridor (formerly East Corridor, extending between Downtown and Collierville), and the South Corridor (extending between Downtown and Horn Lake, Mississippi). MATA initiated in 2000 a Corridor Selection Study, which resulted in the selection of the Southeast Corridor as the priority corridor, and the first leg being the link between the Downtown and Airport, which serves the largest generator of jobs in the region.

Figure S-1 shows the general location of the Downtown-Airport Transit Corridor.

Figure S-1 Downtown-Airport Transit Corridor Study Area



Following the Corridor Selection phase, MATA initiated an Alternatives Analysis to evaluate various transit technologies and alternative alignments within the Downtown-Airport Transit Corridor. This AA/ESR examines the implementation of fixed guideway, high-capacity transit service along two general alignment alternatives in the study corridor. In addition, No-Build and Transportation System Management (TSM) Alternatives are examined. Specific elements of these proposed alternatives are described in greater detail in Chapter 2, Alternatives Considered.

S.2 Purpose and Description of the Project

Previous planning studies and ongoing community dialogue have identified the need within the proposed Downtown-Airport Transit Corridor to provide high capacity, fixed guideway transit improvements that connect the region's largest employment and activity centers. The MPO's land use and transportation planning activities since the mid 1990s have demonstrated the desire to encourage compact urban and suburban development that is focused on light rail transit corridors. The project is intended to address the transportation needs and problems of general mobility and accessibility, work force development (in the form of access to jobs and educational opportunities) for low-income residents, and to encourage and support economic development and redevelopment activities. Support for the project comes from MATA, local officials and citizens who have embraced the concept of rail transit because it contributes to the achievement not only of transportation goals but also economic development, land use and environmental goals. Among the benefits of a rail system recognized by MATA and local officials are:

- Improved mobility and access;
- Reduced traffic congestion;
- Opportunities for focusing new growth around transit stations;
- Pedestrian and transit friendly neighborhoods around transit stations;
- Redevelopment in declining areas; and
- Improved air quality.

The Downtown-Airport Transit Corridor is entirely within the City of Memphis, primarily in the western and central portions of the city. The Corridor is urban in character and has a diverse mixture of land uses and activity centers, including the CBD, the Medical District, the Mid-South Fairgrounds, the former Memphis Defense Depot property, the Memphis International Airport, and the FedEx Corporation's package handling facilities. The Corridor contains more than one-third of the jobs in the Memphis region as well as many of the major tourist destinations in the region. The Corridor also contains residential neighborhoods of a wide range of prices and housing conditions, public housing, and housing for college students and senior citizens. Throughout the Corridor are vacant or underutilized properties with declining business, residential or institutional uses that are targets for economic redevelopment. The Corridor contains substantial areas with low income and unemployed residents who would benefit from enhanced access to job centers; 2000 census data reported unemployment in the Corridor at 6.6 percent, well above the 5.4 percent rate for the City of Memphis and the 4.5 percent rate for Shelby County.

S.3 Alternatives Considered

Chapter 2 describes the initial and refined alternatives that were identified and evaluated in this AA/ESR.

S.3.1 Initial Alternatives Considered

Following the selection of the Downtown-Airport Transit Corridor, MATA initiated a planning effort to address two essential issues in the selected corridor; first, identification, evaluation and the selection of the most appropriate transit mode technology, and second, identification of a short list of alternative transit routes. This study included both technical analysis and community involvement. The planning effort is described in detail in the technical memorandum entitled, Memphis Regional Rail Program, Downtown-Airport Corridor Alternatives Analysis: Evaluation of Alternative Alignments and Technologies, dated April 2002, which is incorporated by reference to this AA/ES report.

S.3.1.1 Tier 1 Technology Alternatives

In the Tier 1 Technology Alternatives investigation, MATA identified and examined alternative transit modes or technologies that may be appropriate to meet high capacity transit needs of the Memphis community. Four modes were evaluated: conventional bus, bus rapid transit, monorail, and light rail. During consideration of the alternative modes, it was recognized that conventional bus vehicles could be identical to vehicles used in a BRT system with the distinguishing feature being different operating plans. MATA determined that the existing conventional bus system could not be expanded to provide an effective level of high-capacity service desired for the Memphis region. Therefore, further consideration of the conventional bus operating system as the high-capacity service mode was dropped from consideration. The three remaining modes (i.e., BRT, monorail, and light rail) remained in consideration as the technology to provide regional service, and were evaluated using 13 general, locally defined criteria. Each criterion had two or more performance measures for a total of 30 measures that dealt with detailed characteristics of the modes.

On November 8, 2001, the Regional Rail Steering Committee (RRSC) debated the relative benefits and cost of the three technologies, with the discussion centering on two topics: 1) the likely impacts of the transit technologies on the existing neighborhoods; and 2) the potential for the type of service to encourage neighborhood and community redevelopment. The RRSC voted unanimously to recommend to the MATA Board that the Alternatives Analysis move forward with the analysis of only light rail transit technology in one of the alignment alternatives. Because of the discussion and the vote, the technologies of bus rapid transit and monorail were removed from further consideration. The RRSC's action was confirmed and adopted by the MATA Board of Commissioners at their meeting on November 28, 2001.

S.3.1.2 Tier 1 Alignment Alternatives

Seven preliminary conceptual (initial) alignments were identified to serve as a starting point for discussions with MATA, the RRSC and the consultant team. The seven alternatives were developed to represent the range of potential alignment solutions. Driving the selection of alternative alignments was an effort to achieve the following objectives:

- Connecting the Downtown and the Airport;
- Connecting major activity centers, including the rail line in the Medical District;
- Serving residential areas including transit dependent enclaves;
- Using existing rights-of-way, including privately held railroads and utility alignments; and
- Identifying the most direct route between the major destinations.

A technical workshop held in Memphis on June 25 and 26, 2001 brought together the technical team (MATA staff with key staff from the consultants) to review information, conduct field investigations and identify the most suitable alternative alignments in the Downtown-Airport Transit Corridor. The team reviewed the seven preliminary conceptual alternatives, and developed a set of combined or refined alignments (Alternatives 1, 2A, 2B and 3). These four alternatives were then evaluated using a set of criteria that included three measures of mobility plus operating and capital costs, operating efficiency, transit friendly station areas, the potential for land redevelopment, congestion, environmental impacts, and the ability to efficiently expand transit service beyond the current downtown to airport route. Alternative 1 scored the highest in the overall achievement of the criteria, followed by Alternatives 2A, 3, and 2B, in descending order.

On February 25, 2002, the Corridor Subcommittee of the RRSC met to discuss the four refined conceptual alignment alternatives and determine whether any of the four alternatives should be eliminated from further consideration. The discussions were informed by preliminary results of the screening process, public meetings held in July and August 2001, agency and public scoping responses, and discussions during RRSC meetings. The dialogue centered on the likely impacts of the alignments on neighborhoods, the potential to encourage neighborhood and community redevelopment, traffic considerations, and feasibility of construction. The Corridor Subcommittee then recommended to the RRSC that Alternative 1 and 2A (hereafter referred to as Alternative 2) be retained for further study in the AA/ESR, and that Alternative 2B and Alternative 3 be eliminated from further consideration. At its March 14, 2002 meeting, the RRSC received and accepted the Corridor Subcommittee's recommendation, and the results of the public meetings held on February 25 and 26, 2002. The MATA Board confirmed and adopted the RRSC's recommendations regarding the alignment alternatives at its regular meeting on March 25, 2002.

S.3.2 Reasonable Alternatives Considered

The second tier of analysis of alternatives focuses on the evaluation of a No-Build Alternative, a Transportation System Management (TSM) Alternative, and two

primary Build Alternatives. The two Build Alternatives are different alignment options for the preferred technology (light rail transit): Alternative 1 (along with the Alternative 1/Fairgrounds option) and Alternative 2.

S.3.2.1 No-Build Alternative

The No-Build Alternative consists of existing transportation services and facilities plus those improvements already under construction, or those for which funding has been committed in the MPO-adopted Transportation Improvement Program (TIP) and the 2020 Long Range Transportation Plan (LRTP). Projects in the LRTP that may affect the Downtown-Airport Transit Corridor and increase trip capacity include widening I-240/I-55 from the Midtown interchange to Mill Branch Road; improving the I-55/Crump Boulevard/Riverside Drive interchange; and widening portions of Lamar Avenue.

The LRTP also includes the following additions to MATA's services and facilities:

- South Intermodal Terminal;
- Five new suburban (smaller) transit centers;
- Six park-and-ride lots on I-40 and I-55;
- New express bus routes along I-40, I-55, Nonconnah Parkway and Highway 78/Lamar Avenue, served by new park-and-ride lots; and
- Fixed bus service expansion to East Memphis, Cordova, Bartlett, Collierville, Raleigh, Millington, West Memphis, Southhaven, Horn Lake, and Olive Branch.

S.3.2.2 TSM Alternative

The TSM Alternative consists of lower-cost measures that could be implemented to make the existing transportation system more efficient. It would use conventional or articulated rubber-tire buses to provide improved local on-street and express bus service. The TSM Alternative would improve MATA's existing bus service by reducing the headways on six existing bus routes that primarily serve the Downtown-Airport Transit Corridor, converting a portion of an existing local route to airport express service, and adding a new airport circulator route.

The three main components of the TSM Alternative are:

1. Conversion of existing local route 2A (Airport) to new route, 2A Express, with headways of 10 minutes in peak periods. Between East Parkway (at Young Avenue) and the Airport, the route would operate with express service; between downtown and Young Avenue, it would operate as local service.
2. Improved headways on six existing routes to 15 minutes in peak periods. The six routes are #7 Air Park, #10 Lamar, #32 Parkway, #34 McLemore, #52 Park, and #56 Union.
3. Implement a new circulator route in the Airport area to serve the Airport terminal, FedEx and other major employment centers (Airport Circulator) with headways of 15 minutes in peak periods.

S.3.2.3 Build Alternatives

In the second tier of the Alternatives Analysis, two primary Build Alternatives (Alternatives 1 and 2) for the preferred technology are under consideration.

The two Build Alternatives contain both unique and common alignment segments in connecting the downtown and the airport. The unique portions of Build Alternatives 1 and 2 focuses on two different routes connecting MATA's recently opened Madison Avenue Line to Airways Boulevard immediately south of Lamar Avenue near Arlington Avenue. Alternative 1 begins at the eastern terminus of the Madison Avenue Line, continues east on Madison Avenue then runs southeast on Cooper Street, east on Young Avenue, and south on East Parkway/Airways Boulevard. Alternative 2 diverges from the Madison Avenue Line at Pauline Street west of I-240 to follow Crump Boulevard and Lamar Avenue to the southeast before turning south to follow Airways Boulevard.

The common segments of the two Build Alternatives are along:

- Madison Avenue Line between Main Street and Pauline Street; and
- Airways Boulevard from Arlington Avenue south to the Democrat Road intersection on Plough Boulevard south of I-240.

South of Democrat Road, the two alternatives also share two options for entering the Memphis Airport Terminal -- one option from the north and the other option from the west side of the terminal. Access to the Airport Terminal from the north is used as a consistent means of comparing the two Build Alternatives in this AA/ES Report. In the subsequent preliminary engineering phase of work, additional design studies can be carried out to define further the cost, physical feasibility, and service issues associated with the two terminal routes.

Alternative 1

From the Madison Avenue Line terminus on Madison Avenue, Alternative 1 would extend about 8.42 miles to the east and south on its path to the Airport. It would run in-street along Madison Avenue, Cooper Street and Young Avenue, then outside of and along the west side of East Parkway and Airways Boulevard to the Memphis Depot property, on new location from the Depot to Plough Boulevard across I-240, and on new location under the western taxiway of the Airport to the Airport terminal. Alternative 1 includes ten LRT stations, which are described in Table S-1.

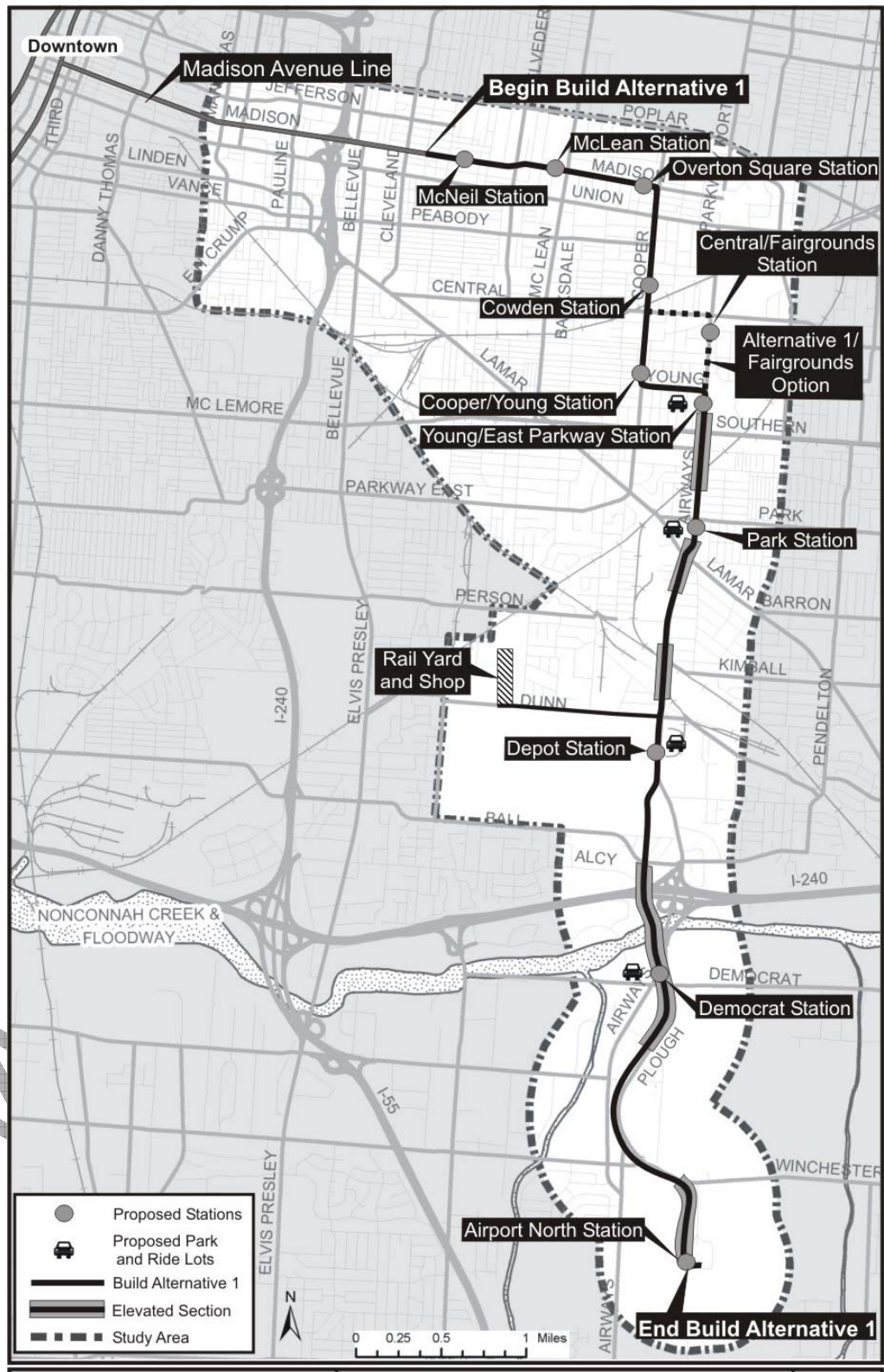
The location of Alternative 1 and its stations are shown in Figure S-2.

Table S-1 Stations Characteristics

| Station | Common & Alternative Alignments | Location in Street Right-of-Way (ROW) | Platform | Bus Bays | Park-and-Ride Spaces |
|-----------------------------------|----------------------------------|---------------------------------------|---------------------------------------|--------------|----------------------|
| McNeil | Alternative 1 | Mid-street | 90' center platform, in street | On-street | None |
| McLean | Alternative 1 | Mid-street | 90' center platform, in street | On-street | None |
| Overton Square | Alternative 1 | Sidewalks, both sides | 90' side platforms (sidewalk) | On-street | None |
| Cowden | Alternative 1 | Mid-street | 90' center platform, in street | On-street | None |
| Cooper/Young | Alternative 1 | Sidewalks, both sides | 90' side platforms (sidewalk) | On-street | None |
| Young/ East Parkway | Alternative 1 | Outside ROW | 90' center platform, off street | 2 off-street | 50 |
| Central /Fairgrounds ¹ | Alternative 1 Fairgrounds option | Outside ROW | 90' side platforms, off street | On-street | None |
| Park | Alternative 1 | Outside ROW | 90' center platform, off street | 2 off-street | 50 |
| Linden | Alternative 2 | Mid-street | 90' center platform, in street | On-street | None |
| Cleveland | Alternative 2 | Mid-street | 90' off-set side platforms, in street | On-street | None |
| Rozelle | Alternative 2 | Mid-street | 90' off-set side platform, in street | On-street | 50 |
| Carnes | Alternative 2 | Mid-street | 90' off-set side platform, in street | On-street | 50 |
| Park/Airways | Alternative 2 | Outside ROW | 90' center platform, off street | 2 off-street | 50 |
| Depot | Common Alignment | Outside ROW | 90' center platform, off street | 2 off-street | 250 |
| Democrat Rd | Common Alignment | Both in and outside ROW | 90' aerial center platform | 2 off-street | 250 |
| Airport North | Common Alignment | Outside ROW | 180' aerial center platform | None | None |

Under Alternative 1/Fairgrounds Option, the Central /Fairgrounds Station replaces Cooper/Young Station.

Figure S-2 Build Alternative 1 and Fairgrounds Option



Build Alternative 1/Fairgrounds Option

A location option under Alternative 1, the Fairgrounds Option, is also under consideration; this option would use the alignment for Alternative 1 as described above, except that it would extend east along Central Avenue from Cooper Street to the east side of East Parkway and run south inside the properties of the Fairview Junior High School and the Fairgrounds before crossing back to the west side of East Parkway and rejoining the Alternative 1 alignment in the southwest quadrant of the intersection of Young Avenue and East Parkway. This option would place a station on the Fairview Junior High School property. The location of Alternative 1/Fairgrounds Option and its stations are shown in Figure S-2, and described in Table S-1, along with Alternative 1.

Build Alternative 2

The Alternative 2 alignment would begin along the Madison Avenue Line on Madison Avenue just west of Pauline Street and west of I-240, and extend about 8.17 miles, running south in Pauline Street to Crump Boulevard and then southeast on Lamar Avenue. In the vicinity of Kerr Street, just west of the Airways Boulevard/Lamar Avenue intersection, the alignment shifts to new location and joins with the alignment of Alternative 1 to run on new location west of Airways Boulevard to the Memphis Depot property, on new location from the Depot to Plough Boulevard, and on new location into the Airport terminal. Alternative 2 has eight LRT stations, which are described in Table S-1. The location of Alternative 2 and its proposed stations are shown in Figure S-3.

Four alignment options on Alternative 2 were identified to address potential guideway and station location issues. Three optional alignments would provide an alternative connection between the Madison Avenue Line and Crump Boulevard/Lamar Avenue. The fourth option, Park Avenue, would provide an alternative connection between Lamar Avenue and Airways Boulevard along Park Avenue; this option was identified at the request of neighborhood residents, as a way to make the Alternative 2 alignment and station more accessible to potential passengers in the vicinity.

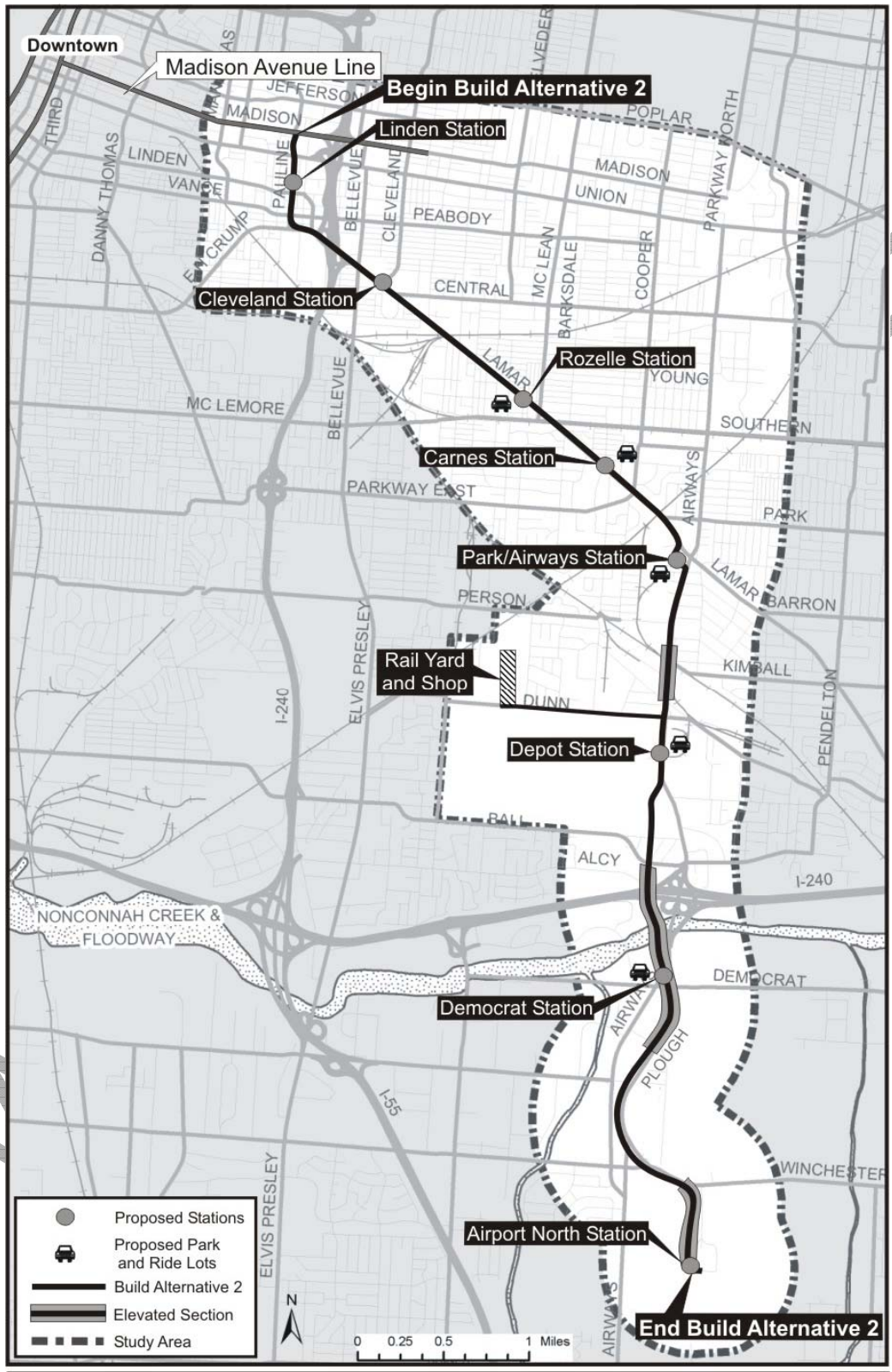
Other Alignment Options

Another alignment option identified was along the common alignment of both alternatives on the Depot property. As an option to avoid the conflict between the LRT project and the City's police precinct project, MATA may consider routing the LRT alignment along the west edge of the commercial property that adjoins the police parcel (and the Depot boundary) on the east side.

There are two options for entering the Airport terminal, one option from the north and the other option from the west side of the terminal. Access to the Airport terminal from the north is used as a consistent means of comparing the Build Alternatives. In the subsequent preliminary engineering phase of work, additional design studies can be carried out to define further the cost, physical feasibility, and service issues associated with the two terminal routes.

Any or all of these options would be investigated further during the preparation of the Environmental Impact Statement (EIS) and Preliminary Engineering (PE) as appropriate to investigate mitigation actions for location and/or operation issues.

Figure S-3 Build Alternative 2



Stations

The location of stations in this AA/ESR represents the best judgment at this time, but the specific locations of the stations can be shifted to reflect input from the community as the project progresses. The low-floor station platforms, elevated up to 14 inches above the rail elevation, would be 90 feet long initially. The exception to the initial station length is the Airport Station, where the platforms would be designed to be 180 feet long to accommodate more than one train at a time at the terminal station. The stations would be equipped with overhead canopies for shading and weather protection, as well as pedestrian lighting, fare vending machines, public telephones, one or two benches, an information kiosk and trash receptacles. The location of park and ride lots and bus bays are shown in Table S-1.

Vehicles

The Downtown-Airport service would require a fleet of seven modern light rail vehicles to provide peak period service, with two spare vehicles. While no specific vehicle model has been selected by MATA to date, the vehicle used as the basis for analysis in this AA/ESR would carry 70 seated passengers plus standees.

Rail Maintenance Yard and Shop

Because the existing trolley maintenance facility on North Main Street would not be adequate to meet the daily maintenance requirements for LRT trains that would run on the Downtown-Airport line, a new rail yard and shop would be necessary for the new high-capacity, fixed guideway transit service. A potential location identified by MATA is on Dunn Avenue about one mile west of Airways Boulevard. This property, referred to as Dunn Field, is owned by the federal government and is undergoing environmental remediation in preparation for transfer to the City of Memphis.

Operations Plan

An operations plan has been developed for the Build Alternatives. The Downtown - Midtown - Airport transit service would operate seven days a week, including holidays. Weekday and Saturday service would operate around the clock. Sunday service would operate for 16 hours. Weekday peak-hour service would be provided from 6:30 to 9:00 a.m. and from 4:00 to 6:30 p.m. The peak hour service would be every ten minutes. During the remainder of the day, the frequency would range from 20 minutes during daytime and early evening hours to 30-40 minutes during the late evening and early morning hours. The average operating speed with dwell times is estimated to be about 21 miles per hour. Fares for rides on the Downtown-Airport LRT line would be the same as for existing fixed route bus service; the basic adult cash fare is currently \$1.25 each way.

Capital Costs

Table S-2 shows the capital cost estimates for the TSM and the Build Alternatives, incremental from the No-Build Alternative. The TSM Alternative requires only the purchase of 27 new 40-foot buses.

Table S-2 Capital Cost for Build Alternatives
(in millions, 2005 Dollars)

| Cost Element | TSM Alt. | Alt.1 | 1/ Fairgrounds | Alt. 2 |
|-----------------------------------|---------------|-----------------|-----------------|-----------------|
| Construction | | | | |
| Guideway Elements | | \$91.16 | \$89.85 | 83.07 |
| Yard & Shop | | \$26.40 | \$26.40 | \$26.40 |
| Systems | | \$45.44 | \$45.77 | \$43.28 |
| Stations | | \$6.12 | \$6.12 | \$5.68 |
| Vehicles | \$7.56 | \$31.75 | \$31.75 | \$31.75 |
| Special Conditions | | \$70.80 | \$70.52 | \$80.09 |
| General Conditions | | \$13.58 | \$13.52 | \$13.51 |
| Subtotal - Construction Cost | | \$285.25 | \$283.93 | \$283.78 |
| Right-of-Way | | \$22.14 | \$22.14 | \$26.34 |
| Design and Management | | \$ 94.54 | \$94.05 | \$94.00 |
| Total Project Capital Cost | \$7.56 | \$401.93 | \$400.13 | \$404.13 |

Source: Belstar and Parsons Brinckerhoff, April 2003; escalated to 2005.

Operating and Maintenance (O&M) Costs

Table S-3 presents the O&M cost estimates for the No-Build, TSM, and Build Alternatives.

Table S-3 O&M Cost Estimates (in 2005 Dollars)

| Item | Alt. 1 * | | | |
|-----------------------------------------|---------------------|---------------------|---------------------|---------------------|
| | No-Build | TSM | 1/ Fairgrounds | Alt. 2 |
| No-Build Route Bus (Annual VHR) | 424,388 | 424,388 | 424,388 | 424,388 |
| Service improvements from No-Build | | 99,943 | 100,397 | 103,137 |
| 100 Airport Express | | 50,650 | | |
| 101 Airport Circulator | | 12,521 | 12,521 | 12,521 |
| Total Annual Fixed Route Bus VRH | 424,388 | 587,502 | 537,306 | 540,046 |
| Estimated Bus Annual O&M Cost | \$31,192,518 | \$43,181,397 | \$39,491,991 | \$39,693,381 |
| Difference in Bus O&M Cost from TSM | | | \$3,689,406 | \$3,488,016 |
| Estimated LRT Annual O&M Cost | | | \$6,525,198 | \$6,021,337 |
| Total Bus & LRT O&M Cost | \$31,192,518 | \$43,181,397 | \$46,017,189 | \$45,714,718 |
| No-Build Route Bus (Annual VHR) | 424,388 | 424,388 | 424,388 | 424,388 |
| Service improvements from No-Build | | 99,943 | 100,397 | 103,137 |

Source: Parsons Brinckerhoff, March 2003 and MATA 2005.

(1) The operating characteristics for Alternative 1 and Alternative 1/Fairgrounds Option are identical and thus are not shown separately. Totals do not include trolley or MATA plus paratransit service.

Finance Plan

A preliminary Financial Plan for the Downtown-Airport Transit Corridor high capacity transit project was developed by MATA in 2003 to demonstrate how the agency intends to fund capital and operating costs for the enhanced transit service. MATA's Financial Plan is based on planning and conceptual level cost estimates and revenue forecasts for the Downtown - Midtown - Airport transit project. As the next phase of project development is undertaken, these estimates and forecasts will be updated

Capital Costs

It is assumed that the Build Alternatives would be funded with federal Section 5309-New Start funds at 50 to 80 percent and non-federal match consisting of 10 to 25 percent from the City of Memphis and 10 to 25 percent from TDOT. The TSM Alternative and the bus portion of the Alternative 1 and Alternative 2 would be funded with Section 5307-Formula and/or Section 5309 Bus and Bus Facilities funds.

It is assumed that the city's share would be provided through General Obligation bonds, the same source that has been used historically to match MATA's previous major capital projects funded with federal discretionary Section 5309 monies and federal Section 5307-Formula funds.

It is assumed that the state's share would be provided by TDOT through its normal budgeting process that allocates funds for the Office of Public Transportation from revenues generated by state gas taxes and other fees, the same source that has been used historically to match MATA's previous capital grants.

MATA has investigated other means of increasing the non-federal share of the project with sources other than Section 5309. MATA has been successful in securing Congestion Mitigation and Air Quality Improvement (CMAQ) funds for several projects, including planning funds for the Downtown-Airport Transit Corridor study, from the Memphis Area Metropolitan Planning Organization (MPO). Due to the relatively small allocation of CMAQ funds that the MPO receives each year, it has been determined that this source is best utilized for small projects to supplement MATA's formula capital program.

Based on discussions with representatives of the City of Memphis and TDOT, it has been concluded that this funding scenario is realistic for the Downtown-Airport Transit Corridor project. Construction funding for future high-capacity transit system extensions, as well as operating funding for MATA beginning in 2013, would likely require one or more new dedicated funding sources.

Operating and Maintenance Costs

Funding for current O&M costs come from passenger fares and other system-generated revenues (about 24 percent), federal grants (19 percent), and state and local sources of operating assistance (15 and 42 percents, respectively).

The Downtown - Midtown - Airport line would begin revenue service in 2013. It is unlikely that additional funding potential from fares, sales, and leases would be adequate to cover the additional operating costs associated with the Downtown-Airport service. Therefore, increases in funding from government entities would be

required. Existing federal transit grant funds that are currently used to support operations are highly targeted to specific purposes and would not be adequate to fund operation of the project. One source of federal highway funding that could be available to cover operating costs for the first three years of operation is the CMAQ program. The Memphis MPO is responsible for determining priorities and allocating CMAQ funds to eligible projects in the Memphis area. MATA has been successful in receiving CMAQ funds to defray costs of the first three years of operation of the Riverfront Line and the Madison Avenue Line. MATA would request CMAQ funding from the MPO for the first three years of operation of this project as well.

Except for the possible short-term relief that could be provided by CMAQ funds, the permanent operating subsidies for the project would need to be covered by state and/or local sources. State sources would likely continue to be from TDOT. Higher levels of funding could be provided from an overall increase in the share of the TDOT budget that is allocated to transit statewide, or dedication of a specific revenue source collected at the state level for transit (e.g., a portion of the gas tax or registration fee revenues). At the local level, the City of Memphis would have the same basic options -- allocate a larger share of its annual operating budget to MATA (currently about three percent), or provide a dedicated revenue source that is earmarked for MATA. Another option would be to collect revenues from other local governments in the region, either at the county level or from individual municipalities.

For the purpose of this analysis, it is assumed that the additional funding needed to operate one of the Build Alternatives for the Downtown-Airport Transit Corridor would be shared between the City of Memphis at 75 percent and TDOT at 25 percent, which is about the same proportion as in the current budget.

S.4 Transportation Impacts

Chapter 4.0 summarizes the transportation impacts associated with the No-Build, TSM, and the Build Alternatives. This chapter focuses on impacts to the overall regional transportation system, including transit, roadways, parking, freight, trucking, bicycling and pedestrian impacts.

S.4.1 Transit Impacts

The primary transit impact areas that are considered include the quality and level of transit service, the impacts on transit travel (including travel time and the number of transfers), and the ridership that would be generated.

S.4.1.1 Transit Level of Service Impacts

- **Geographic Coverage.** Under the No-Build Alternative, no major changes to existing transit services in the study area would occur other than those improvements currently planned or under construction. The TSM Alternative includes low-cost capital improvements to the study area such as improved headways on six existing bus routes, modification of an existing route to an express route serving the Airport, and a new airport area circulator route. The Build Alternatives provide fixed guideway transit service between downtown Memphis and the Airport.

- **Bus Service Changes.** The No-Build Alternative does not include changes to schedules or routes of the existing bus services but does include the construction of six new suburban transit centers. The TSM Alternative includes improvements to existing bus services. Alternative 1 and Alternative 1/Fairgrounds Option would provide 17 connections to existing bus routes and result in five bus routes being truncated to avoid duplication. Alternative 2 would provide 16 connections to existing bus routes and truncate six bus routes.
- **Transfers,** Under the No-Build Alternative, transfers and connections between express and local bus service in the study area would remain similar to existing conditions. Under the TSM Alternative, the improved headways should reduce travel times for passengers having to make transfers and for riders on the new Downtown. Under the Build Alternatives, increased coordination of the multimodal transit network would improve transit access and mitigate the disincentives of some transfers that would be required for the connection with the bus system. The improved bus headways and the addition of the fixed guideway service to the system would reduce both transfer times and overall transit trip travel times.
- **Hours and Frequency of Service.** The No-Build Alternative would not change current service hours or service frequency. The TSM and Build Alternatives each have the potential to decrease travel time throughout the Corridor. Implementation of the TSM Alternative would result in improvement to bus service operating in the study corridor and an Airport area circulator. The Build Alternatives would operate seven days a week, including holidays. Weekday service will operate around the clock; Saturday and Sunday service 17 hours a day.
- **Travel Times.** Comparison of the Build Alternatives indicates that Alternative 1 (and the Fairgrounds Option) would allow riders to travel from the Main Street and Madison Avenue intersection to the Airport Terminal in approximately 30 minutes and 40 seconds. The trip for Alternative 2 riders from the Main and Madison intersection to the Airport would be approximately 27 minutes and 10 seconds.

S.4.1.2 Transit Ridership Impacts

Ridership analysis provides an indication of how attractive the transit service under either of the Build Alternatives would be to the traveling public.

Table S-4 and Table S-5 show the ridership estimates for the four alternatives being considered as part of this study. This ridership is shown in terms of total boardings, which separately counts each time a rider boards a transit vehicle. As a result, each transfer within the transit system is counted as a separate boarding.

Table S-4 2023 No-Build and TSM Daily Transit Boardings

| Alternative Mode | No-Build | | | TSM | | |
|-------------------------|----------|----------|--------|--------|----------|--------|
| | Peak | Off-Peak | Total | Peak | Off-Peak | Total |
| Local Bus | 31,262 | 32,869 | 64,131 | 38,364 | 37,106 | 75,470 |
| Express | 1,096 | 0 | 1,096 | 933 | 153 | 1,086 |
| Total Bus | 32,358 | 32,869 | 65,227 | 39,297 | 37,259 | 76,556 |
| Trolley / Rail | 6,060 | 4,925 | 10,985 | 8,770 | 8,993 | 17,763 |
| Total Transit Ridership | 38,418 | 37,794 | 76,212 | 48,067 | 46,252 | 94,319 |

Source: Parson Brinckerhoff, Travel Forecasting, Methodology and Analysis Report, March 2003.

Table S-5 2023 Build Alternatives Daily Transit Boardings

| Alternative Mode | Alternative 1 | | | Alternative 2 | | |
|-------------------------|---------------|----------|---------|---------------|----------|---------|
| | Peak | Off-Peak | Total | Peak | Off-Peak | Total |
| Local Bus | 34,507 | 36,395 | 70,902 | 34,025 | 36,040 | 70,065 |
| Express | 478 | 0 | 478 | 462 | 0 | 462 |
| Total Bus | 34,985 | 36,395 | 71,380 | 34,487 | 36,040 | 70,527 |
| Trolley / Rail | 17,957 | 12,220 | 30,177 | 18,306 | 12,519 | 30,825 |
| Total Transit Ridership | 52,942 | 48,615 | 101,557 | 52,793 | 48,559 | 101,352 |

Source: Parson Brinckerhoff, Travel Forecasting, Methodology and Analysis Report, March 2003.

Implementation of the TSM Alternative would increase total daily ridership to nearly 95,000 daily boardings. In contrast, both Build Alternatives result in between 101,300 and 101,500 daily boardings. The difference between these two Build forecast numbers is not substantial, particularly within the context of the general accuracy of a travel demand model. As a result, the ridership estimate does not clearly point to one of the Build Alternatives outperforming the other.

The station with the highest number of daily boardings under both alternatives is Main Street at Madison Street, with the station near the intersection of Park Avenue and Airways Boulevard (Park Station under Alternative 1 and Park/Airways Station under Alternative 2) having the second highest boardings. Boardings at Main and Madison are high because it is the Downtown terminal of the service and the point where passengers can transfer to a variety of other transit services, including many buses and the Main Street and Riverfront Loop trolleys. The station at Park and Airways is attracting substantial ridership because of its location near a commercial center and a number of residential neighborhoods and the large number of buses that are expected to link to that station.

S.4.2 Roadway System Impacts

This section compares the roadway impacts of the TSM and Build Alternatives in the proposed transit alignments. Due to relatively low traffic growth rates through 2023, traffic congestion along these alignments is not projected to worsen substantially. These conditions result in an environment that would be very conducive to mixed traffic transit service. First, the transit vehicles would not substantially impact roadway traffic, nor would traffic congestion produce substantial delays that would reduce the competitiveness of transit. From this perspective, the alignments that have been selected appear to be good candidates for introducing high capacity, fixed guideway service.

S.4.2.1 Roadway Segment Impacts

The TSM Alternative assumes an increase in bus transit service over the No-Build Alternative, so its impact to the level of service (LOS) on the region's roadways would be negligible. Build Alternative 1 would impact traffic conditions primarily on the Madison Avenue and Cooper Street segments of the alignment where the service is running in mixed traffic. Under Alternative 1/Fairgrounds Option the LRT would affect travel conditions on Madison Avenue, Cooper Street, and Central Avenue. Because the fixed guideway service would only run at headways of 10 minutes during the peak, and 20 minutes during off-peak, the impacts of the service on traffic are expected to be negligible. The number of roadway lanes along the Alternative 1 and Alternative 1/Fairgrounds Option alignments would not change. For Alternative 2, the new transit line would have dedicated lanes in several segments: Pauline Street between Union Avenue and Lamar Avenue; Lamar Avenue between Pauline Street and Cleveland Street; and between South Parkway and Airways Boulevard. Along Pauline Street, due to the reduction in the number of through lanes, a one- or two- letter degradation in LOS is experienced on these segments (with only one segment of Pauline Street between Vance Avenue and Lamar Avenue, falling from LOS B to LOS D). In the lane-reduced segments along Lamar Avenue, LOS either does not change or is only degraded by one letter of LOS.

S.4.2.2 Intersection Impacts

The introduction of the Build Alternatives would not substantially impact the performance of several of the corridor's major intersections. While most of these intersections are not expected to perform very well, with or without the Build Alternatives, it does not appear that the introduction of either Build Alternative would substantially degrade the LOS at these intersections. Only at the intersections of Union Avenue and Pauline Streets and Lamar Avenue and Bellevue Boulevard under Alternative 2 would any changes in LOS occur. At these two intersections, the LOS would decline from E to F.

S.4.2.3 Station Area Traffic Impacts

In addition to impacts to the roadway network, the implementation of any of the Build Alternatives also may produce localized impacts in station areas, with additional auto trips being used to access the transit stations. At this time, these impacts have not been fully analyzed. Though impacts to local roadway networks were not modeled, the number of trips to the station areas does not appear to be sufficiently large enough to indicate that a substantial degradation in local roadways or intersection LOS would occur. Only at the intersections of Union Avenue and Pauline Streets and Lamar Avenue and Bellevue Boulevard under Alternative 2 would any changes in LOS occur. At the intersection of Union Avenue and Pauline Streets, the PM peak LOS would decrease from E to F. Similarly, at the intersection of Lamar Avenue and Bellevue Boulevard, the Build Alternative would reduce the intersections LOS in the AM peak from E to F.

S.4.3 Regional System Impacts

While the travel market in the Memphis region is comprised of residents and visitors traveling to and through the area, residents make the greatest number of daily regional trips. In the design year of 2023, there are projected to be over 4.5 million daily resident person-trips in the region, an increase of 52 percent from the 1995 data. In 2023, over 50,000 of the region's residential trips are projected to be on bus and rail transit under the TSM condition. Alternative 1 would increase this figure to just over 54,000 transit riders and Alternative 2 would generate an estimated 53,000 residential transit trips. The projected growth in transit trips over 1995 levels represents an increase of 64 percent in the TSM Alternative, 76 percent in Alternative 1 and 72 percent in Alternative 2.

The private automobile is expected to continue to dominate as the preferred mode of transportation in the region. The proposed Downtown - Midtown - Airport transit project would help reduce auto trips and provide alternatives for those who do not have access to a vehicle within the study area. The total rail ridership for Alternative 1 and Alternative 2 would be about the same; however, Alternative 1 would have a higher volume of bus ridership than Alternative 2. Both Build Alternatives would have over 8,000 more rail riders than the TSM Alternative. Riders shifting from bus to rail would constitute about half the increase in rail transit ridership in the Build Alternatives.

S.4.4 Parking

The No-Build and the TSM Alternatives would not reduce the number of on-street parking spaces and it is unlikely that bus service improvements would increase demand for parking at bus stop areas. The Build Alternatives were designed to minimize impacts to on-street parking, which is an important issue to local businesses. It is likely that some spaces would need to be removed in some areas along Alternative 1 to permit operations of the LRT and provide adequate width for stations. This would occur on Madison Avenue, Cooper Street, and Young Avenue. Under Alternative 2 it is likely on-street parking along Pauline Street would need to be removed at the Pauline Street station location as well as along Lamar Avenue.

For many of the proposed LRT stations under the Build Alternatives, there is little or no demand for parking and no parking have been proposed for those stations. However, it appears that several stations may have substantially more demand than what is currently planned to be provided –Cowden and Young/East Parkway under Alternative 1 (and Alternative 1/Fairgrounds), and Alternative 1's Park Station. Under Alternative 2, the proposed stations of Rozelle, Carnes and Park/Airways may have substantially more demand than what is proposed.

S.4.5 Freight Railroad and Trucking Impacts

S.4.5.1 Freight Railroads

The No-Build and the TSM Alternatives would not alter the existing configuration of any of the existing railroad crossings in the study area. Neither of the Build Alternatives would have any long term effect on the operation of the railroads in the Corridor since the project's proposed crossings of existing railroads would be grade separated. However, each of the Build Alternatives would have an effect on the railroads during the construction of the project.

Alternative 1 would require the reconstruction of the existing CSX overpass of Cooper Street between Higbee and Central Avenues. A new LRT structure would be built to cross the at-grade Norfolk Southern Rail line, Southern Avenue and the CN/IC Beltline south of the Young/East Parkway Station. A new structure above the BNSF rail line along Airways Boulevard would also be constructed. Alternative 2 would require reconstruction of the existing CSX overpass at Lamar between Melrose and Willett Streets, reconstruction of the Norfolk Southern overpass of Lamar Avenue between McLean and Barksdale Streets, and the BNSF structure along Airways Boulevard required for Alternative 1.

The Build Alternatives would not affect the railroad operation because the construction of the project would be sequenced to accommodate the need for continuous operation of the various railways during the construction period. The rail company maintenance personnel would be actively involved in the construction activities associated with the relocation of their tracks.

S.4.5.2 Trucking and Deliveries

The No-Build and the TSM Alternatives would not have an effect on existing truck routes or loading and delivery zones. The Build Alternatives would not affect trucking operations on the alignment roadways since the impacts of the fixed guideway transit service on traffic are expected to be negligible.

The Build Alternatives have the potential to affect loading and delivery zones along the corridors. Alternative 1 has the greatest potential to affect deliveries along Madison Avenue and Cooper Street in the areas around the proposed stations. During the PE/EIS phase, more detailed investigations of loading/unloading zones would be made for the locally preferred alternative and efforts would be made to minimize the effects on local businesses.

S.4.6 Bikeways and Pedestrian Impacts

The Memphis MPO's 2005 Regional Bicycle and Pedestrian Plan recommends the enhancement and completion of existing bicycle and pedestrian facilities, as well as the development of new high-profile bicycle and pedestrian projects that will promote awareness and support of biking and walking as viable transportation modes. The Plan includes an extensive network of bicycle facilities. Eight segments of the proposed city bike route would cross the study area.

The No-Build and TSM Alternatives would have little or no effect on bikeways and pedestrian pathways. With the introduction of one of the Build Alternatives, numerous pedestrian and bike crossings would be affected. Most of the areas of potential conflicts would be at existing intersection crossings, in which case they would not necessarily create entirely new hazards for pedestrians. Instead, it may create situations that require greater awareness of on the part of bicyclists and pedestrians to understand new signalization patterns in crosswalk areas.

S.5 Environmental Impacts

Chapter 5.0, Environmental Consequences, identifies the potential impacts on the social, cultural, and natural environment that will result from the construction and operation of the Downtown - Midtown - Airport transit project. The analysis of impacts is based on the environmental setting described in Chapter 3.0, Affected Environment.

Table S-6 summarizes the environmental impacts of the No-Build, TSM, and Build Alternatives.

S.6 Comparison of Costs and Benefits

This section summarizes the comparison of key trade-offs associated with each alternative. The alternatives are compared in terms of effectiveness, efficiency, financial feasibility, and equity. A detailed discussion of the evaluation criteria and findings is in Chapter 6.0 Comparative Costs and Benefits.

Table S-6 Environmental Impacts

| Impact Area | No-Build Alternative | TSM Alternative | Alternative 1 | Alternative 1-Fairgrounds | Alternative 2 | Mitigation |
|-----------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Population | No Impact. | No Impact. | Positive impact - Promotes investment and redevelopment in urban neighborhoods. | Same as Alternative 1. | Same as Alternative 1. | None required. |
| Housing | No Impact. | No Impact. | Short Term – Loss of residences due to relocation. Long Term – Promote investment and redevelopment in urban housing stock. | Same as Alternative 1. | Same as Alternative 1. | MATA will provide relocation assistance. |
| Economic and Employment Impacts | No Impact. | No Impact. | Short term – Loss of property tax revenue due to ROW acquisition (\$207,700). Long Term – Enhanced access promotes job growth, increased property values in station areas. | Same as Alternative 1. | Short term – Loss of property tax revenue due to ROW acquisition (\$244,600). Long Term – Enhanced access promotes job growth, increased property values in station areas. | None Required. |
| Land Use and Development Activity | No Impact. | No Impact. | Positive impact – Enhanced access and station development may spark investment / redevelopment that supports long range plans. | Same as Alternative 1. | Same as Alternative 1. | None Required. |
| Compatibility with Land Use Plans, Policies, and Controls | Not fully supportive of long range plans for compact urban development. | Not fully supportive of long range plans for compact urban development. | Promotes implementation of the vision of the LRTP. | Same as Alternative 1. | Same as Alternative 1. | None Required. |
| Community Facilities | No Impact. | No Impact. | A church would be relocated. | A church would be relocated and Fairview school's front lawn would be affected. | A church and a nursing home would be relocated. | MATA would provide relocation assistance. |

Table S-6 Environmental Impacts (continued)

| Impact Area | No-Build Alternative | TSM Alternative | Alternative 1 | Alternative 1-Fairgrounds | Alternative 2 | Mitigation |
|-----------------------------|----------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Neighborhoods Impacts | No Impact. | No Impact. | Visual impacts to the Cooper Young commercial district and loss of pedestrian bulb & landscaped seating area; business and residential relocations in the Cooper Parkway and Magnolia Barksdale neighborhoods; relocations and potential barrier to social interaction in Alcy-Ball/Nob Hill neighborhood; and Mason-Hayes neighborhood would have yard & shop in viewshed. | Business and residential relocations in the Cooper Parkway and Magnolia Barksdale neighborhoods; relocations and potential barrier to social interaction in Alcy-Ball/Nob Hill neighborhood; and Mason-Hayes neighborhood would have yard & shop in viewshed. | Business and residential relocations in the Lamar Terrace, Rozelle Willet, Cooper Parkway, and Magnolia Barksdale neighborhoods; relocations and potential barrier to social interaction in Alcy-Ball/Nob Hill neighborhood; and Mason-Hayes would have yard & shop in viewshed. | Partnership with neighborhood groups in construction, station design, and relocation processes. |
| Environmental Justice | No Impact. | No Impact. | No disproportionate impact. | No disproportionate impact. | No disproportionate impact. | MATA will coordinate with neighborhood groups in construction, station design, and relocation processes. |
| Displacements & Relocations | No Impact. | No Impact. | 45 residences; 27 businesses, 1 church | 45 residences; 27 businesses, 1 church | 37 residences, 19 businesses, 1 church and 1 nursing home. | During design, efforts will be made to minimize relocations. MATA will provide relocation assistance. |

Table S-6 Environmental Impacts (continued)

| Impact Area | No-Build Alternative | TSM Alternative | Alternative 1 | Alternative 1-Fairgrounds | Alternative 2 | Mitigation |
|---------------------------------------|----------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Visual Quality and Aesthetics | No Impact. | No Impacts. | Potential adverse effect in Cooper-Young neighborhood due to removal of landscaping and pedestrian bulb, tree trimming and Cooper Young Station blocking views to and from businesses and residences; potential visual impacts at station areas, segments of elevated track and segments on new location. | Potential adverse effect at Fairview School due to station location and tree trimming; potential visual impacts at station areas, segments of elevated track and segments on new location. | Potential visual impacts at station areas, segments of elevated track and segments on new location. | Coordination with SHPO and stakeholders in station location and design and in mitigation/landscaping. |
| Air Quality | No Impact. | No Impact. | No Impact. | No Impact. | No Impact. | None Required. |
| Noise and Vibration | No Impact. | No Impact. | 59 residential buildings on Young Ave and East Pkwy affected by noise, 5 recording studios affected by vibration. | 6 residences on East Parkway south of Young Street affected by noise; 5 recording studios affected by vibration. | No Impact. | Typical options include sound barriers, vehicle modifications or track support systems. Detailed mitigation analysis will be completed during design studies. |
| Natural Environment | No Impact. | No Impact. | No Impact. | No Impact. | No Impact. | None Required. |
| Water Resources | No Impact. | No Impact. | Minor impact to Nonconnah Creek and floodplain. | Same as Alternative 1. | Same as Alternative 1. | Use of best management practices during construction. |
| Historic and Archaeological Resources | No Impact. | No Impact. | Adverse effect to Cooper-Young Historic District. | Adverse effect to Fairview Junior High School. | No adverse effect. | Coordinate with SHPO and community to minimize or mitigate adverse effects. |

Table S-6 Environmental Impacts (concluded)

| Impact Area | No-Build Alternative | TSM Alternative | Alternative 1 | Alternative 1-Fairgrounds | Alternative 2 | Mitigation |
|----------------------------------|----------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parklands | No Impact. | No Impact. | No Impact. | Rail crossing of Memphis Parkway System (East Parkway) and use of land in the Fairgrounds/Libert yland complex. | No Impact. | None Required. |
| 4(f) Resources | No Impact. | No Impact. | Adverse effect to Cooper-Young Historic District due to visual and parking impacts. | Adverse effect on Fairview Junior High School due to station location. | No 4(f) involvement. | Coordinate with SHPO and community to minimize or mitigate adverse effects. |
| Safety and Security | No Impact. | No Impact. | No Impact. | No Impact. | No Impact. | None Required. |
| Contamination | No Impact. | No Impact. | 37 potential contamination sites within 100 ft of alignment. | 37 potential contamination sites within 100 ft of alignment. | 23 potential contamination sites within 100 ft of alignment. | Phase I and Phase II Environmental Site Assessments to be made of sites impacted by locally preferred alternative, when selected. |
| Public Utilities | No Impact. | No Impact. | Relocation of utilities would be required for construction. | Same as Alternative 1. | Same as Alternative 1. | Implementation of MATA advance utility identification and relocation program. |
| Construction Impacts | No Impacts. | No Impacts. | Utility relocations; impacts to traffic circulation and parking; disruption of businesses & access; neighborhood disruption; visual, ecological, noise, and air quality impacts; disturbance of contamination sites. | Same as Alternative 1. | Same as Alternative 1. | Implementation of the MATA Construction Impact Mitigation Plan, including outreach to property owners, advanced utility relocation, and segment-by-segment construction. |
| Secondary and Cumulative Impacts | No Impacts. | No Impacts. | Potential for economic development and enhanced quality of life. | Same as Alternative 1. | Same as Alternative 1. | None Required. |

S.6.1 Evaluation Framework

This evaluation incorporates the following criteria:

- **Effectiveness (Goals Attainment)** or how well each alternative helps achieve the purpose of and satisfies the need for transportation improvements in the project areas.
- **Efficiency (Cost Effectiveness)** or the effectiveness of each alternative in attracting new riders relative to estimated capital costs and operating costs.
- **Financial Feasibility** or MATA's ability to pay for each of the alternative's capital and operating costs.
- **Equity**, or how equitable the project is from the perspective of service, financial and environmental benefits, and impacts among affected groups.
- **Trade-Offs** or what is being given up relative to what is being gained for each alternative.

S.6.2 Evaluation Results

The first decision is whether the community desires no action (No-Build), implementation of modest transit service improvements (TSM) or the implementation of high capacity, fixed guideway service in the Downtown-Airport Transit Corridor. With a no action or modest transit improvement decision, MATA would select the No-Build or TSM Alternative with the expectation that a major transportation investment would not be implemented in this corridor in the foreseeable future. If the decision to build the Downtown-Airport transit project were approved, the second decision would determine which of the Build Alternatives would be LPA that would be carried into further study in the PE/EIS stage.

S.6.2.1 No-Build Versus TSM Versus Build Alternative Trade-Offs

In terms of cost effectiveness, implementation of fixed guideway transit service under any of the Build Alternative alignments would achieve the purpose and need in an efficient manner. The TSM Alternative represents the most cost effective alternative, at an estimated cost per new rider of \$3.22 when compared to the No-Build Alternative. Although implementation of the Build Alternative concept represents a substantial investment of local financial resources, the decision to build high-capacity, fixed guideway transit in one of the alignments is financially feasible. However, debt would be incurred during the construction period. The Build Alternative concept would be provided on an equitable basis in terms of population groups served, sources of funds and in general on environmental impacts.

The No-Build and the TSM Alternatives encompass planned transit and highway improvements that will be built regardless of the construction of the Downtown - Midtown - Airport transit project; therefore the No-Build and TSM Alternatives are considered to have no environmental impacts to this study area. However, with the No-Build or TSM scenarios, the travel time savings and service benefits of high-capacity, fixed guideway for riders in this corridor would not occur.

S.6.2.2 Build Alternative Trade-Offs

Each of the Build Alternatives would meet the transportation needs of the project by providing high capacity transit service in the Corridor. Under each alignment alternative, transit stations would be constructed to provide convenient access to residents and employees. The stations would be designed to enhance opportunities for economic development and redevelopment.

The operational characteristics of the high-capacity, fixed guideway service under any of the Build Alternatives would be the same. The capital and operating costs of Build Alternatives are very similar, as are the ridership estimates. The primary differences among the alternative alignments and their stations in their unique segments relate to their environmental impacts. The principal areas of differences are visual and aesthetics, noise and vibration, historic resources and Section 4(f) and construction impacts.

Aesthetics

Alternative 1 and Alternative 1/Fairgrounds Option would each have adverse visual impacts because of their alignments through a historic district or a historic property. Alternative 1 would travel through the NRHP Cooper Young Historic District, and would cause adverse visual impacts in the vicinity of the proposed Cooper/Young Station LRT station where the station, with its long canopies, has the potential to block views to and from the residences and businesses at the station areas. The Fairgrounds Option would travel across the western edge of the NRHP Fairview Junior High School east of East Parkway, and place a station on the property. The proposed Central/Fairgrounds LRT station would add a modern element into the historic setting and disrupt the symmetry of the school's historic circle driveway.

Alternative 2 would not have adverse visual impacts along its alignment.

Noise

Alternative 1 and Alternative 1/Fairgrounds Option would each have potential noise impacts and vibration impacts. The operation of Alternative 1 would exceed the FTA criteria for a noise impact for approximately 59 residential properties along Young Avenue and the west side of East Parkway south of the Young/East Parkway LRT station. The operation of Alternative 1/Fairgrounds Option would exceed the FTA criteria for a noise impact for six residential properties along East Parkway south of the Young/East Parkway LRT station, but the option would avoid the noise impacts to the Young Avenue properties that Alternative 1 would cause. Neither alternative meets the criteria for a severe noise impact.

The operation of Alternative 2 would not exceed the FTA criteria for a noise impact at any properties along its alignment.

Vibration

Alternative 1 and Alternative 1/Fairgrounds Option each are adjacent to several businesses that fall into a special category of land use that is sensitive to vibrations – recording and video studios. Five recording and video studios (four on Madison Avenue and one on Young Avenue) would be impacted by Alternative 1, and five (four on Madison Avenue and one on Central Avenue) would be impacted by Alternative 1/Fairgrounds Option.

No recording or audio studios would be impacted by Alternative 2.

Historic and Section 4(f) Resources

Alternative 1 would adversely affect the Cooper-Young Historic District, which would result in a Section 4(f) impact to that resource. Alternative 1/Fairgrounds Option would adversely affect the Fairview Junior High School, which would result in a section 4(f) impact to that resource. Alternative 2 would have no effect on historic resources.

While Alternative 1 avoids a Section 4(f) use of the Fairview Junior High School, Alternative 1/Fairgrounds Option avoids a use of the Cooper-Young Historic District. Alternative 1/Fairgrounds Option could be modified to avoid a Section 4(f) use by moving the Central/Fairgrounds Station off the NRHP-listed Fairview Junior High property, preserving its historic circle driveway, and placing poles in a manner to minimize any visual impacts. The only build alternative that totally avoids a Section 4(f) use is Alternative 2.

Construction-Related Impacts

Members of the public have raised the issue of construction impacts to businesses as a concern. The construction of any of the Build Alternatives could result in impacts to adjacent businesses and residences during the construction period. Alternative 1 has the highest potential to result in construction impacts to adjacent businesses because of the concentrations of businesses along Madison Avenue and Cooper Street. Alternative 1/Fairgrounds has the potential to affect the same businesses along Madison Avenue and the portion of Cooper Street between Madison Avenue and Central Avenue, and would possibly affect the business node along Central Avenue west of East Parkway. Alternative 1/Fairgrounds Option would avoid the heart of the Cooper Young business district. Alternative 2 has the potential to affect businesses during construction, but the nature of the commercial districts along the Alternative 2 alignment is more dispersed. Regardless of the Build Alternative selected, MATA would design and implement a construction mitigation plan to address many of the concerns raised during the construction of the Madison Avenue Line and the evaluation of this project.

S.7 Consultation and Coordination

MATA has continued to implement activities for public information and agency coordination throughout the planning process. Community and stakeholder participation will continue as the project advances through the project development process, including community and stakeholder review of the DEIS document, formal regulatory agency review, and the public hearing. The consultation and coordination activities are detailed in Chapter 7.0.

S.7.1 Public Involvement Program

A Public Involvement Program (PIP) was developed to encourage an open, proactive, and participatory process for the public, affected agencies and other interested parties. The following components of the PIP have been implemented:

S.7.1.1 Scoping

On August 3, 2001 a Notice of Intent (NOI) to study transportation alternatives, to prepare an EIS and to conduct public scoping meetings was published in the *Federal Register*. At that time, MATA distributed early coordination letters to 42 Federal, state and local agencies, to 143 community leaders, and to eight Indian Tribes. The early coordination letters provided a summary of the project and an invitation to the August 2001 scoping meetings to provide input for the project.

S.7.1.2 Public Meetings

In addition to the two public scoping meetings, MATA held two separate rounds of public meetings to inform the public about the program and to solicit input throughout the Regional Rail program development. The first round of three public meetings was held in July 2001 to gather public input to assist MATA and its study team in making decisions about routes and technologies for high capacity transit service in the Downtown-Airport Transit Corridor. The purpose of the meetings was to explain the study and show the public the route alternatives and technologies being studied, and the sets of criteria that were suggested to evaluate the alternatives. The second round of two public meetings were held on February 25 and 26, 2002 to present the preliminary results of the evaluation on the four alternative alignments and to solicit public input for the alignments to be carried forward into the DEIS.

S.7.1.3 Community Meetings

During the conduct of the study, MATA staff members attended meetings of 39 community organizations to make presentations about the study process and talk with community members about the project. During the period between April 2002 and May 2005, a total of 407 completed comment forms, email comments and letters have been received by MATA as a result of the MATA's community outreach program.

S.7.1.4 Other Community Participation Activities

Other community participation activities included publication of project updates in the six MATA newsletters and MATA's web site, production of an informational video, and two telephone surveys of residents.

S.7.2 Agency Coordination

During the course of the project, contact was made with nine public agencies and two major utilities in order to coordinate efforts, to inform agencies of issues and aspects of the project, and to address agency concerns about the project.

S.7.3 Section 106 Coordination

Coordination with the State Historic Preservation Officer (SHPO) has been on-going during the alternatives analysis phase of the Downtown - Midtown - Airport transit project study, beginning with the scoping letter that was sent by MATA to the SHPO in August 2001. In response to that letter, the SHPO requested that MATA consult with the agency during the DEIS. Since then the draft cultural resources survey and determinations of eligibility have been submitted to the SHPO, and the SHPO has reviewed and commented on the draft report of cultural resource investigations. The Section 106 effects assessment has been coordinated with the SHPO and the draft report has been submitted to the SHPO for review and comment.

S.7.4 Public Review of the AA/ESR

The AA/ES report will be made available for public comment and one or more public hearings will be held to obtain comments on the results of the Alternatives Analysis. A decision on the Locally Preferred Alternative will not be made until after the close of the comment period and all comments have been reviewed and taken into consideration. The MATA Board will make a recommendation on the LPA to the Memphis City Council, which will make the final decision

WORKING DRAFT

APPENDIX A

A. LIST OF ACRONYMS AND ABBREVIATIONS

| Acronym / Abbreviation | Name |
|-----------------------------------|-------------------------------------------------------------------------------------|
| ACHP | Advisory Council on Historic Preservation |
| ADA | Americans with Disabilities Act |
| ADT | Average Daily Traffic |
| AGT | Automated Guideway Transit |
| Airport | Memphis International Airport |
| APE | Area of Potential Effect |
| ARAP | Aquatic Resource Alteration Permit |
| ASTM | American Society for Testing and Materials |
| BNSF | Burlington Northern Santa Fe |
| BRT | Bus Rapid Transit |
| CAAA | Clean Air Act Amendments |
| CBD | Central Business District |
| CEQ | U.S. Council on Environmental Quality |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CERCLIS | Comprehensive Environmental Response, Compensation and Liability Information System |
| CFR | Code of Federal Regulations |
| CIP | Capital Improvement Program |
| CMAQ | Congestion Mitigation and Air Quality |
| CN/IC | Canadian National/ Illinois Central |
| CO | Carbon Monoxide |
| COGIC | Church of God in Christ |
| CORRACTS | Corrective Action Reports |
| dB | Decibels |
| dBA | A-Weighted Decibels |
| DASH | Downtown – Airport Shuttle |
| DEIS | Draft Environmental Impact Statement |
| DOI | United States Department of Interior |
| EDR | Environmental Data Resources, Inc. |
| EIS | Environmental Impact Statement |

| Acronym / Abbreviation | Name |
|-----------------------------------|-----------------------------------------------|
| EPA | United States Environmental Protection Agency |
| ERNS | Emergency Response Notification System |
| FedEx | Federal Express |
| FEIS | Final Environmental Impact Statement |
| FEMA | Federal Emergency Management Agency |
| FFA | Federal Facilities Agreement |
| FHWA | Federal Highway Administration |
| FIRMS | Flood Insurance Rate Maps |
| FTA | Federal Transit Administration |
| GIS | Geographic Information System |
| GTC | Ground Transportation Center |
| HC | Hydrocarbons |
| HCM | Highway Capacity Manual |
| HMIRS | Hazardous Materials Incident Report System |
| HOV | High Occupancy Vehicle |
| HSWA | Hazardous and Solid Waste Amendments |
| Ldn | Day-Night Sound Level |
| Leq | Equivalent Continuous Noise Level |
| Leq(h) | Hourly Equivalent Sound Levels |
| LOS | Level of Service |
| LPA | Locally Preferred Alternative |
| LQG | Large Quantity Generator |
| LRT | Light Rail Transit |
| LRTP | Long-Range Transportation Plan |
| LT | Long-term (noise measurement) |
| LUST | Leaking Underground Storage Tank |
| MATA | Memphis Area Transit Authority |
| Memphis Depot | Memphis Defense Distribution Depot |
| MHA | Memphis Housing Authority |
| MIFA | Memphis Interfaith Association |
| MLGW | Memphis Light Gas and Water |
| MOA | Memorandum of Agreement |

| Acronym / Abbreviation | Name |
|-----------------------------------|--------------------------------------------------------|
| MPO | Metropolitan Planning Organization |
| N/A | Not applicable (does not apply) |
| NAAQS | National Ambient Air Quality Standards |
| NBA | National Basketball Association |
| NEPA | National Environmental Policy Act |
| NFRAP | No Further Remedial Action Planned |
| NHPA | National Historic Preservation Act |
| NOI | Notice of Intent |
| NO _x | Nitrogen Oxides |
| NPDES | National Pollutant Discharge Elimination System Permit |
| NPL | National Priority List |
| NRHP | National Register of Historic Places |
| NSA | Noise Sensitive Area |
| NWI | National Wetland Inventory |
| O&M | Operating and Maintenance |
| O ₃ | Ozone |
| OCS | Overhead Contact System (catenary system) |
| PADS | PCB Activity Data Base System |
| Pb | Lead |
| PCB | Polychlorinated Biphenyl |
| pcphpl | passenger cars per hour per lane |
| PE | Preliminary Engineering |
| PIP | Public Involvement Plan |
| Phase I ESA | Phase I Environmental Site Assessment |
| Phase2 ESA | Phase 2 Environmental Site Assessment |
| PM ₁₀ | Particulate Matter sized 10 microns or less |
| PM _{2.5} | Particulate Matter sized 10 microns or less |
| PPM | Parts Per Million |
| RCRA | Resource Conservation and Recovery Act |
| RCRIS | Resource Conservation and Recovery Information System |
| REC | Recognized Environmental Conditions |
| RMS | Root-Mean-Squared |

| Acronym / Abbreviation | Name |
|-----------------------------------|----------------------------------------------------------------------------------------------------|
| ROD | Record of Decision |
| R.O.W | Right-Of-Way |
| RRSC | Regional Rail Steering Committee |
| RTP | Regional Transit Plan |
| SARA | Superfund Amendment and Reauthorization Act |
| SHPO | State Historic Preservation Office |
| SIP | State Implementation Plan |
| SO _x | Sulfur Oxides |
| SO ₂ | Sulfur Dioxide |
| SQG | Small Quantity Generator |
| ST | Short-term (noise measurement) |
| TAZ | Transportation Analysis Zone |
| TCA | Tennessee Code Annotated |
| TDEC | Tennessee Department of Environmental and Conservation |
| TDEC-MEAC | Tennessee Department of Environmental and Conservation, Memphis Environmental Assistance Center |
| TDOT | Tennessee Department of Transportation |
| TIP | Transportation Improvement Program |
| TPSS | Traction Power Substation |
| TSD | Transportation, Storage, and Disposal |
| TSM | Transportation System Management |
| UPS | United Parcel Service |
| USDA | United States Dairy Association |
| USDOT | United States Department of Transportation |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| UP/SP | Union Pacific / Southern Pacific |
| UST | Underground Storage Tank |
| VdB | Vibration Velocity Levels |
| Vdc | Volts of Direct Current |
| VRH | Vehicle Revenue Hours |