

## 7. DETAILED DEFINITION OF ALTERNATIVES

### 7.1 Introduction

The DTOGS project began by identifying corridors throughout the DTOGS project area and evaluating them based on how well the corridors accomplish the Goals and Objectives of the DTOGS project, identified in Section 1: Project Overview.

#### 7.1.1 *Project Goals and Objectives*

##### Transportation and Mobility

**Goal:** Create transportation improvements that add people-carrying capacity as necessary, minimize operating costs, improve operating efficiency, provide high quality rapid transit alternatives, reduce travel times, and strengthen the project area's transportation system.

*Objective:* Provide a customer-focused transportation system that is integrated, responsive, flexible, and adaptable to technological advancements and changes.

*Objective:* Expand opportunities for diverse populations to move freely to, through, and within the project area.

*Objective:* Enhance the existing transportation infrastructure to serve the high number of transit-dependent persons in the project area.

*Objective:* Attract choice riders and offer alternatives to single-occupancy vehicles (SOV).

## Economic Opportunity and Investment

**Goal:** Support investments in infrastructure, business, and community that sustain the heart of the region.

*Objective:* Create a reliable rapid transit system that:

- Supports an efficient, effective land use development pattern in major activity centers.
- Reduces the need for parking facilities downtown.
- Facilitates the highest and best use of adjacent properties.

*Objective:* Strengthen transit linkages within the project area that support economic development and redevelopment investments.

*Objective:* Equip employers with the confidence that their employees have reliable, fast transit options to travel to and from work.

*Objective:* Attract new residents and promote residential development in the project area.

## Communities and Environment

**Goal:** Facilitate the preservation and enhancement of Wayne County's diverse communities by supporting economic and strategic goals of those areas.

*Objective:* Acknowledge the individual character, identity, and aspirations of each place served, in addition to the vision for the project area.

*Objective:* Support regional goals for cleaner air and water, more efficient energy use, a safer and healthier environment, and the sustainable use of resources.

## Public Involvement

**Goal:** Engage the community in a manner that educates and generates informed consent.

*Objective:* Establish and maintain a partnership between residents, the business community, and the core area stakeholders.

*Objective:* Connect with the communities and local units of government early and at key junctures throughout the study.

### **7.1.2 Purpose and Need**

The DTOGS project examined how transit enhancements can be utilized to address three primary issues in the study area, given existing financial constraints, which were identified in Chapter 2. Purpose and Need.

- High concentration of transit-dependent populations
- Continued and growing dependence on the personal automobile, increasing congestion and the environmental impacts of auto dependence
- Lagging economic reinvestment in the urban core

### **7.1.3 Corridor**

As the study progressed it became apparent that any rapid transit service needed to provide service to the southern portion of the Woodward Avenue corridor. Within this three-mile stretch from downtown Detroit to New Center there are over 100,000 residents, almost 200,000 employees, prominent institutions such as Wayne State University, Detroit Medical Center, and Henry Ford Hospital, as well as a future connection to the Detroit-Ann Arbor commuter rail line. This segment of Woodward Avenue was also the most commonly selected portion for any potential alignment during an exercise conducted as part of the early scoping meetings held in July 2007.

In summary, the DTOGS project evaluated the following alignments:

- Gratiot/Woodward Avenues – On Gratiot Avenue, generally between downtown Detroit and Eight Mile Road, and on Woodward Avenue between downtown and Grand Boulevard
- Michigan/Woodward Avenues – On Michigan Avenue, generally between Evergreen Road and downtown Detroit, and on Woodward Avenue between downtown and Grand Boulevard
- Woodward Avenue – On Woodward, generally between downtown Detroit and Eight Mile Road.

Additionally, this AA completes a detailed evaluation of the following alternatives for the preceding three alignments, illustrated in **Figures 7-1** through **7-3** on pages 7-6 through 7-8.

- TSM
- BRT
- LRT.

Also noteworthy was the strong interest and additional effort undertaken in the DTOGS project to analyze LRT on Gratiot Avenue alone, between downtown Detroit and Eight Mile Road. (This additional sub-alternative excluded the segment of Woodward Avenue between downtown Detroit and Grand Boulevard.) As part of this additional analysis, the DTOGS project determined the order-of-magnitude capital cost, order-of-magnitude operating and maintenance cost, and 2030 ridership. Section 9: Evaluation of Alternatives of this document presents the results of the analysis for the Gratiot Avenue LRT.

The DTOGS project also analyzed No-Build Alternatives for Gratiot, Michigan and Woodward Avenues. These alternatives entailed modifications to existing DDOT Routes 34, 37 and 53, respectively. The Gratiot and Michigan No-Build Alternatives did not include the segment of Woodward Avenue between downtown Detroit and Grand Boulevard, unlike the TSM, BRT and LRT Alternatives.

Three downtown Detroit alignment concepts were also identified as part of the DTOGS project, described in Section 7.7 Downtown Alignments.



This Detailed Definition of Alternatives section defines each alternative in terms of the following elements:

- Existing conditions along each alignment, including roadway geometry, right-of-way width, traffic control, posted speed limits, transit service, existing land use, zoning
- Physical requirements of each alternative, such as transit guideway and other infrastructure, engineering obstacles, safety concerns, potential station locations, alignment termini
- Vehicle requirements associated with each alternative
- Operating plan (service frequency, hours of service, travel speed, travel time and fare structure)
- Future (year 2030) socioeconomic assumptions to estimate future ridership.

The DTOGS project produced separate technical reports for each of the elements aforementioned, and these documents are included in this document as appendices.

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**Recommended Transit Modes**

Conventional Bus  
(Baseline - Required by FTA)



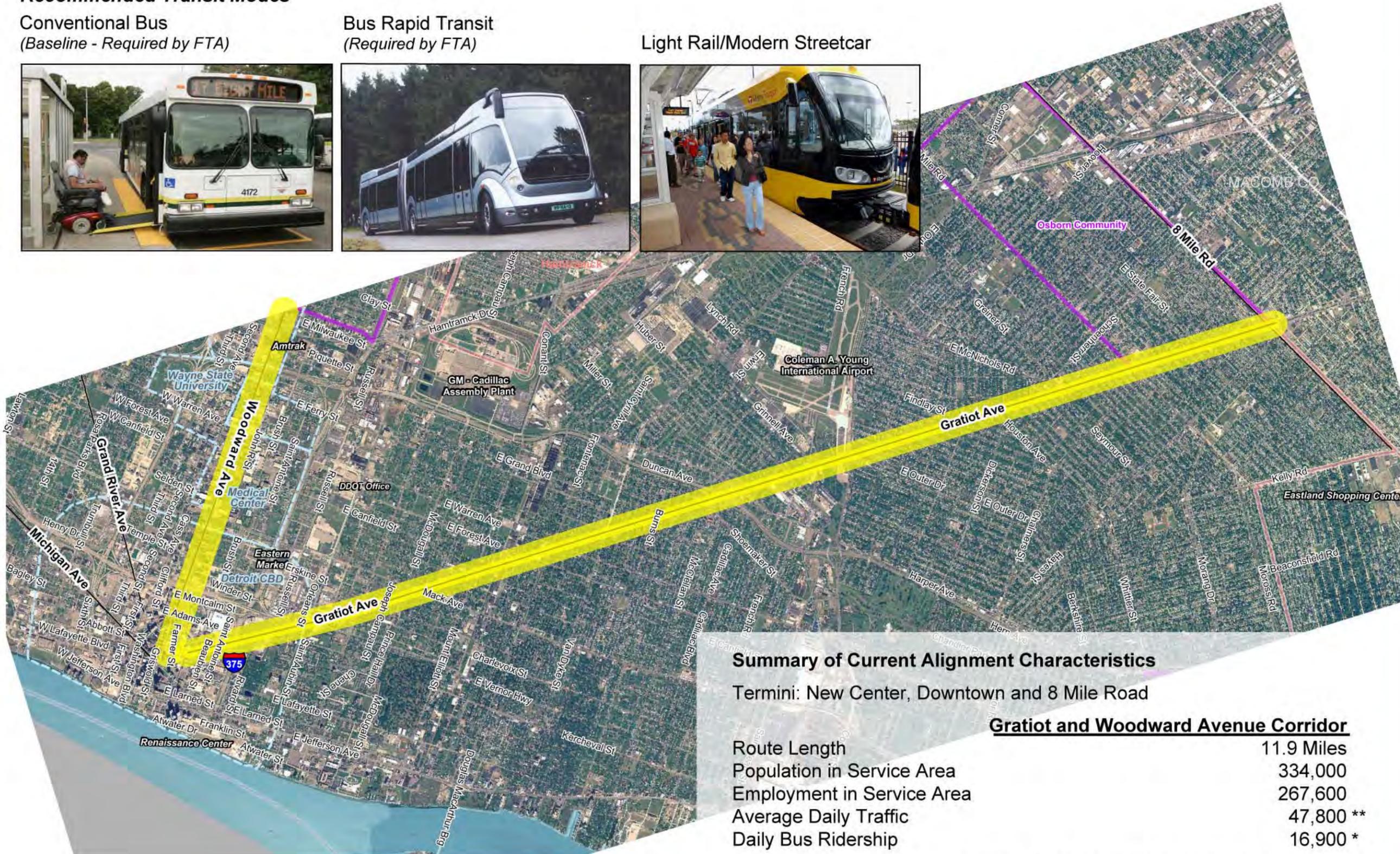
Bus Rapid Transit  
(Required by FTA)



Light Rail/Modern Streetcar



Figure 7-1  
**Recommended Alternative for Gratiot Avenue**



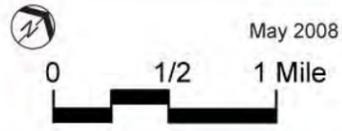
**Summary of Current Alignment Characteristics**

Termini: New Center, Downtown and 8 Mile Road

**Gratiot and Woodward Avenue Corridor**

Route Length	11.9 Miles
Population in Service Area	334,000
Employment in Service Area	267,600
Average Daily Traffic	47,800 **
Daily Bus Ridership	16,900 *

Source: SEMCOG & U.S. Census Bureau \* Does not reflect traffic/ridership on Woodward Ave. \*\* Excluding I-94, where there are no current traffic counts available..



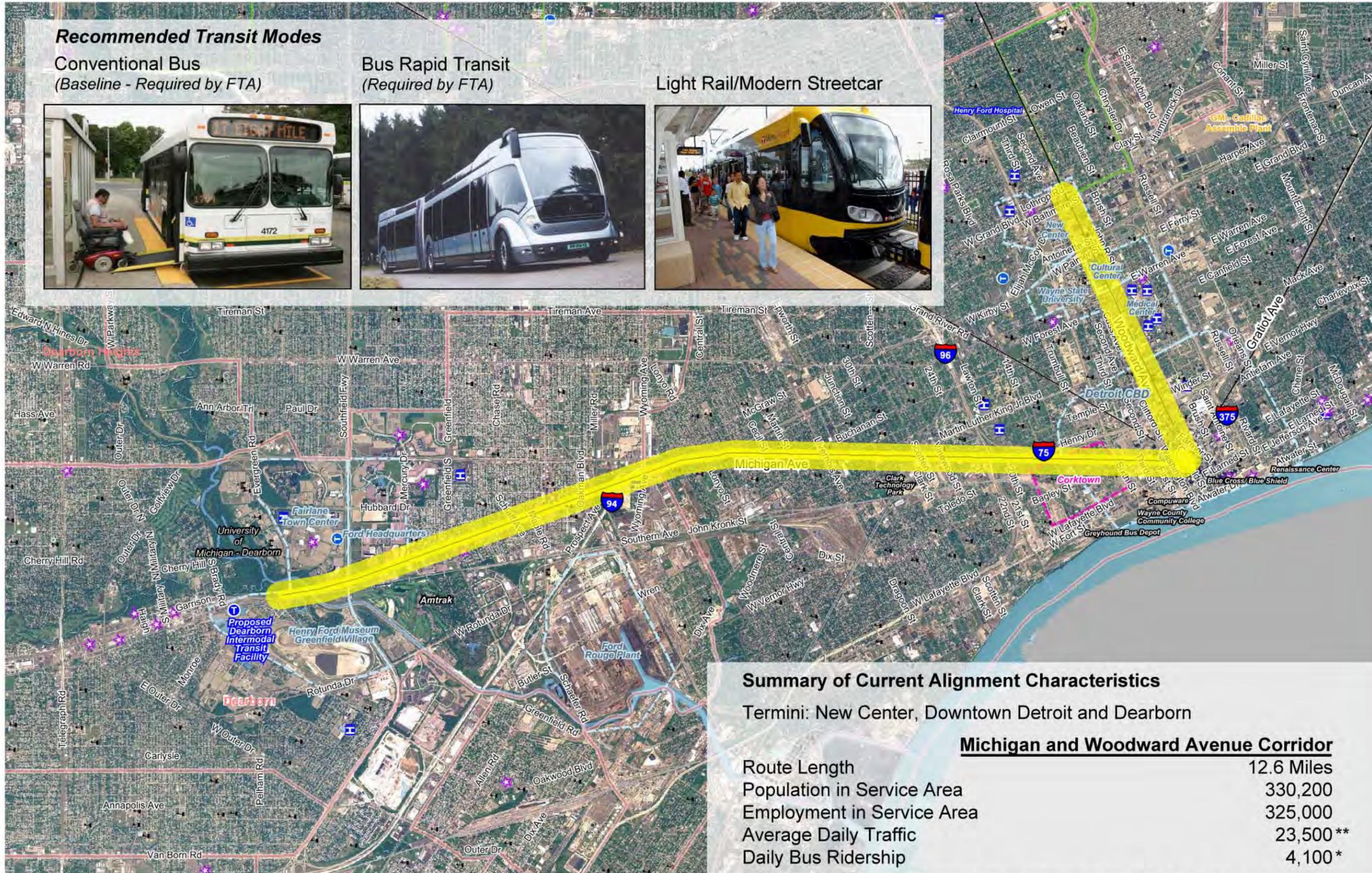
**Recommended Alternative for Michigan Avenue**

**Recommended Transit Modes**

Conventional Bus  
(Baseline - Required by FTA)

Bus Rapid Transit  
(Required by FTA)

Light Rail/Modern Streetcar



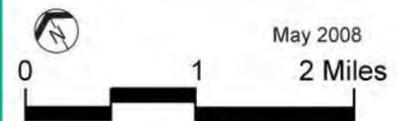
**Summary of Current Alignment Characteristics**

Termini: New Center, Downtown Detroit and Dearborn

**Michigan and Woodward Avenue Corridor**

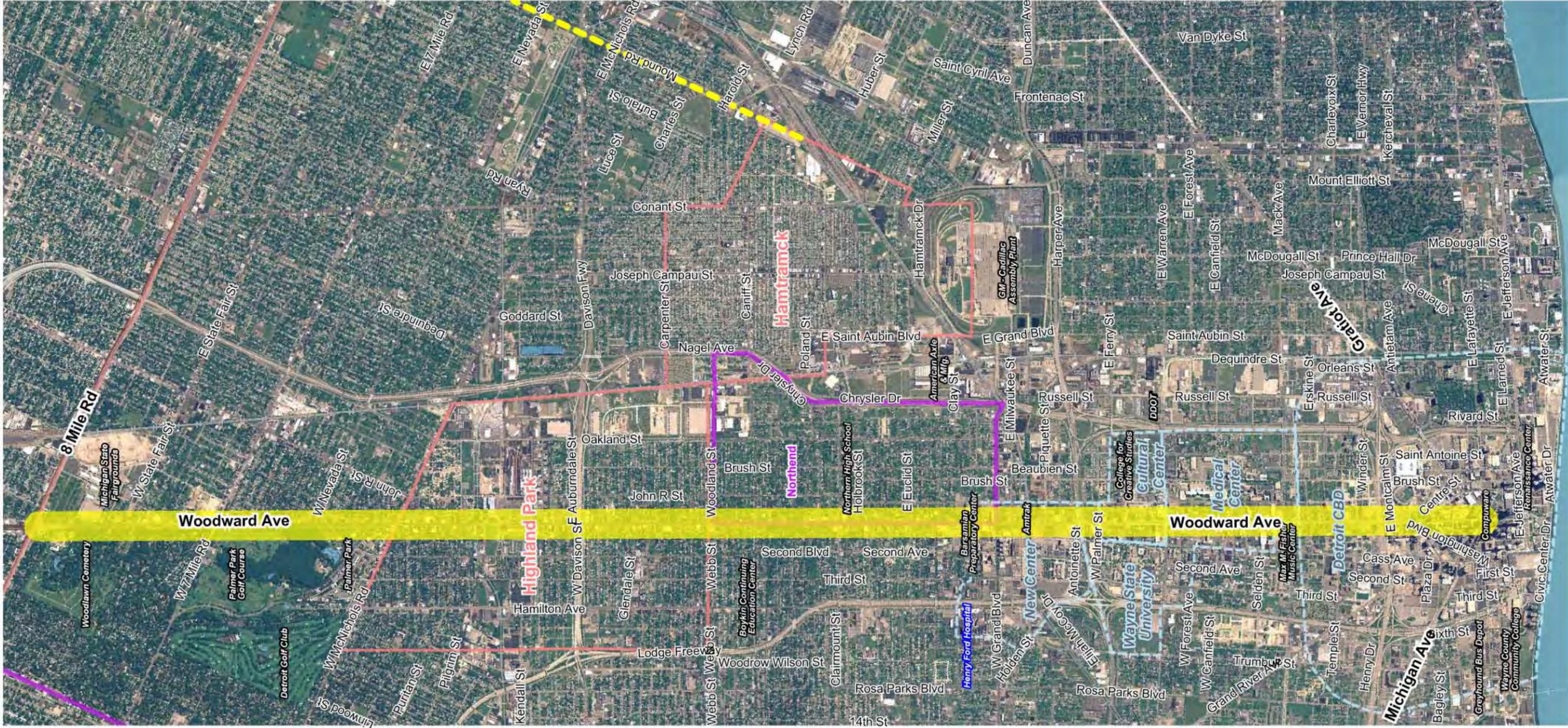
Route Length	12.6 Miles
Population in Service Area	330,200
Employment in Service Area	325,000
Average Daily Traffic	23,500**
Daily Bus Ridership	4,100*

Source: SEMCOG & U.S. Census Bureau \* Does not reflect traffic/ridership on Woodward Ave. \*\* Excluding I-94, where there are no current traffic counts available.



DETROIT TRANSIT  
Options for Growth Study





**Summary of Current Alignment Characteristics**

Termini: Downtown and 8 Mile Road	
Route Length	8.5 Miles
Population in Service Area	273,200
Employment in Service Area	261,900
Average Daily Traffic	24,600
Daily Bus Ridership (DDOT and SMART)	22,400

Mound Road retained for future potential refinement of Woodward Avenue alignment.

**Recommended Transit Modes**

**Conventional Bus**  
(Baseline - Required by FTA)



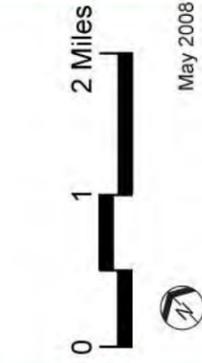
**Bus Rapid Transit**  
(Required by FTA)



**Light Rail/Modern Streetcar**



Figure 7-3  
Recommended Alternative for Woodward Avenue



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## **7.2 Existing Conditions**

An understanding of existing conditions within the area surrounding Gratiot, Michigan and Woodward Avenues helped in determining feasible approaches to implement the various alternatives under consideration in the DTOGS project. This description of existing conditions was organized by alignment, with subsections on characteristics such as roadway geometry, traffic control, land use, right-of-way width, and other transportation-related descriptors.

### **7.2.1 Gratiot Avenue**

Gratiot Avenue (M-3) extends from the Detroit Central Business District (CBD) to Eight Mile Road, a distance of approximately 9 miles. The designated two-mile buffer defined for the Gratiot Corridor in Screen 2 includes many adjacent neighborhoods, but no roadways in the surrounding areas run parallel to Gratiot Avenue. Gratiot Avenue is moderately-traveled, and appears to be oriented primarily to local traffic. Interstate 94 is close by and serves longer-distance travelers and commuters from outlying areas. Gratiot Avenue connects with Michigan and Woodward Avenues in downtown Detroit and with Eight Mile Road to the north.

#### **Current Cross-Section**

Beginning at Eight Mile Road, the northern portion of Gratiot Avenue is striped as three general purpose lanes in each direction, with a two-way center left turn lane (replaced by a left turn lane at major intersections). In addition, on-street parallel parking is available in both directions along the curb in most areas. Although parking spaces are typically not striped, the outside travel lanes are very wide (approximately 20 feet in width), effectively functioning as a travel lane next to a parking lane. South of I-94, the parking lanes generally are separated from the travel lanes by a standard skip stripe, although individual spaces are not designated. Other travel lanes throughout Gratiot Avenue have a standard width of approximately 12 feet. Standard sidewalks generally are located on both sides of the roadway. In some areas, a planted buffer strip separates the sidewalk from the curb; in other areas, the buffer strip has been paved and functions as a widened sidewalk.

As Gratiot Avenue enters downtown Detroit, a streetscape project has modified the cross-section to include a wide landscaped median. Two travel lanes are available in each direction, with an additional outside lane in each direction designated for parking. During peak periods, parking is prohibited in the outside lane, making a third lane available to through traffic. There are few left turn pockets along this stretch of roadway; therefore, left turns are prohibited at most intersections.

### Other Roadway Characteristics

The speed limit is generally 35 mph along the corridor, although vehicles often travel somewhat faster. The large capacity of the roadway enables smooth-flowing traffic conditions during most time periods, with very little congestion. Traffic signals are spaced between three-quarter and one mile apart, slowing traffic only periodically. Due to the commercial-oriented land use, there are numerous driveways along the corridor. The close spacing of the blocks also results in many intersecting streets (though most intersections are unsignalized, and most side streets have low traffic volumes).

An interchange is located at the intersection of Gratiot Avenue and I-94, and all other roadway intersections are at-grade (a bridge crosses over I-375 as Gratiot Avenue enters downtown, but there is no interchange).

### Transit Service

The DDOT trunk route currently operating on Gratiot Avenue is Route 34. Weekday service hours are generally between 4:00 AM and 3:00 AM. Peak headway is 12 minutes.

## Engineering Obstacles

The engineering obstacles that would need to be addressed to provide high-capacity transit service along Gratiot Avenue are relatively limited in number and scope. There are few overpasses, no underpasses, and only one at-grade rail crossing. However, this list is not intended to be all-inclusive of every possible physical constraint, and the issues discussed below vary in complexity. Nevertheless, this narrative is indicative of the major engineering issues that should be considered for screening purposes.

- **Overpasses and Underpasses**

There are several overpasses along Gratiot Avenue. Most overpasses appear to be in good condition, but a more detailed assessment will be needed to determine the level of retrofitting that would be needed for each one to accommodate a fixed guideway for transit. The overpasses along Gratiot Avenue are comprised of a single bridge stretching across the entire roadway. If a fixed guideway transit facility does not utilize a lane on existing bridges (likely requiring a current traffic lane to be rededicated to transit purposes only), then new bridges would need to be constructed to carry the transit facility.

The existing overpasses on Gratiot Avenue are as follows, listed from north to south along the corridor:

- Bridge over I-94 (Edsel Ford Freeway)
- Bridge over railroad corridor between St. Aubin Street and Fisher Freeway
- Bridge over I-375.

No underpasses are present along the Gratiot Avenue corridor, eliminating any possible obstacles due to overhead clearance restrictions.

- **At-Grade Railroad Crossings**

A railroad track crosses the corridor at grade at one location (a single-track crossing between Conner Street and French Road, adjacent to the Coleman A. Young International Airport). This crossing is an important consideration because the situation of rail tracks crossing at grade is extremely undesirable from the standpoints

of both the freight operator and the transit operator. This crossing appears to be well-utilized, and crossing a heavily used freight track at grade with a rail-based transit line would be impossible for safety reasons, in addition to potential schedule adherence issues that would result from conflicting train traffic. In fact, during field review of the corridor, the railroad crossing arms were down and the lights were flashing. However, when automobile traffic did not see an on-coming train, vehicles began driving around the lowered gates.

Safety is a particular concern at this crossing due to limited sight distance. The freight rail line has a significant curve within 500 feet of the grade crossing, making it extremely difficult for automobile and transit traffic on Gratiot Avenue to see an on-coming freight train. Therefore, if rail-based transit were implemented on Gratiot Avenue, a grade separation would be required. Most likely, the transit line would be carried over the existing freight line on a newly-constructed bridge. The expense of such a bridge would be significant, and is a major consideration. The bridge structure itself may also hinder access to adjacent properties.

- **Other Structures**

With regard to potential utilities conflicts, no formal assessment of utility locations has been conducted. However, a field review of Gratiot Avenue indicates a significant number of manholes in the curb lane of the roadway, indicating that there could be major utility relocation needs if a curb-running alignment were to be chosen (manholes were also present in other lanes of the roadway as well). No other major conflicts due to structures were observed.

- **Traffic Issues**

Several traffic issues present potential transit hurdles. The existing roadway infrastructure presents problems primarily for alignments operating along the curb side of the roadway. Along the curb, the numerous driveways and on-street parking present challenges for the efficient and safe operation of transit. Cars turning in and out of closely-spaced driveways hinder transit speed, and have more opportunities for collisions with a transit vehicle. Furthermore, locating transit stations is difficult in areas with many curb cuts. It is likely that a number of driveways would be recommended for closure if a curb-running alignment were selected.

On the other hand, a median-running alignment would present relatively few traffic concerns. Transit stations could be located in new protected medians in the existing two-way center left turn lane, which could have streetscape benefits as well (similar to the planted medians in the streetscape-improved section in the downtown area). Transit vehicles could then operate in the inside travel lanes. Taking a lane away from automobiles is usually not a popular idea with motorists, and may not be politically feasible. However, with three lanes in each direction, it is likely that one lane in each direction could be used for transit without a significant impact on vehicular level of service in the corridor (traffic analyses would need to be conducted to confirm the impacts of “taking a lane”). In fact, the newly streetscape-improved portion of Gratiot Avenue appears to operate well with two travel lanes (plus a parking lane) in each direction. This same situation could be created along other portions of the corridor, with a dedicated median transit lane.

Left turns for vehicles across transit tracks operating in a median alignment could present safety concerns, due to the conflict points between automobiles and transit vehicles. However, this concern is not unique to Gratiot Avenue, and has been addressed through a variety of design treatments and safety programs in other cities with similar situations.

- Safety Concerns

The issue of potential conflicts between median-running transit vehicles and left-turning automobiles was noted above. Other safety concerns are relatively minor. Pedestrian access to a median-running alignment could be a concern, depending on whether two or three lanes of through traffic are maintained with the high-capacity transit service. Fortunately, traffic does not move as fast as on Woodward Avenue north of McNichols Road, and crossing two lanes of traffic (plus a parking lane) is not unusual. Crossing three lanes of traffic may cause some concern, but remains manageable if appropriate safety treatments (including pedestrian signals) are in place.

## Potential Transit Corridor Characteristics

- Logical End Points

As stated earlier, the corridor is defined as extending from downtown Detroit to Eight Mile Road. Downtown Detroit, as the most significant regional destination, provides a logical terminus on the south end of the corridor. On the north end, the corridor could end at Eight Mile Road, if the Eight Mile Road transit corridor is in place. This connection would enable patrons to transfer between the two transit corridors. However, if the Eight Mile corridor is not implemented, there is no obvious anchor at the northern end of the corridor. In this case, the Gratiot corridor could be extended along Eight Mile Road approximately 1.5 miles to the east, to terminate at the Eastland Center shopping center.

Although this corridor does have a strong anchor (downtown Detroit) at one end of the corridor, it is not particularly well-suited for a phased implementation. There is no major destination along the corridor that would serve as a logical terminus for a shorter initial phase of operation. Furthermore, if the Eight Mile Road transit corridor has been implemented, it would be desirable to implement the entire Gratiot Avenue corridor to enable connections between the alignments, rather than terminate the service prior to reaching Eight Mile Road. From a system planning perspective, although the corridor does terminate in downtown Detroit, the lack of a strong anchor elsewhere along the corridor prohibits it from being a good candidate for early implementation.

- Potential Station Locations

The locations of potential transit stations are highly dependent on the type of transit technology that is ultimately selected. Bus rapid transit generally has stations located approximately one-quarter mile apart, while LRT stations typically are spaced around one-half mile apart.

In general, stations should be located near major intersections along the Gratiot Avenue corridor. The highest levels of development (and thus the highest concentrations of trip generators and attractions) are typically located around major

intersections, and intersecting local bus routes run along principal arterials (enabling transfer opportunities at key intersections).

Stations should also be located directly at primary trip generators, such as large housing concentrations, medical facilities, and shopping centers. Interim stations between major intersections and key destinations (spaced appropriately for the type of transit technology) would serve customers destined for other commercial / industrial establishments or nearby residential neighborhoods.

Although there is a significant level of development along the corridor, there are few major barriers from the standpoint of locating stations. The scale of the stations varies significantly depending on the transit technology; for example, a light rail platform (approximately 200 feet long) would require more space than a BRT platform (approximately 60 feet long). For a curbside transit alignment, some right-of-way acquisition could be necessary, but this situation is no different than that of most other established commercial corridors.

- Possible Maintenance Facility Locations

There are very few impediments to locating a maintenance facility directly along the alignment. Many vacant and/or underutilized parcels are available, and the commercial/industrial nature of the corridor is well-suited to the siting of a maintenance facility.

### Existing Land Use

Land uses along Gratiot Avenue are the most consistent of the three proposed DTOGS alignments, as the alignment is generally surrounded by uninterrupted swaths of single-family residential districts. The alignment is located entirely within the City of Detroit.

Retail and commercial uses directly along Gratiot Avenue are generally more auto-oriented than on Michigan and Woodward Avenues. The existing business mix includes a large proportion of fast food restaurants, gas stations, and drive-up banks and pharmacies.

The northern end of the Gratiot alignment between Seven Mile and Eight Mile Roads feature the most active commercial uses along Gratiot, possibly a reflection of the fact that it is bordered by the relatively stable, intact neighborhoods at the northern edge of the City.

The Coleman A. Young International Airport is located at the intersection of Conner Avenue and Gratiot. Until recently, this airport was used for limited commercial passenger service, but is currently utilized almost exclusively for small-scale personal crafts, charter flights, and other general aviation uses.

The areas around Gratiot Avenue between the Airport and the Fisher Freeway (I-75) have experienced major residential demolition and abandonment. These patterns of population and density decline are projected to continue, and create a difficult environment for new real estate development and redevelopment. This is largely reflected in the state of the commercial alignment through this area.

Nearer to downtown, Gratiot passes close by numerous major activity centers, including the Eastern Market and Ford Field (each are within the Russell Street station area). The Eastern Market and the adjacent blocks feature a collection of food vendors and restaurants. The market itself is currently undergoing a redevelopment project intended to upgrade the space for businesses and consumers.

### Existing Zoning

Gratiot alignment is generally B4 (General Businesses District) with R1-R3 (Low Density Residential) within a half-mile. Near Russell Street and Chene Street, there is a broader mix of zoning districts including; B6 (General Service District), M2 (Restricted Industrial District), R4-R5 (Medium Density Residential), R6 (High Density Residential) and PD (Planned Development District). At the Mt. Elliott Street and Conner Street, industrial corridors intersect with Gratiot. There, zoning includes M4 (Intensive Industrial District) and M3 (General Industrial District). There is limited R4-R5 near Warren Avenue, B3 (Shopping District) near Seven Mile Road, and P1 (Open Parking District) near Eight Mile Road.

The existing zoning along Gratiot Avenue is similar to Michigan Avenue in that it would need to be modified to support transit oriented development (TOD). **Appendix G** presents detailed information on the preceding zoning categories and the allowances for density, setbacks and parking.

## **7.2.2 Michigan Avenue**

The Michigan Avenue alignment (U.S. Highway 12) under consideration as part of the DTOGS project extends from the Detroit CBD to the west in Dearborn, near Evergreen Road, for a distance of approximately 9 miles. Parallel routes to Michigan Avenue include I-94, Warren Avenue and several other relatively smaller, collector-type roadways. Michigan Avenue is moderately-traveled east of I-94, and becomes heavily traveled in east Dearborn, particularly where the roadway narrows to 100-foot wide right-of-way. West of Greenfield Road, Michigan Avenue becomes a divided expressway, with interchanges at Greenfield Road and Southfield Freeway. West of Southfield Freeway, Michigan Avenue transitions back to a four-lane roadway with on-street parking. Michigan Avenue connects with Gratiot and Woodward Avenues in downtown Detroit.

### **Current Cross-Section**

West of downtown Detroit, Michigan Avenue is a six-lane, two-way roadway with on-street parking and a two-way center left turn lane that is replaced by a left turn lane at major intersections. A high-occupancy vehicle (HOV) lane has been recently added to this segment of Michigan Avenue as well. Moreover, on-street parallel parking is available in both directions along the curb in most areas. Although parking spaces are typically not striped, the outside travel lanes are wide, effectively functioning as a travel lane next to a parking lane. Parking lanes are generally not separated by striping from travel lanes, nor are individual parking spaces designated, except in East Dearborn. Other travel lanes throughout Michigan Avenue generally have a standard width of approximately 12 feet, widening slightly in Dearborn west of Greenfield Road where the roadway becomes a divided expressway. Standard sidewalks are also generally located on both sides of Michigan Avenue. In East Dearborn, sidewalks are wider and include areas for landscaping and planting.

Additionally, as Michigan Avenue enters East Dearborn (west of I-94), a streetscape project has modified the cross-section to include two lanes of traffic, wider sidewalks and striped on-street parking. This segment of Michigan Avenue narrows from 120 feet to 100 feet right-of-way. It widens again to approximately 204 feet west of Greenfield Road and on-street parking is no longer available due to higher speeds on this segment of the road. The segment of Michigan Avenue between Livernois Street and Wyoming Street in Detroit also has 100 feet of right-of-way. Left turns on Michigan Avenue west of Greenfield Road are provided indirectly, using a “Michigan left” configuration (U-turn then a right turn).

### Other Roadway Characteristics

The speed limit is generally 35 mph between downtown Detroit and East Dearborn, and 45 mph west of Greenfield Road. With the exception of the four-lane segment in East Dearborn, traffic conditions during most time periods are smooth-flowing. Traffic signals are spaced between one-half and one mile apart, slowing traffic periodically. Truck traffic is considerable in the vicinity of the I-94 interchange because of significant industrial uses south of Michigan Avenue in this area. Cross streets and driveways along the avenue are also frequent, and although most intersections are unsignalized, most of these side streets and driveways have low traffic volumes.

Interchanges along Michigan Avenue are located at the Fisher Freeway (I-75), I-94, Greenfield Road and Southfield Freeway. There is a bridge over the Lodge Freeway, but no interchange. All other roadway intersections are at-grade.

### Transit Service

The DDOT trunk route currently operating on Michigan Avenue is Route 37. Weekday service hours are generally between 5:00 AM and 2:00 AM. Peak headway is 30 minutes.

## Engineering Obstacles

The engineering obstacles that would need to be addressed to provide high-capacity transit service along Michigan Avenue are numerous. There are several overpasses with railroad tracks and roadways. The following list is not intended to be all-inclusive of every possible physical constraint, and the issues discussed below vary in complexity. Nevertheless, this narrative is indicative of the major engineering issues that should be considered for the purpose of evaluation.

- **Overpasses and Underpasses**

There are several overpasses along Michigan Avenue. Most overpasses appear to be in good condition, but a more detailed assessment will be needed to determine the level of retrofitting that would be needed for each one to accommodate a fixed guideway for transit. The overpasses along Michigan Avenue are comprised of one to two structures (one per direction) across a roadway. If a fixed guideway transit facility does not utilize a lane on existing bridges (likely requiring a current traffic lane to be rededicated to transit purposes only), then new bridges would need to be constructed to carry the transit facility.

The existing overpasses on Michigan Avenue are as follows, listed from east to west along the corridor:

- Bridge over the Lodge Freeway (M-10) – Single structure
- Bridge over Fisher Freeway (I-75) – Single structure
- Bridge over I-94 – Single structure
- Bridge over Southfield Freeway (M-39) – Two structures
- Bridge over Rouge River – Two structures.

The existing underpasses on Michigan Avenue are as follows, listed from east to west along the corridor, with potential height restrictions since the existing underclearances range between 13.5 feet to 14.5 feet:

- Railroad bridge between Hubbard and Scotten Streets
  - Scotten Street bridge
  - Railroad bridge between Scotten and Lovett Streets
  - Railroad bridge between I-94 and Miller Street
  - Greenfield Road bridge.
- Other Structures

With regard to potential utilities conflicts, no formal assessment of utility locations has been conducted. However, a field review of Michigan Avenue indicates a significant number of manholes in the curb lane of the roadway, indicating that there could be major utility relocation needs if a curb-running alignment were to be chosen (manholes were also present in other lanes of the roadway as well). No other major conflicts due to structures were observed.

Feedback from MDOT staff indicated major utility relocation was entailed as part of the reconstruction of Michigan Avenue between Livernois and Wyoming Streets.

- Traffic Issues

Similar to Gratiot Avenue, several traffic issues present potential transit hurdles. The existing roadway infrastructure presents problems primarily for alignments operating along the curb side of the roadway. Along the curb, the numerous driveways and on-street parking present challenges for the efficient and safe operation of transit. Cars turning in and out of closely-spaced driveways hinder transit speed, and have more opportunities for collisions with a transit vehicle. Furthermore, locating transit stations is difficult in areas with many curb cuts. It is likely that a number of driveways would be recommended for closure if a curb-running alignment were to be selected.

On the other hand, a median-running alignment would present relatively few traffic concerns. Transit stations could be located in new protected medians in the existing two-way center left turn lane, which could have streetscape benefits as well (similar to the planted medians in the streetscape-improved section in the downtown area). Transit vehicles could then operate in the inside travel lanes. Taking a lane away from automobiles is usually not a popular idea with motorists, and may not be politically feasible. However, with three lanes in each direction, it is likely that one lane in each direction could be used for transit without a significant impact on vehicular level of service in the corridor (traffic analyses would need to be conducted to confirm the impacts of “taking a lane”).

The segments of Michigan Avenue with 100-foot wide right-of-way may present difficulties in accommodating a transit guideway, two lanes of traffic, parking, sidewalks and a transit station. This condition – as previously stated – currently exists between Livernois and Wyoming Streets in Detroit, and in East Dearborn.

Left turns for vehicles across transit tracks operating in a median alignment could present safety concerns, due to the conflict points between automobiles and transit vehicles. However, this concern is not unique to Michigan Avenue, and has been addressed through a variety of design treatments and safety programs in other cities with similar situations. “Michigan left” turns on Michigan Avenue west of Greenfield Road would have to be reconfigured to accommodate a transitway and preserve access to adjacent land uses.

- Safety Concerns

The issue of potential conflicts between median-running transit vehicles and left-turning automobiles was noted above. Other safety concerns are relatively minor. Pedestrian access to a median-running alignment could be a concern, depending on whether two or three lanes of through traffic are maintained with the high-capacity transit service. Care should be taken in maintaining pedestrian access on the segment of the Avenue west of Greenfield Road, where the speed limit is 45 mph, the roadway is divided and has six to eight lanes of traffic.

## Potential Transit Corridor Characteristics

- Logical End Points

The Michigan Avenue alignment is defined as extending from downtown Detroit to Dearborn immediately west of Evergreen Road. It also includes the segment of Woodward Avenue between downtown Detroit and Grand Boulevard to the north. To the west, the logical terminus appears to be between Elm Road and Evergreen Road, where an existing parking lot on the south side of the avenue is planned for construction of a new multimodal facility. The multimodal facility would include the relocated Amtrak station currently behind the Dearborn Community and Performing Arts Center (east of the Southfield Freeway interchange), bus bays and a park-and-ride facility.

Although this alignment has strong anchors between downtown Detroit and Dearborn, it is not particularly suited for a phased implementation. There is no major destination along the corridor that would serve as a logical terminus for a shorter initial phase of operation. A park-and-ride facility west of I-94 might be desirable; however, Dearborn has a potentially high transit market that could yield significantly higher ridership. From a system planning perspective, although the corridor does terminate in downtown Detroit, the lack of a strong anchor between downtown and Dearborn prohibits it from being a suitable candidate for early implementation.

- Potential Station Locations

The locations of potential transit stations are highly dependent on the type of transit technology that is ultimately selected. Bus rapid transit generally has stations located approximately one-quarter mile apart, while light rail stations typically are spaced around one-half mile apart.

In general, stations should be located near major intersections along the Michigan Avenue alignment. The highest intensity of development (and thus the highest concentrations of trip generators and attractions) is typically located around major intersections, and intersecting local bus routes run along principal arterials (facilitating transfer opportunities at key intersections).

Stations should also be located directly at primary trip generators, such as large housing concentrations, medical facilities, and shopping centers. Interim stations between major intersections and key destinations (spaced appropriately for the type of transit technology) would serve customers destined for other commercial / industrial establishments or nearby residential neighborhoods.

There are few major barriers from the standpoint of locating stations. The scale of the stations varies significantly depending on the transit technology; for example, a light rail station platform (approximately 200 feet long) would require more space than a BRT platform (approximately 60 feet long). For a curbside transit alignment, some right-of-way acquisition could be necessary, but this situation is no different than that of most other established commercial corridors.

- Possible Maintenance Facility Locations

There are very few impediments to locating a maintenance facility directly along the alignment. Many vacant and/or underutilized parcels are available, and the commercial/industrial nature of the corridor is well-suited to the siting of a maintenance facility.

### Existing Land Use

The area surrounding Michigan Avenue currently contains a mixture of commercial and industrial uses. The following describes land use character and trends along the alignment.

The western end of Michigan Avenue is located in the City of Dearborn, a historic suburb best known as the headquarters of the Ford Motor Company. The city has been experiencing growth in population, largely driven by an influx of Middle-Eastern and Arab immigrants.

The Dearborn portion of the alignment primarily features adjacent auto-oriented retail uses and suburban-style office parks and civic complexes. A major regional shopping center, Fairlane Towne Center, is located near the intersection of Michigan Avenue and the Southfield Freeway (M-39).

The most concentrated residential area of Dearborn is located around the intersection of Michigan Avenue and Schaefer Road. This intersection of two major commercial corridors includes a set of pedestrian-oriented commercial uses, with vacant sites offering development potential.

Unlike much of the rest of Detroit, the areas of southwest Detroit adjacent to Michigan Avenue have experienced an increase in population. The primary areas of growth have been along Vernor Highway, where an influx of Hispanic residents have settled, and in the westernmost portion of the City adjacent to Dearborn. In Detroit, high concentrations of population are located near the proposed Central and Livernois stations. In Dearborn, a high concentration of population is located adjacent to the proposed Schaefer Road station.

The most active commercial and retail area in the Detroit portion lies between Central and Livernois, and then at the eastern end of the alignment in Corktown. These areas retain numerous older, pedestrian-oriented structures.

Industrial areas are located throughout the Michigan alignment, including along a rail right-of-way that parallels the street to the south. Major industrial areas along the alignment include the Clark Street Technology Park and the area near the border of Detroit and Dearborn around Wyoming Avenue.

The Clark Street Technology Park is located on the site of the former Cadillac Motor Division factory. It is part of an Empowerment Zone for the City, and zoned M-4 Industrial District. The 72-acre site was cleared to resemble suburban industrial park setting, with major targeted tenants being suppliers to the auto industry. Current tenants include: Federal Express, Ameritech, Hispanic Manufacturing Center, MPS Group, Piston Automotive, and Vitec.

The historic Corktown neighborhood lies at the far east end of the Michigan alignment. This residential area features an active street corridor along Michigan Avenue, a legacy of former Tiger Stadium. This stable neighborhood has experienced some development and redevelopment activity in recent years.

## Existing Zoning

The Michigan Avenue alignment between Dearborn and the downtown area is generally zoned B4 (General Businesses District). The B4 zoning allows for “thoroughfare-oriented” uses “which may benefit by drawing part of their clientele from passing traffic” There are also small pockets of M4 (Intensive Industrial) and B3 (Shopping District). Within a half mile of the alignment, the zoning is generally R1-R3 Low Density Residential and some large parcels zoned M4. Livernois Avenue, another B4 zoned corridor, intersects Michigan at the proposed Livernois station. Just east of the Rosa Parks Station is an area zoned B4 (in the Corktown neighborhood). Due to a mix of auto-oriented and low density residential districts, the existing zoning would need to be modified to support transit oriented development.

The zoning ordinance of the City of Dearborn generally includes a number of business district zoning types along the Michigan Avenue corridor, including B-A Local Business District (low-intensity uses serving the surrounding residents), B-B Community Business District (auto-oriented commercial development), B-C General Business District (more intensive, larger-scale auto-oriented commercial development), and B-D Downtown Business District (pedestrian-oriented mixed-use district with retail, office and residential).

The B-D zoning functions as an overlay district located in the two downtown areas (East and West) centered on Michigan Avenue. These districts are part of the Schaefer Road and Greenfield Village station areas, respectively. The B-D zoning district builds on the requirements of the underlying zoning categories, adding a set of more stringent development standards, sign regulations, parking requirements, and architectural standards. A special Design Review Committee is in place to review signage and building designs for construction activity in the two B-D designated areas.

The B-C zoning category is prevalent for the parcels along Michigan Avenue between the two downtown districts. This zoning matches the existing large-site, auto-oriented nature of this portion of the corridor.

### **7.2.3 Woodward Avenue**

Woodward Avenue (M-1) within Wayne County limits extends from the Detroit CBD to Eight Mile Road, a distance of approximately 8.5 miles. The designated two-mile buffer defined for the Woodward Avenue corridor in Screen 2 includes many adjacent neighborhoods and parallel roadways to Woodward Avenue, such as I-75, the Lodge Freeway, John R, Cass Street, and Second Street among others. Woodward Avenue is a main thoroughfare, functioning as an alternate route to I-75 and the Lodge Freeway. Woodward Avenue connects with Gratiot and Michigan Avenues in downtown Detroit.

#### Existing Transportation

The Woodward Avenue corridor extends from downtown Detroit to Eight Mile Road, for a distance of approximately 8.5 miles. Parallel routes to Woodward Avenue include I-75, John R, Cass Street and several other relatively smaller, collector-type roadways. As a main north-south thoroughfare between Detroit, Highland Park, Hamtramck and cities north of the Wayne County/Oakland County limits, Woodward Avenue is heavily traveled. North of McNichols Road, Woodward Avenue becomes a divided expressway, with an interchange at Eight Mile Road. Woodward Avenue connects with Gratiot and Michigan Avenues in downtown Detroit.

#### Current Cross-Section

North of downtown Detroit, Woodward Avenue is a six-lane, two-way roadway with on-street parking and a two-way center left turn lane that is replaced by a left turn lane at major intersections. Left turns on Woodward Avenue north of McNichols Road are provided indirectly, using a “Michigan left” configuration (U-turn then a right turn). Woodward Avenue narrows down from 120 feet of right-of-way to 100 feet between Grand Boulevard and Manchester Street, with four lanes of traffic and on-street parking on both sides. Between Manchester Street and McNichols Road, the avenue widens again to 120 feet. North of McNichols Road, Woodward Avenue becomes a divided expressway with generally three to four lanes of traffic in each direction and on-street parking.

On-street parallel parking is available in both directions along the curb in most areas. Although parking spaces are typically not striped, the outside travel lanes are wide, effectively functioning as a travel lane next to a parking lane. Parking lanes are generally not separated by striping from travel lanes, nor are individual parking spaces designated. Travel

lanes throughout Woodward Avenue generally have a standard width of approximately 12 feet, widening slightly north of McNichols Road where the roadway becomes a divided expressway.

Standard sidewalks are generally located on both sides of Woodward Avenue. In downtown Detroit beginning at Comerica Park and the Fox Theatre, sidewalks are wider and include areas for landscaping and planting.

### Other Roadway Characteristics

The speed limit is generally 35 mph between downtown Detroit and McNichols Road, and 45 mph north of McNichols Road. With the exception of the four-lane segment between Grand Boulevard and Manchester Street, traffic conditions during most time periods are smooth-flowing. Traffic signals are spaced between one-half and one mile apart, slowing traffic periodically. Cross streets and driveways along the avenue are also frequent, and many side streets and driveways have medium to high traffic volumes, because of the high concentration of residents and employees in the area.

There are no direct interchanges along Woodward Avenue. There are bridges over the Fisher Freeway, Edsel Freeway (I-94) and Davison Freeway, but no interchange. Actual freeway access is provided through the north and south service roads. All other roadway intersections are at-grade.

### Transit Service

The DDOT trunk route currently operating on Woodward Avenue is Route 53. Weekday service hours are generally between 4:00 AM and 3:00 AM. Peak headway is eight minutes.

### Engineering Obstacles

There are some engineering obstacles that would need to be addressed to provide high-capacity transit service along Woodward Avenue. There are two railroad underpasses and three freeway overpasses. The following list is not intended to be all-inclusive of every possible physical constraint, and the issues discussed below vary in complexity. Nevertheless, this narrative is indicative of the major engineering issues that should be considered for the purpose of evaluation.

- **Overpasses and Underpasses**

There are three overpasses along Woodward Avenue. Most overpasses appear to be in good condition, but a more detailed assessment will be needed to determine the level of retrofitting that would be needed for each one to accommodate a fixed guideway for transit. The overpasses along Woodward Avenue are comprised of one structure across a roadway. If a fixed guideway transit facility does not utilize a lane on existing bridges (likely requiring a current traffic lane to be rededicated to transit purposes only), then new bridges would need to be constructed to carry the transit facility.

The existing overpasses on Woodward Avenue are as follows, listed from south to north along the corridor:

- Bridge over Fisher Freeway
- Bridge over Edsel Freeway
- Bridge over Davison Freeway.

The existing underpasses on Woodward Avenue are as follows, listed from south to north along the corridor, with potential height restrictions since the existing underclearances range between 13.5 feet to 14.5 feet:

- Railroad bridge near the Amtrak Station, between Endicott and Baltimore Streets (two structures)
- Railroad bridge between Midland and Bartlett Streets.

- **Other Structures**

With regard to potential utilities conflicts, no formal assessment of utility locations has been conducted. However, field review of Woodward Avenue indicates a significant number of manholes in both the curb and inside lanes of the roadway, indicating that there could be major utility relocation needs. Also given the age of the roadway relative to Michigan Avenue, it is likely that any rapid transit implementation within the right-of-way would entail major utility modifications.

- Traffic Issues

Similar to Gratiot and Michigan Avenues, several traffic issues present potential transit hurdles. The existing roadway infrastructure presents problems primarily for alignments operating along the curb side of the roadway. Along the curb, the numerous driveways and on-street parking present challenges for the efficient and safe operation of transit. Cars turning in and out of closely-spaced driveways hinder transit speed, and have more opportunities for collisions with a transit vehicle. Furthermore, locating transit stations is difficult in areas with many curb cuts. It is likely that a number of driveways would be recommended for closure if a curb-running alignment were to be selected.

On the other hand, a median-running alignment would present relatively few traffic concerns. Transit stations could be located in new protected medians in the existing two-way center left turn lane, which could have streetscape benefits as well (similar to the planted medians in the streetscape-improved section in the downtown area). Transit vehicles could then operate in the inside travel lanes. Taking a lane away from automobiles is usually not a popular idea with motorists, and may not be politically feasible. However, with three lanes in each direction, it is likely that one lane in each direction could be used for transit without a significant impact on vehicular level of service in the corridor (traffic analyses would need to be conducted to confirm the impacts of “taking a lane”).

The segment of Woodward Avenue with 100-foot wide right-of-way may present difficulties in accommodating a transit guideway, two lanes of traffic, parking, sidewalks and a transit station. This condition currently exists between Webb and Manchester Streets in Highland Park.

Left turns for vehicles across transit tracks operating in a median alignment could present safety concerns, due to the conflict points between automobiles and transit vehicles. However, this concern is not unique to Woodward Avenue, and has been addressed through a variety of design treatments and safety programs in other cities with similar situations. “Michigan left” turns on Woodward Avenue particularly north of McNichols Road would have to be reconfigured to accommodate a transitway and preserve access to adjacent land uses.

- Safety Concerns

The issue of potential conflicts between median-running transit vehicles and left-turning automobiles was noted above. Other safety concerns are relatively minor. Pedestrian access to a median-running alignment could be a concern, depending on whether two or three lanes of through traffic are maintained with the high-capacity transit service. Care should be taken in maintaining pedestrian access on the segment of Woodward Avenue north of McNichols Road, where the speed limit is 45 mph, the public right-of-way is 204 feet wide, and consists of a divided six to eight lane roadway with on-street parking.

### Potential Transit Corridor Characteristics

- Logical End Points

The Woodward Avenue alignment is defined as extending northward from downtown Detroit to Eight Mile Road, Wayne County's boundary with Oakland County. To the north, the logical terminus appears to be at or near Eight Mile Road, south of which is the Michigan State Fairgrounds and current site of DDOT's existing bus transfer facility.

The Woodward Avenue alignment has strong anchors between downtown Detroit, New Center, Highland Park, and Eight Mile Road. It appears suited for a phased implementation particularly if an extension into Oakland County is considered. Within DDOT's existing service area, anywhere on the segment of Woodward Avenue between McNichols Road and Eight Mile Road could likely accommodate a regional transit station (end-of-line facility). For example, Route 45 on Seven Mile Road currently has a significant volume of bus transfers to and from bus routes on Woodward Avenue.

- Potential Station Locations

The locations of potential transit stations are highly dependent on the type of transit technology that is ultimately selected. Bus rapid transit generally has stations located approximately one-quarter mile apart, while light rail stations typically are spaced around one-half mile apart.

In general, stations should be located near major intersections along the Michigan Avenue alignment. The highest levels of development (and thus the highest concentrations of trip generators and attractions) are typically located around major intersections, and intersecting local bus routes run along principal arterials (facilitating transfer opportunities at key intersections).

Stations should also be located directly at primary trip generators, such as large housing concentrations, medical facilities, and shopping centers. Interim stations between major intersections and key destinations (spaced appropriately for the type of transit technology) would serve customers destined for other commercial / industrial establishments or nearby residential neighborhoods.

There are few major barriers from the standpoint of locating stations. The scale of the stations varies significantly depending on the transit technology; for example, a light rail station platform (approximately 200 feet long) would require more space than a BRT platform (approximately 60 feet long). For a curbside transit alignment, some right-of-way acquisition could be necessary, but this situation is no different than that of most other established commercial corridors.

- Possible Maintenance Facility Locations

The former Ford Model T Plant on Woodward Avenue north of Manchester Street has been identified as a potential location of a yard and shop. The segment of Woodward Avenue north of McNichols Road on the east side might also have some potential sites for a maintenance facility.

### Existing Land Use

The Woodward Avenue alignment currently contains a mixture of commercial, institutional and residential uses. The following describes land use character and trends along the alignment.

The State Fairgrounds, a collection of open space, field houses, and parking areas, are located at the end of the line, near the northern boundary of the City of Detroit. A recent development plan is in place to transform a portion of the fairgrounds into a new 330,000-square-foot retail shopping center anchored by a JC Penney. The “Shoppes at Gateway Park” is currently scheduled to begin construction during 2008, and would become the largest shopping center located in the City of Detroit.

The northern portion of the alignment (north of Highland Park) is typified by low-density, suburban housing densities and a wide right-of-way arterial boulevard.

The Woodward alignment bisects the City of Highland Park, a once-thriving suburb and industrial center located within, but separate from, the City of Detroit. Highland Park has experienced significant economic decline and loss of population in recent years, but has recently enjoyed several retail and employment development projects along the corridor.

The 40,000-square-foot Shops at Woodward Place is due to open in summer 2008. This \$6 million retail development is being built on the former site of a Sears store, and will be anchored by an Aldi grocery store.

The former site of the Chrysler Group headquarters has become an industrial park called Oakland Park, and is now home to transportation and logistics users such as a Coca-Cola’s Metro Detroit Sales and Distribution Center. A new 200,000-square-foot distribution building is being developed by Stuart Frankel Development Company.

The New Center area, centered on Grand Boulevard, was the historic headquarters of General Motors, and retains a cluster of dense office and employment uses, highlighted by the historic Fisher Building and Cadillac Place.

The Midtown area is home to numerous Detroit institutions (WSU, DMC, the cultural district including the Detroit Institute of Arts, Public Library, and College for Creative Studies) and is one of the areas of the City experiencing an increase in population.

Lower Woodward is home to two major sports parks (Comerica Park, Ford Field) and an active entertainment and theater district.